For the latest products,
information, innovations and
solutions, go to
bannerengineering.com

P/N 178074

Banner Engineering Corp.
9714 Tenth Avenue North
Minneapolis, Minnesota 55441
763-544-3164 • 1-888-373-6767
www.bannerengineering.com

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

BANNER®

more sensors, more solutions



2014

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

The Complete Solution

Banner solves problems for most of the manufacturing companies in the Fortune 500, who rely on innovative automation solutions.

Banner products help manufacture the cars you drive, the TVs you watch, the food you eat, the medicine you take and virtually every product you consume. Whatever the industry, Banner has a solution to help you automate your plants, improve efficiency and manufacture quality products.

Sensors

- Presence
- Absence
- Inspection
- Gating
- Counting
- Measurement
- Position

Vision

- Pattern Recognition
- Complex Part Inspection
- Multi-Component Gauging
- Part ID/Orientation
- Assembly Verification
- Print Verification
- Traceability (Bar Code and Text)

Lighting & Indication

- Bin & Part Picking
- Error Proofing
- Pick-to-Light & Call for Parts
- Visual & Audible Indication
- Operator Guidance
- Andon Indication
- Pilot & Stack Light Replacement
- Visual Management

Wireless

- Process Control & Monitoring
- Factory Automation
- Commercial & Consumer Monitoring
- Agriculture & Water Management
- Traffic Monitoring & Control

Machine Safety

- Safety Light Screens
- Safety Modules & Controllers
- Emergency Stop Devices
- Safety Interlocks
- Ergonomic Two-Hand Control & Run Bars

Who is Banner

Banner Sensor Installed Every



3.5

Seconds

Somewhere in the World

Manufacturing Specialists



30,000+

Products

Customers First
Integrity Always
Quality in Everything
New Solutions — Every Day

BANNER®

Global Presence



Network of

3,000

Professionals



Application

Solutions

Experts

Banner Specials



Rapid

Customization

Contact Us

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Contents

Sensors

page 19

Photoelectric page 27
- Featured page 28
- Rectangle page 110
- Right Angle page 158
- Barrel page 184
- Slot & Area page 222
- Miniature page 236
- Fiber Optics page 256

Measurement page 314
- Optical page 316
- Ultrasonic page 334
- Radar page 372
- Arrays page 380

Special Purpose page 396
- Barcode Readers page 398
- Registration, Color & Luminescence page 414
- Stainless Steel page 428
- Clear Object page 454
- Temperature page 468
- Hazardous Area page 474

Vision

page 488

iVu page 490

***Presence*PLUS** page 499

Vision Lighting page 512

Brackets 846

Cordsets 904

Misc Accessories 940

Reference 974

Index 1060

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Lighting & Indicators

page 528

LED Lighting page 532

Tower Lights page 554

Indicators page 568

- Base Mount page 570
- Barrel Mount page 582
- T-Style page 588
- Flat Mount page 594

Touch Buttons page 606

Pick-to-Light page 628

Wireless

page 650

Discrete page 654

Discrete & Analog page 654

Serial page 662

Serial & Ethernet page 664

Machine Safety

page 676

Light Screens page 682

Laser Scanner page 710

E-Stop & Stop Control page 716

Interlock Switches page 758

Controllers & Modules page 798

Two-Hand Control page 832

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Contents

Sensors
page **19**

Photoelectric **27**

Featured	28	Rectangle	110	Right Angle	158	Barrel	184			Slot & Area	222	Miniature	236	Fiber	256
QS18	30	MINI-BEAM	112	T8	160	M12	186	S18	200	SLM	224	VSM	238	Amps	260
QS30	52	Q25	134	T18	164	S12-2	193	M18	204	SL	228	VS1	244	Plastic	286
Q12	68	Q40	140	TM18	172	SB12	196	S30	212	LX	232	VS2	248	Glass	306
Q20	74	PicoDot	146	T30	178	SB12T	196	SM30	218			VS3	252		
Q45	80	QM42/QMT42	150			S18-2	198								
Q60	104														

Vision
page **488**

iVu	490	*Presence*PLUS	498
TG	490	Proll	502
		P4 OMNI	506

Lighting & Indicators
page **528**

LED Lighting	532	Tower Lights	554
WLS28-2	534	TL50	558
WLB32	538	TL50BL	560
WLC60	540	CL50	564
WLC90	542		
WLA	544		
WL50S	546		
WL50-2	548		

Wireless
page **650**

Discrete Wire Replacement		Discrete and Analog Wire Replacement	
PM8	654	PM2	654
Q45RD	657	PB2	660
Q45BL-RG	658		

Machine Safety
page **676**

Light Screens	682	Laser Scanner	710	Emergency Stop Buttons	716	Emergency Stop & Stop Control	738
EZ-SCREEN Type 4	686	AG4	711	Illuminated 30 mm and Flat	718	Rope Pulls	740
EZ-SCREEN LP	692			30 mm and Flat	720	EDG1 Enabling Device	754
EZ-SCREEN Grid & Points	700			Locking	722		
EZ-SCREEN Type 2	706			Panel Mount	730		
				Illuminated Panel Mount	731		

Accessories
page **844**

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Measurement 314

Optical 316		Ultrasonic 334				Radar 370		Array 380	
LE	318	QT50U	336	T18U	356	Q120RA	372	EZ-ARRAY	382
LH	320	S18U	342	Q45U	358	QT50R	373	MINI-ARRAY	386
LG	322	T30UX	350	Q45UR	362	QT50R-AF2W	374	HR MINI-ARRAY	392
LT3	326	T30U	350	QS18U	366				
LT7	330	M25U	354						

Special Purpose 396

Barcode Scanners 398		Registration/ Color 414		Stainless Steel 428		Clear Object 454		Temp 468	Hazardous Area 474	
iVu BCR	400	R58	416	QM26	430	QS30	456	T-GAGE 470	MINI-BEAM	476
P4 BCR	408	R55F	422	QMH26	434	Q26	458		Q45	480
TCNM	410	QC50	424	M25U	438	OMNI-BEAM	460		SMI30	484
		QCX50	424	SM30	440	MINI-BEAM	464			
		QL56	426	VSM	440					
				M18	450					

Vision Lighting 512

Ring Lights	514	Linear Array Backlights Lights	519	Spot Lights	522	Tubular Fluorescent Lights	525
Area Lights	516	Linear Array Lights	520	Low-Angle Ring Lights	524		
Backlights	518	On-Axis Lights	521	Laser Line Generator Lights	524		

Base Mount Indicators 570		Barrel Mount Indicators 582		T-Style Indicators 588		Flat Mount Indicators 594				Touch Buttons 608		Pick-to-Light 628			
K50L	572	S18L	584	T30	590	K80L	596	SP150	603	K50 Touch	610	PDV	630	K30 PB	642
K50BL	574	S22L	585	T18	591	K80 Call Light	598	SP250	603	K30 Touch	615	PVL	632	K50 PB	642
K50LD	575	M18	586	T8L	592	K50FL	599	SP350	603	OTB/LTB	618	PVA	634	K80 PB	642
K30L	576					K80FL	600	TL30F	604	VTB	622	K50 Touch	636	VTB	646
K50L Haz	578					K80 Segment	602			K30L Push-Button	624	K30 Touch	638		
K30L Haz	579									K50L Push-Button	625	K50 Optical	640		

Serial Wire Replacement

DX80SR 662

Serial and Ethernet Cable Replacement

DX80ER 664

Interlock Switches 758		Safety Controllers 798		Safety Modules 810		Two-Hand Control Indicators 832	
Magnet	760	SC26-2	800	E-Stop Guard	812	Two Hand-Control Module	834
Hinge	764	SC22-3	804	Universal	818	STB	838
Compact Plastic	772			Safety Mat Monitoring	820	Run Bar	842
Locking	777			Muting	822		
				Safe Speed	826		
				Interface Relay	828		
				Extension Relay	830		

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

New Products

PLASTIC BARREL-MOUNT SENSORS

S18-2

- High performance sensing
- Available in multiple operating modes
- Wide operating range from -40° C to +70° C
- Easy mounting for quick setup and installation

See page 198





DUAL DISPLAY FIBER AMPLIFIER

DF-G1

- IO-Link communication allows full configuration of DF-G1 operating parameters and monitoring of signal strength
- Easy-to-read dual digital displays show signal level and threshold simultaneously
- Lever action fiber clamp provides stable, reliable and trouble-free fiber clamping

See page 260

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



LASER SENSOR

LE550

- Easy adjustment with a two-line, eight-character intuitive display
- Repeatability and accuracy for challenging targets, from metal to black rubber
- Visible class 2 laser for small spot size and simple alignment
- Ideal for applications such as loop control, thickness measurement, roll diameter and positioning

See page 318

LASER BARCODE SCANNER

Barcode Reader

- Able to decode over a dozen of the most commonly used linear barcode symbols
- IP65 rugged industrial housing
- Can output data read over RS-232 or RS-485
- SMART TEACH push button programming

See page 412



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

LED LIGHTING

WLC90, WLC60 & WLB32

- Rugged, chemically resistant and food safe 316 stainless steel housing
- Made to last in the harshest high-pressure washdown environments and temperature cycling
- Stream-lined design with minimal cracks and crevices for a cleanable hygienic design
- Easy mounting for quick setup and installation

See page 532



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



INDICATORS FOR HAZARDOUS AREAS

K50/K30

- Up to three colors in one device and five colors to choose from
- Models rated to IP67 and IP69K for use in harsh environments
- Unique design appears gray when off, eliminating false indication from ambient light
- Long-lasting LED technology for years of maintenance-free operation
- Worldwide IECEx approval for quicker access into countries outside Europe and North America

See page 579

ILLUMINATED PUSH BUTTON

K30 Touch Button

- Up to three colors in one device with a variety of colors for customized indication
- Quick-disconnect models for easy installation
- Dry contact switch output is completely isolated from the LED indicator input
- Designed for panel-mount or stand-alone applications

See page 624



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

New Products

SIMPLE WIRE REPLACEMENT

PM Series

- Choose from two I/O model configurations
- Select from eight pre-mapped network topologies
- No software needed
- Menu driven LCD User Interface
- Use LCD for I/O and signal strength monitoring
- Advanced expandability with the User Configuration Tool software

See page 651





SELF-CONTAINED WIRELESS SENSOR

Wireless Q45

- Simple yet highly expandable
- IP67 rated housing for use in demanding environments
- Supports Point to Point and Star network topologies

See page 651

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



PROGRAMMABLE SAFETY CONTROLLER

SC26-2

- Intuitive programming environment for easy implementation
- Configure inputs, outputs and functionality of the controller for more usability
- Base controller allows eight of the 26 inputs to be configured as outputs for efficient terminal utilization
- Ethernet models available providing up to 64 virtual status outputs, fault diagnostic codes and messages

See page 800

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Applications



Automotive

The manufacturing of vehicles is a very diverse and complex process requiring participation from hundreds of Tier 1 and 2 supplier companies to deliver a finished product to the consumer. A high level of automation is used throughout the automotive supply chain, requiring a broad spectrum of controls to ensure quality, productivity and worker safety on the plant floor.

Whether it is a basic sensor for conveyor lines, safeguarding devices for operator safety or vision-based technology for error proofing, Banner Engineering offers a wide range of solutions to meet the challenges of today's automotive manufacturer.

Sample applications



iVu page 490

Banner's iVu Image Sensor with C-Mount Lens inspects a car frame to ensure it has been correctly assembled.



EZ-SCREEN® LP page 692

Banner's EZ-SCREEN® Low-Profile cascading Safety Light Curtains simplify the guarding of multiple areas with production equipment.



DX80 & VTB page 651

Wireless I/O Network and EZ-LIGHT® Indicators create a maintenance call system from the plant floor to the maintenance shop without the need for long cable runs.



K50 page 640

Banner provides the broadest selection of Pick-to-Light devices for bin picking applications.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Food & Beverage

Automated processes in the food and beverage industry have ever increasing needs to address challenging applications and environments, and have a demand for tracking methods to address food contamination before human consumption. To eliminate bacteria and the risk of food borne illness, equipment must be washed down using pressurized water, high temperatures and aggressive chemicals. The components used on this equipment must be designed to stand up to harsh environmental conditions and need to meet hygienic design standards for easy cleaning.

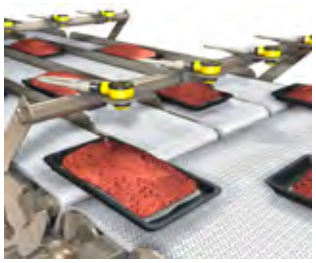
Banner Engineering provides many products for sensing, identification, inspection, communication, safety and wireless transmission that can be applied to food and beverage applications. Banner proudly offers solutions to the industry with a variety of specifications to address customers' environmental concerns, including IP69K/IP67 ratings, ECOLAB® certification, hygienic designs and stainless steel housings.

Sample applications



QM26 page 430

The rugged QM26 washdown photoelectric sensor detects the presence of a clear glass jar to ensure it is in the correct place before it is filled with salsa.



T18 page 164

The T18 sensor reliably counts trays of ground meat on a conveyor.



iVu Plus TG page 490

Banner's iVu Plus TG vision sensor inspects trays to ensure there are six buns per tray.



DX80 page 651

Banner's DX80 monitors the liquid level in a reservoir of a filling machine with a wireless radio instead of using a slip ring.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Applications



Material Handling

Material handling is the process of handling finished goods throughout the entire cycle from finished product all the way through distribution. This includes various types of movement, including intermodal shipping, warehouse operations, conveyance, storage and distribution center operations. Other material handling operations include baggage handling, vehicle control and post-primary packaging operations.

Banner Engineering is well versed on the intricacies of the material handling industry and is synchronized with the industry's objectives of increasing manufacturing efficiencies by reducing downtime and overall manufacturing costs. Banner's vast offering, including sensor, vision, safety and lighting products, suits needs for material handling applications ranging from inception to installation. With a history of high performance, Banner provides quality products with lasting performance.

Sample applications



QS18 page 30

Banner's QS18 reliably detects baggage along a conveyor to ensure efficient, optimized baggage handling processes.



*Presense*Plus® P4 page 498

Banner's highly reliable P4 Vision Sensor reads barcodes to detect the presence and absence of products at a distribution center.



TL50 page 554

Banner's E-Stop Button and Signal Tower Lights with audible alarms provide highly visible and audible fault detection. The E-Stop button is setup for use in case of an emergency as a part of safety control.



DX80 page 651

Banner Engineering's indicators and wireless products help create a safe environment for workers by providing forklift and traffic control in pick-to-light applications.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Packaging

In the packaging industry, the package can be just as important as the product. As consumers' tastes change so does the packaging to reflect consumer preference. Today's packaging machines must be flexible for quick product changeovers and accommodate new product materials and designs while maintaining fast and efficient throughput.

Banner Engineering understands the needs of today's packagers. Whether it is safeguarding a robotic case packer, reading barcodes for track and trace systems, inspecting label position, counting bottles going into a flow wrapper, monitoring product levels or call for parts, Banner has a solution to fit your needs.

Sample applications



QS18 page 30

Banner's QS18LD laser sensor scans across the top of the package to see if any flaps are open.



R58 page 416

With a 15 µs repeatability, Banner's R58 can track the position of each label on the web to ensure the label is correctly positioned on a bottle. One sensor can be used for all label color combinations with three LED sensing colors.



iVu BCR page 400

After the frozen dinner is placed in the carton, Banner's iVu BCR reads a 2D code on the carton to ensure it is the correct carton to prevent packaging errors.

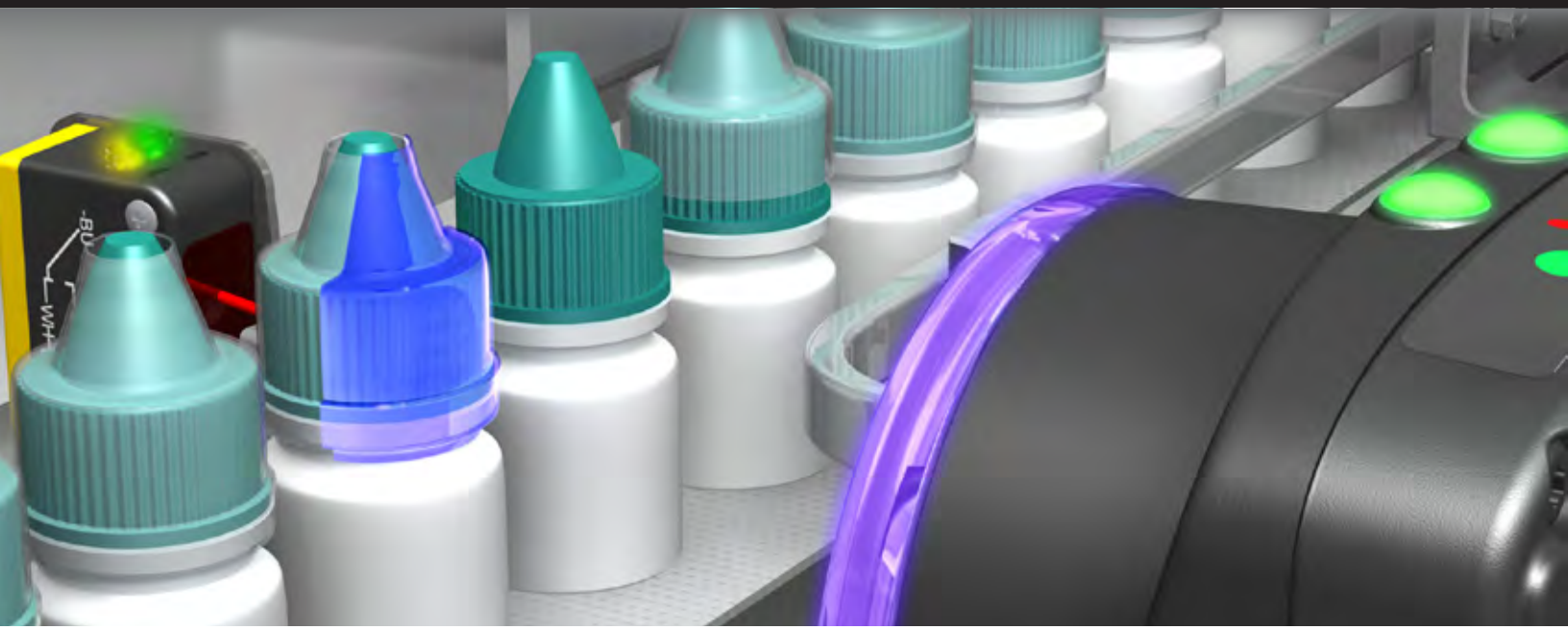


WLS28 page 535

Using high-powered and long-lasting LED technology, Banner's WLS28 work lights are compact and bright enough to use in this area for optimal visibility.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Applications



Pharmaceutical

The manufacturing of pharmaceutical and medical products requires a high level of control to maintain product integrity, overall quality and process efficiency. Banner Engineering offers sensing expertise and solutions for a wide range of applications in pharmaceutical and medical industries, providing customers with reliable detection, accurate inspection, advanced sensing technologies and cost-effective solutions.

Banner Engineering can solve the most challenging sensing problems and can rapidly analyze an application to find the optimal solution. Banner has the expertise to provide solutions in many pharmaceutical and medical areas including pharmaceutical solid or liquid dose packaging, pharmacy automation, lab automation, clinical diagnostic automation, product identification, track-and-trace, seal integrity verification, visual indication and process/facility sensing and monitoring.

Sample applications



Q12 Fixed-Field page 68

The compact Q12 fixed field sensor is ideal for space constraint applications. The fixed-field sensing provides excellent background suppression for reliable sensing even on closely positioned conveyors in automated syringe processing equipment.



iVu BCR page 400

The iVu Bar Code Reader (BCR) with a remote touch screen display simplifies barcode reading of various symbologies including 1D, 2D Datamatrix, and PharmaCode. Inspection configuration can be setup easily using the touch screen without the need of a PC.



WLA page 544

Banner's WLA Series are LED lights designed for work cell illumination. The WLA lights are ideal as overhead lighting in visual inspection stations for pharmaceutical liquid dose packaging. These lights provide excellent intensity, uniformity and a continuous working-life of over 50,000 hours.



DX80 page 651

Banner's SureCross Wireless I/O Network provides an easy way to communicate and monitor I/Os where wiring is not feasible. Temperature and humidity monitoring points can be easily populated throughout a pharmaceutical manufacturing facility using the DX80 wireless network.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

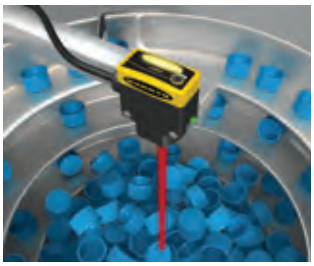


Assembly & Manufacturing

Assembly and manufacturing industries are a vital component of the world's economy. Employee knowledge and innovative, reliable products ensure manufacturing and assembly industries meet productivity goals and quality standards.

Banner Engineering understands the diverse needs in manufacturing and assembly processes, which is why we provide solutions for all types of manufacturing and assembly. Whether manual or automatic processes, Banner offers safety, pick-to-light, LED lighting, sensor and vision products to help with many applications, including quality checks, production line verification, precision, assembly verification and many more with long-lasting solutions.

Sample applications



QS30 page 52

Keeping the feeder bowl stocked with parts is necessary to ensure the process continues without interruption.



iVu Plus TG page 490

To verify the expected number of holes exists on a small metal part, the iVu Plus TG Image Sensor with Multipoint Inspections can be configured for multiple regions of interest (ROIs) to ensure holes exist and were punched in the correct place.



Q45 Push Button page 651

Operators need a way to easily call forklift drivers for additional parts or to remove completed assemblies. Banner's wireless network and K50 indicator lights create a complete parts delivery solution for improved communication between work station operators and forklift drivers.



30 mm E-Stop page 716

The E-Stops run along the length of a conveyor so the operator can press it from anywhere along its length to immediately stop the conveyor.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SENSORS

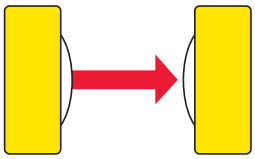


PHOTOELECTRIC page 27

MEASUREMENT page 314

SPECIAL PURPOSE page 396

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Opposed Mode

The sensor's emitter and receiver are housed in two separate units. The emitter is placed opposite the receiver. An object is detected when it breaks the effective beam.

Model		Range	Dims (H x W x D)	IP Rating	Power Supply	Output	Page #
	QS18	20 m	35 x 15 mm (D varies by model)	IP67; NEMA 6P	10-30 V dc 20-140 V ac/dc 20-270 V ac/dc	DC: PNP or NPN P-MOSFET N-MOSFET	30
	QS30	60 m	44 x 22 mm (D varies by model)	IP67; NEMA 6	10-30 V dc 12-250 V ac/dc 24-250 V ac/dc	DC: Bipolar NPN/PNP AC/DC: SPDT e/m relay	52
	Q12	2 m	23 x 8 x 12 mm	IP67	10-30 V dc	Bipolar NPN/PNP, PNP or NPN	68
	Q20	20 m	35 x 15 x 31 mm	IP67; NEMA 6P	10-30 V dc	PNP or NPN	74
	Q45	60 m	88 x 45 x 55 mm	IP67; NEMA 6P	10-30 V dc 90-250 V ac 24-250 V ac/dc 12-250 V ac/dc 5-15 V dc (NAMUR)	DC: Bipolar NPN/PNP AC: SPST AC/DC: SPDT Relay* NAMUR: Constant current	80
	MINI-BEAM	30 m	31 x 12 x varies	IP67; NEMA 4X	10-30 V dc 24-240 V ac 5-15 V dc (NAMUR)	DC: Bipolar NPN/PNP AC: SPST NAMUR: Constant current	112
	Q25	20 m	50 x 25 x 30 mm	IP67; NEMA 6P	10-30 V dc 20-250 V ac	DC: PNP or NPN AC: SPST*	134
	Q40	60 m	70 x 40 x 46 mm	IP67; NEMA 6P	10-30 V dc 20-250 V ac	DC: PNP or NPN AC: SPST*	140
	QM42	10 m	42 x 13 x 42 mm	IP67; NEMA 6P	10-30 V dc	PNP or NPN	150
	QMT42	10 m	58 x 18 x 42 mm	IP67; NEMA 6P	10-30 V dc	PNP or NPN	152
	T8	2 m	19 x 19 x 16 mm	IP67; NEMA 6	10-30 V dc	NP or NPN	160
	T18	20 m	DC: 42 x 30 x 30 mm AC: 52 x 30 x 30 mm	IP67; NEMA 6P	10-30 V dc 20-250 V ac	DC: PNP or NPN AC: SPST*	164
	TM18	20 m	41 x 30 x 30 mm	IP67 or IP69K	10-30 V dc	DC: PNP or NPN	172
	T30	60 m	52 x 40 x 45 mm	IP67; NEMA 6P	10-30 V dc 20-250 V ac	DC: PNP or NPN AC: SPST*	178

* AC models are solid-state

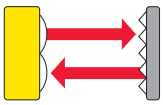
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Model		Range	Dims (H x W x D)	IP Rating	Power Supply	Output	Page #
	M12	5 m	12 x 67.5 mm	IP67; NEMA 6P	10-30 V dc	PNP or NPN	186
	S12-2	20 m	ø 12 x 34 mm	IP67	10-30 V dc	PNP or NPN	193
	S12	15 m	16 x 31 mm	IP65	10-30 V dc	PNP or NPN	192
	SB12/SB12T	1.5 m	15.8 x 31 mm	IP65	10-30 V dc	PNP or NPN	196
	S18	20 m	DC: ø 18 x 59 mm AC: ø 18 x 85 mm	IP67; NEMA 6P	10-30 V dc 20-250 V ac	DC: PNP or NPN AC: SPST*	200
	M18	20 m	ø 18 x 59 mm	IP67; NEMA 6P	10-30 V dc	PNP or NPN	204
	S30	60 m	DC: ø 30 x 69 mm AC: ø 30 x 81 mm	IP67; NEMA 6P	10-30 V dc 20-250 V ac	DC: PNP or NPN AC: SPST*	212
	SM30	150 m	ø 30 x 99 mm	IP67; NEMA 6P	10-30 V dc 24-240 V ac	Bi-Modal PNP/NPN AC: SPST*	218
	SLM	220 mm	Max size: 12 x 252 x 140 mm	IP67	10-30 V dc	Bipolar NPN/PNP	224
	SL10	10 mm	72 x 52 x 19 mm	IP67	10-30 V dc	Bipolar NPN/PNP	229
	SL30	30 mm	72 x 52 x 19 mm	IP67	10-30 V dc	Bipolar NPN/PNP	228
	VSM	250 mm	4 x 36.8 mm	IP67	10-30 V dc	PNP or NPN	238
	VS2	3 m	25 x 12 x 4 mm	IP67; NEMA 6	10-30 V dc	PNP or NPN	248
	QM26	8.5 m	45 x 14 x 25 mm	IP67, IP69K	10-30 V dc	DC: PNP or NPN	430

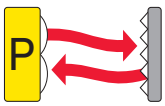
* AC models are solid-state

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SENSOR SELECTION GUIDE



Retroreflective Mode



Polarized Retroreflective Mode

The sensor contains both the emitter and receiver elements. The effective beam is established by the size of the retroreflector. As with an opposed-mode sensor, an object is sensed when it interrupts or breaks the effective beam.

	Model	Range	Dims (H x W x D)	IP Rating	Power Supply	Output	Page #
	QS18	Retro: 6.5 m Polar Retro: 3.5 m	35 x 15 x 31 mm	IP67; NEMA 6P	10-30 V dc, 20-140 V ac/dc 20-270 V ac/dc	DC: PNP or NPN P-MOSFET N-MOSFET	30
	QS30	Retro: 12 m Polar Retro: 8 m	44 x 22 x 35 mm	IP67; NEMA 6	10-30 V dc, 12-250 V ac/dc 24-250 V ac/dc	DC: Bipolar NPN/PNP AC/DC: SPDT e/m relay	54
	Q12	Retro: 1.5 m Polar Retro: 1 m	23 x 8 x 12 mm	IP67	10-30 V dc	Bipolar NPN/PNP, PNP or NPN	68
	Q20	Retro: 6 m Polar Retro: 4 m	35 x 15 x 31 mm	IP67; NEMA 6P	10-30 V dc	PNP or NPN	74
	Q45	Retro: 9 m Polar Retro: 6 m	88 x 45 x 55 mm	IP67; NEMA 6P	10-30 V dc 90-250 V ac 24-250 V ac/dc, 12-250 V ac/dc 5-15 V dc (NAMUR)	DC: Bipolar NPN/PNP AC: SPST or SPDT Relay AC/DC: SPST or SPDT Relay NAMUR: Constant current	80
	MINI-BEAM	Retro: 5 m Polar Retro: 3 m	31 x 12 x varies	IP67; NEMA 4X	10-30 V dc, 24-240 V ac, 5-15 V dc (NAMUR)	DC: Bipolar NPN/PNP AC: SPST or SPDT Relay NAMUR: Constant current	112
	Q25	Polar Retro: 2 m	50 x 25 x 30 mm	IP67; NEMA 6P	10-30 V dc or 20-250 V ac	DC: PNP or NPN AC: SPST*	134
	Q40	Polar Retro: 6 m	70 x 40 x 46 mm	IP67; NEMA 6P	10-30 V dc or 20-250 V ac	DC: PNP or NPN AC: SPST*	140
	QMT42	Polar Retro: 3 m	58 x 18 x 42 mm	IP67; NEMA 6P	10-30 V dc	PNP or NPN	152
	T18	Retro: 2 m Polar Retro: 2 m	DC: 42 x 30 x 30 mm AC: 52 x 30 x 30 mm	IP67; NEMA 6P	10-30 V dc 20-250 V ac	DC: PNP or NPN AC: SPST*	164

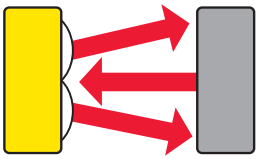
* AC models are solid-state

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Model		Range	Dims (H x W x D)	IP Rating	Power Supply	Output	Page #
	TM18	Polar Retro: 5.5 m	41 x 30 x 30 mm	IP67 or IP69K	10-30 V dc	PNP or NPN	172
	T30	Polar Retro: 6 m	52 x 40 x 45 mm	IP67; NEMA 6P	10-30 V dc or 20-250 V ac	DC: PNP or NPN AC: SPST*	178
	M12	Retro: 2.5 m Polar Retro: 1.5 m	12 x 67.5 mm	IP67; NEMA 6P	10-30 V dc	PNP or NPN	186
	S18	Retro: 9 m Polar Retro: 2 m	DC: ø 18 x 59 mm AC: ø 18 x 85 mm	IP67; NEMA 6P	10-30 V dc or 20-250 V ac	DC: PNP or NPN AC: SPST*	200
	M18	Retro: 2 m Polar Retro: 2 m	ø 18 x 59 mm	IP67; NEMA 6P	10-30 V dc or	PNP or NPN	204
	S30	Polar Retro: 6 m	DC: ø 30 x 69 mm AC: ø 30 x 81 mm	IP67; NEMA 6P	10-30 V dc or 20-250 V ac	DC: PNP or NPN AC: SPST*	212
	VS3	Polar Retro: 250 mm	26 x 9 x 16 mm	IP67; NEMA 6	10-30 V dc	PNP or NPN	252
	QM26	Polar Retro: 3 m	45 x 14 x 25 mm	IP67, IP69	10-30 V dc	PNP or NPN	430
	Q26	Polar Retro: 800 mm	52 x 14 x 25 mm	IP67; NEMA 6	10-30 V dc	PNP or NPN	458

* AC models are solid-state

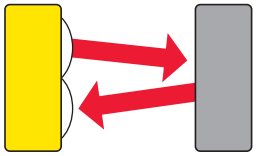
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Divergent Mode

Light from the emitter strikes a surface of an object at some arbitrary angle and is diffused from the surface at all angles. The emitted beam and receiver's field-of-view are very wide.

Model		Range	Dims (H x W x D)	IP Rating	Power Supply	Output	Page #
	QS18	300 mm	35 x 15 x 31 mm	IP67; NEMA 6P	10-30 V dc,	PNP or NPN	35
	MINI-BEAM	130 mm	31 x 12 x varies	IP67; NEMA 4X	10-30 V dc, 24-240 V ac, 5-15 V dc (NAMUR)	Varies	112

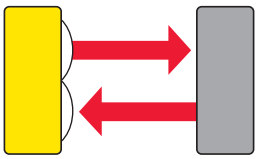


Convergent Mode

Uses additional optics to create a small, intense and well-defined spot at a fixed distance from the front of the sensor lens.

Model		Range	Dims (H x W x D)	IP Rating	Power Supply	Output	Page #
	QS18	43 mm	35 x 15 x 31 mm	IP67; NEMA 6P	10-30 V dc	PNP or NPN	30
	Q45	100 m	88 x 45 x 55 mm	IP67; NEMA 6P	10-30 V dc, 90-250 V ac, 24-250 V ac/dc, 12-250 V ac/dc 5-15 V dc (NAMUR)	Bipolar NPN/PNP AC: SPST or SPDT Relay AC/DC: SPST or SPDT Relay NAMUR: Constant current	80
	MINI-BEAM	49 mm	31 x 12 x varies	IP67; NEMA 4X	10-30 V dc, 24-240 V ac, 5-15 V dc (NAMUR)	DC: Bipolar NPN/PNP AC: SPST or SPDT Relay NAMUR: Constant Current	112
	PICO-DOT®	305 mm	40.6 x 12.7 x 45.6 mm	IP67; NEMA 6	10-30 V dc	PNP or NPN	146
	VS1	15 mm	26 x 8 x 12 mm	IP67; NEMA 6	10-30 V dc	PNP or NPN	244
	VS2	30 mm	25 x 12 x 4 mm	IP67; NEMA 6	10-30 V dc	PNP or NPN	248

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Diffuse Mode

Light from the emitter strikes a surface of an object at some arbitrary angle and is diffused from the surface at all angles.

Model		Range	Dims (H x W x D)	IP Rating	Power Supply	Output	Page #
	QS18	800 mm	35 x 15 x 31 mm	IP67; NEMA 6P	10-30 V dc, 20-140 V ac/dc, 20-270 V ac/dc	DC: PNP or NPN AC/DC: P-MOSFET or N-MOSFET	30
	QS30	1.4 m	44 x 22 x varies	IP67; NEMA 6 NPN or PNP	10-30 V dc	Bipolar NPN/PNP	52
	Q20	1.5 m	35 x 15 x 31 mm	IP67; NEMA 6P	10-30 V dc	Bipolar NPN/PNP	74
	Q45	3 m	88 x 45 x 55 mm	IP67; NEMA 6P	10-30 V dc, 90-250 V ac 24-250 V ac, 12-250 V dc or 5-15 V dc (NAMUR)	Bipolar NPN/PNP AC: SPST or SPDT Relay AC: SPST or SPDT Relay SPST or SPDT Relay NAMUR: Constant current	80
	MINIBEAM	380 mm	31 x 12 x varies	IP67; NEMA 4X	10-30 V dc, 24-240 V ac, 5-15 V dc (NAMUR)	DC: Bipolar NPN/PNP AC: SPST NAMUR: Constant current	112
	QM42	400 mm	42 x 12.7 x 42 mm	IP67; NEMA 6P	10-30 V dc	NPN or PNP	150
	QMT42	6 m	58 x 18 x 42 mm	IP67; NEMA 6P	10-30 V dc	NPN or PNP	152
	T18 DC	500 mm	42 x 30 x 30 mm	IP67; NEMA 6P	10-30 V dc	NPN or PNP	164
	T18 AC	300 mm	52 x 30 x 30 mm	IP67; NEMA 6P	10-30 V dc	AC: SPST*	165
	TM18	500 mm	41 x 30 x 30 mm	IP67; NEMA 6P or IP69K (when QD PVC jacket is protected)	10-30 V dc	Bipolar NPN/PNP	172
	S18	300 mm	DC: ø 18 x 59 mm AC: ø 18 x 85 mm	IP67; NEMA 6P	10-30 V dc or 20-250 V ac	NPN or PNP AC: SPST*	200
	M18	300 mm	ø 18 x 59 mm	IP67; NEMA 6P	10-30 V dc or	DC: PNP or NPN	204
	VSM	90 mm	4 x 36.8 mm	IP67	10-30 V dc	DC: PNP or NPN	238
	LT3	5 m	69 x 35 x 87 mm	IP67; NEMA 6P	12-24 V dc	DC: PNP or NPN Analog: 4-20 mA 0-10 V	326
	LT7	10 m	93 x 42 x 95 mm	IP67	18 -30 V dc	DC: PNP or NPN Analog: 4-20 mA 0-10 V	330



Photoelectric

A photoelectric sensor is an optical control used in a variety of automated processes. It works by detecting a visible or invisible beam of light, and responding to a change in the received light intensity. Banner supplies sensors to virtually all the manufacturing companies in the Fortune 500. Banner offers the world's most complete line of photoelectric sensors – over 12,000.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

PHOTOELECTRIC

FEATURED page 28

RECTANGLE page 110

RIGHT ANGLE page 158

BARREL page 184

SLOT & AREA page 222

MINIATURE page 236

FIBER OPTICS page 256

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Featured

The featured sensors are the most versatile sensors available in the photoelectric line. Featured sensors have a variety of mounting styles and options, housing options, configuration modes, ranges, response speeds and many more. Start here to find solutions that meet your sensing needs.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Max Sensing Range	Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	QS18 General purpose sensor to solve most applications page 30	Opposed: 20 m Laser Emitter: 15 m Retro: 6.5 m Polarized Retro: 3.5 m Laser Retro Polarized: 10 m Convergent: 43 mm Diffuse: 1 m Laser Diffuse: 300 mm Fixed-Field: 100 mm Adjustable-Field: 300 mm Laser Adjustable-Field: 250 mm Ultrasonic: 500 mm	Varies by model	IP67; NEMA 6	ABS	10 to 30 V dc, 20 to 140 V ac/dc or 20 to 270 V ac/dc
	QS30 Performance sensor page 52	Opposed: 213 m Opposed Water Dect: 8 m Retro: 12 m Retro Clear Object: 2 m Polarized Retro: 8 m Laser Polarized Retro: 18 m Diffuse: 1 m Laser Diffuse: 800 mm Fixed-Field: 600 mm Adjustable-Field: 600 mm	Varies by model	IP67; NEMA 6P	ABS	10 to 30 V dc, 24 to 250 V ac or 12 to 250 V dc
	Q12 Self-contained minature sensor page 68	Opposed: 2 m Retro: 1.5 m Polarized Retro: 1 m Fixed-Field: 50 mm	22 x 8 x 12.4 mm	IP67	Thermoplastic Elastomer	10 to 30 V dc
	Q20 Universal housing page 74	Opposed: 20 m Retro: 6 m Polarized Retro: 4 m Diffuse: 1500 mm Fixed-Field: 150 mm	32 x 12 x 29 mm	IP67; NEMA 6	ABS	10 to 30 V dc
	Q45 Advanced one-piece, rugged sensor with outstanding optical performance page 80	Opposed: 60 m Retro: 9 m Polarized Retro: 6 m Laser Polarized Retro: 40 m Diffuse: 3 m Convergent: 100 m	87.6 x 44.5 x 54.1 mm	IP67; NEMA 6P	Thermoplastic Polyester	10 to 30 V dc, 90 to 250 V ac, 24 to 250 V ac or 12 to 250 V dc
	Q60 Laser or LED sensor for low reflectivity targets, regardless of background page 104	Adjustable-Field: 2 m Laser Adjustable-Field: 2 m	75 x 25 x 60 mm	IP67; NEMA 6	ABS	10 to 30 V dc, 12 to 250 V dc or 24 to 250 V ac

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



QS18 Sensors

Versatile Sensor Solves Wide Variety of Applications

The QS18 line offers the broadest selection of sensors to suit many sensing application needs. With a standardized style, the QS18 is ideal for global manufacturing.

- All-purpose sensor solves widest variety of sensing applications
- Versatile sensor with many mounting options
- Meets IP67 and NEMA 6 standards for use in harsh environments
- Universal housing for global use



QS18 page 32

The QS18 Standard Sensor requires little to no adjustment. The sensor is available in multiple sensing modes and has a wide variety of connection options.



QS18 *Expert*™ page 34

The QS18 *Expert*™ offers advanced sensing with single push-button programming and several sensing modes and configuration options.



QS18 Laser page 36

The QS18 Laser Sensor has a narrow visible beam for easy alignment and small object detection.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



QS18 Adjustable-Field page 38

The QS18 Adjustable-Field Sensor is ideal for background and foreground suppression. The sensor is available in long-range models for sensing up to 300 mm.



QS18 Universal Voltage page 40

The QS18 Universal Voltage Sensor operates on ac or dc voltage and has several sensing modes available, making it an ideal sensor for many manufacturing environments.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



QS18
DC-Operated Sensors

The QS18 Standard Sensor requires little to no adjustments. The sensor is available in multiple sensing modes and has a wide variety of connection options.

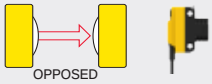
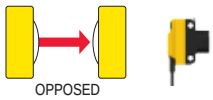
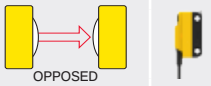
- All-purpose sensor solves widest variety of sensing applications
- Versatile sensor with many mounting options
- Meets IP67 and NEMA 6 standards for use in harsh environments
- Universal housing for global use
- Cordsets and brackets see page 42



Mail Sorting for Size
Three QS18 opposed mode sensors above the roller conveyor detect any passing object, triggering the horizontal QS18 sensor. Letters pass below the horizontal QS18 undetected and are diverted to the letter conveyor. Parcels are detected and continue forward.

Opposed QS18, 10-30 V DC

⇨ Infrared LED ➡ Visible Red LED

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
 OPPOSED	20 m	2 m	QS186E Emitter	
		4-pin Euro QD	QS186EQ8 Emitter	
		2 m	QS18VN6R	QS18VP6R
		4-pin Euro QD	QS18VN6RQ8	QS18VP6RQ8
 OPPOSED	20 m	2 m	QS186EV Emitter	NEW
		4-pin Euro QD	QS186EVQ8 Emitter	NEW
 OPPOSED	3 m	2 m	QS186EB Emitter	
		4-pin Euro QD	QS186EBQ8 Emitter	
		2 m	QS18VN6RB	QS18VP6RB
		4-pin Euro QD	QS18VN6RBQ8	QS18VP6RBQ8

Retro & Polar Retro QS18, 10-30 V DC

➡ Visible Red LED

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
 RETRO	6.5 m†	2 m	QS18VN6LV	QS18VP6LV
		4-pin Euro QD	QS18VN6LVQ8	QS18VP6LVQ8
 P POLAR RETRO	3.5 m†	2 m	QS18VN6LP	QS18VP6LP
		4-pin Euro QD	QS18VN6LPQ8	QS18VP6LPQ8

For more specifications see page 43.

Connection options: A model with a QD requires a mating cordset (see page 42).

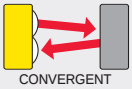
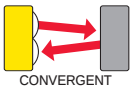
For 9 m cable, add suffix W/30 to the 2 m model number (example, QS18VN6LV W/30).
QD models
- For 4-pin integral Euro-style QD, add suffix Q8 (example, QS18VN6LVQ8).
- For 4-pin integral Pico-style QD, add suffix Q7 (example, QS18VN6LVQ7).
- For 4-pin 150 mm Euro-style pigtail QD, add suffix Q5 (example, QS18VN6LVQ5).
- For 4-pin 150 mm Pico-style pigtail QD, add suffix Q (example, QS18VN6LVQ).

† Retroreflective range is specified using one model BRT-84 retroreflector.
* Contact factory at 1-888-373-6767 for Bipolar NPN/PNP output model options.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

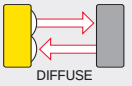
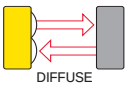
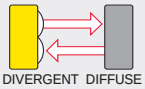
Convergent QS18, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
 CONVERGENT	16 mm	2 m	QS18VN6CV15	QS18VP6CV15
		4-pin Euro QD	QS18VN6CV15Q8	QS18VP6CV15Q8
 CONVERGENT	43 mm	2 m	QS18VN6CV45	QS18VP6CV45
		4-pin Euro QD	QS18VN6CV45Q8	QS18VP6CV45Q8

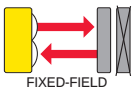
Diffuse QS18, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
 DIFFUSE	450 mm	2 m	QS18VN6D	QS18VP6D
		4-pin Euro QD	QS18VN6DQ8	QS18VP6DQ8
 DIFFUSE	100 mm	2 m	QS18VN6DB	QS18VP6DB
		4-pin Euro QD	QS18VN6DBQ8	QS18VP6DBQ8
 DIVERGENT DIFFUSE	100 mm	2 m	QS18VN6W	QS18VP6W
		4-pin Euro QD	QS18VN6WQ8	QS18VP6WQ8

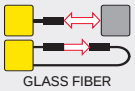
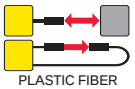
Fixed-Field QS18, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
 FIXED-FIELD	0-50 mm Cutoff	2 m	QS18VN6FF50	QS18VP6FF50
		4-pin Euro QD	QS18VN6FF50Q8	QS18VP6FF50Q8
	0-100 mm Cutoff	2 m	QS18VN6FF100	QS18VP6FF100
		4-pin Euro QD	QS18VN6FF100Q8	QS18VP6FF100Q8

Glass & Plastic Fiber QS18, 10-30 V DC

Infrared LED Visible Red LED

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m	QS18VN6F	QS18VP6F
		4-pin Euro QD	QS18VN6FQ8	QS18VP6FQ8
 PLASTIC FIBER	Range varies by sensing mode and fiber optics used	2 m	QS18VN6FP	QS18VP6FP
		4-pin Euro QD	QS18VN6FPQ8	QS18VP6FPQ8



Fiber Optics

Fiber optic sensors are ideal for harsh conditions including high vibration, extreme heat, noisy, wet, corrosive or explosive environments. Fiber optic sensors are small enough to fit in confined areas and can be positioned precisely where needed with flexible fibers.

Page 256

For more specifications see page 43.

Connection options: A model with a QD requires a mating cordset (see page 42).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS18VN6LV W/30).

- For 4-pin integral Euro-style QD, add suffix Q8 (example, QS18VN6LVQ8).
- For 4-pin integral Pico-style QD, add suffix Q7 (example, QS18VN6LVQ7).
- For 4-pin 150 mm Euro-style pigtail QD, add suffix Q5 (example, QS18VN6LVQ5).
- For 4-pin 150 mm Pico-style pigtail QD, add suffix Q (example, QS18VN6LVQ).

* Contact factory at 1-888-373-6767 for Bipolar NPN/PNP output model options.

Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



QS18 *Expert*™ DC-Operated Sensors with Push-Button Programming

The QS18 Expert offers advanced sensing with single push-button programming and several sensing modes and configuration options.

- Intuitive push-button lock out to prevent accidental configuration changes
- Bright LED status indicators visible from 360°
- Reliable detection of reflective objects
- Cordsets and brackets see page 42

TEACH Mode

Sensors can be configured via any of five TEACH or SET options (by push button or the remote wire) to define the sensing limits. Sensing limit configuration options include:

- Static TEACH: one switching threshold, determined by two taught conditions
- Dynamic (on-the-fly) TEACH: one switching threshold, determined by multiple sampled conditions
- Light SET and Dark SET: one switching threshold, offset from a single sensing condition (the "dark" condition or the "light" condition
- Window SET: a sensing window, centered around a single sensing condition

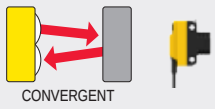
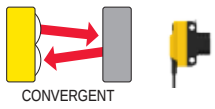
Polar Retro QS18 *Expert*™, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
 POLAR RETRO	3.5 m†	2 m	QS18EN6LP	QS18EP6LP
		4-pin Euro QD	QS18EN6LPQ8	QS18EP6LPQ8

Convergent QS18 *Expert*™, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
 CONVERGENT	16 mm	2 m	QS18EN6CV15	QS18EP6CV15
		4-pin Euro QD	QS18EN6CV15Q8	QS18EP6CV15Q8
 CONVERGENT	43 mm	2 m	QS18EN6CV45	QS18EP6CV45
		4-pin Euro QD	QS18EN6CV45Q8	QS18EP6CV45Q8

For more specifications see page 44.

Connection options: A model with a QD requires a mating cordset (see page 42).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS18EN6LP W/30).

QD models

- For 4-pin integral Euro-style QD, add suffix Q8 (example, QS18EN6LPQ8).
- For 4-pin integral Pico-style QD, add suffix Q7 (example, QS18EN6LPQ7).
- For 4-pin 150 mm Euro-style pigtail QD, add suffix Q5 (example, QS18EN6LPQ5).
- For 4-pin 150 mm Pico-style pigtail QD, add suffix Q (example, QS18EN6LPQ).

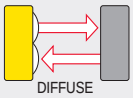
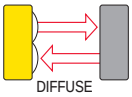
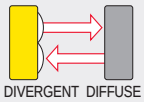
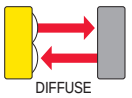
† Retroreflective range is specified using one model BRT-84 retroreflector.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

* Contact factory at 1-888-373-6767 for Bipolar NPN/PNP output model options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

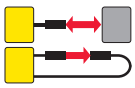
Diffuse QS18 *Expert*™, 10-30 V DC

Infrared LED Visible Red LED

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
 DIFFUSE	800 mm	2 m	QS18EN6D	QS18EP6D
		4-pin Euro QD	QS18EN6DQ8	QS18EP6DQ8
 DIFFUSE	500 mm	2 m	QS18EN6DB	QS18EP6DB
		4-pin Euro QD	QS18EN6DBQ8	QS18EP6DBQ8
 DIVERGENT DIFFUSE	300 mm	2 m	QS18EN6W	QS18EP6W
		4-pin Euro QD	QS18EN6WQ8	QS18EP6WQ8
 DIFFUSE	600 mm	2 m	QS18EN6DV	QS18EP6DV
		4-pin Euro QD	QS18EN6DVQ8	QS18EP6DVQ8

Plastic Fiber QS18 *Expert*™, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
 PLASTIC FIBER	Range varies by sensing mode and fiber optics used	2 m	QS18EN6FP	QS18EP6FP
		4-pin Euro QD	QS18EN6FPQ8	QS18EP6FPQ8

For more specifications see page 44.

Connection options: A model with a QD requires a mating cordset (see page 42).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS18EN6D W/30).

QD models

- For 4-pin integral Euro-style QD, add suffix Q8 (example, QS18EN6DQ8).
- For 4-pin integral Pico-style QD, add suffix Q7 (example, QS18EN6DQ7).
- For 4-pin 150 mm Euro-style pigtail QD, add suffix Q5 (example, QS18EN6DQ5).
- For 4-pin 150 mm Pico-style pigtail QD, add suffix Q (example, QS18EN6DQ).

Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

* Contact factory at 1-888-373-6767 for Bipolar NPN/PNP output model options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



QS18 Laser
DC-Operated Long-Range Laser Sensors

The QS18 Laser Sensor has a narrow visible beam for easy alignment and small object detection.

- Long sensing ranges
- Ideal for confined areas
- Available in opposed, diffuse, retroreflective and adjustable-field modes
- Emitter models available with five beam shapes
- Cordsets and brackets see page 42

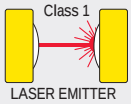
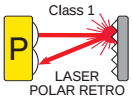
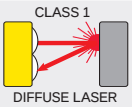


Package Inspection Using Diffuse-Mode Laser Sensors

When packaging medical supplies, error-proofing and quality control are of the utmost importance. In this application, it's necessary to inspect each package of gauze pads to ensure that the lid has been closed and that tape has been applied to seal the package. Automating this process means greater efficiency and less chance of error.

Class 1 Laser QS18, 10-30 V DC

Visible Red Laser

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
	15 m (4500 X excess gain)	2 m	QS186LE**	
		4-pin Euro QD	QS186LEQ8**	
	See data sheet for more information.	2 m	QS186LE10	
		4-pin Euro QD	QS186LE10Q8	
		2 m	QS186LE11	
		4-pin Euro QD	QS186LE11Q8	
		2 m	QS186LE12	
		4-pin Euro QD	QS186LE12Q8	
		2 m	QS186LE14	
		4-pin Euro QD	QS186LE14Q8	
	0.1-10 m†	2 m	QS18VN6LLP	QS18VP6LLP
		4-pin Euro QD	QS18VN6LLPQ8	QS18VP6LLPQ8
	300 mm	2 m	QS18VN6LD	QS18VP6LD
		4-pin Euro QD	QS18VN6LDQ8	QS18VP6LDQ8

For more specifications see page 43.

Connection options: A model with a QD requires a mating cordset (see page 42).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS186LE W/30).

QD models

- For 4-pin integral Euro-style QD, add suffix Q8 (example, QS186LEQ8).
- For 4-pin integral Pico-style QD, add suffix Q7 (example, QS186LEQ7).
- For 4-pin 150 mm Euro-style pigtail QD, add suffix Q5 (example, QS186LEQ5).
- For 4-pin 150 mm Pico-style pigtail QD, add suffix Q (example, QS186LEQ).

† Retroreflective range is specified using one model BRT-51X51BM or BRT-TVHG-2X2 retroreflector. Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

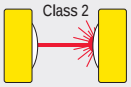
* Contact factory at 1-888-373-6767 for Bipolar NPN/PNP output model options.

** Specified with QS18 threaded lens receiver. Not recommended for dusty or dirty envirmonments; the scattered light would greatly reduce excess gain.

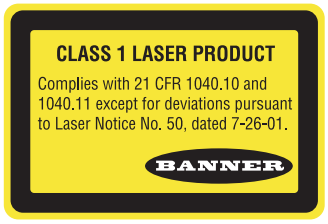
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Class 2 Laser QS18, 10-30 V DC

Visible Red Laser

Sensing Mode	Range	Connection	Models*
	15 m (7000 X excess gain)	2 m	QS186LE2**
		4-pin Euro QD	QS186LE2Q8**
Class 2 LASER SPOT	See data sheet for more information.	2 m	QS186LE210
		4-pin Euro QD	QS186LE210Q8
Class 2 LASER SPOT		2 m	QS186LE211
		4-pin Euro QD	QS186LE211Q8
Class 2 LASER SPOT		2 m	QS186LE212
		4-pin Euro QD	QS186LE212Q8
Class 2 LASER SPOT		2 m	QS186LE214
		4-pin Euro QD	QS186LE214Q8

For safe laser use (Class 1 or Class 2):
- Do not permit a person to stare at the laser from within the beam
- Do not point the laser at a person's eye at close range
- Terminate the beam emitted by a Class 2 laser product at the end of its useful path
- Locate open laser beam paths either above or below eye level, where practical



Class 1 Laser Sensors
Lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing. Reference IEC 60825-1: 2001, section 8.2.



Class 2 Lasers
Lasers that emit visible radiation in the wavelength range from 400 nm to 700 nm, where eye protection is normally afforded by aversion responses, including the blink reflex. This reaction may be expected to provide adequate protection under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing. Reference IEC 60825-1:2001, section 8.2.

For more specifications see page 43.

Connection options: A model with a QD requires a mating cordset (see page 42).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS186LE2 W/30).

QD models
- For 4-pin integral Euro-style QD, add suffix Q8 (example, QS186LE2Q8).
- For 4-pin integral Pico-style QD, add suffix Q7 (example, QS186LE2Q7).
- For 4-pin 150 mm Euro-style pigtail QD, add suffix Q5 (example, QS186LE2Q5).
- For 4-pin 150 mm Pico-style pigtail QD, add suffix Q (example, QS186LE2Q).

* Contact factory at 1-888-373-6767 for Bipolar NPN/PNP output model options.

** Specified with QS18 threaded lens receiver. Not recommended for dusty or dirty envirmonments; the scattered light would greatly reduce excess gain.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



QS18 Adjustable-Field
DC-Background and Foreground Suppression Sensors

The QS18 Adjustable-Field Sensor is ideal for background and foreground suppression. The sensor is available in long-range models for sensing up to 300 mm.

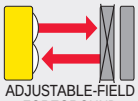
- Background suppression models for detection of objects when the background condition is not fixed
- Foreground suppression models for detection when background is fixed and object varies in color or shape
- Visible red LED or laser sensing beam
- Crosstalk avoidance models available for reliable sensing
- Cordsets and brackets see page 42

Adjustable-Field Foreground

- Foreground suppression models for reliable detection when a fixed background is present and the object color or shape varies
- Objects detected to the face of the sensor (no dead zone)
- Simple multiturn screw adjustment of cutoff distance
- Enhanced immunity to fluorescent lights
- Crosstalk immunity algorithm allows two sensors to be used in close proximity
- Visible red emitter

Adjustable-Field Foreground QS18, 10-30 V DC

Visible Red LED — Visible Red Laser

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
 ADJUSTABLE-FIELD FOREGROUND	Adjustable between 30-200 mm	2 m	QS18AB6AFF200 (Bipolar NPN/PNP)	
		4-pin Euro Pigtail QD	QS18AB6AFF200Q5 (Bipolar NPN/PNP)	
		2 m	QS18VN6AFF200	QS18VP6AFF200
		4-pin Euro Pigtail QD	QS18VN6AFF200Q5	QS18VP6AFF200Q5
 ADJUSTABLE-FIELD FOREGROUND	Adjustable between 15-40 mm	2 m	QS18AB6AFF40 (Bipolar NPN/PNP)	
		4-pin Euro Pigtail QD	QS18AB6AFF40Q5 (Bipolar NPN/PNP)	
		2 m	QS18VN6AFF40	QS18VP6AFF40
		4-pin Euro Pigtail QD	QS18VN6AFF40Q5	QS18VP6AFF40Q5

For more specifications see page 43.

Connection options: A model with a QD requires a mating cordset (see page 42).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS18VN6AFF200 W/30).

QD models

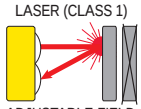
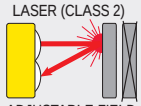
- For 4-pin integral Euro-style QD, add suffix Q8 (example, QS18EN6LPQ8).
- For 4-pin integral Pico-style QD, add suffix Q7 (example, QS18EN6LPQ7).
- For 4-pin 150 mm Euro-style pigtail QD, add suffix Q5 (example, QS18EN6LPQ5).
- For 4-pin 150 mm Pico-style pigtail QD, add suffix Q (example, QS18EN6LPQ).

* Contact factory at 1-888-373-6767 for Bipolar NPN/PNP output model options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Adjustable-Field Background QS18, 10-30 V DC

Visible Red LED Visible Red Laser

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
 ADJUSTABLE-FIELD BACKGROUND SUPPRESSION	Adjustable between 30-300 mm	2 m	QS18AB6AF300 (Bipolar NPN/PNP)	
		4-pin Euro Pigtail QD	QS18AB6AF300Q5 (Bipolar NPN/PNP)	
		2 m	QS18VN6AF300	QS18VP6AF300
		4-pin Euro Pigtail QD	QS18VN6AF300Q5	QS18VP6AF300Q5
 ADJUSTABLE-FIELD BACKGROUND SUPPRESSION	Adjustable between 15-40 mm	2 m	QS18AB6AF40 (Bipolar NPN/PNP)	
		4-pin Euro Pigtail QD	QS18AB6AF40Q5 (Bipolar NPN/PNP)	
		2 m	QS18VN6AF40	QS18VP6AF40
		4-pin Euro Pigtail QD	QS18VN6AF40Q5	QS18VP6AF40Q5
 ADJUSTABLE-FIELD BACKGROUND SUPPRESSION	1 mm to cutoff point (adjustable between 20-100 mm)	2 m	QS18VN6AF100	QS18VP6AF100
		4-pin Euro Pigtail QD	QS18VN6AF100Q5	QS18VP6AF100Q5
LASER (CLASS 1)  ADJUSTABLE-FIELD BACKGROUND SUPPRESSION	1 mm to cutoff point (adjustable between 30-150 mm)	2 m	QS18VN6LAF	QS18VP6LAF
		4-pin Euro Pigtail QD	QS18VN6LAFQ5	QS18VP6LAFQ5
LASER (CLASS 2)  ADJUSTABLE-FIELD BACKGROUND SUPPRESSION	20 mm to cutoff point (adjustable between 50-250 mm)	2 m	QS18VN6LAF250	QS18VP6LAF250
		4-pin Euro Pigtail QD	QS18VN6LAF250Q5	QS18VP6LAF250Q5

Adjustable-Field Background

- Background suppression models for reliable detection of objects when the background condition is not controlled or fixed
- Simple multiturn screw adjustment of cutoff distance
- Enhanced immunity to fluorescent lights
- Crosstalk immunity algorithm allows two sensors to be used in close proximity
- Visible red emitter

For more specifications see page 43.

Connection options: A model with a QD requires a mating cordset (see page 42).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS18EN6LP W/30).

QD models

- For 4-pin integral Euro-style QD, add suffix Q8 (example, QS18EN6LPQ8).
- For 4-pin integral Pico-style QD, add suffix Q7 (example, QS18EN6LPQ7).
- For 4-pin 150 mm Euro-style pigtail QD, add suffix Q5 (example, QS18EN6LPQ5).
- For 4-pin 150 mm Pico-style pigtail QD, add suffix Q (example, QS18EN6LPQ).

* Contact factory at 1-888-373-6767 for Bipolar NPN/PNP output model options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



QS18 Universal Voltage
Versatile Sensors Operate on AC or DC Voltage

The QS18 Universal Voltage Sensor operates on ac or dc voltage and has several sensing modes available, making it an ideal sensor for many manufacturing environments.

- Meets IP67 and NEMA 6 standards for use in harsh environments
- Universal housing for global use
- Versatile sensor with many mounting options
- Ready to hook up out of the box
- Cordsets and brackets see page 42

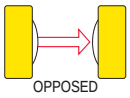


Conveyor Jam Detection Using Opposed-Mode Sensors

When an object is lodged in front of the sensor an output is triggered, alerting personnel to the presence of the jam. QS18 Universal Voltage sensors can be connected to either ac or dc power, allowing them to operate in applications already using ac power without requiring a separate power supply.

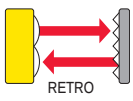
Opposed QS18 Universal Voltage, 20-140 V AC/DC or 20-270 V AC/DC

Infrared LED

Sensing Mode	Range	Output††	Models* LO	Models* DO
 OPPOSED	20 m	—	QS18WE Emitter	
		N-MOSFET (Sinking)	QS18ANWR	QS18RNWR
		P-MOSFET (Sourcing)	QS18APWR	QS18RPWR

Polar Retro & Retro
QS18 Universal Voltage, 20-140 V AC/DC or 20-270 V AC/DC

Visible Red LED

Sensing Mode	Range	Output††	Models* LO	Models* DO
 POLAR RETRO	3.5 m†	N-MOSFET (Sinking)	QS18ANWLP	QS18RNWLP
		P-MOSFET (Sourcing)	QS18APWLP	QS18RPWLP
 RETRO	6.5 m†	N-MOSFET (Sinking)	QS18ANWLV	QS18RNWLV
		P-MOSFET (Sourcing)	QS18APWLV	QS18RPWLV

For more specifications see page 45.

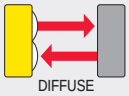
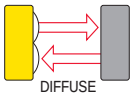
Connection options: A model with a QD requires a mating cordset (see page 42).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS18WE W/30).
QD models
• For 4-pin 150 mm Micro-style pigtail QD, add suffix Q2 to the model number (example, QS18WEQ2).
600V cable models: Standard models are supplied with 300V cable. For a 600V cable, add suffix C1 to the 2 m model number (example, QS18WEC1).
† Retroreflective range is specified using one model BRT-84 retroreflector.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.
†† MOSFET: Metal oxide semiconductor field-effect transistor.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Diffuse QS18 Universal Voltage, 20-140 V AC/DC or 20-270 V AC/DC

Visible Red LED
Infrared LED

Sensing Mode	Range	Connection††	Models* LO	Models* DO
 DIFFUSE	450 mm	N-MOSFET (Sinking)	QS18ANWDL	QS18RNWDL
		P-MOSFET (Sourcing)	QS18APWDL	QS18RPWDL
 DIFFUSE	1 m	N-MOSFET (Sinking)	QS18ANWDXL	QS18RNWDXL
		P-MOSFET (Sourcing)	QS18APWDXL	QS18RPWDXL

For more specifications see page 42.

Connection options: A model with a QD requires a mating cordset (see page 45).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS18WE W/30).
QD models
• For 4-pin 150 mm Micro-style pigtail QD, add suffix Q2 to the model number (example, QS18WEQ2).
600V cable models: Standard models are supplied with 300V cable. For a 600V cable, add suffix C1 to the 2 m model number (example, QS18WEC1).
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.
†† MOSFET: Metal oxide semiconductor field-effect transistor.

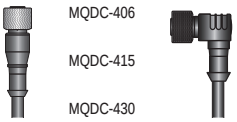
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for ..Q8 or ..Q5 models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA



Pico QD (for ..Q7 or ..Q models)

See page 906

Length	Snap-on 4-Pin Straight	Snap-on 4-Pin Right-Angle
2.00 m	PKG4-2	PKW4Z-2



Micro QD (for ..Q2 models)

See page 925

Length	Threaded 4-Pin Straight
1.83 m	MQAC-406
4.57 m	MQAC-415
9.14 m	MQAC-430



Euro QD with Shield

See page 909

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDEC2-406	MQDEC2-406RA
4.57 m	MQDEC2-415	MQDEC2-415RA
9.14 m	MQDEC2-430	MQDEC2-430RA



Pico QD with Shield

See page 906

Length	Snap-on 4-Pin Straight	Snap-on 4-Pin Right-Angle
2.00 m	PKG4S-2	PKW4ZS-2



Additional cordset information available. See page 904.

Brackets

QS18

See page 859	See page 860	See page 865	See page 865	See page 861
SMB18A	SMB18FA..	SMBQS18A	SMBQS18AF	SMB18SF

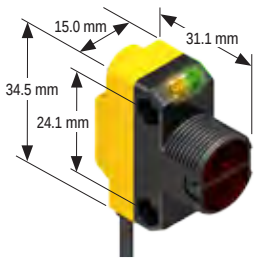


Additional brackets and information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966

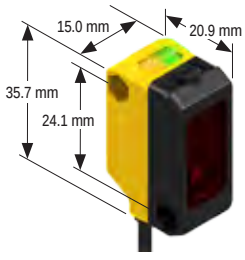




Opposed, Retroreflective,
Laser Retroreflective, Convergent,
Diffuse, Laser Diffuse and Fixed-Field Models
Suffix E, R, LV, LP, LLP, CV15, CV45, D, DV, LD, LE and FF



Opposed, Diffuse and Divergent Diffuse Models
Suffix EB, RB, DB and W



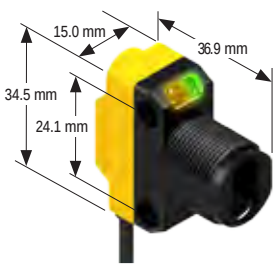
Adjustable-Field Models
Suffix AFF, AF and LAF



Opposed, Retroreflective,
Polar Retroreflective and Diffuse Models
Suffix E, R, LP, LV, DL and XL



Plastic Fiber Models
Suffix FP



Glass Fiber Models
Suffix F

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

QS18, DC, Laser, Adjustable-Field Specifications

Supply Voltage and Current	**Retroreflective, Diffuse and Adjustable-Field Laser:** 10 to 30 V dc (10% max. ripple) at less than 15 mA, exclusive of load **Laser Emitters:** 10 to 30 V dc (10% max. ripple) at less than 35 mA **Adjustable-Field (40, 200 & 300 mm):** 10 to 30 V dc (10% max. ripple) at less than 27 mA **All Others:** 10 to 30 V dc (10% max. ripple) at less than 25 mA, exclusive of load
Laser Characteristics (Laser models only)	**Wavelength: Class 1:** 650 nm visible red **Class 2:** Adjustable-Field—658 nm visible red Laser Emitter—650 nm visible red
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Laser Control (Emitters only)	Apply 0 V dc to white wire to enable beam Apply +10 to 30 V dc to white wire to inhibit beam **Enable Time: Class 1**—240 ms **Class 2**—8 ms **Disable time: Class 1**—100 ms **Class 2**—1 ms
Output Configuration*	**Solid-state complementary:** NPN (current sinking), PNP (current sourcing), or bipolar (both sinking and sourcing depending on model) **Rating:** 100 mA total output current **OFF-state leakage current:** Adjustable-Field LED (40, 200 & 300 mm), Retroreflective, Diffuse and Adjustable-Field Laser: **NPN:** less than 200 µA @ 30 V dc (see Application Note 1) **PNP:** less than 10 µA @ 30 V dc **Fixed-Field:** less than 200 µA @ 30 V dc **All others:** less than 50 µA @ 30 V dc ON-state saturation voltage: Adjustable-Field LED (40, 200 & 300 mm), Retroreflective, Diffuse and Adjustable-Field Laser: **NPN:** less than 1.6 V @ 100 mA **PNP:** less than 3.0 V @ 100 mA **All others:** less than 1 V @ 10 mA; less than 1.5 V @ 100 mA Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time*	**Opposed:** 750 microseconds ON; 375 microseconds OFF **Retroreflective Laser, Diffuse Laser and Adjustable-Field (100, 150 & 250 mm):** 700 microseconds ON/OFF **Adjustable-Field (40, 200 & 300 mm):** 2.8 milliseconds ON/OFF **Fixed-Field:** 850 microseconds ON/OFF **All others:** 600 microseconds ON/OFF
Delay at Power-up	**Laser Emitters: Class 1**—250 milliseconds **Class 2**—10 milliseconds **Adjustable-Field LED (40, 200 & 300 mm), Retroreflective, Diffuse and Adjustable-Field Laser:** 200 milliseconds; outputs do not conduct during this time. **All others:** 100 milliseconds; outputs do not conduct during this time.
Repeatability*	**Opposed:** 100 microseconds **Retroreflective Laser, Diffuse Laser and Adjustable-Field Laser:** 130 microseconds **Adjustable-Field LED (100 mm):** 175 microseconds **Adjustable-Field LED (40, 200 & 300 mm):** 250 microseconds **Fixed-Field:** 160 microseconds **All Others:** 150 microseconds
Adjustments*	**Retro, Retro Laser, Convergent, Diffuse, Diffuse Laser and Glass & Plastic Fiber Optic:** Single-turn sensitivity (Gain) adjustment potentiometer **Adjustable-Field:** Five-turn adjustment screw sets cutoff distance between min. and max. position
Indicators	**Laser Emitters: Green LED:** Power applied **All others, 2 LED indicators: (Green:** Power ON **Yellow:** Light sensed) See data sheet for detailed information
Construction	ABS housing; acrylic lens cover (Laser Emitter models have PMMA window) 2.5 mm (adjustable-field only) and 3 mm mounting hardware included
Environmental Rating	Rated IEC IP67; NEMA 6; UL Type 1
Connections	2 m or 9 m 4-wire PVC cable, or 4-pin 150 mm pigtail Pico-style QD (Q), or 4-pin 150 mm pigtail Euro-style QD (Q5), or 4-pin Integral Pico-style QD (Q7), or 4-pin Integral Euro-style QD (Q8), depending on model. QD cordsets are ordered separately. See page 42.
Operating Conditions	Lasers / Adjustable-Field LED (100 mm) / Adjustable-Field LED (40, 200 & 300 mm) / All others **Temperature:** -10° to +50° C / 0° to +55° C / -20° to +55° C / -20° to +70° C **Relative humidity:** 95% @ 50° C (non-condensing)
Laser Classification (Laser models only)	Class 1 and Class 2 laser product; complies with IEC 60825-1: 2001 and 21 CFR 1040.10, except deviations pursuant to Laser Notice 50, dated 7-26-01.
Certifications	CE c UL us
Application Notes	AF models: NPN off-state leakage current is < 200 µA for load resistances > 3 kΩ or optically isolated loads. For load current of 100 mA, leakage is < 1% of load current
Hookup Diagrams	**LED Emitters:** DC02 (p. 974) **Single output:** DC03 (p. 974) **Bipolar:** DC04 (p. 974) **Laser Emitters:** DC22 (p. 979)

* Does not apply to laser emitter models.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

QS18 *Expert*™ Specifications

Supply Voltage	10 to 30 V dc (10% max. ripple) at less than 35 mA, exclusive of load; 10 to 24 V dc @ greater than 55° C
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state NPN (current sinking) or PNP (current sourcing), depending on model Light (LO) or Dark Operate (DO) selectable Selectable 30 millisecond output OFF-delay Rating: 100 mA max. OFF-state leakage current: less than 50 µA @ 30 V dc ON-state saturation voltage: less than 1.5 V (2 m cable); 1.7 V (9 m cable) Protected against false pulse on power-up and continuous overload or short circuit of output
Output Response Time	600 microseconds ON/OFF
Delay at Power-up	Momentary delay on power-up; outputs do not conduct during this time
Repeatability	75 microseconds
Adjustments	Thresholds: Push-button/remote-wire configurable *Expert*™-style TEACH and SET options: Light/Dark Operate: selectable by programming order (load output follows the first taught target condition) Push-button enable/disable: remote wire only See data sheet for detailed information
Indicators	2 LED indicators: Green: RUN mode, output short-circuit Yellow: Output ON/marginal, TEACH mode
Construction	ABS housing
Environmental Rating	Meets NEMA 6; IEC IP67; UL Type 1
Connections	2 m or 9 m 4-wire PVC cable, or 4-pin 150 mm pigtail Pico-style QD (Q), or 4-pin 150 mm pigtail Euro-style QD (Q5), or 4-pin Integral Pico-style QD (Q7), or 4-pin Integral Euro-style QD (Q8). QD cordsets are ordered separately. See page 42.
Operating Conditions	Temperature: -20° to +70° C Relative humidity: 90% @ 50° C (non-condensing)
Certifications	CE c UL US
Hookup Diagrams	DC07 (p. 975)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

QS18 Universal Voltage Specifications

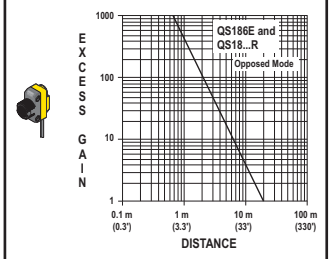
Supply Voltage	P-MOSFET Models: 20 to 140 V ac/dc @ < 10 mA, exclusive of load N-MOSFET Models: 20 to 270 V ac/dc @ < 10 mA, exclusive of load	
Supply Protection Circuitry	Protected against reverse polarity and transient over-voltages	
Output Configuration	Single Discrete Output, 100 mA load rating N-MOSFET or P-MOSFET, depending on model number Light Operate or Dark Operate, depending on model number	
Output Rating	P-MOSFET models 100 mA with short circuit protection OFF-state leakage current: < 400 µA ON-state saturation voltage: 2.75 V	N-MOSFET models 100 mA with short circuit protection OFF-state leakage current: < 400 µA ON-state saturation voltage: 2.5 V
Output Protection Circuitry	Protected against output short-circuit and false pulse on power up Latching short-circuit protection; reset by cycling power	
Delay at Power-up	100 milliseconds max. dc, 300 milliseconds max. ac; outputs do not conduct during this time	
Repeatability	1.5 milliseconds	
Output Response Time	Opposed mode: 16.6 milliseconds (1 cycle at 60 Hz) All other modes: 8.3 milliseconds (½ cycle at 60 Hz)	
Adjustments	Diffuse, Retroreflective and Polarized Retroreflective models only: 1-turn potentiometer Sensitivity (Gain) adjustment	
Indicators	Green: Power ON Yellow: Light Sensed	
Construction	Housing: ABS Lenses: PMMA Gain Adjuster: acetal	
Environmental Rating	IEC IP67 (NEMA 6); 1200 PSI washdown NEMA ICS5, Annex F-2002 (PW12); UL Type 1	
Connections	2 m 3-conductor, 22 AWG PVC cable (300 V ac), or 150 mm pigtail PVC cable with 4-pin threaded Micro-style connector; C1 suffix models: 2 m 3-conductor, 22 AWG PVC cable (600 V ac)	
Operating Conditions	Temperature: Less than 140 V ac/dc: −25° to +70° C (N-MOSFET and P-MOSFET models) 140 V ac/dc or greater: −25° to +55° C (N-MOSFET models only) Max. Relative Humidity: 95% @ 55° C (non-condensing)	
Certifications	CE c UL us LISTED 8N35 IND. CONT. EQ.	
Hookup Diagrams	Cabled Emitters: UN03 (p. 984) Other cable models: UN05 (p. 985) QD Emitters: UN04 (p. 984) Other QD models: UN06 (p. 985)	

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves (Diffuse mode performance based on 90% reflectance white test card)

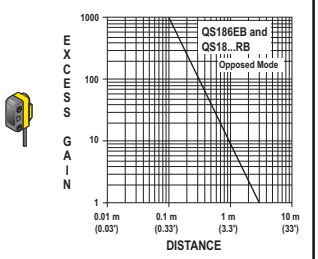
○ = Infrared LED ● = Visible Red LED P = Visible Red LED Polarized LP = Visible Red Laser Polarized ✸ = Visible Red Laser

Opposed Mode WORLD-BEAM® QS18



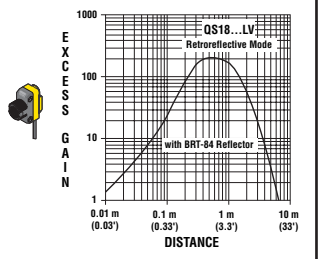
Range: 20 m | LED: ○

Opposed Mode WORLD-BEAM® QS18



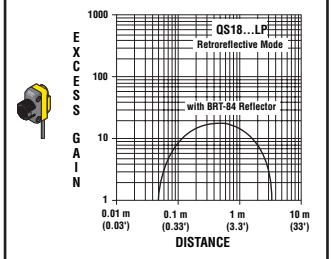
Range: 3 m | LED: ○

Retroreflective Mode WORLD-BEAM® QS18



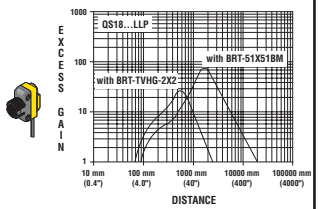
Range: 6.5 m | LED: ●

Polarized Retroreflective Mode WORLD-BEAM® QS18



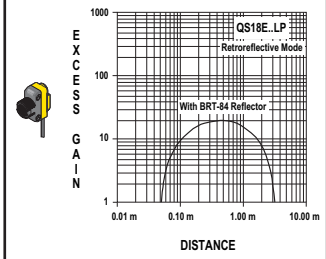
Range: 3.5 m | LED: P

Retroreflective Mode WORLD-BEAM® QS18 Class 1 Laser



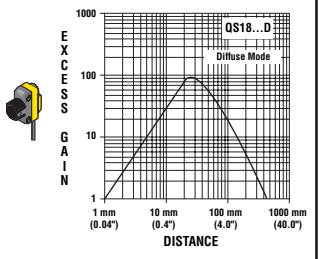
Range: 20 m | LED: LP

Polarized Retroreflective Mode WORLD-BEAM® QS18 *Expert*™



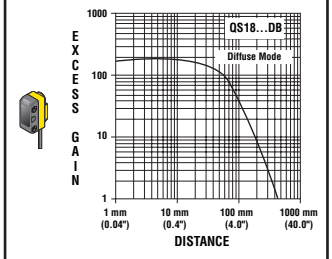
Range: 3.5 m | LED: P

Diffuse Mode WORLD-BEAM® QS18



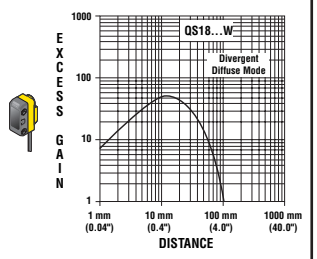
Range: 450 mm | LED: ○

Diffuse Mode WORLD-BEAM® QS18



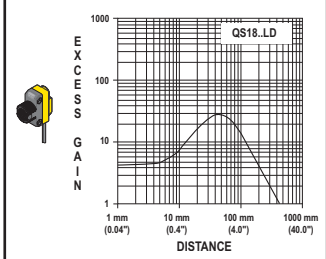
Range: 450 mm | LED: ○

Divergent Diffuse Mode WORLD-BEAM® QS18



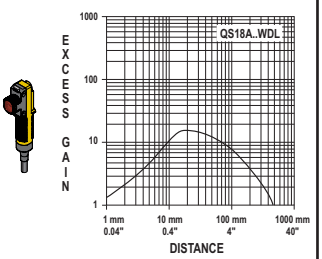
Range: 100 mm | LED: ○

Diffuse Mode WORLD-BEAM® QS18 Class 1 Laser



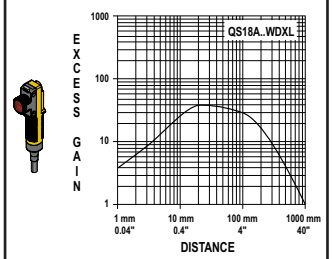
Range: 300 mm | LED: ✸

Diffuse Mode WORLD-BEAM® QS18



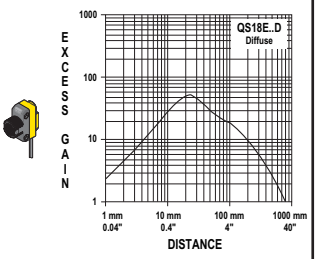
Range: 450 mm | LED: ●

Diffuse Mode WORLD-BEAM® QS18



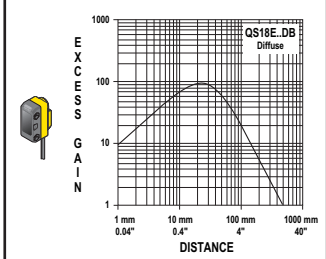
Range: 1 m | LED: ○

Diffuse Mode WORLD-BEAM® QS18 *Expert*™



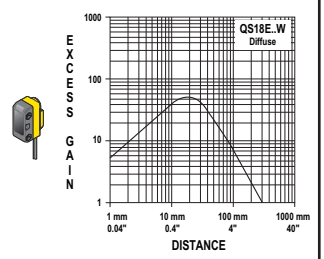
Range: 800 mm | LED: ○

Diffuse Mode WORLD-BEAM® QS18 *Expert*™



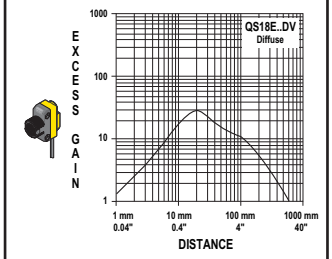
Range: 500 mm | LED: ○

Divergent Diffuse Mode WORLD-BEAM® QS18 *Expert*™



Range: 300 mm | LED: ○

Diffuse Mode WORLD-BEAM® QS18 *Expert*™



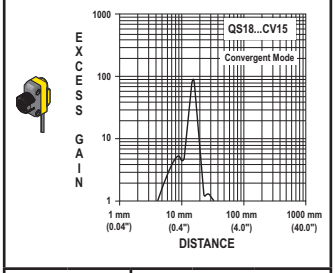
Range: 600 mm | LED: ●

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves (Convergent, Diffuse, Adjustable-Field and Fixed-Field mode performance based on 90% reflectance white test card)

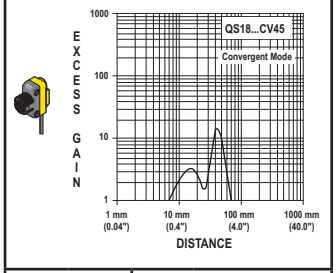
○ = Infrared LED ● = Visible Red LED ✸ = Visible Red Laser

Convergent Mode WORLD-BEAM® QS18



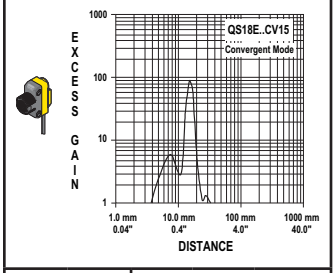
Range: 16 mm | LED: ●

Convergent Mode WORLD-BEAM® QS18



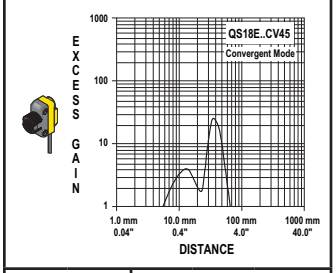
Range: 43 mm | LED: ●

Convergent Mode WORLD-BEAM® QS18 *Expert*™



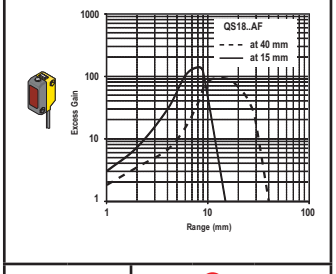
Range: 16 mm | LED: ●

Convergent Mode WORLD-BEAM® QS18 *Expert*™



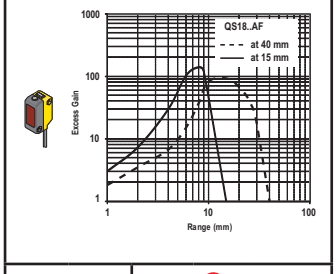
Range: 43 mm | LED: ●

Adjustable-Field Mode WORLD-BEAM® QS18 Background Suppression



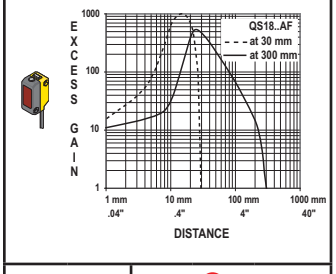
Cutoff: 15-40 mm | LED: ●

Adjustable-Field Mode WORLD-BEAM® QS18 Foreground Suppression



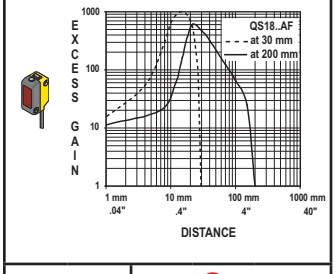
Cutoff: 15-40 mm | LED: ●

Adjustable-Field Mode WORLD-BEAM® QS18 Background Suppression



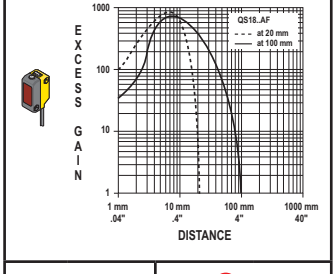
Cutoff: 30-300mm | LED: ●

Adjustable-Field Mode WORLD-BEAM® QS18 Foreground Suppression



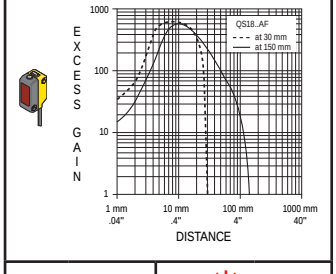
Cutoff: 30-200mm | LED: ●

Adjustable-Field Mode WORLD-BEAM® QS18



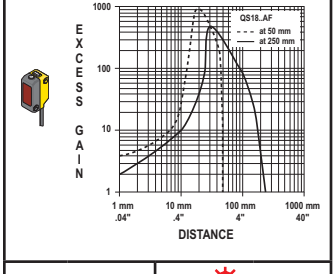
Cutoff: 20 -100 mm | LED: ●

Adjustable-Field Mode WORLD-BEAM® QS18 Class 1 Laser



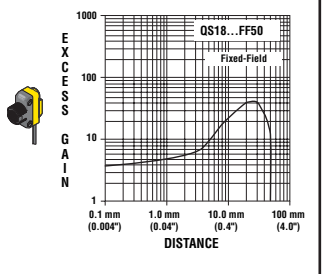
Cutoff: 30 -150 mm | LED: ✸

Adjustable-Field Mode WORLD-BEAM® QS18 Class 2 Laser



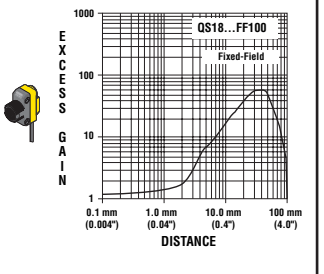
Cutoff: 50 - 250 mm | LED: ✸

Fixed-Field Mode WORLD-BEAM® QS18



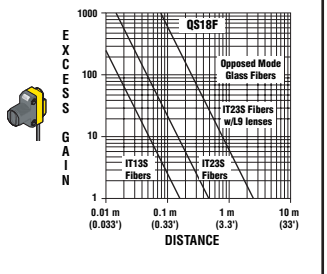
Cutoff: 50 mm | LED: ●

Fixed-Field Mode WORLD-BEAM® QS18



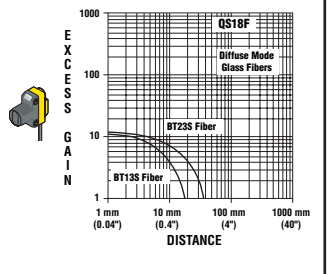
Cutoff: 100 mm | LED: ●

Opposed Mode—Glass Fiber WORLD-BEAM® QS18



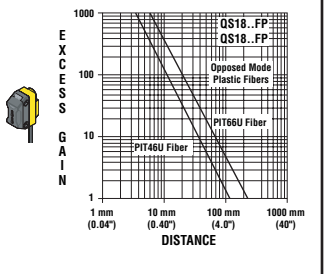
Range: Varies | LED: ○

Diffuse Mode—Glass Fiber WORLD-BEAM® QS18



Range: Varies | LED: ○

Opposed Mode—Plastic Fiber WORLD-BEAM® QS18



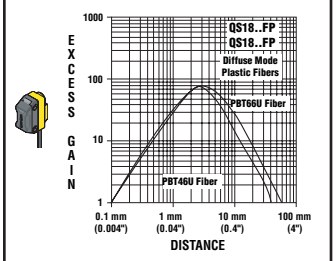
Range: Varies | LED: ●

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves (Diffuse mode performance based on 90% reflectance white test card)

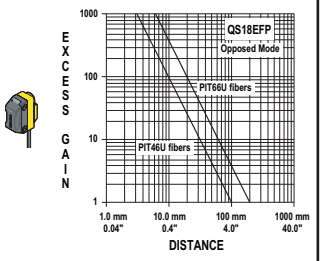
● = Visible Red LED

Diffuse Mode—Plastic Fiber WORLD-BEAM® QS18



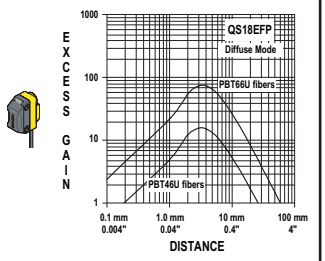
Range: Varies | LED: ●

Opposed Mode—Plastic Fiber WORLD-BEAM® QS18 *Expert*™



Range: Varies | LED: ●

Diffuse Mode—Plastic Fiber WORLD-BEAM® QS18 *Expert*™



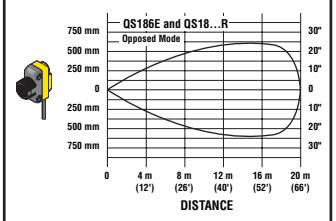
Range: Varies | LED: ●

Beam Patterns (Diffuse mode performance based on 90% reflectance white test card)

○ = Infrared LED ● = Visible Red LED P = Visible Red LED Polarized

Opposed Mode WORLD-BEAM® QS18

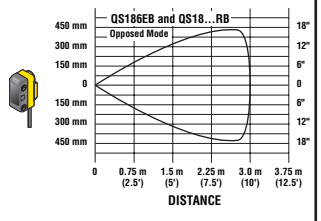
Effective Beam: 13 mm



Range: 20 m | LED: ○

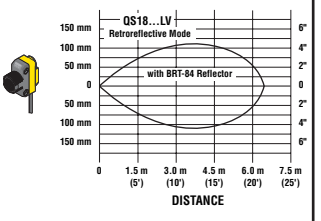
Opposed Mode WORLD-BEAM® QS18

Effective Beam: 13 mm



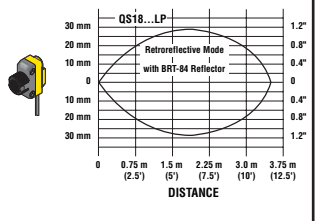
Range: 3 m | LED: ○

Retroreflective Mode WORLD-BEAM® QS18



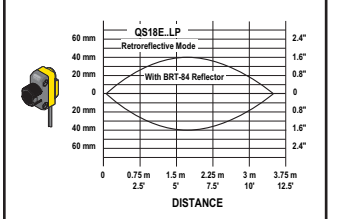
Range: 6.5 m | LED: ●

Polarized Retroreflective Mode WORLD-BEAM® QS18



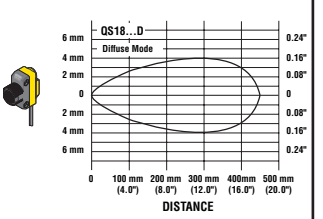
Range: 3.5 m | LED: P

Polarized Retroreflective Mode WORLD-BEAM® QS18 *Expert*™



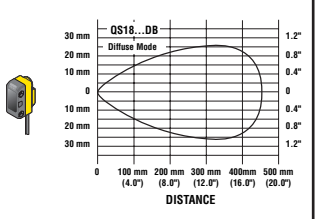
Range: 3.5 m | LED: P

Diffuse Mode WORLD-BEAM® QS18



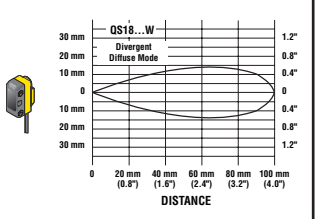
Range: 450 mm | LED: ○

Diffuse Mode WORLD-BEAM® QS18



Range: 450 mm | LED: ○

Divergent Diffuse Mode WORLD-BEAM® QS18



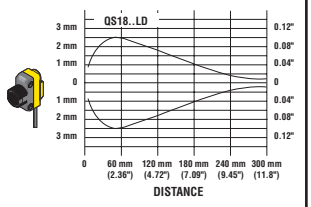
Range: 100 mm | LED: ○

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Beam Patterns (Diffuse and Convergent mode performance based on 90% reflectance white test card)

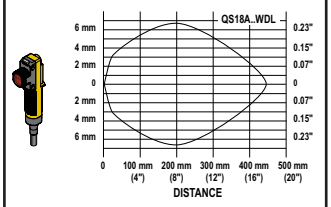
○ = Infrared LED ● = Visible Red LED ✸ = Visible Red Laser

Diffuse Mode WORLD-BEAM® QS18 Class 1 Laser



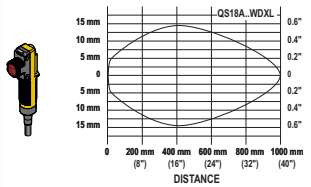
Range: 300 mm | LED: ✸

Diffuse Mode WORLD-BEAM® QS18



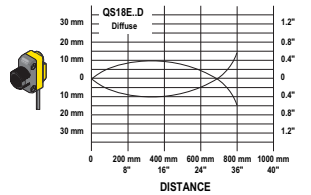
Range: 450mm | LED: ●

Diffuse Mode WORLD-BEAM® QS18



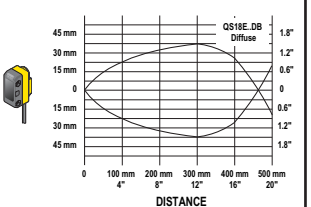
Range: 1 m | LED: ○

Diffuse Mode WORLD-BEAM® QS18 *Expert*™



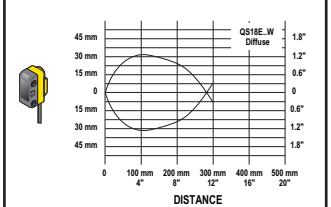
Range: 800 mm | LED: ○

Diffuse Mode WORLD-BEAM® QS18 *Expert*™



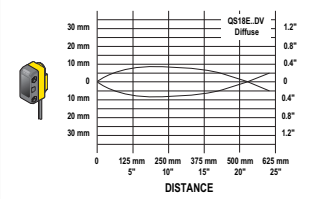
Range: 500 mm | LED: ○

Diffuse Mode WORLD-BEAM® QS18 *Expert*™



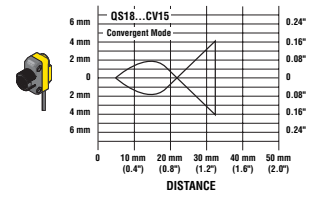
Range: 300 mm | LED: ○

Diffuse Mode WORLD-BEAM® QS18 *Expert*™



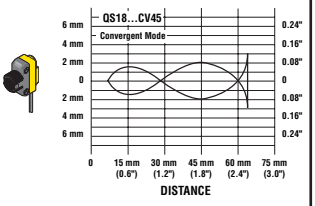
Range: 600 mm | LED: ●

Convergent Mode WORLD-BEAM® QS18



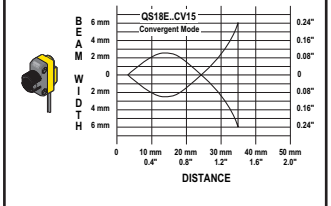
Range: 16 mm | LED: ●

Convergent Mode WORLD-BEAM® QS18



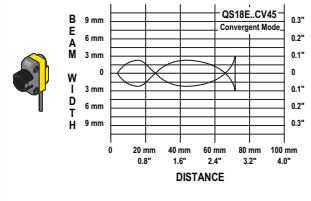
Range: 43 mm | LED: ●

Convergent Mode WORLD-BEAM® QS18 *Expert*™



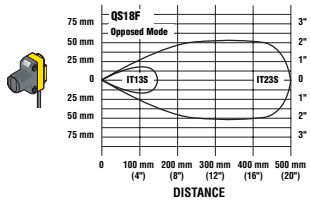
Range: 16 mm | LED: ●

Convergent Mode WORLD-BEAM® QS18 *Expert*™



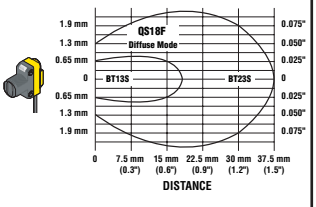
Range: 43 mm | LED: ●

Opposed Mode—Glass Fiber WORLD-BEAM® QS18



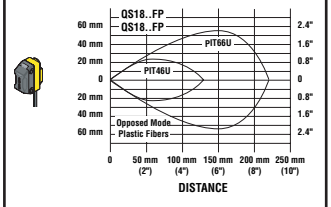
Range: Varies | LED: ○

Diffuse Mode—Glass Fiber WORLD-BEAM® QS18



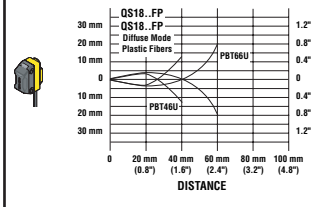
Range: Varies | LED: ○

Opposed Mode—Plastic Fiber WORLD-BEAM® QS18



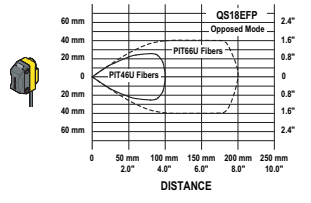
Range: Varies | LED: ●

Diffuse Mode—Plastic Fiber WORLD-BEAM® QS18



Range: Varies | LED: ●

Opposed Mode—Plastic Fiber WORLD-BEAM® QS18 *Expert*™

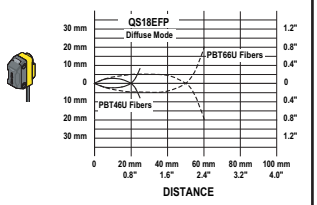


Range: Varies | LED: ●

Beam Patterns (Diffuse mode performance based on 90% reflectance white test card)

● = Visible Red LED

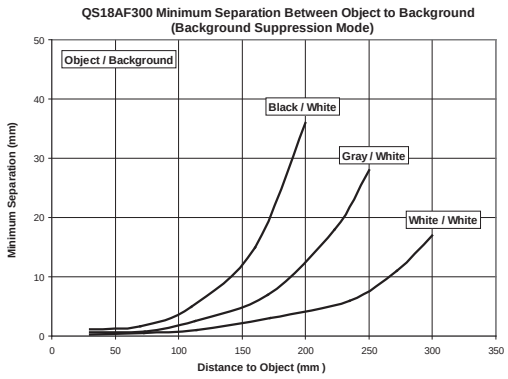
Diffuse Mode—Plastic Fiber
WORLD-BEAM® QS18 *Expert*™



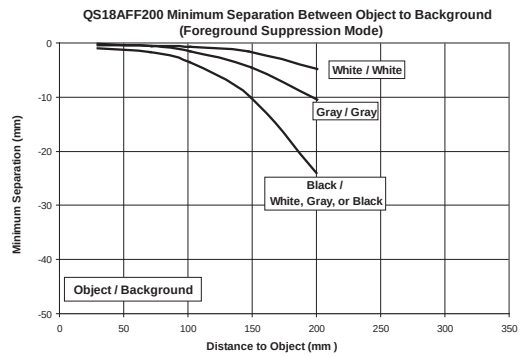
Range: Varies	LED: ●

Minimum Separation Distance

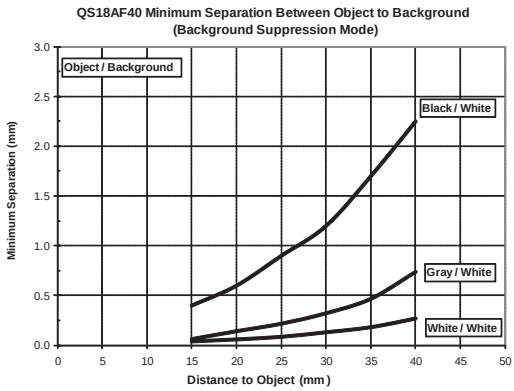
WORLD-BEAM® QS18 Adjustable-Field Background Suppression LED (30-300 mm)



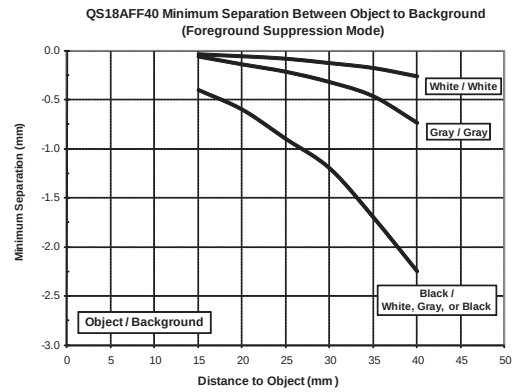
WORLD-BEAM® QS18 Adjustable-Field Foreground Suppression LED (30-200 mm)



WORLD-BEAM® QS18 Adjustable-Field Background Suppression LED (15-40 mm)



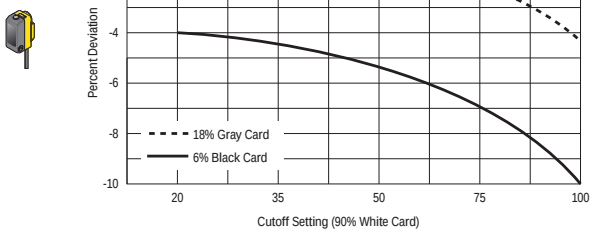
WORLD-BEAM® QS18 Adjustable-Field Foreground Suppression LED (15-40 mm)



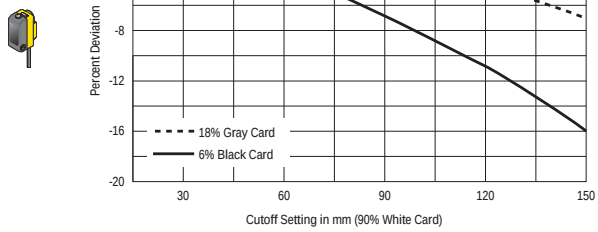
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cutoff Point Deviation

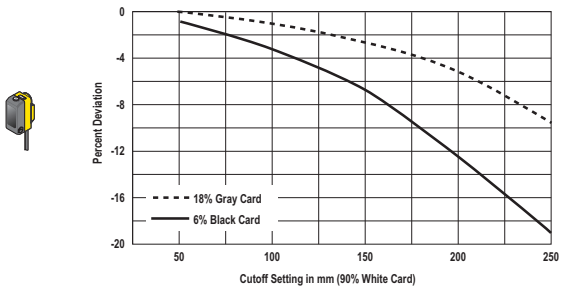
WORLD-BEAM® QS18 Adjustable-Field Background Suppression LED (20-100 mm)



WORLD-BEAM® QS18 Adjustable-Field Background Suppression Class 1 Laser (30-150 mm)



WORLD-BEAM® QS18 Adjustable-Field Background Suppression Class 2 Laser (50-250 mm)



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



QS30 Sensors
High-Performance, Long-Range Sensors

The QS30 is a line of specialized photoelectric sensors that have the ability to differentiate colors in low contrast applications.

- Right-angle, barrel- and side-mount sensors
- Specialized models for reliable detection of water or liquids containing water



QS30 page 54

Eight sensing modes for solving most applications: opposed, retroreflective, convergent, diffuse, plastic and glass fiber optic, and adjustable-field and fixed-field. High-performance sensing with visible, long-range Class 1 and 2 lasers with narrow effective beam for small object detection and precise position control.



QS30 *Expert*™ page 56

Single push-button programming with five advanced sensing options for reliable detection of reflective objects.



QS30 Adjustable-Field page 58

Background suppression models for detection of objects when the background condition is not fixed, and foreground suppression models for detection when background is fixed and object varies in color or shape.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



QS30 Universal Voltage page 59

Compact ac or dc powered sensor can be used in almost any mounting configuration, including 18 mm barrel, base or side mounting.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



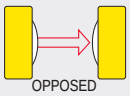
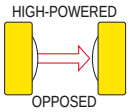
QS30
DC-Operated Long-Range Sensors

The QS30DC sensor is a specialized photoelectric sensor that has high performance and long range with a consistent voltage source.

- Ability to work reliably in low contrast applications
- Ability to detect liquid in translucent and opaque bottles
- Right-angle, barrel- and side-mount sensors
- Rated to IP67 for use in harsh environments
- Cordsets and brackets see page 60

Opposed QS30, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Model
 OPPOSED	60 m	2 m 5-pin Euro QD	—	QS30E Emitter*
				QS30EQ Emitter*
		2 m 5-pin Euro QD	Bipolar NPN/PNP	QS30R
				QS30RQ
 HIGH-POWERED OPPOSED	213 m	2 m 5-pin Euro QD	—	QS30EX Emitter
				QS30EXQ Emitter
		2 m 5-pin Euro QD	Bipolar NPN/PNP LO	QS30ARX
				QS30ARXQ
		2 m 5-pin Euro QD	Bipolar NPN/PNP DO	QS30RRX
				QS30RRXQ

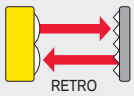


Case Entry Detection Using Polar Retroreflective Sensors

The QS30LP verifies that there is a box present to be picked up before being sent to the palletizer. Shrink wrap is placed around the boxes on the pallet before being shipped.

Retro & Polar Retro QS30, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Model
 RETRO	12 m†	2 m 5-pin Euro QD	Bipolar NPN/PNP	QS30LV
				QS30LVQ
 POLAR RETRO	8 m†	2 m 5-pin Euro QD	Bipolar NPN/PNP	QS30LP
				QS30LPQ

For more specifications see page page 61.

Connection options: A model with a QD requires a mating cordset (see page 60).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS30R W/30).

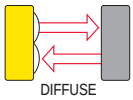
* Standard emitters will only work with standard receivers.

† Retroreflective range is specified using one model BRT-84 retroreflector.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

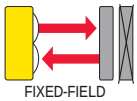
Diffuse QS30, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Model
 DIFFUSE	1 m	2 m	Bipolar NPN/PNP	QS30D
		5-pin Euro QD		QS30DQ

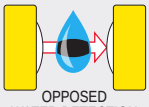
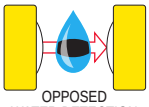
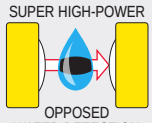
Fixed-Field QS30, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Model
 FIXED-FIELD	200 mm Cutoff	2 m	Bipolar NPN/PNP	QS30FF200
		5-pin Euro QD		QS30FF200Q
	400 mm Cutoff	2 m	Bipolar NPN/PNP	QS30FF400
		5-pin Euro QD		QS30FF400Q
	600 mm Cutoff	2 m	Bipolar NPN/PNP	QS30FF600
		5-pin Euro QD		QS30FF600Q

Opposed Water Detection QS30, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Model
 OPPOSED WATER DETECTION	4 m†	2 m	—	QS30EXH2O Emitter*
		5-pin Euro Pigtail QD		QS30EXH2OQ5 Emitter*
		2 m	Bipolar NPN/PNP LO	QS30ARXH2O
		5-pin Euro Pigtail QD		QS30ARXH2OQ5
		2 m	Bipolar NPN/PNP DO	QS30RRXH2O
		5-pin Euro Pigtail QD		QS30RRXH2OQ5
 OPPOSED WATER DETECTION	2 m†	2 m	Bipolar NPN/PNP LO	QS30ARH2O
		5-pin Euro Pigtail QD		QS30ARH2OQ5
		2 m	Bipolar NPN/PNP DO	QS30RRH2O
		5-pin Euro Pigtail QD		QS30RRH2OQ5
 SUPER HIGH-POWER OPPOSED WATER DETECTION	8 m†	2 m	—	QS30EXSH2O Emitter*
		5-pin Euro Pigtail QD		QS30EXSH2OQ5 Emitter*
		2 m	Bipolar NPN/PNP LO	QS30ARXSH2O
		5-pin Euro Pigtail QD		QS30ARXSH2OQ5
		2 m	Bipolar NPN/PNP DO	QS30RRXSH2O
		5-pin Euro Pigtail QD		QS30RRXSH2OQ5

For more specifications see page page 61.

Connection options: A model with a QD requires a mating cordset (see page 60).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS30D W/30).

* Super High-Power emitters will only work with Super High-Power receivers.

† Sensors can be used at ranges greater than listed for applications that require less excess gain. Please consult the factory for assistance on your long-range applications. Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



QS30 *Expert*™
High-Performance with Push-Button Programming

The QS30 *Expert*™ has high-performance sensing for challenging applications and is easy to align with an 8-segment LED bargraph.

- Available in laser retroreflective, diffuse, laser diffuse and retroreflective sensing modes
- Visible red LED or laser for easy alignment
- Models available for reliable clear object detection
- Models available for small object detection and precision control
- Cordsets and brackets see page 60

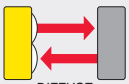
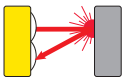
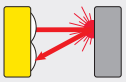
TEACH Mode

Sensors can be configured via any of five TEACH or SET options (by push button or the remote wire) to define the sensing limits. Sensing limit configuration options include:

- Static TEACH: one switching threshold, determined by two taught conditions
- Dynamic (on-the-fly) TEACH: one switching threshold, determined by multiple sampled conditions
- Light SET and Dark SET: one switching threshold, offset from a single sensing condition (the "dark" condition or the "light" condition
- Window SET: a sensing window, centered around a single sensing condition

Diffuse QS30 *Expert*™, 10-30 V DC

Visible Red LED Visible Red Laser

Sensing Mode	Laser Class	Range	Connection	Model Bipolar NPN/PNP
 DIFFUSE	—	High-Speed: 1100 mm Normal: 1400 mm	2 m 5-pin Euro QD	QS30EDV QS30EDVQ
 DIFFUSE LASER	Class 1	400 mm	2 m 5-pin Euro QD	QS30LD QS30LDQ
 DIFFUSE LASER	Class 2	800 mm	2 m 5-pin Euro QD	QS30LDL QS30LDLQ

For more specifications see page 62.

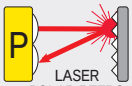
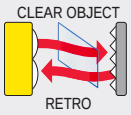
Connection options: A model with a QD requires a mating cordset (see page 60).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS30EDV W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Laser Retro & Polar Retro QS30 *Expert*™, 10-30 V DC

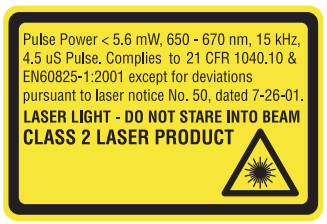
Visible Red LED — Visible Red Laser

Sensing Mode	Laser Class	Range	Connection	Model Bipolar NPN/PNP
	Class 1	0.2-18 m†	2 m 5-pin Euro QD	QS30LLP QS30LLPQ
	Class 1 (low contrast)	0.2-18 m†	2 m 5-pin Euro QD	QS30LLPC QS30LLPCQ
	—	100 mm to 2 m††	2 m 5-pin Euro QD	QS30ELVC QS30ELVCQ

For safe laser use (Class 1 or Class 2):
- Do not permit a person to stare at the laser from within the beam
- Do not point the laser at a person's eye at close range
- Terminate the beam emitted by a Class 2 laser product at the end of its useful path
- Locate open laser beam paths either above or below eye level, where practical



Class 1 Laser Sensors
Lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing. Reference IEC 60825-1: 2001, section 8.2.



Class 2 Lasers
Lasers that emit visible radiation in the wavelength range from 400 nm to 700 nm, where eye protection is normally afforded by aversion responses, including the blink reflex. This reaction may be expected to provide adequate protection under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing. Reference IEC 60825-1:2001, section 8.2.

For more specifications see page 62.

Connection options: A model with a QD requires a mating cordset (see page 60).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS30LLP W/30).

† Retroreflective range is specified using one model BRT-51X51BM retroreflector. BRT-TVHG-2X2 and BRT-51X51BM are included. Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

†† BRT-2X2LVC and BRT40X19A retroreflectors are included with sensor.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



QS30 Adjustable-Field Background and Foreground Suppression

The QS30 Adjustable-Field Sensor provides reliable, accurate detection, even with low-reflectivity targets.

- Background suppression models for detection of objects when the background condition is not fixed
- Foreground suppression models for detection when background is fixed and the object varies in color or shape
- Fluorescent light and crosstalk avoidance for reliable sensing
- Long range for reliable sensing up to 600 mm
- Cordsets and brackets see page 60

Adjustable-Field Foreground

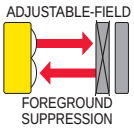
- Foreground suppression models for reliable detection when a fixed background is present and the object color or shape varies
- Objects detected to the face of the sensor (no dead zone)
- Simple multiturn screw adjustment of the cutoff distance
- Enhanced immunity to fluorescent lights
- Crosstalk immunity algorithm allows two sensors to be used in close proximity
- Visible red emitter

Adjustable-Field Background

- Background suppression models detect objects of various color, and ignores objects beyond their cutoff range
- Simple multiturn screw adjustment of the cutoff distance
- Enhanced immunity to fluorescent lights
- Crosstalk immunity algorithm allows two sensors to be used in close proximity
- Visible red emitter

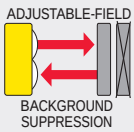
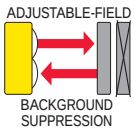
Foreground Suppression QS30, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Model
	Adjustable between 50-400 mm	2 m	Bipolar NPN/PNP	QS30AFF400
		5-pin Euro QD		QS30AFF400Q

Background Suppression QS30 Adjustable-Field, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Model
	Adjustable between 50-300 mm	2 m	Bipolar NPN/PNP	QS30AF
		5-pin Euro QD		QS30AFQ
	Adjustable between 50-600 mm	2 m	Bipolar NPN/PNP	QS30AF600
		5-pin Euro QD		QS30AF600Q

For more specifications see page 63.

Connection options: A model with a QD requires a mating cordset (see page 60).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS30AFF400 W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



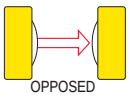
QS30 Universal Voltage
Versatile Sensors Operate on AC or DC Voltage

The QS30 Universal Sensor is a versatile, specialized sensor for use in many environments regardless of supply voltage.

- Able to differentiate colors in low contrast applications
- Right-angle, barrel- and side-mount sensors
- Available in opposed, retroreflective and fixed-field sensing modes
- Operates from 12 to 250 V dc or 24 to 250 V ac
- Cordsets and brackets see page 60

Opposed QS30, 12-250 V DC or 24-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Model
 OPPOSED	60 m	2 m	—	QS303E Emitter
		2 m	SPDT e/m Relay	QS30VR3R

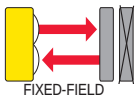
Polar Retro QS30, 12-250 V DC or 24-250 V AC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Model
 POLAR RETRO	8 m†	2 m	SPDT e/m Relay	QS30VR3LP

Fixed-Field QS30, 12-250 V DC or 24-250 V AC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Model
 FIXED-FIELD	200 mm Cutoff	2 m	SPDT e/m Relay	QS30VR3FF200
	400 mm Cutoff	2 m	SPDT e/m Relay	QS30VR3FF400
	600 mm Cutoff	2 m	SPDT e/m Relay	QS30VR3FF600

For more specifications see page 64.

Connection options: A model with a QD requires a mating cordset (see page 60).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS303E W/30).
QD models: Available with modified specification, contact factory at 1-888-373-6767.

† Retroreflective range is specified using one model BRT-84 retroreflector.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 912

Length	Threaded 5-Pin	
	Straight	Right-Angle
1.83 m	MQDC1-506	MQDC1-506RA
4.57 m	MQDC1-515	MQDC1-515RA
9.14 m	MQDC1-530	MQDC1-530RA





Additional cordset information available. See page 904.

Brackets

QS30

See page 869	See page 871	See page 872	See page 871
SMB30A	SMBQS30L	SMBQS30YL	SMBQS30Y









Additional brackets and more information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966







Opposed, Retroreflective, Diffuse, Fixed-Field and Expert Models
Suffix E, R, LP, LV, D, AF, FF, LLP, LLPC, LVC, EDV, LD and LDL



Opposed High-Power Models
Suffix EX and RX



Adjustable-Field, Fixed-Field and Universal Voltage Models
Suffix AFF, FF, R, E, LP

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

QS30 Specifications

Supply Voltage and Current	**Emitters (High-Powered):** 10 to 30 V dc (10% max. ripple) at less than 70 mA **Receivers (High-Powered):** 10 to 30 V dc (10% max. ripple) at less than 22 mA **All others:** 10 to 30 V dc (10% max. ripple) at 40 mA, (exclusive of load) **Emitters (Water):** 10 to 30 V dc (10% max. ripple) at less than 80 mA **Receivers (Water):** 10 to 30 V dc (10% max. ripple) at less than 65 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Bipolar:** One PNP (current sourcing) and one NPN (current sinking); Light Operate (LO) or Dark Operate (DO) selectable or configurable (depending on model)
Output Response Time	**Opposed:** 5 milliseconds ON/OFF **Opposed (High-Power):** 30 milliseconds ON/OFF **Opposed (Water):** **10 x excess gain or more– Standard:** 1 millisecond ON/OFF **Super High-Power:** 10 milliseconds ON/OFF **2x to 10x excess gain– Standard:** 3 milliseconds ON/OFF **Super High-Power:** 30 milliseconds ON/OFF **All others:** 2 milliseconds ON/OFF
Delay at Power-Up	100 milliseconds; outputs do not conduct during this time (except Opposed High-Powered and Water)
Repeatability	**Opposed:** not applicable **Opposed (High-Power):** 5 milliseconds **Opposed (Water):** **10 x excess gain or more– Standard:** 500 microseconds **Super High-Power:** 5 milliseconds **2x to 10x excess gain– Standard:** 2.5 milliseconds **Super High-Power:** 25 milliseconds **All others:** 500 microseconds
Adjustments	**Opposed (High-Power and Water):** Light Operate/Dark Operate–dependent on model selected Frequency via gray wire: **A:** Gray (+) **B:** Gray (-) **Emitter only:** LED inhibit, via white wire White (-) turns emitter LED OFF (to allow verification of sensor operation) **Opposed, Retroreflective, and Polarized Retroreflective:** Selectable Light/Dark Operate is achieved via the gray wire **Light Operate**: Low (0 to 3 V)* **Dark Operate**: High (open or 5 to 30 V)* **Diffuse:** Selectable Light/Dark Operate is achieved via the gray wire **Light Operate**: High (open or 5 to 30 V)* **Dark Operate:** Low (0 to 3 V)* **Diffuse, Retroreflective, and Polarized Retroreflective (only):** Single-turn sensitivity (Gain) adjustment potentiometer * Input impedance 10 kΩ See data sheet for more detailed information
Indicators	**Opposed (High-Power):** 4-LED Signal Strength light bar **Green LED:** Power ON **Frequency indicator:** (A or B) **Receiver only: Yellow LED:** Output conducting **All others (except emitters):** Large, oval LED indicator on sensor back **Yellow:** Output conducting Small indicator on back (adjustable-field only) **Blue/Red:** End of travel (EOT) LED 2 indicators on top **Green:** Power ON **Yellow:** Light sensed
Construction	ABS plastic housing; acrylic lens cover
Environmental Rating	**Opposed (High-Power): Cabled:** IP67; NEMA 6P **QD:** IP69K per DIN 40050-9 **Opposed (Water):** IEC IP67 (NEMA 6); PW12 1200 PSI washdown per NEMA PW12 **All others:** IP67; NEMA 6
Connections	5-conductor 2 m or 9 m PVC cable, or 5-pin 150 mm pigtail or integral Euro-style quick-disconnect fitting, depending on model. QD cordsets are ordered separately. See page 60.
Operating Conditions	**Opposed (Water), Opposed (High-Power):** -20° to +60° C **Relative humidity:** 95% (non-condensing) **All others:** -20° to +70° C **Relative humidity:** 95% (non-condensing)
Certifications	CE
Hookup Diagrams	**High-Powered and Water models: Emitters:** DC10 (p. 976) **Receivers:** DC11 (p. 976) **All other models: Emitters:** DC02 (p. 974) **Bipolar NPN/PNP:** DC08 (p. 975)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

QS30 *Expert*™ Specifications

Supply Voltage and Current	**Diffuse LED and Retroreflective LED:** 10 to 30 V dc (10% max. ripple) at less than 25 mA, exclusive of load **Diffuse Laser and Retroreflective Laser:** 10 to 30 V dc (10% max. ripple @ 10% duty cycle) @ 35 mA max current, exclusive of load
Output Protection Circuitry	Protected against output short-circuit, continuous overload, transient over-voltages and false pulse on power-up
Sensing Beam	**LED models:** 660 nm visible Red **Laser models: Class 1:** 650 nm visible Red **Class 2:** 658 nm visible Red
Beam Size at Aperture	**Diffuse Laser:** Approx. 2 mm **Retroreflective Laser:** Approx. 3 mm
Output Configuration	**Bipolar:** One NPN (current sinking) and one PNP (current sourcing); Light Operate (LO) or Dark Operate (DO) configurable
Output Response Time	**Diffuse LED:** **High-speed mode:** 300 microseconds **Normal mode:** 1.8 milliseconds **Diffuse Laser, Retroreflective Laser and Retroreflective LED:** 500 microseconds
Delay at Power-up	**Diffuse LED and Retroreflective LED:** 250 milliseconds; outputs do not conduct during this time **Diffuse Laser and Retroreflective Laser:** 1 second max.; outputs do not conduct during this time
Repeatability	**Diffuse LED:** **High-speed mode:** 100 microseconds **Normal mode:** 150 microseconds **Retroreflective LED:** 150 microseconds **Diffuse Laser and Retroreflective Laser:** 70 microseconds
Adjustments	2 push buttons and remote wire for TEACH programming and configuration See data sheet for detailed information
Indicators	2 LEDs: **Green:** Power ON **Yellow:** Output conducting See data sheets for more detailed information
Construction	PC/ABS housing with acrylic lens cover
Environmental Rating	**Retroreflective LED:** IEC IP67 (NEMA 6); PW12 1200 PSI washdown **All others:** IP67; NEMA 6
Connections	5-conductor 2 m or 9 m attached PVC cable, or 5-pin Euro-style quick-disconnect fitting. QD cordset are ordered separately. See page 60.
Operating Conditions	**Diffuse LED and Retroreflective LED:** **Temperature:** -10° to +55° C **Relative humidity:** 95% @ 55° C (non-condensing) **Diffuse Laser and Retroreflective Laser:** **Temperature:** -10° to +50° C **Relative humidity:** 95% @ 50° C (non-condensing)
Application Note	If supply voltage is > 24 V dc, derate maximum output current 1 mA/°C above 25°C
Certification	CE
Hookup Diagrams	DC08: (p. 975)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

QS30 Adjustable-Field Specifications

Supply Voltage	10 to 30 V dc (10% max. ripple); current consumption: AF600 & AFF400 models: Less than 80 mA at 10 V dc, less than 40 mA at 30 V dc AF models: 45 mA max current
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Delay at Power-Up	AF600 & AFF400 models: 200 milliseconds; outputs do not conduct during this time AF models: 250 milliseconds; outputs do not conduct during this time
Output Configuration	Bipolar: One PNP (current sourcing) and one NPN (current sinking
Output Rating	AF600 & AFF400 models: 100 mA total output current (derate 1 mA per °C above 30°C) Off-state leakage current: less than 5 µA @ 30 V dc ON-state saturation voltage: NPN: less than 1.5 V @ 100 mA PNP: less than 2.0 V @ 100 mA AF models: 150 mA total output current (derate 1 mA per °C above 25°C) Off-state leakage current: less than 50 µA @ 30 V dc ON-state saturation voltage: NPN: less than 200 mV @ 10 mA; less than 1 V @ 150 mA PNP: less than 1.25 V @ 10 mA; less than 2 V @ 150 mA
Output Protection	Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time	AF600 & AFF400 models: 5 milliseconds ON/OFF AF models: 1 millisecond ON/OFF
Repeatability	AF600 & AFF400 models: 750 microseconds AF models: 170 microseconds
Adjustments	AF600 & AFF400 models: Four-turn adjustment screw sets cutoff distance between min and max. positions, clutched at both ends of travel AF models: 2 push buttons and remote wire • Easy push-button configuration • Manually adjust (+/–) cutoff (push buttons only) • N.O./N.C. and OFF-delay configuration options (push buttons only) • Push-button lockout (from remote wire only) 2 push buttons or LO/DO adjustment
Indicators	AF600 & AFF400 models: Large, oval LED indicator on sensor back Yellow: Output conducting Small indicator on back Blue/Red: End of travel (EOT) LED 2 indicators on top Green: Power ON Yellow: Light sensed AF models: 8-segment red bargraph: Distance relative to cutoff point Green LED: Power ON Yellow LED: Output conducting
Construction	ABS plastic housing; acrylic lens cover
Environmental Rating	IEC IP67; NEMA 6
Connections	5-conductor 2 m or 9 m PVC cable, or 5-pin 150 mm pigtail or integral Euro-style quick-disconnect fitting, depending on model. QD cordsets are ordered separately. See page 60.
Operating Conditions	AF600 & AFF400 models: -20° to +60°C; 95% relative humidity @ 50° C non-condensing) AF models: -10° to +55°C; 90% relative humidity @ 55°C (non-condensing)
Vibration and Mechanical Shock	All model meet Mil. Std. 202F requirements. Method 201A (Vibration: 10 to 60 Hz max. double amplitude 0.06", max. acceleration 10G). Also meets IEC 947-5-2 requirements: 30G, 11 milliseconds duration, half sine wave.
Certifications	CE
Hookup Diagrams	Emitters: DC02 (p. 974) Bipolar NPN/PNP: DC08 (p. 975)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

QS30 Universal Voltage Specifications

Supply Voltage	24 to 250 V ac, 50/60 Hz or 12 to 250 V dc (1.0 watt max.)
Supply Protection Circuitry	Protected against transient voltages
Output Configuration	SPDT (Single-Pole Double-Throw) electromechanical relay output (all models except emitters)
Output Response Time	15 milliseconds ON/OFF
Delay at Power-Up	100 millisecond delay; output does not conduct during this time
Indicators	2 LED indicators on sensor top: Green: Power ON Yellow: Light sensed Large, oval LED indicator on sensor back (except emitters): Yellow: Output conducting See data sheet for detailed information
Construction	ABS housing; Acrylic lens cover
Environmental Rating	IEC IP67; NEMA 6
Connections	2 m or 9 m 5-wire PVC cable
Operating Conditions	Temperature: -20° to +70° C Relative humidity: 95% @ 50° C (non-condensing)
Certifications	CE c UL us LISTED
Hookup Diagrams	Emitters: UN02 (p. 984) All other models: UN01 (p. 984)

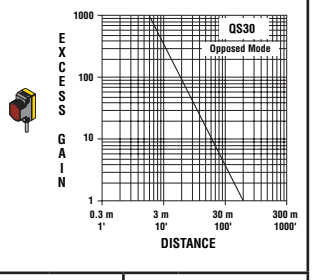
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

(Diffuse, Adjustable-Field and Fixed-Field mode performance based on 90% reflectance white test card)

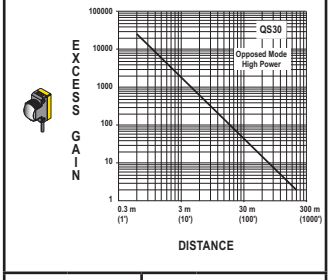
○ = Infrared LED ● = Visible Red LED P = Visible Red LED Polarized LP = Visible Red Laser Polarized ✸ = Visible Red Laser

Opposed Mode WORLD-BEAM® QS30



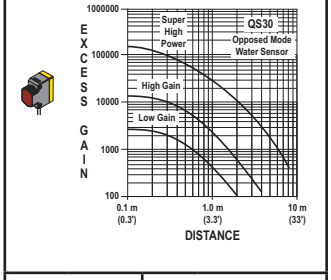
Range: 60 m | LED: ○

Opposed Mode WORLD-BEAM® QS30 High Power



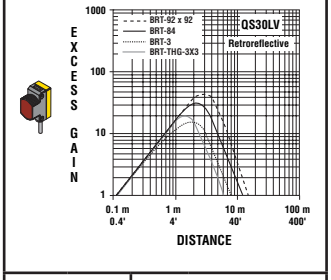
Range: 213 m | LED: ○

Opposed Mode WORLD-BEAM® QS30 High-Power Water



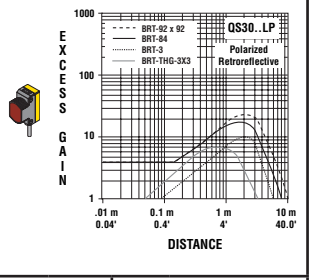
Range: 8 m | LED: ○

Retroreflective Mode WORLD-BEAM® QS30



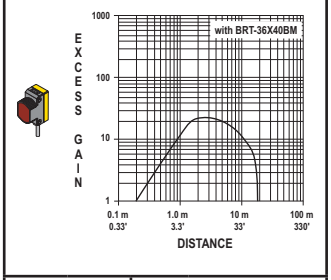
Range: 12 m | LED: ●

Polarized Retroreflective Mode WORLD-BEAM® QS30



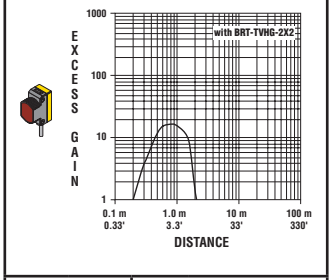
Range: 8 m | LED: P

Retroreflective Mode WORLD-BEAM® QS30 *Expert*™ Class 1 Laser



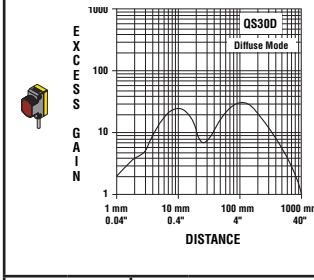
Range: 18 m | LED: LP

Retroreflective Mode WORLD-BEAM® QS30 *Expert*™ Class 1 Laser



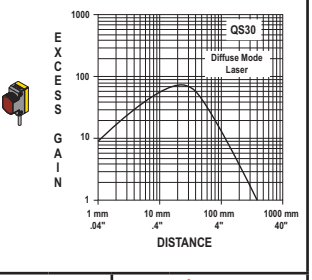
Range: 2 m | LED: LP

Diffuse Mode WORLD-BEAM® QS30



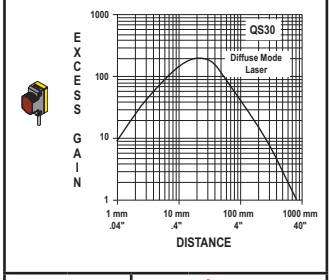
Range: 1 m | LED: ○

Diffuse Mode WORLD-BEAM® QS30 *Expert*™ Class 1 Laser



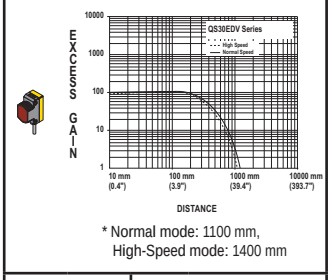
Range: 400 mm | LED: ✸

Diffuse Mode WORLD-BEAM® QS30 *Expert*™ Class 2 Laser



Range: 800 mm | LED: ✸

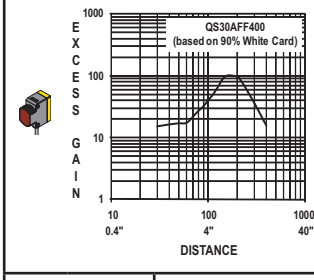
Diffuse Mode WORLD-BEAM® QS30 *Expert*™ Visible Red LED



* Normal mode: 1100 mm, High-Speed mode: 1400 mm

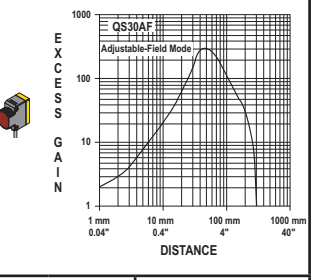
Range: 1400 mm* | LED: ●

Adjustable-Field Mode WORLD-BEAM® QS30 Foreground Suppression



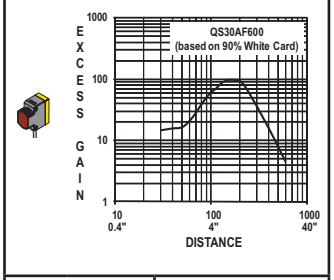
Cutoff: 50-400 mm | LED: ●

Adjustable-Field Mode WORLD-BEAM® QS30 Background Suppression



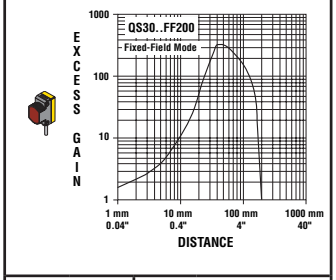
Cutoff: 50-300 mm | LED: ●

Adjustable-Field Mode WORLD-BEAM® QS30 Background Suppression



Cutoff: 50-600 mm | LED: ●

Fixed-Field Mode WORLD-BEAM® QS30



Cutoff: 200 mm | LED: ●

ø 10 mm spot size @ 160 mm focus
ø 7 mm spot size @ 200 mm cutoff

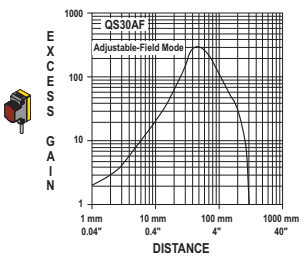
Using 18% gray test card: performance will be 95% of values shown.
Using 6% black test card: performance will be 90% of values shown.

Excess Gain Curves

(Fixed-Field mode performance based on 90% reflectance white test card)

● = Visible Red LED

Fixed-Field Mode WORLD-BEAM® QS30

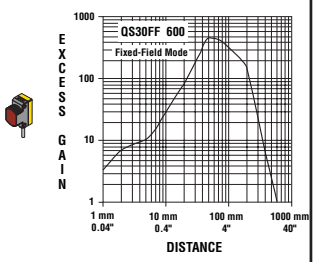


ø 10 mm spot size @ 160 mm focus
ø 10 mm spot size @ 400 mm cutoff

Using 18% gray test card: performance will be 90% of values shown.
Using 6% black test card: performance will be 85% of values shown.

Cutoff: 300 mm | LED: ●

Fixed-Field Mode WORLD-BEAM® QS30

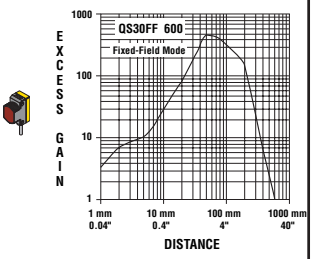


ø 10 mm spot size @ 160 mm focus
ø 15 mm spot size @ 600 mm cutoff

† Using 18% gray test card: performance will be 85% of values shown.
† Using 6% black test card: performance will be 75% of values shown.

Cutoff: 600 mm | LED: ●

Fixed-Field Mode WORLD-BEAM® QS30



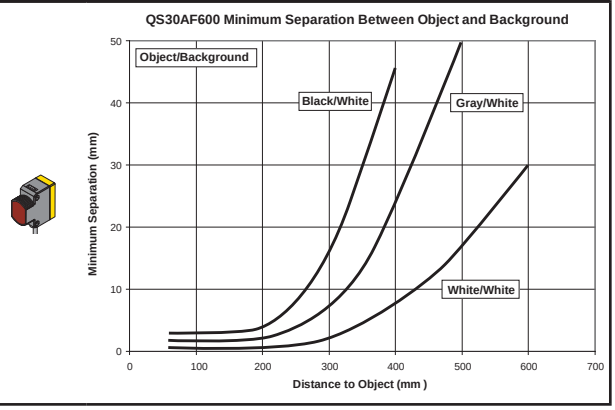
ø 10 mm spot size @ 160 mm focus
ø 15 mm spot size @ 600 mm cutoff

† Using 18% gray test card: performance will be 85% of values shown.
† Using 6% black test card: performance will be 75% of values shown.

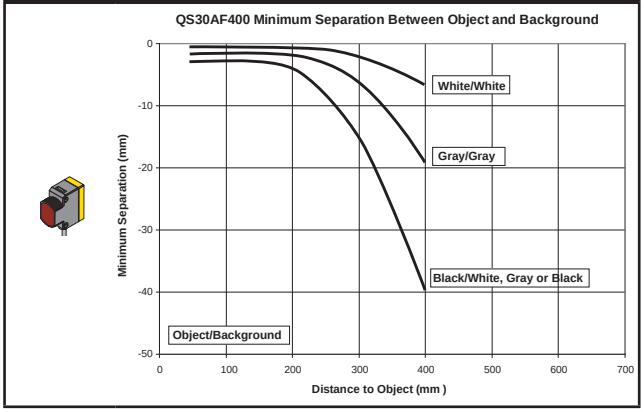
Cutoff: 600 mm | LED: ●

Minimum Separation Distance

WORLD-BEAM® QS30 Adjustable-Field Background Suppression (50-600 mm)



WORLD-BEAM® QS30 Adjustable-Field Foreground Suppression (50-400 mm)



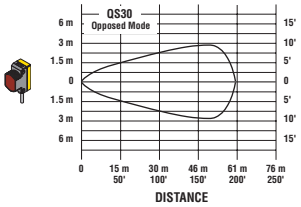
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Beam Patterns (Diffuse mode performance based on 90% reflectance white test card)

○ = Infrared LED ● = Visible Red LED P = Visible Red LED Polarized ✸ = Visible Red Laser

Opposed Mode WORLD-BEAM® QS30

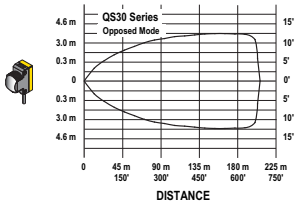
Effective Beam: 18 mm



Range: 60 m | LED: ○

Opposed Mode WORLD-BEAM® QS30 High Power

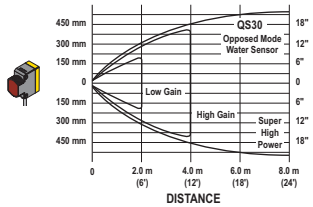
Effective Beam: 18 mm



Range: 213 m | LED: ○

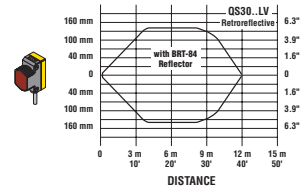
Opposed Mode WORLD-BEAM® QS30 Water

Effective Beam: 13 mm



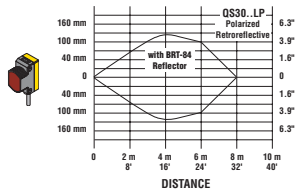
Range: 8 m | LED: ○

Retroreflective Mode WORLD-BEAM® QS30



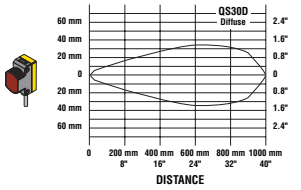
Range: 12 m | LED: ●

Polarized Retroreflective Mode WORLD-BEAM® QS30



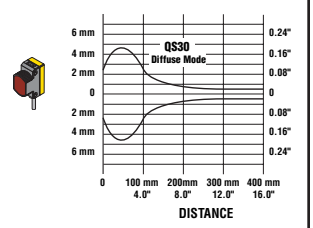
Range: 8 m | LED: P

Diffuse Mode WORLD-BEAM® QS30



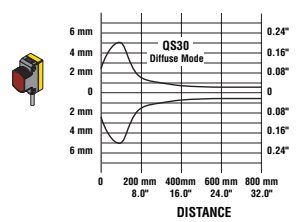
Range: 1 m | LED: ○

Diffuse Mode WORLD-BEAM® QS30 *Expert*™ Class 1 Laser



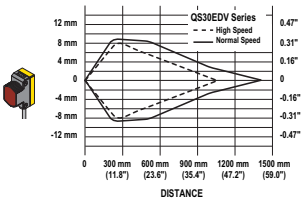
Range: 400 mm | LED: ✸

Diffuse Mode WORLD-BEAM® QS30 *Expert*™ Class 2 Laser



Range: 800 mm | LED: ✸

Diffuse Mode WORLD-BEAM® *Expert*™ Visible Red LED



Range: 1400 mm | LED: ●

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



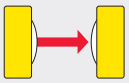
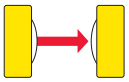
Q12
Miniature Self-Contained Sensors

The Q12 sensor is a small sensor with high performance for powerful sensing in confined spaces.

- Overmolded housing
- Short-range background suppression
- Visible red LED for easy alignment
- Powerful optics
- Cordsets and brackets see page 70

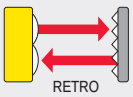
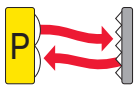
Opposed Q12, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output	Models LO*	Models DO*
 OPPOSED	2 m	2 m	–	Q126E Emitter	
		4-Pin Pico Pigtail QD	–	Q126EQ Emitter	
		3-Pin Pico Pigtail QD	–	Q126EQ3 Emitter	
 OPPOSED	2 m	2 m	Bipolar NPN/PNP	Q12AB6R	Q12RB6R
		4-Pin Pico Pigtail QD	Bipolar NPN/PNP	Q12AB6RQ	Q12RB6RQ
		3-Pin Pico Pigtail QD	PNP	Q12AP6RQ3	Q12RP6RQ3
		3-Pin Pico Pigtail QD	NPN	Q12AN6RQ3	Q12RN6RQ3

Retro & Polar Retro Q12, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output	Models LO*	Models DO*
 RETRO	1.5 m†	2 m	Bipolar NPN/PNP	Q12AB6LV	Q12RB6LV
		4-Pin Pico Pigtail QD	Bipolar NPN/PNP	Q12AB6LVQ	Q12RB6LVQ
		3-Pin Pico Pigtail QD	PNP	Q12AP6LVQ3	Q12RP6LVQ3
		3-Pin Pico Pigtail QD	NPN	Q12AN6LVQ3	Q12RN6LVQ3
 POLAR RETRO	1 m†	2 m	Bipolar NPN/PNP	Q12AB6LP	Q12RB6LP
		4-Pin Pico Pigtail QD	Bipolar NPN/PNP	Q12AB6LPQ	Q12RB6LPQ
		3-Pin Pico Pigtail QD	PNP	Q12AP6LPQ3	Q12RP6LPQ3
		3-Pin Pico Pigtail QD	NPN	Q12AN6LPQ3	Q12RN6LPQ3

For more specifications see page 71.

Connection options:

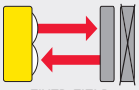
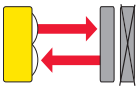
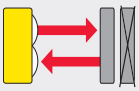
Bipolar Models Only:
For 9 m cable, add suffix W/30 to the 2 m model number (example, Q126E W/30).
QD models: A model with a QD requires a mating cordset (see page 70).
For 4-pin 150 mm Euro-style QD, add suffix Q5 (example, Q126EQ5).

* For black housing, add prefix D to the model number, for example, DQ12AB6R (NEW)
† Retroreflective range is specified using a BRT-60X40C retroreflector.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Fixed-Field Q12, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output	Models LO*	Models DO*
 FIXED-FIELD	15 mm Cutoff	2 m	Bipolar NPN/PNP	Q12AB6FF15	Q12RB6FF15
		4-Pin Pico Pigtail QD	Bipolar NPN/PNP	Q12AB6FF15Q	Q12RB6FF15Q
		3-Pin Pico Pigtail QD	PNP	Q12AP6FF15Q3	Q12RP6FF15Q3
		3-Pin Pico Pigtail QD	NPN	Q12AN6FF15Q3	Q12RN6FF15Q3
 FIXED-FIELD	30 mm Cutoff	2 m	Bipolar NPN/PNP	Q12AB6FF30	Q12RB6FF30
		4-Pin Pico Pigtail QD	Bipolar NPN/PNP	Q12AB6FF30Q	Q12RB6FF30Q
		3-Pin Pico Pigtail QD	PNP	Q12AP6FF30Q3	Q12RP6FF30Q3
		3-Pin Pico Pigtail QD	NPN	Q12AN6FF30Q3	Q12RN6FF30Q3
 FIXED-FIELD	50 mm Cutoff	2 m	Bipolar NPN/PNP	Q12AB6FF50	Q12RB6FF50
		4-Pin Pico Pigtail QD	Bipolar NPN/PNP	Q12AB6FF50Q	Q12RB6FF50Q
		3-Pin Pico Pigtail QD	PNP	Q12AP6FF50Q3	Q12RP6FF50Q3
		3-Pin Pico Pigtail QD	NPN	Q12AN6FF50Q3	Q12RN6FF50Q3

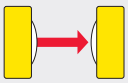
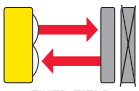
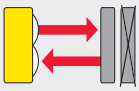
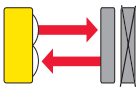


Bottle Cap Detection Using Fixed-Field Sensors

As bottle caps pass below the fixed-field beam identifies bottle caps regardless of color and rejects bottles missing caps.

PFA-Jacketed Q12, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output	Models LO	Models DO
 OPPOSED	1.5 m	2 m	Bipolar NPN/PNP	Q12AB6RCR	Q12RB6RCR
 FIXED-FIELD	12 mm Cutoff	2 m	Bipolar NPN/PNP	Q12AB6FF15CR	Q12RB6FF15CR
 FIXED-FIELD	28 mm Cutoff	2 m	Bipolar NPN/PNP	Q12AB6FF30CR	Q12RB6FF30CR
 FIXED-FIELD	48 mm Cutoff	2 m	Bipolar NPN/PNP	Q12AB6FF50CR	Q12RB6FF50CR

For more specifications see page 71.

Connection options:

Bipolar Models Only:
For 9 m cable, add suffix W/30 to the 2 m model number (example, Q12RB6FF15 W/30).
QD models: A model with a QD requires a mating cordset (see page 70).
For 4-pin 150 mm Euro-style QD, add suffix Q5 (example, Q12RB6FF15Q5).

* For black housing, add prefix D to the model number, for example, DQ12AB6R (NEW)
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q5 models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA





Additional cordset information available.
See page 904.

Pico QD (for Q and Q3 models)

See page 904

Length	Straight 3-Pin	Straight 4-Pin	Right-Angle 3-Pin	Right-Angle 4-Pin
2.00 m	PKG3M-2	PKG4M-2	PKG3M-2	PKW4M-2
5.00 m	PKG3M-5	PKG4M-5	PKG3M-5	PKW4M-5
7.00 m	PKG3M-7	–	PKG3M-7	–
9.00 m	PKG3M-9	PKG4M-9	PKG3M-9	PKW4M-9
10.0 m	PKG3M-10	–	PKG3M-10	–





Brackets

Q12

See page 858 | See page 858

SMBQ12A	SMBQ12T

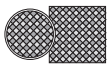




Additional bracket information available.
See page 846.

Other Accessories

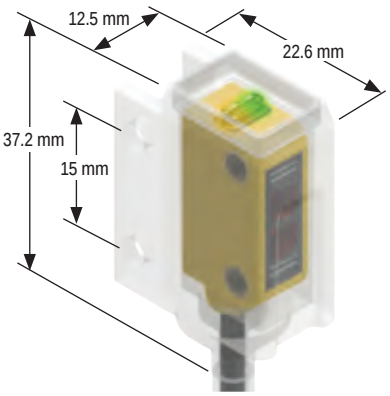
Reflectors	Apertures
See page 940	See page 966







Opposed, Retroreflective and
Fixed-Field Models
Suffix E, R, LV and FF



Chemical-Resistant Models
Suffix CR

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q12 Specifications

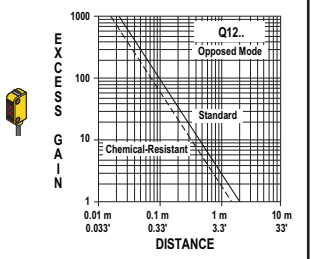
Sensing Beam	640 nm visible red
Supply Voltage and Current	10 to 30 V dc (10% max. ripple) @ 20 mA max. current
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Bipolar:** 1 NPN (current sinking) and 1 PNP (current sourcing); Light Operate (LO) or Dark Operate (DO), depending on model **Single-output:** 1 NPN or 1 PNP; Light Operate (LO) or Dark Operate (DO), depending on model
Output Rating	50 mA total across both outputs with overload and short circuit protection **OFF-state leakage current:** NPN: 200 µA PNP: 10 µA **ON-state saturation voltage:** NPN: 1.25 V @ 50 mA PNP: 1.45 V @ 50 mA
Output Protection Circuitry	Protected against false pulse on power-up; short-circuit protected
Output Response Time	**Opposed:** 1.3 milliseconds ON; 900 microseconds OFF **All others:** 700 microseconds ON/OFF
Delay at Power-up	120 milliseconds; outputs do not conduct during this time
Repeatability	175 microseconds
Switching Frequency	**Opposed models:** 385 Hz **All other models:** 715 Hz
Indicators	**2 LED indicators** (Emitters-Green only): Green—power ON Yellow—light sensed
Construction	**Polarized Retroreflective:** Thermoplastic elastomer housing with glass lens **Standard:** Thermoplastic elastomer housing with polycarbonate lens **Chemical-resistant:** Housing encased in PFA jacket; cable encased in 3/16" O.D. PFA tubing
Environmental Rating	**Standard:** IEC IP67 **Chemical-resistant:** IEC IP67 (NEMA 6) and PW12 1200 psi washdown per NEMA ICS 5, Annex F-2002
Connections	**Bipolar:** 2 m or 9 m attached PVC cable, or 150 mm pigtail with 4-pin Pico-style (Q) or 4-pin Euro-style (Q5) quick-disconnect fitting. QD cordsets are ordered separately. See page 70. **Single output:** 150 mm pigtail with 3-pin Pico-style (Q3) quick-disconnect fitting. QD cordsets are ordered separately. See page 70. **Chemical-resistant:** 2 m attached cable encased in 3/16" O.D. PFA tubing
Operating Conditions	**Temperature:** -20° to +55° C **Storage temperature:** -30° to +75° C **Relative humidity:** 95% max. @ 50° C (non-condensing)
Certifications	CE c UL us
Hookup Diagrams	**Emitters:** DC02 (p. 974) **Bipolar:** DC04 (p. 974) **Single output:** DC01 (p. 974)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

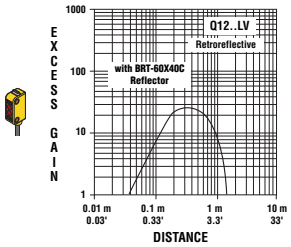
● = Visible Red LED P = Visible Red LED Polarized

Opposed Mode WORLD-BEAM® Q12



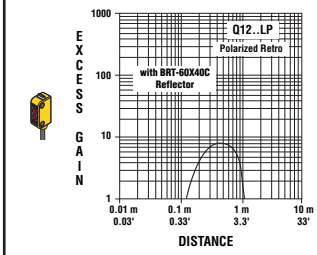
Range: 2 m | LED: ●

Retroreflective Mode WORLD-BEAM® Q12



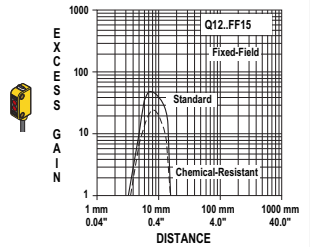
Range: 1.5 m | LED: ●

Polarized Retroreflective Mode WORLD-BEAM® Q12



Range: 1 m | LED: P

Fixed-Field Mode WORLD-BEAM® Q12



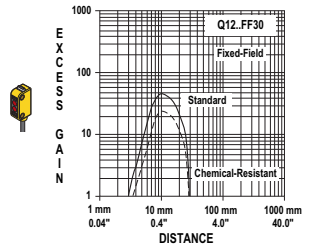
Cutoff: 15 mm | LED: ●

90% white card
Standard Models:
Ø 0.4 mm spot size @ 10 mm focus
Ø 1.5 mm spot size @ 15 mm cutoff

Chemical-Resistant Models:
Ø 0.4 mm spot size @ 8 mm focus
Ø 1.5 mm spot size @ 13 mm cutoff

Using 18% gray test card: cutoff distance will be 95% of value shown.
Using 6% black test card: cutoff distance will be 90% of value shown.

Fixed-Field Mode WORLD-BEAM® Q12



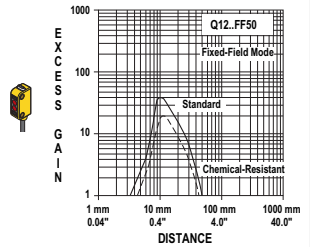
Cutoff: 30 mm | LED: ●

90% white card
Standard Models:
Ø 0.5 mm spot size @ 16 mm focus
Ø 3.0 mm spot size @ 30 mm cutoff

Chemical-Resistant Models
Ø 0.5 mm spot size @ 14 mm focus
Ø 3.0 mm spot size @ 28 mm cutoff

Using 18% gray test card: cutoff distance will be 90% of value shown.
Using 6% black test card: cutoff distance will be 80% of value shown.

Fixed-Field Mode WORLD-BEAM® Q12



Cutoff: 50 mm | LED: ●

90% white card
Standard Models:
Ø 0.5 mm spot size @ 16 mm focus
Ø 6.5 mm spot size @ 50 mm cutoff

Chemical-Resistant Models:
Ø 0.5 mm spot size @ 14 mm focus
Ø 6.5 mm spot size @ 48 mm cutoff

Using 18% gray test card: cutoff distance will be 80% (standard) or 70% (chemical resistant) of value shown.
Using 6% black test card: cutoff distance will be 60% (standard) or 50% (chemical resistant) of value shown.

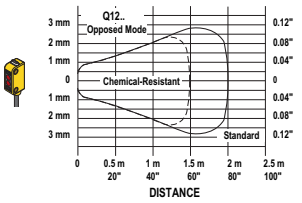
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Beam Patterns

● = Visible Red LED P = Visible Red LED Polarized

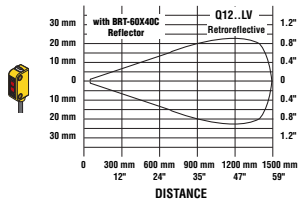
Opposed Mode WORLD-BEAM® Q12

Effective Beam: 5.7 mm



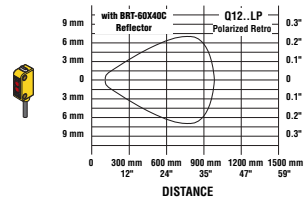
Range: 2 m | LED: ●

Retroreflective Mode WORLD-BEAM® Q12



Range: 1.5 m | LED: ●

Retroreflective Mode WORLD-BEAM® Q12



Range: 1 m | LED: P

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



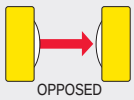
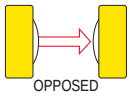
Q20
Industry Standard Global Housing

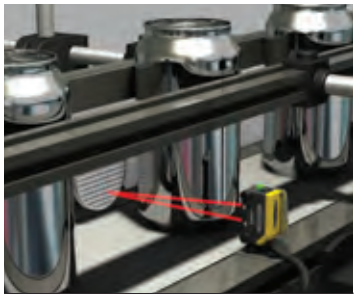
The Q20 is a versatile sensor with universal rectangular housing and multiple mounting options, making it ideal for global manufacturing.

- Rated to 1200 psi for use in washdown environments
- Enhanced design for noise immunity and crosstalk avoidance
- Visible red beam for easy alignment on most models
- Cordsets and brackets see page 76

Opposed Q20, 10-30 V DC

Infrared LED | Visible Red LED

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
 OPPOSED	12 m	2 m	Q20E Emitter	
		4-pin Euro Pigtail QD	Q20EQ5 Emitter	
		2 m	Q20NR	Q20PR
		4-pin Euro Pigtail QD	Q20NRQ5	Q20PRQ5
 OPPOSED	20 m	2 m	Q20EL Emitter	
		4-pin Euro Pigtail QD	Q20ELQ5 Emitter	
		2 m	Q20NRL	Q20PRL
		4-pin Euro Pigtail QD	Q20NRLQ5	Q20PRLQ5

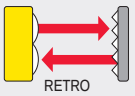


Unfinished Can Detection Using Polar Retro Sensors

When the unfinished cans pass between the sensor and the retroreflector, the light reflected off the cans has a different polarization than the light returned by the retroreflector. As a result, the beam will be blocked by the cans and the output will be triggered.

Retro & Polar Retro Q20, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
 RETRO	6 m†	2 m	Q20NLV	Q20PLV
		4-pin Euro Pigtail QD	Q20NLVQ5	Q20PLVQ5
 POLAR RETRO	4 m†	2 m	Q20NLP	Q20PLP
		4-pin Euro Pigtail QD	Q20NLPQ5	Q20PLPQ5

For more specifications see page 77.

Connection options: A model with a QD requires a mating cordset (see page 77).

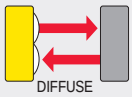
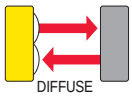
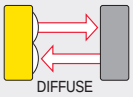
For 9 m cable, add suffix W/30 to the 2 m model number (example, Q20E W/30).
QD models:
- For a 4-pin 150 mm Pico-style pigtail QD, add suffix Q (example, Q20NDQ).
- For a 4-pin integral Pico-style QD, add suffix Q7 (example, Q20EQ7).

* Available with health or alarm mode output; contact factory at 1-888-373-6767 for details.
† Retroreflective range is specified using one model BRT-84 retroreflector. Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories section for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

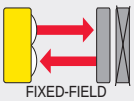
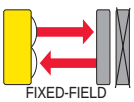
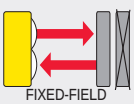
Diffuse Q20, 10-30 V DC

Infrared LED Visible Red LED

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
 DIFFUSE	250 mm	2 m	Q20ND	Q20PD
		4-pin Euro Pigtail QD	Q20NDQ5	Q20PDQ5
 DIFFUSE	800 mm	2 m	Q20NDL	Q20PDL
		4-pin Euro Pigtail QD	Q20NDLQ5	Q20PDLQ5
 DIFFUSE	1500 mm	2 m	Q20NDXL	Q20PDXL
		4-pin Euro Pigtail QD	Q20NDXLQ5	Q20PDXLQ5

Fixed-Field Q20, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models* NPN	Models* PNP
 FIXED-FIELD	0-50 mm Cutoff	2 m	Q20NFF50	Q20PFF50
		4-pin Euro Pigtail QD	Q20NFF50Q5	Q20PFF50Q5
 FIXED-FIELD	0-100 mm Cutoff	2 m	Q20NFF100	Q20PFF100
		4-pin Euro Pigtail QD	Q20NFF100Q5	Q20PFF100Q5
 FIXED-FIELD	0-150 mm Cutoff	2 m	Q20NFF150	Q20PFF150
		4-pin Euro Pigtail QD	Q20NFF150Q5	Q20PFF150Q5

For more specifications see page 77.

Connection options: A model with a QD requires a mating cordset (see page 76).

For 9 m cable, add suffix W/30 to the 2 m model number (example, Q20ND W/30).

QD models:

- For a 4-pin 150 mm Euro-style pigtail QD, add suffix Q5 (example, Q20NDQ5).
- For a 4-pin 150 mm Pico-style pigtail QD, add suffix Q (example, Q20NDQ).
- For a 4-pin integral Pico-style QD, add suffix Q7 (example, Q20NDQ7).

* Available with health or alarm mode output; contact factory at 1-888-373-6767 for details.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q5 models)

See page 928

Length	Threaded 4-Pin Straight		Threaded 4-Pin Right-Angle	
1.83 m	MQDC-406		MQDC-406RA	
4.57 m	MQDC-415		MQDC-415RA	
9.14 m	MQDC-430		MQDC-430RA	

Additional cordset information available. See page 904.

Pico QD (for Q models)

See page 906

Length	Threaded 4-Pin Straight		Threaded 4-Pin Right-Angle	
2.00 m	PKG4M-2		PKW4M-2	
5.00 m	PKG4M-5		PKW4M-5	
9.00 m	PKG4M-9		PKW4M-9	

Pico QD (for Q7 models)

See page 906

Length	Snap-on 4-Pin Straight		Snap-on 4-Pin Right-Angle	
2.00 m	PKG4-2		PKW4Z-2	

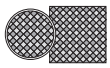
Brackets

Q20

See page 867	See page 867	See page 867	See page 868
SMBQ20H	SMBQ20L	SMBQ20LV	SMBQ20U
			

Additional bracket information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966
	



Opposed, Retroreflective,
Fixed-Field and Diffuse Models
Suffix E, EL, R, RL, LP, LV,
D, DL, DXL and FF

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q20 Specifications

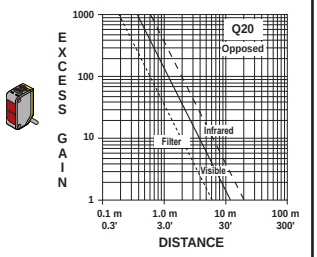
Supply Voltage and Current	10 to 30 V dc (10% maximum ripple) at less than 18 mA, exclusive of load
Supply Protection Circuity	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state complementary; PNP (sourcing) or NPN (sinking), depending on model
Output Rating	100 mA with short circuit protection OFF-state leakage current: NPN: less than 200 µA sinking PNP: less than 10 µA sourcing ON-state saturation voltage: NPN: less than 1.6 V @ 100 mA PNP: less than 3.0 V @ 100 mA
Output Response Time	Opposed: 1 millisecond/600 microseconds OFF All others: 800 microseconds ON/OFF
Delay at Power-up	100 milliseconds; outputs do not conduct during this time
Repeatability	Opposed: 140 microseconds All others: 155 microseconds
Adjustments	Diffuse, Retroreflective and Polarized Retroreflective: single-turn sensitivity (Gain) adjustment potentiometer
Indicators	Emitters: Green power ON only All others: Two LED Indicators: Green: Power ON Yellow: Black (LO) wire conducting
Construction	Housing: ABS Lenses: PPMA Gain Adjuster: PBT
Connections	2 m or 9 m 4-wire PVC cable, 4-pin 150 mm pigtail Pico-style QD (Q), or 4-pin 150 mm pigtail Euro-style QD (Q5), or 4-pin integral Pico-style QD (Q7), depending on model. QD cordsets are ordered separately. See pages 76.
Operating Conditions	Temperature: –20° to +60° C Relative humidity: 95% @ 50° C (non-condensing)
Enviromental Rating	IEC IP67; NEMA 6 and 1200 psi washdown NEMA ICS 5, Annex F-2002
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements method 201A (vibration: 10 to 60 Hz max., double amplitude 0.06", maximum acceleration 10G). Also meets IEC 947-5-2: 30G 11 ms duration, half sine wave
Application Note	1. Opposed mode sensor spacing can be reduced by alternating emitters and receivers or by applying crosstalk filters (visible red models only). 2. NPN OFF-state leakage current is < 200 µA for load resistances > 3 kΩ or optically isolated loads. For load currents of 100 mA, leakage is < 1% of load current.
Certification	CE
Hookup Diagram	Emitters: DC02 (p. 981) All others: DC03 (p. 974)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves (Diffuse and Fixed-Field mode performance based on 90% reflectance white test card)

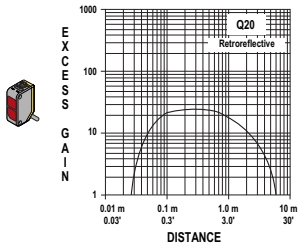
○ = Infrared LED ● = Visible Red LED P = Visible Red LED Polarized

Opposed Mode WORLD-BEAM® Q20



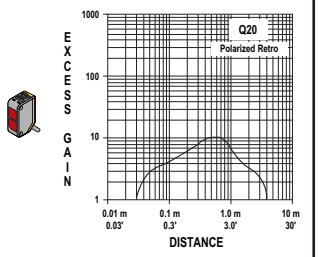
Range: 20 m | LED: ● ○

Retroreflective Mode WORLD-BEAM® Q20



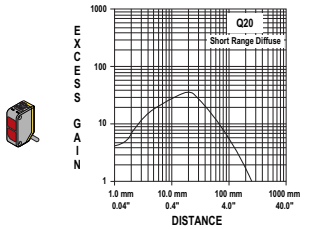
Range: 6 m | LED: ●

Polarized Retroreflective Mode WORLD-BEAM® Q20



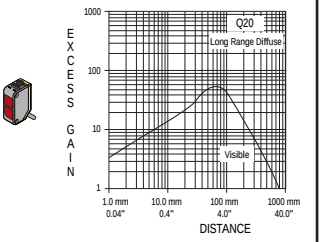
Range: 4 m | LED: P

Diffuse Mode WORLD-BEAM® Q20



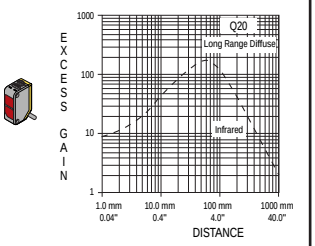
Range: 250 mm | LED: ●

Diffuse Mode WORLD-BEAM® Q20



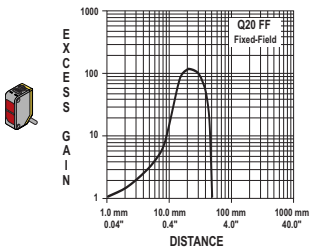
Range: 800 mm | LED: ●

Diffuse Mode WORLD-BEAM® Q20



Range: 1500 mm | LED: ○

Fixed-Field Mode Q20

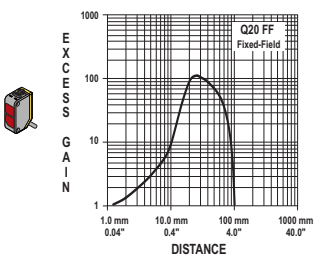


Ø 6 mm spot size @ 25 mm focus
Ø 6 mm spot size @ 50 mm cutoff

† Using 18% gray test card:
Cutoff distance will be 95% of value shown.
† Using 6% black test card:
Cutoff distance will be 90% of value shown.

Cutoff: 50 mm | LED: ●

Fixed-Field Mode Q20

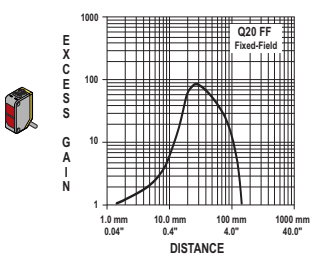


Ø 6 mm spot size @ 50 mm focus
Ø 6 mm spot size @ 100 mm cutoff

† Using 18% gray test card:
Cutoff distance will be 90% of value shown.
† Using 6% black test card:
Cutoff distance will be 85% of value shown.

Cutoff: 100 mm | LED: ●

Fixed-Field Mode Q20



Ø 6 mm spot size @ 75 mm focus
Ø 9 mm spot size @ 150 mm cutoff

† Using 18% gray test card:
Cutoff distance will be 80% of value shown.
† Using 6% black test card:
Cutoff distance will be 70% of value shown.

Cutoff: 150 mm | LED: ●

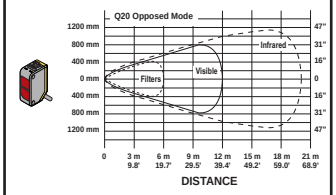
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Beam Patterns (Diffuse mode performance based on 90% reflectance white test card)

○ = Infrared LED ● = Visible Red LED P = Visible Red LED Polarized

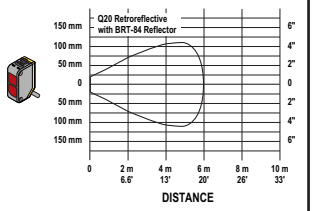
Opposed Mode WORLD-BEAM® Q20

Effective Beam: 10 mm



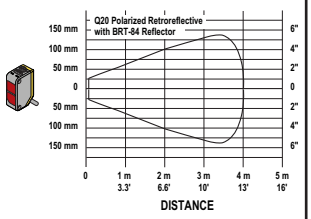
Range: 20 m | LED: ● ○

Retroreflective Mode WORLD-BEAM® Q20



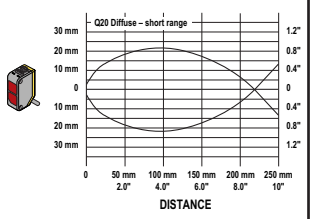
Range: 6 m | LED: ●

Polarized Retroreflective Mode WORLD-BEAM® Q20



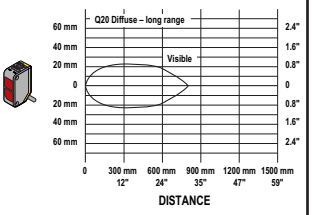
Range: 4 m | LED: P

Diffuse Mode WORLD-BEAM® Q20



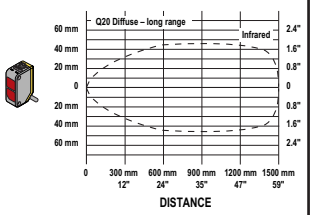
Range: 250 mm | LED: ●

Diffuse Mode WORLD-BEAM® Q20



Range: 800 mm | LED: ●

Diffuse Mode WORLD-BEAM® Q20



Range: 1500 mm | LED: ○

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Q45 Sensors
Rugged with Output Timing Logic

The Q45 line of sensors offers an advanced, economical solution with limit switch replacement body style and timing options.

- Comprehensive offering including laser diode and retroreflective models
- High-powered diffuse and laser retroreflective for ranges over 200 feet
- Models available for dc, ac or ac/dc universal
- Accommodates output timing logic or 7-segment LED signal strength display on standard model



Q45 DC page 82

Variety of sensing modes for solving most applications: opposed, retroreflective and diffuse. High-performance sensing with visible long range Class 1 and 2 lasers with narrow effective beam for small object detection and precise position control.



Q45 AC page 84

Six sensing modes for solving most applications: Opposed, retroreflective, diffuse, convergent, laser and glass and plastic fiber optic. High-performance sensing with visible long range Class 1 and 2 lasers with narrow effective beam for small object detection and precise position control.



Q45 Universal Voltage page 86

Economical and versatile for use in all environments regardless of power supply.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Q45 Laser page 88

Retroreflective laser sensors offer a visible laser beam for easy alignment and long-range sensing.



Q45 NAMUR page 90

Specialized sensor for explosive environments, meeting intrinsically safe standards to ensure it is safe for use in hazardous areas.



Q45 Wireless page 92

The SureCross® Q45 is the first self-contained wireless standard photoelectric solution for the most challenging control and monitoring needs.

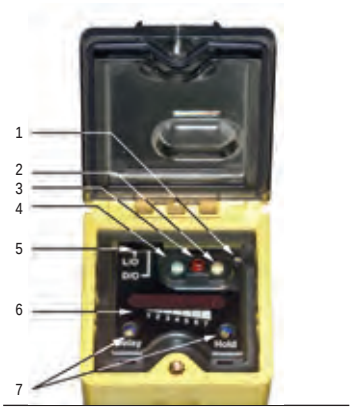
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Q45
DC-Operated
Adjustable Output Timing Logic

The Q45 Standard sensor is available in multiple sensing modes to suit many application needs.

- Opposed, retroreflective, diffuse, convergent, laser and glass and plastic fiber optic modes
- Electromechanical or solid-state options
- Rugged design rated to IP67 to withstand 1200 psi washdown
- Card options see page 89
- Cordsets and brackets see page 94

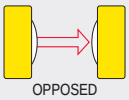
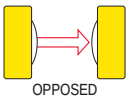


Indicators and Controls

1: Sensitivity Adjustment
2: Output Status Indicator
3: Signal Indicator
4: Power ON Indicator
5: Light/Dark Operate Switch
6: Optional LED Display
7: Optional Timing Adjustments

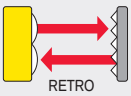
Opposed Q45, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
 OPPOSED	60 m	2 m 4-Pin Mini QD 4-Pin Euro QD	—	Q456E Emitter Q456EQ Emitter Q456EQ5 Emitter
 OPPOSED	60 m	2 m 4-Pin Mini QD 4-Pin Euro QD	Bipolar NPN/PNP	Q45BB6R Q45BB6RQ Q45BB6RQ5

Retro & Polar Retro Q45, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
 RETRO	0.08 - 9 m†	2 m 4-Pin Mini QD 4-Pin Euro QD	Bipolar NPN/PNP	Q45BB6LV Q45BB6LVQ Q45BB6LVQ5
 POLAR RETRO	0.15 - 6 m†	2 m 4-Pin Mini QD 4-Pin Euro QD	Bipolar NPN/PNP	Q45BB6LP Q45BB6LPQ Q45BB6LPQ5

For more specifications see page 96.

Connection options: A model with a QD requires a mating cordset (see page 94).

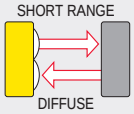
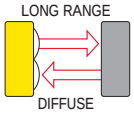
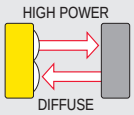
For 9 m cable, add suffix W/30 to the 2 m model number (example, Q456E W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector (BRT-2X2 for Q45BB6LL models).
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

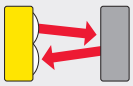
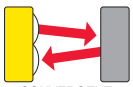
Diffuse Q45, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Models
	450 mm	2 m 4-Pin Mini QD 4-Pin Euro QD	Bipolar NPN/PNP	Q45BB6D Q45BB6DQ Q45BB6DQ5
	1.8 m	2 m 4-Pin Mini QD 4-Pin Euro QD	Bipolar NPN/PNP	Q45BB6DL Q45BB6DLQ Q45BB6DLQ5
	3 m	2 m 4-Pin Mini QD 4-Pin Euro QD	Bipolar NPN/PNP	Q45BB6DX Q45BB6DXQ Q45BB6DXQ5

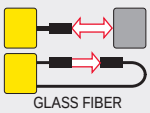
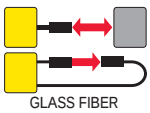
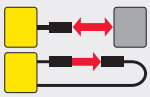
Convergent Q45, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
	38 mm	2 m 4-Pin Mini QD 4-Pin Euro QD	Bipolar NPN/PNP	Q45BB6CV Q45BB6CVQ Q45BB6CVQ5
	100 mm	2 m 4-Pin Mini QD 4-Pin Euro QD	Bipolar NPN/PNP	Q45BB6CV4 Q45BB6CV4Q Q45BB6CV4Q5

Glass & Plastic Fiber Q45, 10-30 V DC

Infrared LED Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
	Range varies by sensing mode and fiber optics used	2 m 4-Pin Mini QD 4-Pin Euro QD	Bipolar NPN/PNP	Q45BB6F Q45BB6FQ Q45BB6FQ5
	Range varies by sensing mode and fiber optics used	2 m 4-Pin Mini QD 4-Pin Euro QD	Bipolar NPN/PNP	Q45BB6FV Q45BB6FVQ Q45BB6FVQ5
	Range varies by sensing mode and fiber optics used	2 m 4-Pin Mini QD 4-Pin Euro QD	Bipolar NPN/PNP	Q45BB6FP Q45BB6FPQ Q45BB6FPQ5

For more specifications see page 96.

Connection options: A model with a QD requires a mating cordset (see page 94).

For 9 m cable, add suffix W/30 to the 2 m model number (example, Q45BB6D W/30).

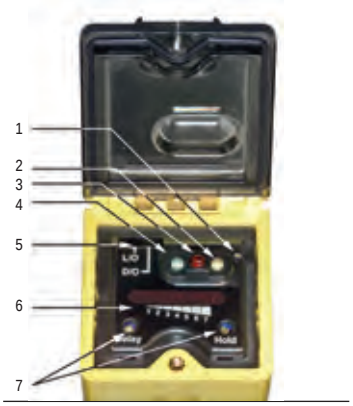
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Q45
AC-Operated
Adjustable Output Timing Logic

The Q45 AC sensor has several sensing modes and mounting options available.

- Opposed, retroreflective, diffuse, convergent, laser and glass and plastic fiber optic modes
- Electromechanical or solid-state options
- Rugged design rated to IP67 to withstand 1200 psi washdown
- Card options see page 89
- Cordsets and brackets see page 94

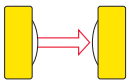


Indicators and Controls

1: Sensitivity Adjustment
2: Output Status Indicator
3: Signal Indicator
4: Power ON Indicator
5: Light/Dark Operate Switch
6: Optional LED Display
7: Optional Timing Adjustments

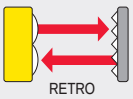
Opposed Q45, 90-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Models
 OPPOSED	60 m	2 m 3-Pin Mini QD 4-Pin Micro QD	—	Q452E Emitter Q452EQ Emitter Q452EQ1 Emitter
	60 m	2 m 5-Pin Mini QD	SPDT e/m Relay	Q45VR2R Q45VR2RQ
	60 m	2 m 3-Pin Mini QD 4-Pin Micro QD	SPST Solid-state Relay	Q45BW22R Q45BW22RQ Q45BW22RQ1

Retro & Polar Retro Q45, 90-250 V AC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
 RETRO	0.08 - 9 m†	2 m 5-Pin Mini QD	SPDT e/m Relay	Q45VR2LV Q45VR2LVQ
		2 m 3-Pin Mini QD 4-Pin Micro QD	SPST Solid-state Relay	Q45BW22LV Q45BW22LVQ Q45BW22LVQ1
 POLAR RETRO	0.15 - 6 m†	2 m 5-Pin Mini QD	SPDT e/m Relay	Q45VR2LP Q45VR2LPQ
		2 m 3-Pin Mini QD 4-Pin Micro QD	SPST Solid-state Relay	Q45BW22LP Q45BW22LPQ Q45BW22LPQ1

For more specifications see page 97.

Connection options: A model with a QD requires a mating cordset (see page 94).

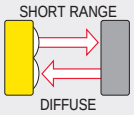
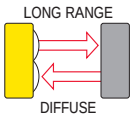
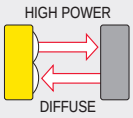
For 9 m cable, add suffix W/30 to the 2 m model number (example, Q45VR2LV W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

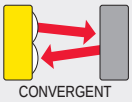
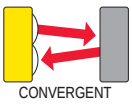
Diffuse Q45, 90-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Models
	450 mm	2 m 5-Pin Mini QD 2 m 3-Pin Mini QD 4-Pin Micro QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR2D Q45VR2DQ Q45BW22D Q45BW22DQ Q45BW22DQ1
	1.8 m	2 m 5-Pin Mini QD 2 m 3-Pin Mini QD 4-Pin Micro QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR2DL Q45VR2DLQ Q45BW22DL Q45BW22DLQ Q45BW22DLQ1
	3 m	2 m 5-Pin Mini QD 2 m 3-Pin Mini QD 4-Pin Micro QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR2DX Q45VR2DXQ Q45BW22DX Q45BW22DXQ Q45BW22DXQ1

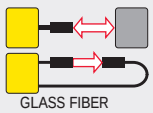
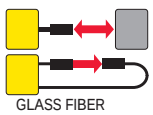
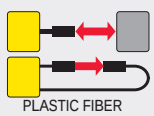
Convergent Q45, 90-250 V AC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
	38 mm	2 m 5-Pin Mini QD 2 m 3-Pin Mini QD 4-Pin Micro QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR2CV Q45VR2CVQ Q45BW22CV Q45BW22CVQ Q45BW22CVQ1
	100 mm	2 m 5-Pin Mini QD 2 m 3-Pin Mini QD 4-Pin Micro QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR2CV4 Q45VR2CV4Q Q45BW22CV4 Q45BW22CV4Q Q45BW22CV4Q1

Glass & Plastic Fiber Q45, 90-250 V AC

Infrared LED Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
	Range varies by sensing mode and fiber optics used	2 m 5-Pin Mini QD 2 m 3-Pin Mini QD 4-Pin Micro QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR2F Q45VR2FQ Q45BW22F Q45BW22FQ Q45BW22FQ1
	Range varies by sensing mode and fiber optics used	2 m 5-Pin Mini QD 2 m 3-Pin Mini QD 4-Pin Micro QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR2FV Q45VR2FVQ Q45BW22FV Q45BW22FVQ Q45BW22FVQ1
	Range varies by sensing mode and fiber optics used	2 m 5-Pin Mini QD 2 m 3-Pin Mini QD 4-Pin Micro QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR2FP Q45VR2FPQ Q45BW22FP Q45BW22FPQ Q45BW22FPQ1

For more specifications see page 97.

Connection options: A model with a QD requires a mating cordset (see page 94).

For 9 m cable, add suffix W/30 to the 2 m model number (example, Q45VR2DX W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Q45 Universal Voltage
Operate on AC or DC Voltage

The Q45 Universal Voltage Sensor is economical and versatile for use in all environments regardless of power supply.

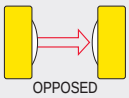
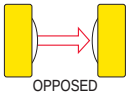
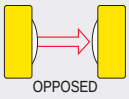
- Models for ac or dc power
- Opposed, retroreflective, diffuse, convergent and glass and plastic fiber optic modes
- A variety of cable and connector options
- Cordsets and brackets see page 94



Rugged Sensors
Built to withstand severe environments including heavy washdown of 1200 psi.

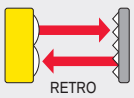
Opposed Q45, 12-250 V DC or 24-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Models
 OPPOSED	60 m	2 m 3-Pin Mini QD	—	Q453E Emitter Q453EQ Emitter
 OPPOSED	60 m	2 m 5-Pin Mini QD	SPDT e/m Relay	Q45VR3R Q45VR3RQ
 OPPOSED	60 m	2 m 4-Pin Mini QD	SPST Solid-state Relay	Q45BW13R Q45BW13RQ

Retro & Polar Retro Q45, 12-250 V DC or 24-250 V AC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
 RETRO	0.08 - 9 m†	2 m 5-Pin Mini QD 2 m 4-Pin Mini QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR3LV Q45VR3LVQ Q45BW13LV Q45BW13LVQ
 POLAR RETRO	0.15 - 6 m†	2 m 5-Pin Mini QD 2 m 4-Pin Mini QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR3LP Q45VR3LPQ Q45BW13LP Q45BW13LPQ

For more specifications see page 98.

Connection options: A model with a QD requires a mating cordset (see page 94).

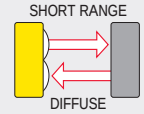
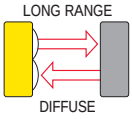
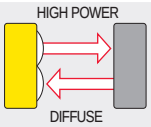
For 9 m cable, add suffix W/30 to the 2 m model number (example, Q45VR3LV W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

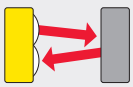
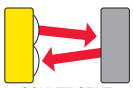
Diffuse Q45, 12-250 V DC or 24-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Models
	450 mm	2 m 5-Pin Mini QD 2 m 4-Pin Mini QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR3D Q45VR3DQ Q45BW13D Q45BW13DQ
	1.8 m	2 m 5-Pin Mini QD 2 m 4-Pin Mini QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR3DL Q45VR3DLQ Q45BW13DL Q45BW13DLQ
	3 m	2 m 5-Pin Mini QD 2 m 4-Pin Mini QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR3DX Q45VR3DXQ Q45BW13DX Q45BW13DXQ

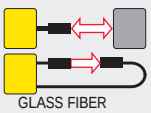
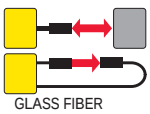
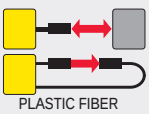
Convergent Q45, 12-250 V DC or 24-250 V AC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
	38 mm	2 m 5-Pin Mini QD 2 m 4-Pin Mini QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR3CV Q45VR3CVQ Q45BW13CV Q45BW13CVQ
	100 mm	2 m 5-Pin Mini QD 2 m 4-Pin Mini QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR3CV4 Q45VR3CV4Q Q45BW13CV4 Q45BW13CV4Q

Glass & Plastic Fiber Q45, 12-250 V DC or 24-250 V AC

Infrared LED Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
	Range varies by sensing mode and fiber optics used	2 m 5-Pin Mini QD 2 m 4-Pin Mini QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR3F Q45VR3FQ Q45BW13F Q45BW13FQ
	Range varies by sensing mode and fiber optics used	2 m 5-Pin Mini QD 2 m 4-Pin Mini QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR3FV Q45VR3FVQ Q45BW13FV Q45BW13FVQ
	Range varies by sensing mode and fiber optics used	2 m 5-Pin Mini QD 2 m 4-Pin Mini QD	SPDT e/m Relay SPST Solid-state Relay	Q45VR3FP Q45VR3FPQ Q45BW13FP Q45BW13FPQ

For more specifications see page 98.

Connection options: A model with a QD requires a mating cordset (see page 94).

For 9 m cable, add suffix W/30 to the 2 m model number (example, Q45VR3D W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



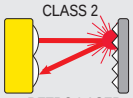
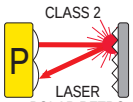
Q45
Retroreflective Laser Sensors

The Q45 retroreflective laser sensors offer a visible laser beam for easy alignment and long-range sensing.

- Extended 70 m sensing range
- Visible laser beam for easy target alignment
- Precise small object or edge detection
- Accommodates output timing logic or 7-segment LED signal strength display on standard model
- Cordsets and brackets see page 94

Q45, 10-30 V DC

Visible Red Laser

Sensing Mode	Range	Connection	Output Type	Models
	0.3 - 70 m†	2 m 5-Pin Mini QD 5-Pin Euro QD	Bipolar NPN/PNP	Q45BB6LL Q45BB6LLQ Q45BB6LLQ6
	0.6 - 40 m†	2 m 5-Pin Mini QD 5-Pin Euro QD	Bipolar NPN/PNP	Q45BB6LLP Q45BB6LLPQ Q45BB6LLPQ6

For more specifications see page 96.

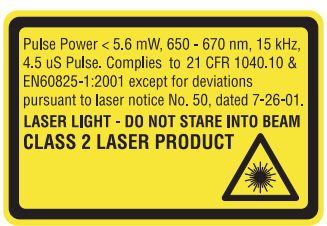
Connection options: A model with a QD requires a mating cordset (see page 94).

For 9 m cable, add suffix W/30 to the 2 m model number (example, Q45BB6LL W/30).

† Retroreflective range is specified using one model BRT-2X2 retroreflector.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

For safe laser use (Class 1 or Class 2):

- Do not permit a person to stare at the laser from within the beam.
- Do not point the laser at a person's eye at close range.
- Terminate the beam emitted by a Class 2 laser product at the end of its useful path.
- Locate open laser beam paths either above or below eye level, where practical.



Class 2 Lasers

Lasers that emit visible radiation in the wavelength range from 400 to 700 nm, where eye protection is normally afforded by aversion responses, including the blink reflex. This reaction may be expected to provide adequate protection under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing. Reference IEC 60825-1:2001, section 8.2.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

45LM Series Modules

Q45 sensors easily accept the addition of output timing logic and signal strength display functions. Display models have a 7-element display which gives a "finer" indication of excess gain than does the LED that is standard on most Q45 sensors. The modules listed below may be used with all Q45 sensors except NAMUR models.

Function	Model	Timing Logic Functions
Programmable output timing logic	45LM58	• Models with programmable output timing provide the following timing logic functions: - ON delay - OFF delay - ON/OFF delay - Retriggerable one-shot - Non-retriggerable one-shot - Delayed one-shot - ON delayed one-shot - Repeat cycle timer - Limit timer - Rate sensor - Flip-flop (alternate action)
Programmable output timing, plus signal strength display	45LM58D	• Selectable timing ranges: 0.01 to 0.15 seconds 0.1 to 1.5 seconds 1 to 15 seconds • Delay and hold time ranges may be individually selected and times precisely set using 15-turn adjustment potentiometers. Delay or hold time may also be displayed (zero seconds). • Module allows sensor output to be programmed for normally-open or normally-closed operation.
Signal strength display, only (no programmable functions)	45LMD	• Models with signal strength display gives precise indication of excess gain. Valuable for sensor setup and alignment, critical evaluation of alternative sensing schemes and close monitoring of sensing performance over time (example, dirt build-up on lenses or progressive misalignment).

45LM Series Module Specifications

Operating Temperature	-40° to +70° C
Timing Adjustments	Two 15-turn clutched potentiometers with brass elements, accessible from outside at the top of the sensor, beneath an o-ring sealed polycarbonate cover.
Timing Repeatability	Plus or minus 2% of the timing range (max.); assumes conditions of constant temperature and power supply.
Useful Time Range	Useful time range is from maximum time down to 5% of maximum. When the timing potentiometer is set fully counterclockwise, time will be approximately 5% of maximum.
Response Time	When the delay time is switched OFF, the card adds no measurable sensing response time.
LED Display	7-element LED display, visible through transparent top sensor cover. The more LEDs that are lit, the stronger the received light signal; three LEDs lit is equivalent to an excess gain of about 1x.

Signal Strength Display

LED Number	Approximate Gain	Display
#1	0.25x	
#2	0.5x	
#3	1.0x	
#4	2.0x	
#5	4.0x	
#6	6.0x	
#7	8.0x	

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



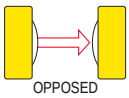
Q45 NAMUR
Rectangular Sensors for Hazardous Areas

The Q45 NAMUR is a specialized sensor for explosive environments meeting intrinsically safe standards to ensure it is safe for use in hazardous areas.

- Intrinsically safe dc models for potentially explosive environments.
- For use with approved DIN 19 234 switching amplifiers
- 1.2 mA output or less in dark condition and 2.1 mA or more in light condition
- Cordsets and brackets see page 94

Opposed Q45, 5-15 V DC

Infrared LED

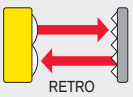
Sensing Mode	Range	Connection	Output Type	Models
 OPPOSED	6 m	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q459E Emitter
		2 m 4-Pin Euro QD		Q459EQ Emitter
				Q45AD9R
				Q45AD9RQ



Intrinsically Safe Models
Ideal for potentially explosive environments these sensors meet DIN 19234 safety requirements, and are available in several sensing modes.

Retro & Polar Retro Q45, 5-15 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
 RETRO	9 m†	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9LV
				Q45AD9LVQ
 POLAR RETRO	6 m†	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9LP
				Q45AD9LPQ

For more specifications see page99.

Connection options: A model with a QD requires a mating cordset (see page 94).

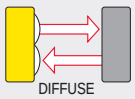
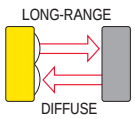
For 9 m cable, add suffix W/30 to the 2 m model number (example, Q459E W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector.
Actual sensing range may differ, depending on efficiency and reflective area of the retroreflector in use. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

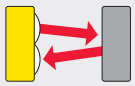
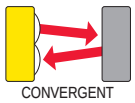
Diffuse Q45, 5-15 V DC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Models
 DIFFUSE	300 mm	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9D Q45AD9DQ
 LONG-RANGE DIFFUSE	1 m	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9DL Q45AD9DLQ

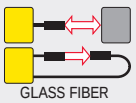
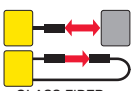
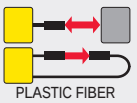
Convergent Q45, 5-15 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
 CONVERGENT	38 mm	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9CV Q45AD9CVQ
 CONVERGENT	100 mm	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9CV4 Q45AD9CV4Q

Glass & Plastic Fiber Q45, 5-15 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9F Q45AD9FQ
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9FV Q45AD9FVQ
 PLASTIC FIBER	Range varies by sensing mode and fiber optics used	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9FP Q45AD9FPQ

For more specifications see page 99.

Connection options: A model with a QD requires a mating cordset (see page 94).

For 9 m cable, add suffix W/30 to the 2 m model number (example, Q45AD9D W/30).



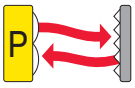
Q45 Wireless
Wireless Sensors

The SureCross® Q45 is the first self-contained wireless standard photoelectric solution for the most challenging control and monitoring needs. Easily add a scalable wireless sensor network to improve efficiency by monitoring and coordinating multiple machines and processes without pulling cables.

- True self-contained wireless with no cables, cordsets or external power
- 1 km line-of-sight
- Built-in antenna
- 2.4 GHz unlicensed frequency
- Used exclusively with Banner's DX80 gateways (see page 651)

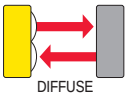
Retroflective Q45 Wireless

Visible Red LED

Sensing Mode	Sensing Range	Wireless Communication Range	Output	Models
 POLAR RETRO	6 m	1,000 m (with line of sight)	2 or 6 Discrete	DX80N2Q45LP

Diffuse Q45 Wireless

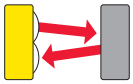
Visible Red LED

Sensing Mode	Sensing Range	Wireless Communication Range	Output	Models
 DIFFUSE	300 mm	1,000 m (with line of sight)	2 or 6 Discrete	DX80N2Q45D

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

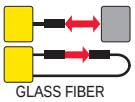
Convergent Q45 Wireless

Visible Red LED

Sensing Mode	Sensing Range	Wireless Communication Range	Output	Models
 CONVERGENT	38 mm	1,000 m (with line of sight)	2 or 6 Discrete	DX80N2Q45CV

Fiber Optic Q45 Wireless

Visible Red LED

Sensing Mode	Sensing Range	Wireless Communication Range	Output	Models
 GLASS FIBER	varies by selected fiber	1,000 m (with line of sight)	2 or 6 Discrete	DX80N2Q45F

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q5 models)

See page 908

Length	Straight 4-Pin	Straight 5-Pin	Right-Angle 4-Pin	Right-Angle 5-Pin
1.83 m	MQDC-406	MQDC1-506	MQDC-406RA	MQDC1-506RA
4.57 m	MQDC-415	MQDC1-515	MQDC-415RA	MQDC1-515RA
9.14 m	MQDC-430	MQDC1-530	MQDC-430RA	MQDC1-530RA

Mini QD (for Q models)

See page 928

Length	Straight 3-Pin	Straight 4-Pin	Straight 5-Pin
1.83 m	MBCC-306	MBCC-406	MBCC-506
4.57 m	MBCC-312	MBCC-412	MBCC-512
9.14 m	MBCC-330	MBCC-430	MBCC-530

Micro QD (for Q1 models)

See page 925

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQAC-406	MQAC-406RA
4.57 m	MQAC-415	MQAC-415RA
9.14 m	MQAC-430	MQAC-430RA

NAMUR Euro QD (for Q models)

See page 909

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQD9-406	MQD9-406RA
4.57 m	MQD9-415	MQD9-415RA

Additional cordset information available. See page 904.

Brackets

Q45

See page 869	See page 869	See page 870
SMB30A	SMB30FA..	SMB30SC

Additional bracket information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Opposed, Retroreflective
and Diffuse Models
Suffix E, R, D, DL, DX, LV and LP



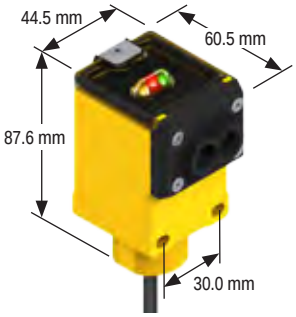
Retroreflective Laser Models
Suffix LL and LLP



Convergent Models
Suffix CV and CV4



Plastic Fiber Model
Suffix FP



Glass Fiber Models
Suffix F and FV

OTHER AVAILABLE MODELS



Wireless Q45 651

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q45 DC Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple), at less than 50 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Bipolar:** one current sourcing (PNP) and one current sinking (NPN) open-collector transistor
Output Rating	250 mA max. each output up to 50° C, derated to 150 mA at 70° C (derate 5 mA/° C) **OFF-state leakage current:** less than 1 µA **Output saturation voltage (both outputs):** less than 1 volt at 10 mA and less than 2 volts at 250 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time	**Opposed:** 2 milliseconds ON and 1 millisecond OFF **Laser Retroreflective:** less than 2 milliseconds **All others:** 2 milliseconds ON/OFF
Delay at Power-up	100 milliseconds; output does not conduct during this time
Repeatability	**Opposed:** 0.25 milliseconds **All others:** 0.5 milliseconds Response time and repeatability specifications are independent of signal strength
Adjustments	Light Operate (LO), Dark Operate (DO) select switch and multi-turn sensitivity control. Optional logic and logic/display modules have adjustable timing functions. See data sheet for detailed information.
Indicators	**Power (Green):** LED lights whenever 10 to 30 V dc power is applied, and flashes to indicate output overload or output short circuit **Signal (Red):** LED lights whenever the sensor sees its modulated light source, and pulses at a rate proportional to the strength of the received light signal **Load (Yellow):** LED lights whenever an output is conducting **Optional 7-element:** LED signal strength display module
Construction	Molded reinforced thermoplastic polyester housing, o-ring sealed transparent polycarbonate cover, molded acrylic lenses, and stainless steel hardware. Q45s are designed to withstand 1200 psi washdown. The base of cabled models has a ½" NPS integral internal conduit thread.
Environmental Rating	IP67; NEMA 6P
Laser Classification (Laser Retroreflective models only)	Class II laser product. US Safety Standards 21 CFR 1040.10 and 1040.11; European Standards EN 60825 and IEC 60825
Connections	PVC-jacketed 4-wire (5-wire for Laser Retroreflective) 2 m or 9 m cables. For 4-pin Mini-style QD use "Q" suffix, (5-pin Mini-style QD for Laser Retroreflective use "Q" suffix) or for 4-pin Euro-style use "Q5" suffix (5-pin Euro-style QD for Laser Retroreflective use "Q6" suffix). QD cordsets are ordered separately. See page 94.
Operating Conditions	**Temperature:** -40° to +70° C (-10° to +40° C for Retroreflective Laser models) **Relative humidity:** 90% at 50° C (non-condensing)
Application Notes	Optional logic timing modules are available. See page 89 for more information.
Certifications	Retroreflective Laser: CE ETL LISTED All others: CE CSA c UL us
Hookup Diagrams	**Emitters:** DC02 (p.974) **Laser Retroreflective Models:** DC13 (p. 977) **Other DC Models:** DC04 (p. 974)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q45 AC Specifications

Supply Voltage and Current	90 to 250 V ac (50 - 60 Hz) **Average current:** 20 mA. **Peak current:** 500 mA at 120 V ac, 750 mA at 250 V ac
Supply Protection Circuitry	Protected against transient voltages
Output Configuration	**Q45VR2 models:** SPDT (single-pole double-throw) electromechanical relay output (except emitters) **Q45BW22 models:** Short circuit/overload protected FET solid-state relay
Output Rating	**Q45VR2 models:** **Max. switching power (resistive load):** 150 W, 600 VA **Max. switching voltage (resistive load):** 250 V ac or 30 V dc **Max. switching current (resistive load):** 5 A @ 250 V ac **Min. voltage and current:** 5 V dc, 0.1 mA **Mechanical life of relay:** 10,000,000 operations **Electrical life of relay at full resistive load:** 100,000 operations **Q45BW22 models:** **Continuous current:** 300 mA max. to 50° C (derate to 200 mA at 70° C, 5 mA/° C) **Inrush current:** 3A max. for 100 milliseconds, 5A max. for 1 millisecond **OFF-state leakage current:** less than 100 µA **Saturation voltage:** less than 3 V at 200 mA
Output Protection Circuitry	**Q45VR2 models:** Protected against false pulse on power-up **Q45BW22 models:** Manually-resettable output latch-out trips in the event of an output overload or short circuit condition. The green Power LED flashes to indicate the latch-out. To reset the output, remove power to the sensor and load for 5 seconds, then restore power.
Output Response Time	**Q45VR2 models:** 15 milliseconds ON/OFF **Q45BW22 models: Opposed:** 2 milliseconds ON, 1 millisecond OFF **All others:** 2 milliseconds ON/OFF
Delay at Power-up	100 milliseconds; output does not conduct during this time
Repeatability	**Opposed:** 0.25 milliseconds; **All others:** 0.5 milliseconds Response time and repeatability specifications are independent of signal strength
Adjustments	Light Operate (LO), Dark Operate (DO) select switch and multi-turn sensitivity control, optional logic and logic/display modules have adjustable timing functions. See data sheet for detailed information.
Indicators	**Power (Green):** LED lights whenever 90-250 V ac power is applied, and flashes to indicate output overload or output short circuit **Signal (Red):** LED lights whenever the sensor sees its modulated light source, and pulses at a rate proportional to the strength of the received light signal **Load (Yellow):** LED lights whenever an output relay is energized **Optional 7-element:** LED signal strength display module
Construction	Molded reinforced thermoplastic polyester housing, o-ring sealed transparent polycarbonate cover, molded acrylic lenses, and stainless steel hardware. Q45s are designed to withstand 1200 psi washdown. The base of cabled models has a ½" NPS integral internal conduit thread.
Environmental Rating	NEMA 6P; IEC IP67
Connections	**Q45VR2 models:** PVC-jacketed 2-wire emitters or 5-wire (all others) 2 m or 9 m unterminated cables, or 3-pin (emitters) or 5-pin (all others) Mini-style quick-disconnect (QD) fittings are available ("Q"- suffix models). QD cordsets are ordered separately. **Q45BW22 models:** PVC-jacketed 2 m or 9 m cables, or 3-pin Mini-style ("Q" suffix models) or 4-pin Micro-style ("Q1" suffix models) quick-disconnect (QD) fittings are available. QD cordsets are ordered separately. See page 94.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Application Notes	Transient suppression is recommended for contacts switching inductive loads. Optional logic timing modules are available. See page 89 for more information.
Certifications	Q45VR2 models: CE, CSA, cULus Q45BW22 models: CSA, cULus
Hookup Diagrams	**VR2 Models:** **Emitters:** AC03 (p. 981) **Other VR2 Models:** AC08 (p. 982) **BW22 Models:** **Cabled & Mini QD:** AC05 (p. 982) **Micro QD:** AC06 (p. 982) **Cabled & Mini QD Emitters:** AC03 (p. 981) **Micro QD Emitters:** AC07 (p. 982)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q45 Universal Voltage Specifications

Supply Voltage and Current	24 to 250 V ac, 50/60 Hz or 12 to 250 V dc (1.5 watts max.)
Supply Protection Circuitry	Protected against transient voltages. DC hookup is without regard to polarity.
Output Configuration	Q45VR3 models: SPDT (Single-Pole, Double-Throw) electromechanical relay output. All models except emitters. Q45BW13 models: Optically isolated SPST solid-state switch. All models except emitters.
Output Rating	Q45VR3 models: Max. switching power (resistive load): 1250VA, 150W Max. switching voltage (resistive load): 250 V ac, 125 V dc Max. switching current (resistive load): 5A @ 250 V ac, 5A @ 30 V dc derated to 200 mA @ 125 V dc Min. voltage and current: 5 V dc, 10 mA Mechanical life of relay: 50,000,000 operations Electrical life of relay at full resistive load: 100,000 operations Q45BW13 models: 250 V ac, 250 V dc, 300 mA Output saturation voltage: 3 V at 300 mA, 2 V at 15 mA OFF-state leakage current: less than 50 µA Inrush current: 1 amp for 20 milliseconds, non-repetitive
Output Protection Circuitry	Protected against false pulse on power-up
Output Response Time	Q45VR3 models: 15 milliseconds ON/OFF NOTE: 100 millisecond delay on power-up. Relay is de-energized during this time. Q45BW13 models: Opposed: 2 milliseconds ON, 1 millisecond OFF All others: 2 milliseconds ON/OFF
Delay at Power-up	100 milliseconds; output does not conduct during this time
Repeatability	Opposed: 0.25 milliseconds All others: 0.5 milliseconds Response time and repeatability specifications are independent of signal strength
Adjustments	Light Operate (LO), Dark Operate (DO) select switch and multi-turn sensitivity control on top of sensor, optional logic and logic/display modules have adjustable timing functions. See data sheet for detailed information.
Indicators	Power (Green) LED lights whenever 24 to 250 V ac, or 12 to 250 V dc power is applied Signal (Red) LED lights whenever the sensor sees its modulated light source and pulses at a rate proportional to the strength of the received light signal Load (Yellow) LED lights whenever the output relay is energized Optional 7-element LED signal strength display module
Construction	Molded reinforced thermoplastic polyester housing, o-ring-sealed transparent polycarbonate cover, molded acrylic lenses, and stainless steel hardware. Q45s are designed to withstand 1200 psi washdown. The base of cabled models has a ½" NPS integral internal conduit thread.
Environmental Rating	IP67; NEMA 6P
Connections	Q45VR3 models: PVC-jacketed 2 m or 9 m unterminated cables, or 5-pin Mini-style quick-disconnect (QD) fittings are available ("Q"- suffix models). QD cordsets are ordered separately. See page 94. Q45BW13 models: PVC-jacketed 2 m or 9 m unterminated cables, or 4-pin Mini-style quick-disconnect (QD) fittings are available ("Q"- suffix models). QD cordsets are ordered separately. See page 94.
Operating Conditions	Temperature: -25° to +55° C Relative humidity: 90% at 50° C (non-condensing)
Application Notes	Transient suppression is recommended for contacts switching inductive loads. Optional output timing modules are available. See page 89 for more information.
Certifications	Q45VR3 models: Q45BW13 models:
Hookup Diagrams	VR3 Models: Emitters: UN02 (p. 984) BW13 Models: Emitters: UN02 (p. 984) Other VR3 Models: UN01 (p. 984) Other AC/DC Models: UN07 (p. 985)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q45 NAMUR Specifications

Supply Voltage and Current	5 to 15 V dc. Supply voltage is provided by the amplifier to which the sensor is connected.
Output	Constant current output: ≤ 1.2 mA in the dark condition and ≥ 2.1 mA in the light condition
Output Response Time	Opposed receiver: 2 milliseconds ON/0.4 milliseconds OFF All others: 5 milliseconds ON/OFF (does not include amplifier response)
Adjustments	Multi-turn sensitivity control on top of sensor
Indicators	Power (Red): LED (emitters only) lights whenever 5 - 15 V dc power is applied Signal (Red): LED lights whenever the sensor sees its modulated light source
Construction	Molded thermoplastic polyester housing, o-ring sealed transparent Lexan® top cover, molded acrylic lenses, and stainless steel hardware. Q45s are designed to withstand 1200 psi washdown. The base of cabled models has a ½" NPS integral internal conduit thread.
Environmental Rating	IP67; NEMA 6P
Connections	PVC-jacketed 2 m or 9 m cables, or 4-pin Euro-style quick-disconnect (QD) fitting are available. QD cordsets are ordered separately. See page 94.
Operating Conditions	Temperature: -40° to +70° C Relative humidity: 90% at 50° C (non-condensing)
Design Standards	Q45AD9 Series sensors comply with the following standards: DIN 19234, EN 50 014: 1977, EN 50 020: 2002
Certifications	CE, CSA Exia NRTL/C, KEMA, ETL, FM APPROVED
Hookup Diagrams	SP01 (p. 987)

Lexan® is a registered trademark of General Electric Co.

APPROVALS

CSA: #LR 41887	Intrinsically Safe, with Entity for Class I, Groups A-D Class I, Div. 2, Groups A-D	KEMA: #03 ATEX 1441x	II IG EEx ia IICTC
FM: #J.I. 5Y3A4.AX	Intrinsically Safe, with Entity for Class I, II, III, Div. 1, Groups A-G Class I, II, III, Div. 2, Groups A-D and G	ETL: #558044	Tested per FM and CSA as shown above

Q45 Wireless Specifications

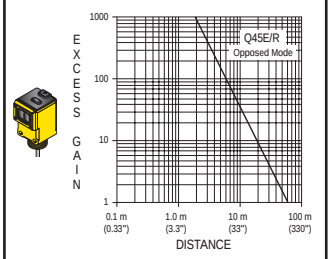
See data sheet for more information

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

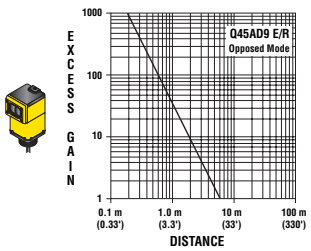
○ = Infrared LED ● = Visible Red LED P = Visible Red LED Polarized LP = Visible Red Laser Polarized ✸ = Visible Red Laser

Opposed Mode Q45



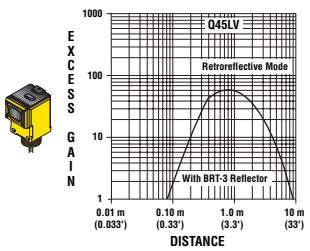
Range: 60 m | LED: ○

Opposed Mode Q45 NAMUR



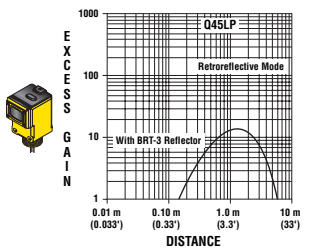
Range: 6 m | LED: ○

Retroreflective Mode Q45



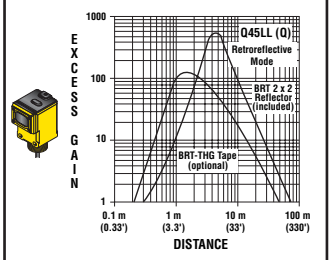
Range: 9 m | LED: ●

Polarized Retroreflective Mode Q45



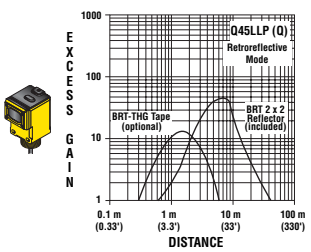
Range: 6 m | LED: P

Retroreflective Mode Q45 Class 2 Laser



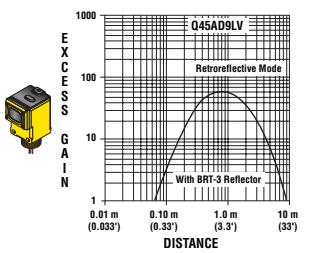
Range: 70 m | LED: ✸

Polarized Retroreflective Mode Q45 Class 2 Laser



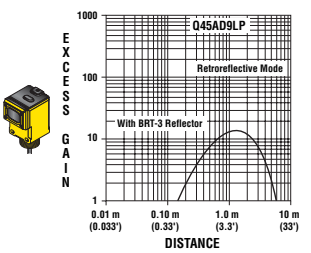
Range: 40 m | LED: LP

Retroreflective Mode Q45 NAMUR



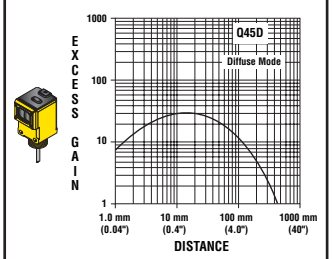
Range: 9 m | LED: ●

Polarized Retroreflective Mode Q45 NAMUR



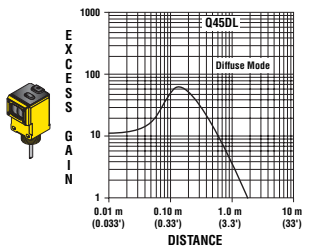
Range: 6 m | LED: P

Diffuse Mode Q45



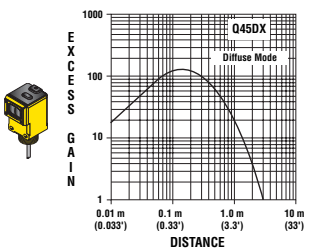
Range: 450 mm | LED: ○

Diffuse Mode Q45



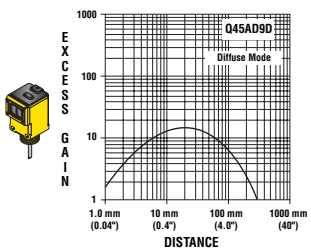
Range: 1.8 m | LED: ○

Diffuse Mode Q45



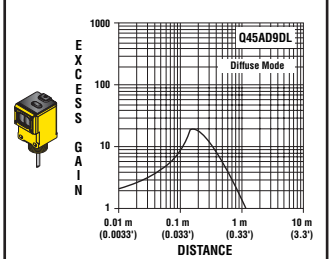
Range: 3 m | LED: ○

Diffuse Mode Q45 NAMUR



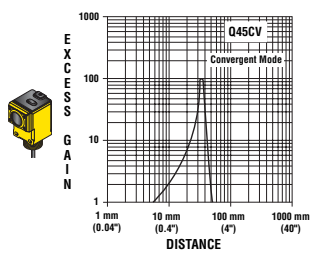
Range: 300 mm | LED: ○

Diffuse Mode Q45 NAMUR



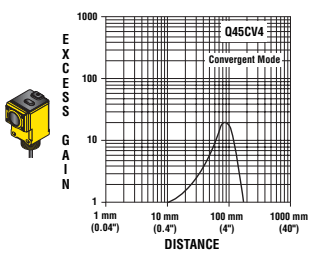
Range: 1 m | LED: ○

Convergent Mode Q45



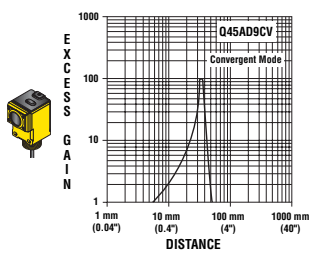
Range: 38 mm | LED: ●

Convergent Mode Q45



Range: 100 mm | LED: ●

Convergent Mode Q45 NAMUR



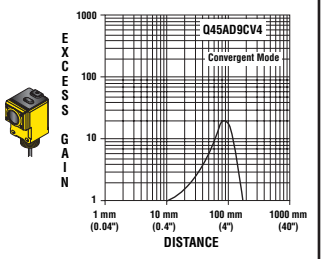
Range: 38 mm | LED: ●

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

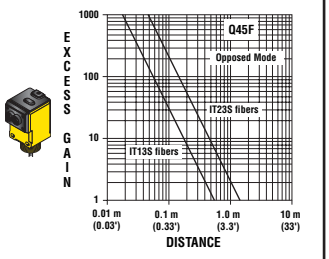
○ = Infrared LED ● = Visible Red LED P = Visible Red LED Polarized ✸ = Visible Red Laser

Convergent Mode Q45 NAMUR



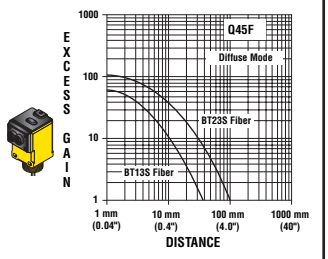
Range: 100 mm | LED: ●

Opposed Mode—Glass Fiber Q45



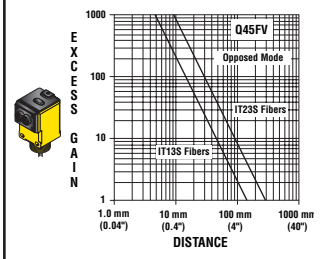
Range: Varies | LED: ○

Diffuse Mode—Glass Fiber Q45



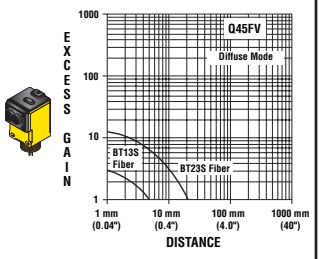
Range: Varies | LED: ○

Opposed Mode—Glass Fiber Q45



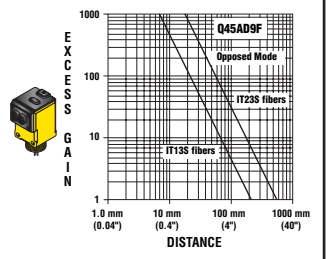
Range: Varies | LED: ●

Diffuse Mode—Glass Fiber Q45



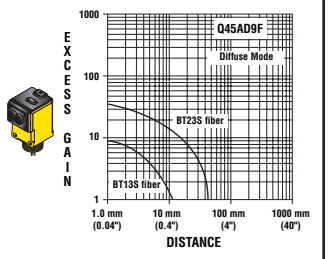
Range: Varies | LED: ●

Opposed Mode—Glass Fiber Q45 NAMUR



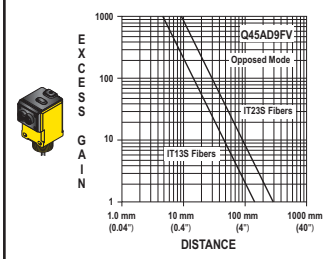
Range: Varies | LED: ○

Diffuse Mode—Glass Fiber Q45 NAMUR



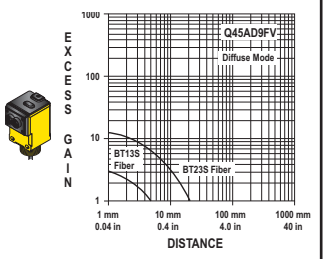
Range: Varies | LED: ○

Opposed Mode—Glass Fiber Q45 NAMUR



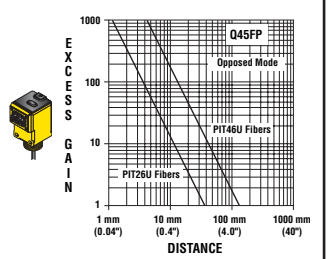
Range: Varies | LED: ●

Diffuse Mode—Glass Fiber Q45 NAMUR



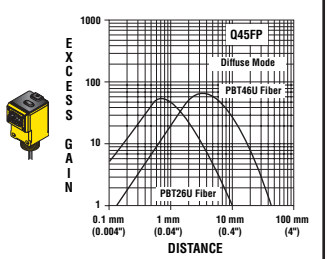
Range: Varies | LED: ●

Opposed Mode—Plastic Fiber Q45



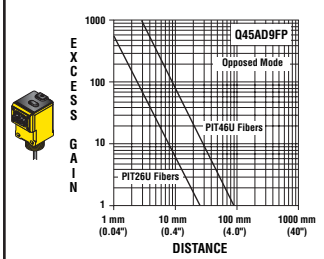
Range: Varies | LED: ●

Diffuse Mode—Plastic Fiber Q45



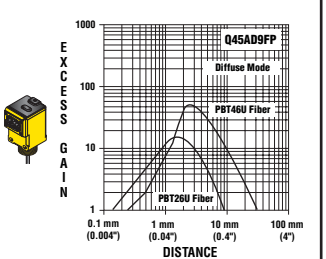
Range: Varies | LED: ●

Opposed Mode—Plastic Fiber Q45 NAMUR



Range: Varies | LED: ●

Diffuse Mode—Plastic Fiber Q45 NAMUR



Range: Varies | LED: ●

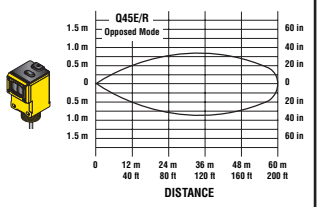
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Beam Patterns

○ = Infrared LED ● = Visible Red LED P = Visible Red LED Polarized

Opposed Mode Q45

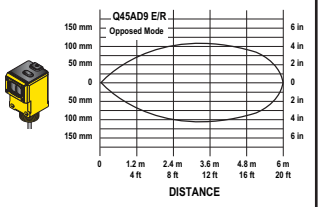
Effective Beam: 13 mm



Range: 60 m | LED: ○

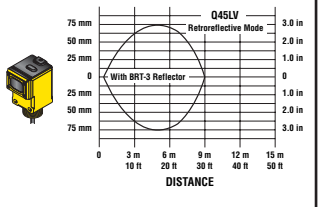
Opposed Mode Q45 NAMUR

Effective Beam: 13 mm



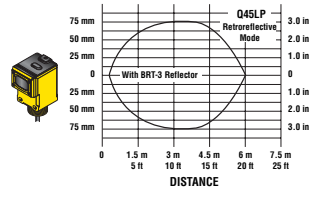
Range: 6 m | LED: ○

Retroreflective Mode Q45



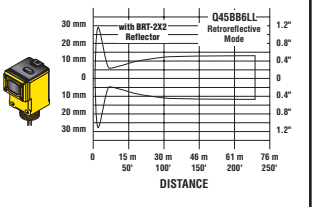
Range: 9 m | LED: ●

Polarized Retroreflective Mode Q45



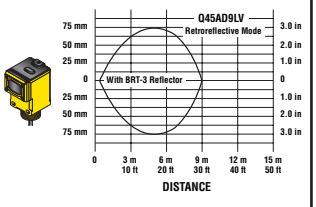
Range: 6 m | LED: P

Retroreflective Mode Q45 Class 2 Laser



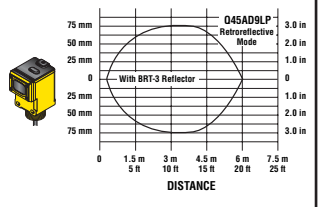
Range: 70 m | LED: ✸

Retroreflective Mode Q45 NAMUR



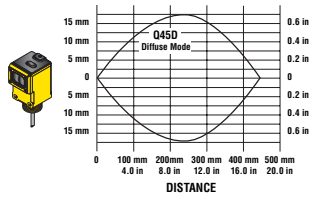
Range: 9 m | LED: ●

Polarized Retroreflective Mode Q45 NAMUR



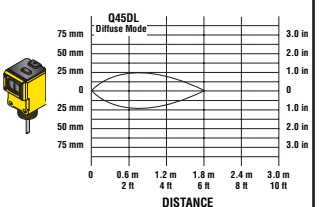
Range: 6 m | LED: P

Diffuse Mode Q45



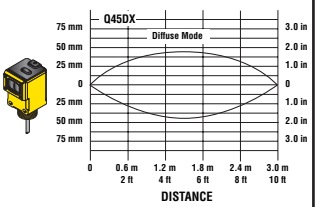
Range: 450 mm | LED: ○

Diffuse Mode Q45



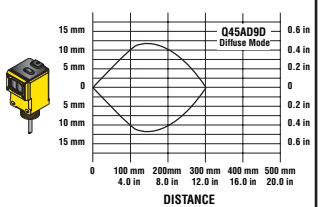
Range: 1.8 m | LED: ○

Diffuse Mode Q45



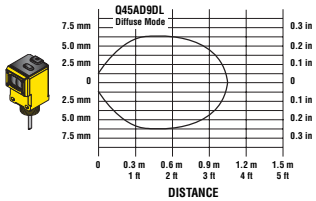
Range: 3 m | LED: ○

Diffuse Mode Q45 NAMUR



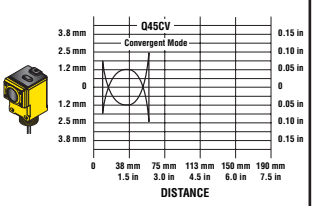
Range: 300 mm | LED: ○

Diffuse Mode Q45 NAMUR



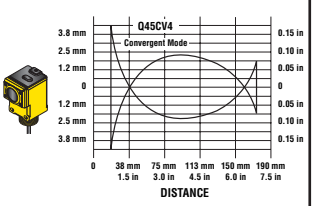
Range: 1 m | LED: ○

Convergent Mode Q45



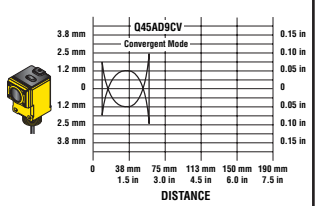
Range: 38 mm | LED: ●

Convergent Mode Q45



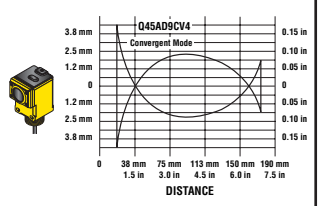
Range: 100 mm | LED: ●

Convergent Mode Q45 NAMUR



Range: 38 mm | LED: ●

Convergent Mode Q45 NAMUR



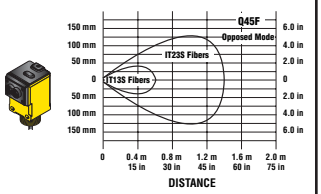
Range: 100 mm | LED: ●

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Beam Patterns (Diffuse and Convergent mode performance based on 90% reflectance white card)

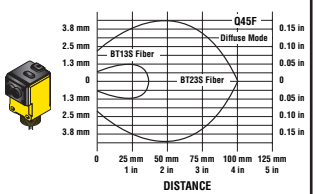
○ = Infrared LED ● = Visible Red LED P = Visible Red LED Polarized ✸ = Visible Red Laser

Opposed Mode—Glass Fiber Q45



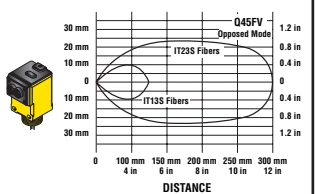
Range: Varies | LED: ○

Diffuse Mode—Glass Fiber Q45



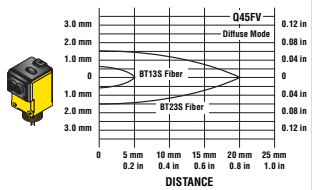
Range: Varies | LED: ○

Opposed Mode—Glass Fiber Q45



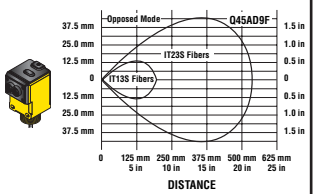
Range: Varies | LED: ●

Diffuse Mode—Glass Fiber Q45



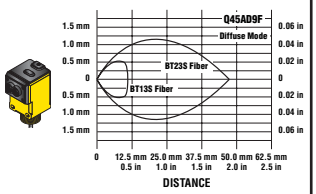
Range: Varies | LED: ●

Opposed Mode—Glass Fiber Q45 NAMUR



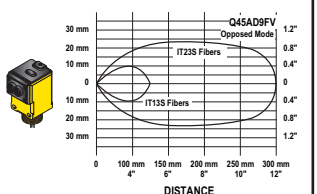
Range: Varies | LED: ○

Diffuse Mode—Glass Fiber Q45 NAMUR



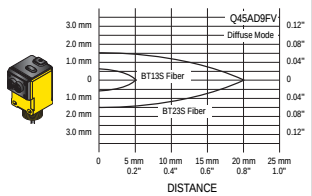
Range: Varies | LED: ○

Opposed Mode—Glass Fiber Q45 NAMUR



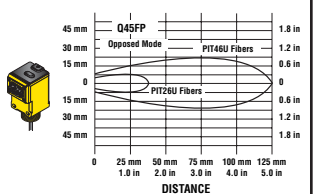
Range: Varies | LED: ●

Diffuse Mode—Glass Fiber Q45 NAMUR



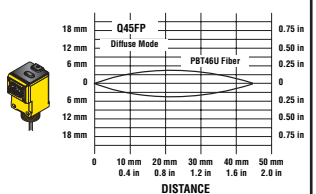
Range: Varies | LED: ●

Opposed Mode—Plastic Fiber Q45



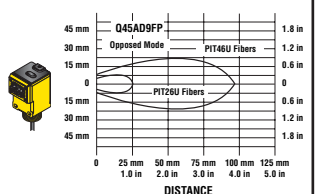
Range: Varies | LED: ●

Diffuse Mode—Plastic Fiber Q45



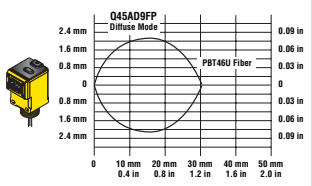
Range: Varies | LED: ●

Opposed Mode—Plastic Fiber Q45 NAMUR



Range: Varies | LED: ●

Diffuse Mode—Plastic Fiber Q45 NAMUR



Range: Varies | LED: ●

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Q60
Long-Range, Adjustable-Field Sensors

The Q60 is a long-range sensor with a sharp cut off and extremely high gain to detect dark targets, and a laser model to detect thin targets at maximum range.

- Output timing ON/OFF
- Detects objects with a defined sensing field, ignoring objects located beyond the sensing point
- Features two-turn, logarithmic adjustment of sensing field cutoff point from 0.2 to 2 m
- Easy push-button or remote programming of output timing
- Cordsets and brackets see page 106

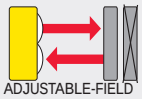
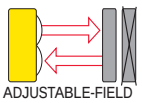


Pallet Shrink-Wrapping

Sensor can see targets up to 2 m away with a sharp cutoff, detects the presence of the package, and stops the shrink-wrapping function when it no longer "sees" the top of the pallet

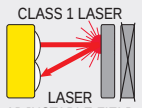
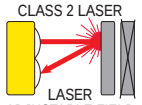
Adjustable-Field Q60, 10-30 V DC

Infrared LED | Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
	Min.: 65 - 130 mm† Cutoff: 200 - 1000 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	Q60BB6AFV1000 Q60BB6AFV1000Q
	Min.: 50 - 125 mm† Cutoff: 200 - 2000 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	Q60BB6AF2000 Q60BB6AF2000Q

Laser Adjustable-Field Q60, 10-30 V DC

Visible Red Laser

Sensing Mode	Range	Connection	Output Type	Models
	Min.: 100 - 260 mm† Cutoff: 200 - 1400 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	Q60BB6LAF1400 Q60BB6LAF1400Q
	Min.: 75 - 240 mm† Cutoff: 200 - 2000 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	Q60BB6LAF2000 Q60BB6LAF2000Q

For more specifications see page 107.

Connection options: A model with a QD requires a mating cordset (see page 106).

For 9 m cable, add suffix W/30 to the 2 m model number (example, Q60BB6AF2000 W/30).

† Minimum range varies by established cutoff point (see excess gain curves, page 108 and cutoff point deviation curves, page 109).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



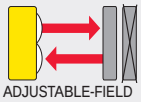
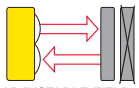
Q60 Universal Voltage
Operates on AC or DC Voltage

The Q60 Universal Voltage Sensor detects objects within a defined sensing range and operates on either ac or dc voltage for use in many locations, regardless of power supply.

- Powerful infrared sensing beam
- Features two-turn, logarithmic adjustment of sensing field cutoff point from 0.2 to 2 m
- Easy push-button or remote programming of output timing
- Integral cable or quick-disconnect options
- Cordsets and brackets see page 106

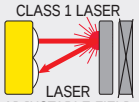
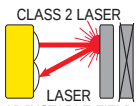
Q60 Universal Voltage, 12-250 V DC or 24-250 V AC

Infrared LED | Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
 ADJUSTABLE-FIELD	Min.: 65 - 130 mm† Cutoff: 200 - 1000 mm	2 m	SPDT e/m Relay	Q60VR3AFV1000
		4-Pin Micro QD	SPST e/m Relay	Q60VR3AFV1000Q1
 ADJUSTABLE-FIELD	Min.: 50 - 125 mm† Cutoff: 200 - 2000 mm	2 m	SPDT e/m Relay	Q60VR3AF2000
		4-Pin Micro QD	SPST e/m Relay	Q60VR3AF2000Q1

Q60 Universal Voltage, 12-250 V DC or 24-250 V AC

Visible Red Laser

Sensing Mode	Range	Connection	Output Type	Models
 CLASS 1 LASER LASER ADJUSTABLE-FIELD	Min.: 100 - 260 mm† Cutoff: 200 - 1400 mm	2 m	SPDT e/m Relay	Q60VR3LAF1400
		4-Pin Micro QD	SPST e/m Relay	Q60VR3LAF1400Q1
 CLASS 2 LASER LASER ADJUSTABLE-FIELD	Min.: 75 - 240 mm† Cutoff: 200 - 2000 mm	2 m	SPDT e/m Relay	Q60VR3LAF2000
		4-Pin Micro QD	SPST e/m Relay	Q60VR3LAF2000Q1

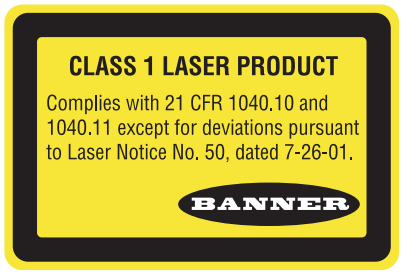
For more specifications see page 107.

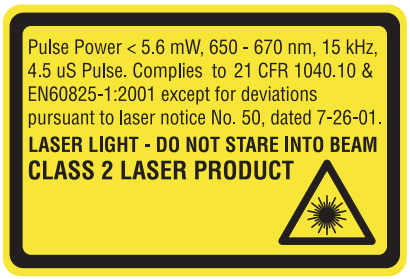
Connection options: A model with a QD requires a mating cordset (see page 106).

For 9 m cable, add suffix W/30 to the 2 m model number (example, Q60VR3AFV1000 W/30).

† Minimum range varies by established cutoff point (see excess gain curves, page 108 and cutoff point deviation curves, page 109).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es





Class 1 Lasers

Lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing. Reference 60825-1 Amend. 2 © IEC:2001(E), section 8.2.

For safe laser use:

- Do not permit a person to stare at the laser from within the beam
- Do not point the laser at a person's eye at close range
- Locate open laser beam paths either above or below eye level, where practical

Class 2 Lasers

Lasers that emit visible radiation in the wavelength range from 400 nm to 700 nm where eye protection is normally afforded by aversion responses, including the blink reflex. This reaction may be expected to provide adequate protection under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing. Reference 60825-1 Amend. 2 © IEC:2001(E), section 8.2.

For safe laser use:

- Do not permit a person to stare at the laser from within the beam
- Do not point the laser at a person's eye at close range
- Locate open laser beam paths either above or below eye level, where practical

Cordsets

Euro QD (for Q models)

See page 912

Length	Threaded 5-Pin Straight		Threaded 5-Pin Right-Angle	
1.83 m	MQDC1-506		MQDC1-506RA	
4.57 m	MQDC1-515		MQDC1-515RA	
9.14 m	MQDC1-530		MQDC1-530RA	

Additional cordset information available. See page 904.

Micro QD (for Q1 models)

See page 925

Length	Threaded 4-Pin Straight		Threaded 4-Pin Right-Angle	
1.83 m	MQAC-406		MQAC-406RA	
4.57 m	MQAC-415		MQAC-415RA	
9.14 m	MQAC-430		MQAC-430RA	

Brackets

Q60

See page 873	See page 873	See page 874
SMBAMSQ60IP	SMBAMSQ60P	SMBQ60
		

Additional bracket information available. See page 846.



Adjustable-Field Models
Suffix AF, AFV and LAF

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q60 Specifications

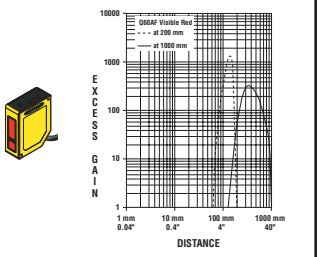
Supply Voltage and Current	Q60BB6AF and Q60BB6AFV models: 10 to 30 V dc (10% max. ripple) at less than 50 mA exclusive of load Q60BB6LAF models: 10 to 30 V dc (10% max. ripple) at less than 35 mA exclusive of load Q60VR3LAF and Q60VR3AFV Universal models: 12 to 250 V dc or 24 to 250 V ac, 50/60 Hz Input power 1.5 W max.
Supply Protection Circuitry	Protected against reverse polarity and transient voltages (Q60VR3 model's dc hookup is without regard to polarity)
Output Configuration	Q60BB6AF, Q60BB6AFV and Q60BB6LAF models: Bipolar: one NPN (current sinking) and one PNP (current sourcing) open-collector transistor Q60VR3AF, Q60VR3LAF and Q60VR3AFV cabled models: E/M Relay (SPDT), normally closed and normally open contacts Q60VR3AFQ1, Q60VR3AFVQ1 and Q60VR3LAFQ1 (QD) models: E/M Relay (SPST), normally open contact
Output Rating	DC models:150 mA max. each output @ 25 °C OFF-state leakage current: less than 5 µA @ 30 V dc Output saturation NPN: less than 200 mV @ 10 mA; less than 1 V @ 150 mA Output saturation PNP: less than 1 V at 10 mA; less than 1.5 V at 150 mA Universal Voltage models: Min. voltage and current: 5 V dc, 10 mA Mechanical life of relay: 50,000,000 operations Electrical life of relay at full resistive load: 100,000 operations Max. switching power (resistive load): Cabled models: 1250 VA, 150 W QD models: 750 VA, 90 W Max. switching voltage (resistive load): Cabled models: 250 V ac, 125 V dc QD models: 250 V ac, 125 V dc Max. switching current (resistive load): Cabled models: 5 A @ 250 V ac, 5 A @ 30 V dc derated to 200 mA @ 125 V dc QD models: 3 A @ 250 V ac, 3 A @ 30 V dc derated to 200 mA @ 125 V dc
Output Protection Circuitry	Q60BB6AF, Q60BB6LAF and Q60BB6AFV models: Protected against continuous overload or short circuit of outputs All models: Protected against false pulse on power-up
Output Response Time	Q60BB6AF, Q60BB6LAF and Q60BB6AFV models: 2 milliseconds ON/OFF Q60VR3AF, Q60VR3LAF and Q60VR3AFV Universal models: 15 milliseconds ON/OFF
Delay at Power-up	150 milliseconds (Q60BB6LAF has 1 second max.); outputs do not conduct during this time
Repeatability	500 microseconds
Sensing Hysteresis	See charts on page 108 2000 mm cutoff - less than 3% of set cutoff distance 800 mm cutoff - less than 0.5% of set cutoff distance 1600 mm cutoff - less than 2.25% of set cutoff distance 400 mm cutoff - less than 0.25% of set cutoff distance 1200 mm cutoff - less than 1.30% of set cutoff distance
Adjustments	2 momentary push buttons: ON-delay and OFF-delay ON Delay select: 8 milliseconds to 16 seconds LO/DO select OFF Delay select: 8 milliseconds to 16 seconds Push-button lockout: for security Slotted, geared, 2-turn, cutoff range adjustment screw (mechanical stops on both ends of travel)
Indicators NOTE: Outputs are active during on/off timing selection mode.	Q60AF, Q60AFV and Q60LAF models: ON-Delay Green ON Steady: Run mode, ON-delay is active Green Flashing: ON-delay Selection mode is active OFF-Delay Green ON Steady: Run mode, OFF-delay is active Green Flashing: OFF-delay Selection mode is active 5-Segment Light Bar*: Indicates relative delay time during ON/OFF-delay Selection modes Output Amber ON Steady: Outputs are conducting Green ON Steady: During ON/OFF-delay Selection modes Dark Operate Green ON Steady: Dark Operate is selected Lockout Green ON Steady: Buttons are locked out Light Operate Green ON Steady: Light Operate is selected Signal Green ON Steady: Sensor is receiving signal Green Flashing: Marginal signal (1.0 to 2.25 excess gain) *Output, Dark Operate, Lockout, Light Operate and Signal indicators function as 5-Segment Light Bar during ON/OFF-delay Selection modes
Laser Characteristics	Spot Size: approximately 4 x 2 mm throughout range (collimated beam) Angle of Divergence: 5 milliradians NOTE: Contact factory for custom laser spot size.
Construction	Housing: ABS polycarbonate blend Lens: acrylic Cover: Clear ABS
Environmental Rating	IEC IP67; NEMA 6
Connections	2 m or 9 m integral cable. DC models offer a 5-pin Euro-style QD fitting. AC models offer 4-pin Micro-style QD fitting. QD cordsets are ordered separately. See page 106.
Operating Conditions	Temperature: Q60BB6LAF (DC) models: -10° to +50° C Q60VR3LAF Universal models: -10° to +45° C All others: -20° to +55° C Relative humidity: 90% at 50° C (non-condensing)
Certifications	CE cULus
Hookup Diagrams	DC: DC08 (p. 975) Universal Cabled: UN01 (p. 984) Universal QD: UN08 (p. 985)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain (Performance based on 90% reflectance white card)

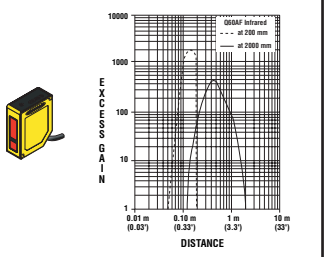
○ = Infrared LED ● = Visible Red LED ✸ = Visible Red Laser

Adjustable-Field Mode Q60 Visible Red



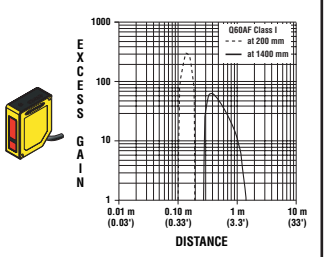
Cutoff: 200-1000 mm | LED: ●

Adjustable-Field Mode Q60 Infrared



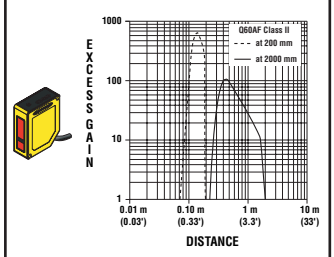
Cutoff: 200-2000 mm | LED: ○

Adjustable-Field Mode Q60 Class 1 Laser



Cutoff: 200-1400 mm | LED: ✸

Adjustable-Field Mode Q60 Class 2 Laser

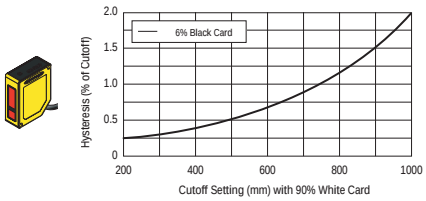


Cutoff: 200-2000 mm | LED: ✸

Hysteresis Curves

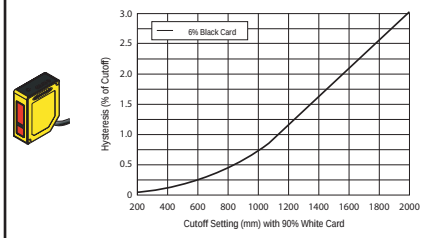
○ = Infrared LED ● = Visible Red LED ✸ = Visible Red Laser

Adjustable-Field Mode Q60 Visible Red



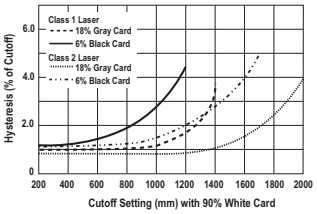
Cutoff: 1000 mm | LED: ●

Adjustable-Field Mode Q60 Infrared



Cutoff: 2000 mm | LED: ○

Adjustable-Field Mode Q60 Lasers

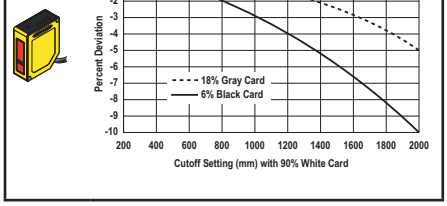


Cutoff: Class 1: 1400 mm
Class 2: 2000 mm | LED: ✸

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cuttoff Point Deviation Curves

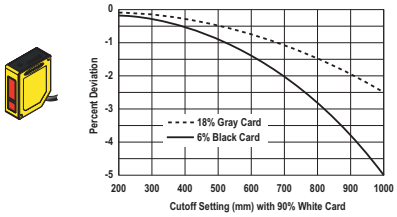
Adjustable-Field Mode Q60 Infrared LED



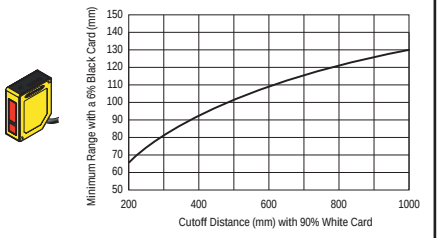
Adjustable-Field Mode Q60 Infrared LED



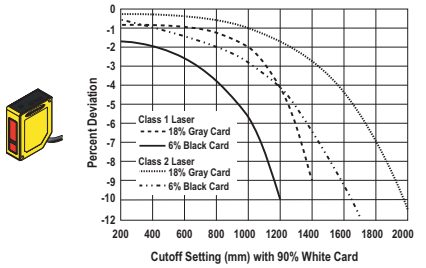
Adjustable-Field Mode Q60 Visible Red



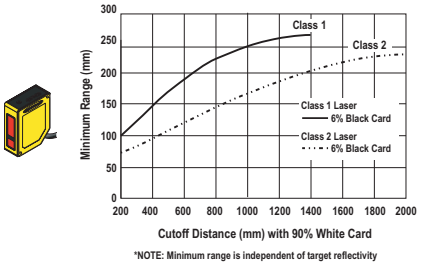
Adjustable-Field Mode Q60 Visible Red LED



Adjustable-Field Mode Q60 Lasers



Adjustable-Field Mode Q60 Lasers



See data sheet for detailed deviation information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Rectangle

Rectangular sensors have a housing mounting pattern that is still the industry standard for any machine builder. The rectangle housing style offers side and barrel mounting options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Max Sensing Range	Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	MINI-BEAM Comprehensive sensor line with a series of LED colors, gain pots/ TEACH modes and ac/dc models. Page 112	Opposed: 30 m Clear Plastic Opposed: 0.3 m Retro: 5 m Retro Polarized: 3 m Convergent: 49 m Diffuse: 300 mm Glass/Plastic Fiber: Varies	Varies by model	IP67	Thermoplastic Polyester	10 to 30 V dc, 24 to 240 V ac, 5 to 15 V dc
	Q25 Completely epoxy-encapsulated for use in harsh sensing environments, including food and beverage applications. Page 134	Opposed: 20 m Retro Polarized: 2 m Fixed-Field: 100 mm	50.2 x 25 x 30 mm	IP67; NEMA 6	Thermoplastic Polyester	10 to 30 V dc, 20 to 240 V ac
	Q40 Completely epoxy-encapsulated long-range sensor available in ac or dc supply voltages. Page 140	Opposed: 60 m Retro Polarized: 6 m Fixed-Field: 600 mm	69.8 x 41 x 46 mm	QD models: IP69K Other models: IP67; NEMA 6P	Thermoplastic Polyester	10 to 30 V dc, 20 to 245 V ac
	Pico Dot The PicoDot® is a convergent-mode laser sensor with extreme precision. Page 146	Laser Polarized Retro: 10.6 m Laser Convergent: 305 mm	PD45: 40.6 x 45.6 x 12.7 mm PD49: 42.7 x 49.1 x 15.2 mm	PD45: IP54 PD49: IP67	ABS	10 to 30 V dc
	QM42 Universal housing design with 18 mm threaded lens; an ideal replacement for hundreds of other sensor styles. Page 150	Opposed: 10 m Retro Polarized: 3 m Diffuse: 400 mm Adjustable-Field: 150 mm Plastic Fiber: Varies	42 x 12.7 x 42 mm	IP67; NEMA 6	Die-cast zinc alloy	10 to 30 V dc
	QMT42 Available in eight modes with a compact housing for limited space setups. Page 152	Diffuse: 6 m Fixed-Field: 2 m Adjustable-Field: 400 mm	58 x 18 x 42 mm	IP67; NEMA 6	Die-cast zinc alloy	10 to 30 V dc

OTHER AVAILABLE MODELS



Q20 page 74

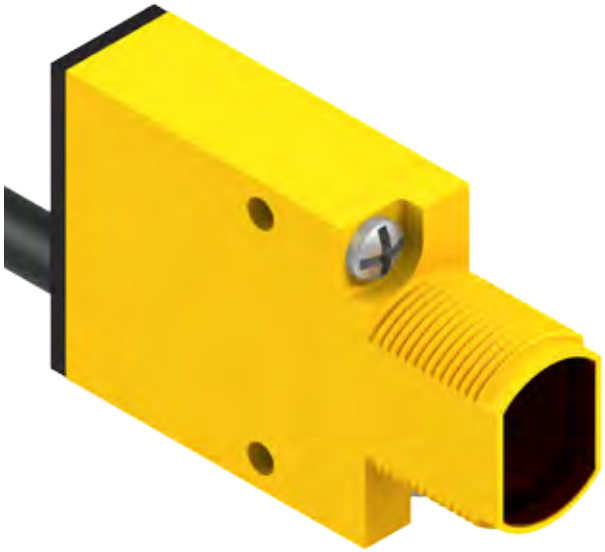


Q45 page 80



Q60 page 104

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



MINI-BEAM®
Complete Line of Industry Standard Sensors

Comprehensive sensor line with a series of LED colors, gain pots/TEACH modes and ac or dc models.

- Complimentary outputs and bipolar operation
- AC, DC or universal models available
- Infrared or visible red, green, blue or white sensing beam
- Industry standard mounting holes



MINI-BEAM DC page 114

Eight sensing modes for solving most applications: opposed, retroreflective, convergent, diffuse, plastic and glass fiber optic, and adjustable-field and fixed-field. High-performance sensing with visible long-range Class 1 and 2 lasers with narrow effective beam for small object detection and precise position control.



MINI-BEAM AC page 116

Single push-button programing of five advanced sensing options for reliable detection of reflective objects.



MINI-BEAM Expert page 118

Sensing modes include opposed, retroreflective, convergent, diffuse and plastic and glass fiber optic.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



MINI-BEAM NAMUR page 120

Ideal for hazardous environments with approved switching amplifiers that have intrinsically safe input circuits.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



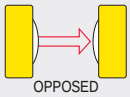
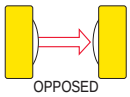
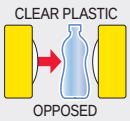
MINI-BEAM®
DC-Operated Industry Standard Sensors

Comprehensive sensors with a series of LED colors.

- Complimentary outputs
- Available with opposed, retroreflective, diffuse and convergent modes
- Infrared or visible red, green, blue or white sensing beam
- Industry standard mounting holes
- Cordsets and brackets see page 122

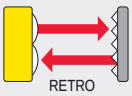
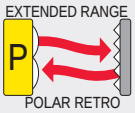
Opposed MINI-BEAM®, 10-30 V DC

⇨ Infrared LED ➡ Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 OPPOSED	3 m	2 m 4-Pin Euro QD 2 m 4-Pin Euro QD	Bipolar NPN/PNP	SM31E Emitter SM31EQD Emitter SM31R SM31RQD
 OPPOSED	30 m	2 m 4-Pin Euro QD 2 m 4-Pin Euro QD	Bipolar NPN/PNP	SM31EL Emitter SM31ELQD Emitter SM31RL SM31RLQD
 CLEAR PLASTIC OPPOSED	0.3 m	2 m 4-Pin Euro QD 2 m 4-Pin Euro QD	Bipolar NPN/PNP	SM31EPD Emitter* SM31EPDQD Emitter* SM31RPD* SM31RPDQD*

Retro & Polar Retro MINI-BEAM®, 10-30 V DC

➡ Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 RETRO	5 m†	2 m 4-Pin Euro QD	Bipolar NPN/PNP	SM312LV SM312LVQD
 POLAR RETRO	50 mm - 2 m†	2 m 4-Pin Euro QD	Bipolar NPN/PNP	SM312LVAG SM312LVAGQD
 EXTENDED RANGE POLAR RETRO	10 mm - 3 m†	2 m 4-Pin Euro QD	Bipolar NPN/PNP	SM312LP SM312LPQD

For more specifications see page 124.

Connection options: A model with a QD requires a mating cordset (see page 122).

For 9 m cable, add suffix W/30 to the 2 m model number (example, SM312D W/30).

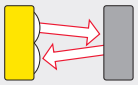
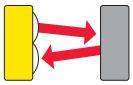
* Actual range depends on light transmission through the plastic being sensed. Some clear plastic materials may not be detected. When in doubt, ask your Banner representative to evaluate material samples.

† Retroreflective range is specified using one model BRT-3 retroreflector. Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

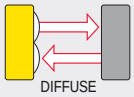
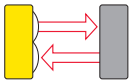
Convergent MINI-BEAM®, 10-30 V DC

Infrared LED Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 CONVERGENT	16 mm	2 m	Bipolar NPN/PNP	SM312C
		4-Pin Euro QD		SM312CQD
	43 mm	2 m		SM312C2
		4-Pin Euro QD		SM312C2QD
 CONVERGENT	16 mm	2 m	Bipolar NPN/PNP	SM312CV†
		4-Pin Euro QD		SM312CVQD†
	43 mm	2 m		SM312CV2†
		4-Pin Euro QD		SM312CV2QD†

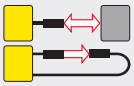
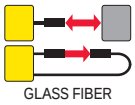
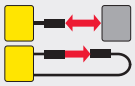
Diffuse MINI-BEAM®, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Output	Models
 DIFFUSE	380 mm	2 m	Bipolar NPN/PNP	SM312D
		4-Pin Euro QD		SM312DQD
	300 mm	2 m		SM312DBZ
		4-Pin Euro QD		SM312DBZQD
 DIVERGENT DIFFUSE	130 mm	2 m	Bipolar NPN/PNP	SM312W
		4-Pin Euro QD		SM312WQD

Glass & Plastic Fiber MINI-BEAM®, 10-30 V DC

Infrared LED Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m	Bipolar NPN/PNP	SM312F
		4-Pin Euro QD		SM312FQD
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m	Bipolar NPN/PNP	SM312FV†
		4-Pin Euro QD		SM312FVQD†
 PLASTIC FIBER	Range varies by sensing mode and fiber optics used	2 m	Bipolar NPN/PNP	SM312FP†
		4-Pin Euro QD		SM312FPQD†

For more specifications see page 124.

Connection options: A model with a QD requires a mating cordset (see page 122).

For 9 m cable, add suffix W/30 to the 2 m model number (example, SM312D W/30).

† Other LED colors available. Contact factory for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



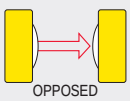
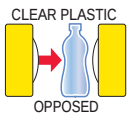
MINI-BEAM® AC
AC-Operated Industry Standard Sensors

Comprehensive sensors with a series of LED colors.

- Available with opposed, retroreflective, diffuse and convergent modes
- Infrared or visible red, green, blue or white sensing beam
- Industry standard mounting holes
- Cordsets and brackets see page 122

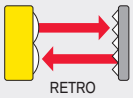
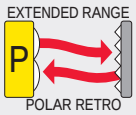
Opposed MINI-BEAM®, 24-240 V AC

⇨ Infrared LED ➡ Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 OPPOSED	3 m	2 m	SPST Solid-State 2-Wire	SMA31E Emitter
		3-Pin Micro QD		SMA31EQD Emitter
		2 m		SM2A31R
		3-Pin Micro QD		SM2A31RQD
	30 m	2 m		SMA31EL Emitter
		3-Pin Micro QD		SMA31ELQD Emitter
		2 m		SM2A31RL
		3-Pin Micro QD		SM2A31RLQD
 CLEAR PLASTIC OPPOSED	0.3 m	2 m	SPST Solid-State 2-Wire	SMA31EPD Emitter*
		3-Pin Micro QD		SMA31EPDQD Emitter*
		2 m		SM2A31RPD*
		3-Pin Micro QD		SM2A31RPDQD*

Retro & Polar Retro MINI-BEAM®, 24-240 V AC

➡ Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 RETRO	5 m†	2 m	SPST Solid-State 2-Wire	SM2A312LV
		3-Pin Micro QD		SM2A312LVQD
 POLAR RETRO	50 mm - 2 m†	2 m	SPST Solid-State 2-Wire	SM2A312LVAG
		3-Pin Micro QD		SM2A312LVAGQD
 EXTENDED RANGE POLAR RETRO	10 mm - 3 m†	2 m	SPST Solid-State 2-Wire	SM2A312LP
		3-Pin Micro QD		SM2A312LPQD

For more specifications see page 125.

Connection options: A model with a QD requires a mating cordset (see page 122).

For 9 m cable, add suffix W/30 to the 2 m model number (example, SM312D W/30).

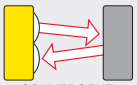
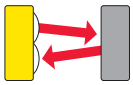
* Actual range depends on light transmission through the plastic being sensed. Some clear plastic materials may not be detected. When in doubt, ask your Banner representative to evaluate material samples.

† Retroreflective range is specified using one model BRT-3 retroreflector. Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

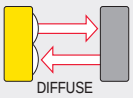
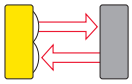
Convergent MINI-BEAM®, 24-240 V AC

Infrared LED | Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 CONVERGENT	16 mm	2 m	SPST Solid-State 2-Wire	SM2A312C
		3-Pin Micro QD		SM2A312CQD
	43 mm	2 m		SM2A312C2
		3-Pin Micro QD		SM2A312C2QD
 CONVERGENT	16 mm	2 m	SPST Solid-State 2-Wire	SM2A312CV†
		3-Pin Micro QD		SM2A312CVQD†
	43 mm	2 m		SM2A312CV2†
		3-Pin Micro QD		SM2A312CV2QD†

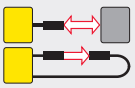
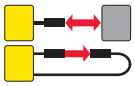
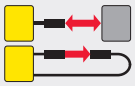
Diffuse MINI-BEAM®, 24-240 V AC

Infrared LED

Sensing Mode	Range	Connection	Output	Models
 DIFFUSE	380 mm	2 m	SPST Solid-State 2-Wire	SM2A312D
		3-Pin Micro QD		SM2A312DQD
	300 mm	2 m		SM2A312DBZ
		3-Pin Micro QD		SM2A312DBZQD
 DIVERGENT DIFFUSE	130 mm	2 m	SPST Solid-State 2-Wire	SM2A312W
		3-Pin Micro QD		SM2A312WQD

Glass & Plastic Fibers MINI-BEAM®, 24-240 V AC

Infrared LED | Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m	SPST Solid-State 2-Wire	SM2A312F
		3-Pin Micro QD		SM2A312FQD
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m	SPST Solid-State 2-Wire	SM2A312FV
		3-Pin Micro QD		SM2A312FVQD
 PLASTIC FIBER	Range varies by sensing mode and fiber optics used	2 m	SPST Solid-State 2-Wire	SM2A312FP
		3-Pin Micro QD		SM2A312FPQD

For more specifications see page 125.

Connection options: A model with a QD requires a mating cordset (see page 122).

For 9 m cable, add suffix W/30 to the 2 m model number (example, SM312D W/30).

* Actual range depends on light transmission through the plastic being sensed. Some clear plastic materials may not be detected. When in doubt, ask your Banner representative to evaluate material samples.

† Other LED colors available. Contact factory for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



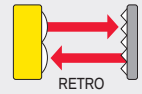
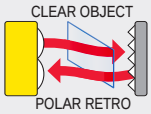
MINI-BEAM® *Expert*
Industry Standard Sensors with Push-Button Programming

Comprehensive sensors with a series of LED colors, gain pots/TEACH modes and dc operation.

- Complimentary outputs and bipolar operation
- Available with retroreflective, diffuse and convergent modes
- Infrared or visible red, green, blue or white sensing beam
- Industry standard mounting holes
- Cordsets and brackets see page 122

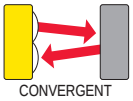
Retro & Polar Retro MINI-BEAM®, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 RETRO	5 m†	2 m 5-Pin Euro QD	Bipolar NPN/PNP	SME312LV SME312LVQD
 POLAR RETRO	10 mm - 3 m†	2 m 5-Pin Euro QD	Bipolar NPN/PNP	SME312LP SME312LPQD
 CLEAR OBJECT POLAR RETRO	1 m	2 m 5-Pin Euro QD	Bipolar NPN/PNP	SME312LPC* SME312LPCQD*

Convergent MINI-BEAM®, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 CONVERGENT	16 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	SME312CV†† SME312CVQD††
	43 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	SME312CV2†† SME312CV2QD††

For more specifications see page 126.

Connection options: A model with a QD requires a mating cordset (see page 122).

For 9 m cable, add suffix W/30 to the 2 m model number (example, SME312LV W/30).

* NOTE: For clear object detection, sensing range varies, according to the efficiency and reflective area of the retroreflector(s) used.
For these low-contrast applications, the model BRT-2X2 reflector is recommended and is included with each SME312LPC(QD) sensor.
- For applications with high vibration, the model BRT-51X51BM, with its micro-prism geometry, is recommended.
- For long-range applications, the BRT-77X77C reflector provides a range up to 2 m.
- SME312LPC(QD) are for use with corner cube type reflectors only; reflective tape is not recommended.

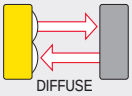
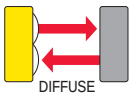
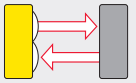
† NOTE: Retroreflective range is specified using one model BRT-3 retroreflector, unless otherwise noted. Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories section for more information.

†† NOTE: Other LED colors available. Contact factory for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

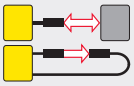
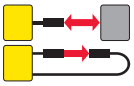
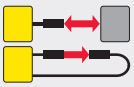
Diffuse MINI-BEAM®, 10-30 V DC

Infrared LED Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 DIFFUSE	380 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	SME312D SME312DQD
 DIFFUSE	1100 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	SME312DV SME312DVQD
 DIVERGENT DIFFUSE	130 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	SME312W SME312WQD

Glass & Plastic Fiber MINI-BEAM®, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Output	Models
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m 5-Pin Euro QD	Bipolar NPN/PNP	SME312F†† SME312FQD††
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m 5-Pin Euro QD	Bipolar NPN/PNP	SME312FV†† SME312FVQD††
 PLASTIC FIBER	Range varies by sensing mode and fiber optics used	2 m 5-Pin Euro QD	Bipolar NPN/PNP	SME312FP†† SME312FPQD††

For more specifications see page 126.

Connection options: A model with a QD requires a mating cordset (see page 122).

For 9 m cable, add suffix W/30 to the 2 m model number (example, SME312D W/30).

* NOTE: For clear object detection, sensing range varies, according to the efficiency and reflective area of the retroreflector(s) used.
For these low-contrast applications, the model BRT-2X2 reflector is recommended and is included with each SME312LPC(QD) sensor.
- For applications with high vibration, the model BRT-51X51BM, with its micro-prism geometry, is recommended.
- For long-range applications, the BRT-77X77C reflector provides a range up to 2 m.
- SME312LPC(QD) are for use with corner cube type reflectors only; reflective tape is not recommended.

†† NOTE: Other LED colors available. Contact factory for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

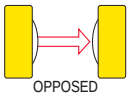


MINI-BEAM® NAMUR
Compact Sensors for Hazardous Areas

The MIAD9 series NAMUR models are ideal for hazardous environments with approved switching amplifiers that have intrinsically safe input circuits.

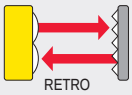
- Available in opposed, retroreflective, convergent, diffuse and fiber optic modes
- Infrared or visible red sensing beam
- Industry standard mounting holes
- Cordsets and brackets see page 122

Opposed MINI-BEAM®, 5-15 V DC

Sensing Mode	Range	Connection	Output	Models
 OPPOSED	6 m	2 m 4-Pin Euro QD	—	MI9E Emitter MI9EQ Emitter
		2 m 4-Pin Euro QD	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9R MIAD9RQ

Retro & Polar Retro MINI-BEAM®, 5-15 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 RETRO	5 m†	2 m 4-Pin Euro QD	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9LV MIAD9LVQ
 POLAR RETRO	50 mm - 2 m†	2 m 4-Pin Euro QD	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9LVAG MIAD9LVAGQ

For more specifications see page 127.

Connection options: A model with a QD requires a mating cordset (see page 122).

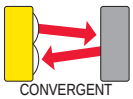
For 9 m cable, add suffix W/30 to the 2 m model number (example, MIAD9LV W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector. Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories section for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

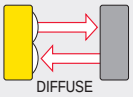
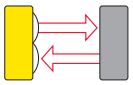
Convergent MINI-BEAM®, 5-15 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 CONVERGENT	16 mm	2 m	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9CV
		4-Pin Euro QD		MIAD9CVQ
	43 mm	2 m	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9CV2
		4-Pin Euro QD		MIAD9CV2Q

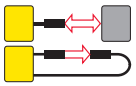
Diffuse MINI-BEAM®, 5-15 V DC

Infrared LED

Sensing Mode	Range	Connection	Output	Models
 DIFFUSE	380 mm	2 m	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9D
		4-Pin Euro QD		MIAD9DQ
 DIVERGENT DIFFUSE	75 mm	2 m	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9W
		4-Pin Euro QD		MIAD9WQ

MINI-BEAM® NAMUR Fiber Sensors, 5-15 V DC

Infrared LED

Sensing Mode	Range	Connection	Output	Models
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9F
		4-Pin Euro QD		MIAD9FQ

For more specifications see page 127.

 **Connection options:** A model with a QD requires a mating cordset (see page 122).

For 9 m cable, add suffix W/30 to the 2 m model number (example, MIAD9LV W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD for DC and *Expert* models

See page 908

Length	Straight 4-Pin	Straight 5-Pin	Right-Angle 4-Pin	Right-Angle 5-Pin
1.83 m	MQDC-406	MQDC1-506	MQDC-406RA	MQDC1-506RA
4.57 m	MQDC-415	MQDC1-515	MQDC-415RA	MQDC1-515RA
9.14 m	MQDC-430	MQDC1-530	MQDC-430RA	MQDC1-530RA




Micro QD for AC models

See page 925

Length	Threaded 3-Pin Straight	Threaded 3-Pin Right-Angle
1.83 m	MQDC-306	MQDC-306RA
4.57 m	MQDC-315	MQDC-315RA
9.14 m	MQDC-330	MQDC-330RA




NAMUR Euro QD (for Q models)

See page 909

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQD9-406	MQD9-406RA
4.57 m	MQD9-415	MQD9-415RA




Additional cordset information available. See page 904.

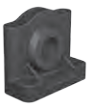
Brackets

MINI-BEAM

See page 859	See page 860	See page 861	See page 862	See page 861
SMB18A	SMB18FA..	SMB18SF	SMB312B	SMB3018SC



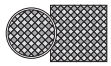




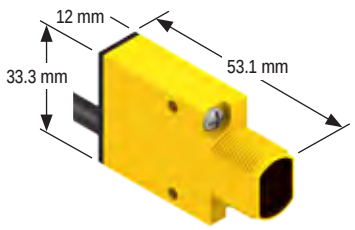
Additional brackets and information available. See page 846.

Other Accessories

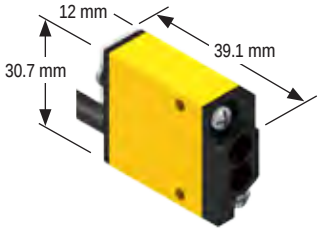
Reflectors	Apertures
See page 940	See page 966



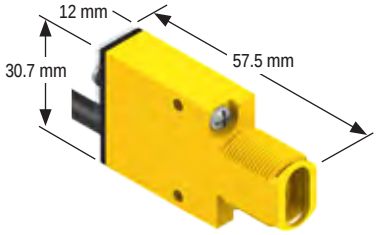

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



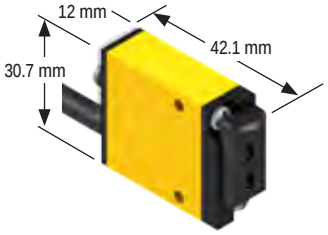
MINI-BEAM DC
Opposed, Retroreflective,
Diffuse and Convergent Models
Suffix E, R, EPD, RPD, D, LV, LP, C, C2, CV, CV2, CVB, CV2B, CVG and CV2G



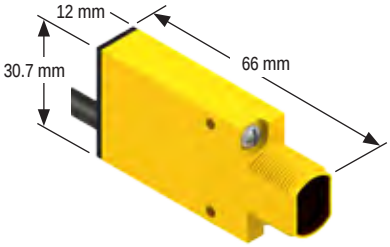
MINI-BEAM DC
Diffuse Models
Suffix DBZ and W



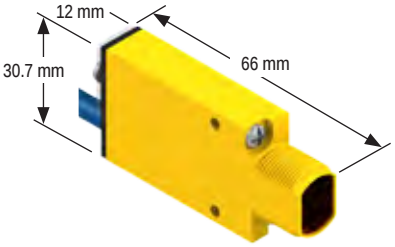
MINI-BEAM DC
Glass Fiber Models
Suffix F, FV, FVG and FVB



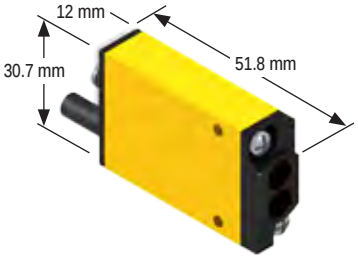
MINI-BEAM DC
Plastic Fiber Models
Suffix FP, FPG and FPB



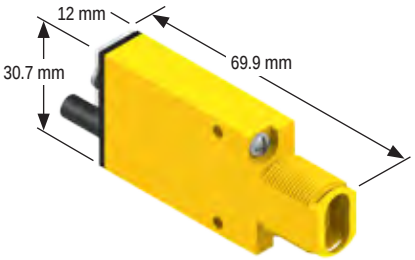
MINI-BEAM AC & *Expert*
Opposed, Retroreflective,
Diffuse and Convergent Models
Suffix E, R, EPD, RPD, D, DV, LV, LP, C, CV, CV2, CVG, CVB and CVW



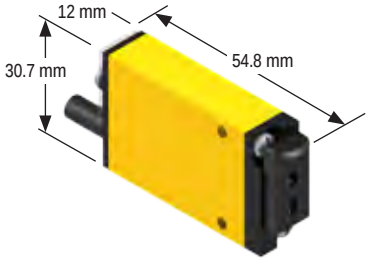
MINI-BEAM NAMUR
Retroreflective, Diffuse and
Convergent Models
Suffix E, R, LV, D and CV



MINI-BEAM AC, *Expert* & NAMUR
Diffuse Models
Suffix DBZ and W



MINI-BEAM AC, *Expert* & NAMUR
Glass Fiber Models
Suffix F and FV



MINI-BEAM AC, *Expert* & NAMUR
Plastic Fiber Models
Suffix FP

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

MINI-BEAM® DC Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at less than 25 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Bipolar:** One current sourcing (PNP) and one current sinking (NPN) open-collector transistor; Light Operate (LO) or Dark Operate (DO) selectable
Output Rating	150 mA max. each output at 25° C, derated to 100 mA at 70° C (derate ≈ 1 mA per ° C) **OFF-state leakage current:** less than 1 µA **Output saturation voltage (PNP output):** less than 1 V @ 10 mA; less than 2 V @ 150 mA **Output saturation voltage (NPN output):** less than 200 mV @ 10mA; less than 1 V @ 150 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs
Output Response Time	Sensors will respond to either a "light" or a "dark" signal of 1 millisecond or longer duration, 500 Hz max. 0.3 millisecond response modification is available. See note below†.
Delay at Power-up	100 millisecond; outputs do not conduct during this time.
Repeatability	**Opposed:** 0.14 milliseconds **Non-Polarized and Polarized Retroreflective, Diffuse, Convergent, and Glass and Plastic Fiber Optic:** 0.3 milliseconds. Response time and repeatability specifications are independent of signal strength.
Adjustments	Light or Dark Operate select switch and 15-turn GAIN (sensitivity) adjustment potentiometer
Indicators	Alignment Indicating Device system (AID) lights a rear-panel mounted red LED indicator whenever the sensor sees a "light" condition, with a superimposed pulse rate proportional to the light signal strength (the stronger the signal, the faster the pulse rate)
Construction	Reinforced thermoplastic polyester housing, totally encapsulated, o-ring sealing, acrylic lenses, and stainless steel screws
Environmental Rating	Meets NEMA standards 1, 2, 3, 3S, 4, 4X, 6, 12, and 13; IEC IP67
Connections	PVC-jacketed 4-conductor 2 m or 9 m cables, or 4-pin Euro-style quick-disconnect (QD) fitting are available. QD cordsets are ordered separately. See page 122.
Operating Conditions	**Temperature:** -20° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Certifications	
Hookup Diagrams	**Emitters:** DC02 (p. 974) **Other Models:** DC04 (p. 974)

† NOTE: DC MINI-BEAMs may be ordered with 0.3 millisecond ON/OFF response by adding suffix MHS to the model number (example, SM312LVMHS). This modification reduces sensing range (and excess gain).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

MINI-BEAM® AC Specifications

Supply Voltage and Current	24 to 240 V ac (50/60 Hz), 250 V ac max
Supply Protection Circuitry	Protected against transient voltages
Output Configuration	SPST SCR solid-state relay (Light/Dark Operate selectable); 2-wire hookup
Output Rating	Min. load current 5 mA max. steady-state load capability 300 mA to 50° C ambient 100 mA to 70° C ambient **Inrush capability:** 3 amps for 1 second (non repetitive); 10 amps for 1 cycle (non repetitive) **OFF-state leakage current:** less than 1.7 mA rms **ON-state voltage drop:** ≤ 5 volts at 300 mA load, ≤ 10 volts at 15 mA load
Output Protection Circuitry	Protected against false pulse on power-up
Output Response Time	**Opposed:** 2 milliseconds ON and 1 millisecond OFF **Non-Polarized and Polarized Retroreflective, Convergent and Plastic Fiber Optic:** 4 milliseconds ON and OFF **Diffuse and Glass Fiber Optic:** 8 milliseconds ON and OFF OFF response time specification does not include load response of up to ½ ac cycle (8.3 milliseconds) Response time specification of load should be considered when important
Delay at Power-up	300 milliseconds
Repeatability	**Opposed:** 0.3 milliseconds **Non-Polarized and Polarized Retroreflective, Convergent and Plastic Fiber Optic:** 1.3 milliseconds **Diffuse and Glass Fiber Optics:** 2.6 milliseconds Response time and repeatability specifications are independent of signal strength
Adjustments	Light or Dark Operate select switch and 15-turn slotted GAIN (sensitivity) adjustment potentiometer
Indicators	Red indicator LED on rear of sensor is “ON” when the load is energized
Construction	Reinforced thermoplastic polyester housing, totally encapsulated, o-ring sealing, acrylic lenses, and stainless steel screws
Environmental Rating	Meets NEMA standards 1, 2, 3, 3S, 4, 4X, 6, 12, and 13; IEC IP67
Connections	PVC-jacketed 2-conductor 2 m or 9 m cables, or 3-pin Micro-style quick-disconnect (QD) fitting are available. QD cordsets are ordered separately. See page 122.
Operating Conditions	**Temperature:** -20° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Application Notes	1. Overload conditions can destroy ac MINI-BEAM sensors. Directly wiring sensor without load series across hot and neutral will damage sensor (except emitter models). 2. Low voltage use requires careful analysis of the load to determine if the leakage current or on-state voltage of the sensor will interfere with proper operation of the load. 3. The false-pulse protection feature may cause momentary drop-out of the load when the sensor is wired in series or parallel with mechanical switch contacts.
Certifications	CE cULus CSA
Hookup Diagrams	**Cabled Emitters:** AC03 (p.981) **All Other Cables Models:** AC01 (p. 981) **QD Emitters:** AC04 (p. 981) **All Other Cabled Models:** AC02 (p. 981)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

MINI-BEAM® *Expert*™ Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at less than 45 mA, exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Bipolar: One current sourcing (PNP) and one current sinking (NPN) open-collector transistor Configuration in TEACH sequence for Light Operate (LO) or Dark Operate (DO)
Output Rating	150 mA max. each output at 25° C, derated to 100 mA at 70° C (derate ≈ 1 mA per ° C) OFF-state leakage current: less than 5 µA @ 30 V dc Output saturation voltage (PNP output): less than 1 V at 10 mA and less than 2 V at 150 mA Output saturation voltage (NPN output): less than 200 mV at 10 mA and less than 1 V at 150 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs
Output Response Time	Sensors will respond to either a “light” or a “dark” signal of 500 microseconds or longer duration, 1 kHz max.
Delay at Power-up	1 second; outputs do not conduct during this time
Repeatability	100 microseconds (all models)
Adjustments	Push-button TEACH mode sensitivity setting; remote TEACH mode input is provided (gray wire)
Indicators	Two LEDs: Yellow and Bicolor Green/Red Green: power ON Red: OFF when no signal is received. Yellow (TEACH Mode): ON to indicate sensor is ready to learn output ON condition OFF to indicate sensor is ready to learn output OFF condition Yellow (RUN Mode): ON when outputs are conducting See data sheet for more detailed information.
Construction	Reinforced thermoplastic polyester housing, totally encapsulated, o-ring seal, acrylic lenses, and stainless steel screws
Environmental Rating	Meets NEMA standards 1, 2, 3, 3S, 4, 4X, 6, 12, and 13; IEC IP67
Connections	PVC-jacketed 5-conductor 2 m or 9 m unterminated cable, or 5-pin Euro-style quick-disconnect (QD) fitting are available. QD cordsets are ordered separately. See page 122.
Operating Conditions	Temperature: -20° to +70° C Relative humidity: 90% at 50° C (non-condensing)
Application Notes	The first condition presented during TEACH mode becomes the output ON condition
Certifications	CE c UL US
Hookup Diagrams	DC08 (p. 975)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

MINI-BEAM® NAMUR Specifications

Supply Voltage	5 to 15 V dc (provided by the amplifier to which the sensor is connected)
Output	**Constant current output:** ≤ 1.2 mA in the "dark" condition and ≥ 2.1 mA in the "light" condition
Output Response Time	**Opposed receiver:** 2 milliseconds ON/400 microseconds OFF **All others:** 5 milliseconds ON/OFF (does not include amplifier response)
Adjustments	GAIN (sensitivity) adjustment potentiometer
Indicators	Red LED Alignment Indicator Device (AID) located on rear panel lights when the sensor sees a "light" condition; pulse rate is proportional to signal strength (the stronger the signal, the faster the pulse rate).
Construction	Reinforced thermoplastic polyester housing, totally encapsulated, o-ring sealing, acrylic lenses and stainless steel screws
Environmental Rating	Meets NEMA standards 1, 2, 3, 3S, 4, 4X, 6, 12 and 13; IEC IP67
Connections	PVC-jacketed 2-conductor 2 m or 9 m cables, or special 4-pin Euro-style quick-disconnect (QD) fitting are available; QD cordsets are ordered separately. See page 122.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Design Standards	MIAD9 Series sensors comply with the following standards: DIN 19 234, EN 50 014 Part 1. 1977, EN50 020 Part 7. 1977, Factory Mutual #3610 and 3611, CSA 22.2 #157-92 and 22.2 #213-M1987
Certifications	CE KEMA FM APPROVED ETL LISTED CSA®
Hookup Diagrams	SP01 (p. 987)

APPROVALS

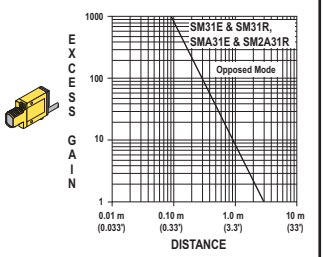
CSA:	#LR 41887	Instrinsically Safe, with Entity for Class I, Groups A-D Class I, Div. 2, Groups A-D	FM:	#J.I. 5Y3A4.AX	Intrinsically Safe, with Entity for Class I, II, III, Div. 1, Groups A-G Class I, II, III, Div. 2, Groups A-D and G
KEMA:	#03ATEX1441X	II IG EEx ia IIC T6	ETL:	#553868	

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves (Diffuse mode performance based on 90% reflectance white test card)

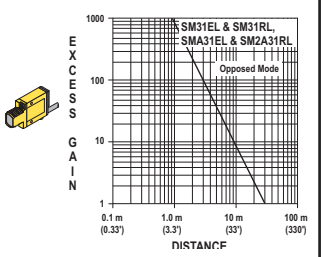
○ = Infrared LED ● = Visible Red LED P = Visible Red LED Polarized ■ = Visible Red Clear Object Detection Polarized

Opposed Mode MINI-BEAM®



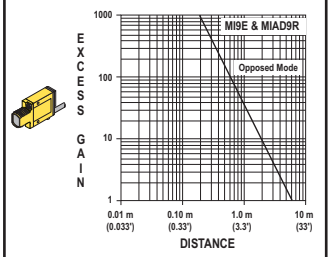
Range: 3 m | LED: ○

Opposed Mode MINI-BEAM®



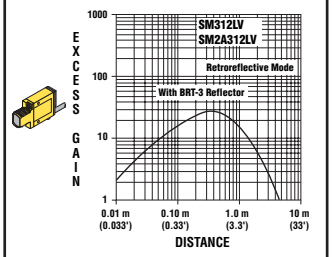
Range: 30 m | LED: ○

Opposed Mode MINI-BEAM® NAMUR



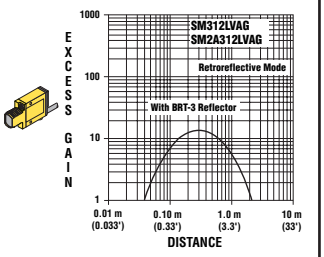
Range: 6 m | LED: ○

Retroreflective Mode MINI-BEAM®



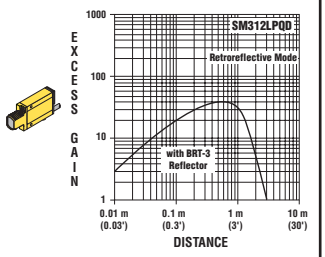
Range: 5 m | LED: ●

Polarized Retroreflective Mode MINI-BEAM®



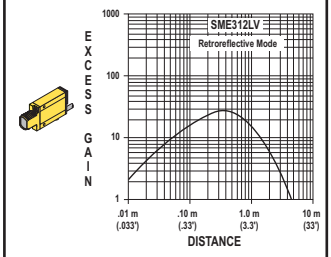
Range: 2 m | LED: P

Polarized Retroreflective Mode MINI-BEAM®



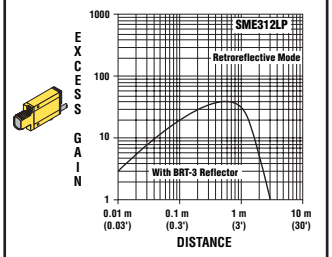
Range: 3 m | LED: P

Retroreflective Mode MINI-BEAM® *Expert*™



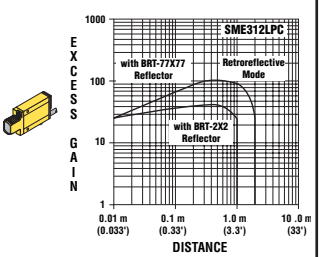
Range: 5 m | LED: ●

Polarized Retroreflective Mode MINI-BEAM® *Expert*™



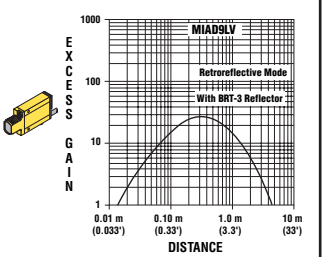
Range: 3 m | LED: P

Retroreflective Mode MINI-BEAM® *Expert*™



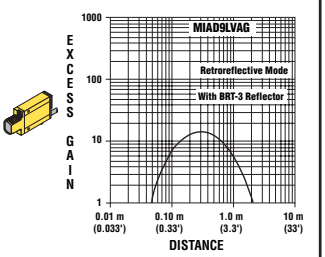
Range: 1 m | LED: ■

Retroreflective Mode MINI-BEAM® NAMUR



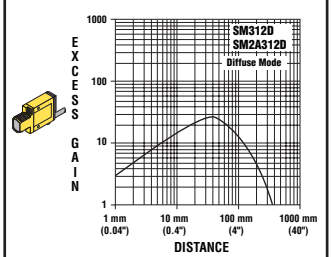
Range: 5 m | LED: ●

Polarized Retroreflective Mode MINI-BEAM® NAMUR



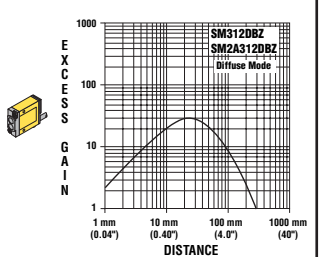
Range: 2 m | LED: P

Diffuse Mode MINI-BEAM®



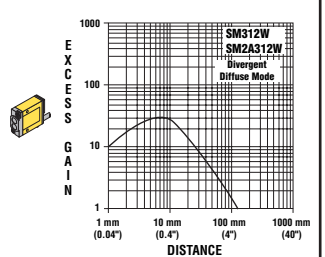
Range: 380 mm | LED: ○

Diffuse Mode MINI-BEAM®



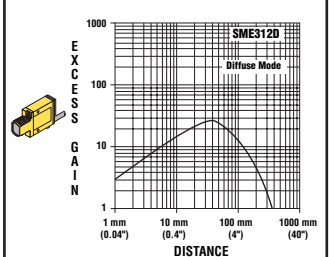
Range: 300 mm | LED: ○

Divergent Diffuse Mode MINI-BEAM®



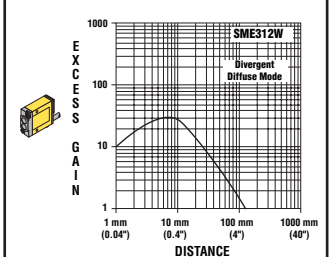
Range: 130 mm | LED: ○

Diffuse Mode MINI-BEAM® *Expert*™



Range: 380 mm | LED: ○

Divergent Diffuse Mode MINI-BEAM® *Expert*™



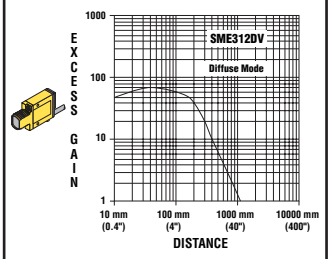
Range: 130 mm | LED: ○

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves (Diffuse mode performance based on 90% reflectance white test card)

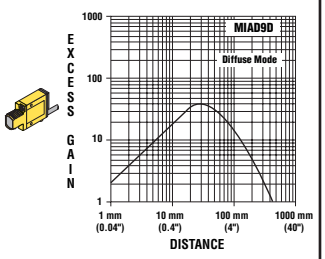
○ = Infrared LED ● = Visible Red LED

Diffuse Mode MINI-BEAM® *Expert*™



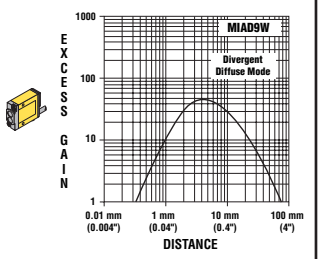
Range: 1100 mm | LED: ●

Diffuse Mode MINI-BEAM® NAMUR



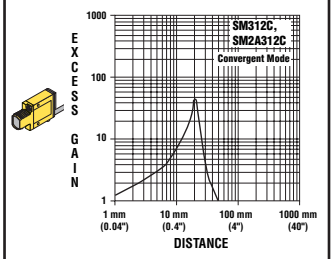
Range: 380 mm | LED: ○

Divergent Diffuse Mode MINI-BEAM® NAMUR



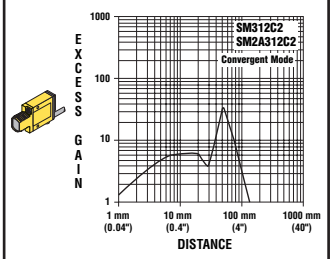
Range: 75 mm | LED: ○

Convergent Mode MINI-BEAM®



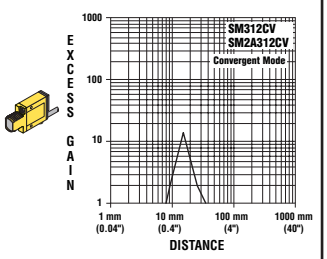
Range: 16 mm | LED: ○

Convergent Mode MINI-BEAM®



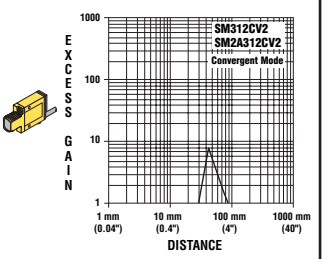
Range: 43 mm | LED: ○

Convergent Mode MINI-BEAM®



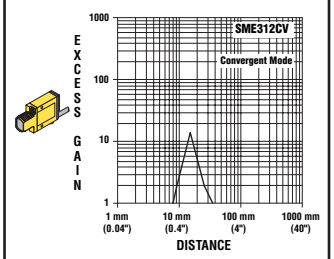
Range: 16 mm | LED: ●

Convergent Mode MINI-BEAM®



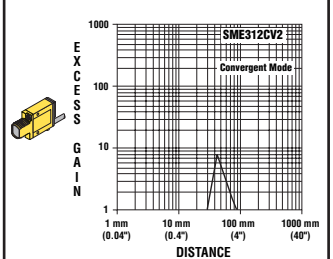
Range: 43 mm | LED: ●

Convergent Mode MINI-BEAM® *Expert*™



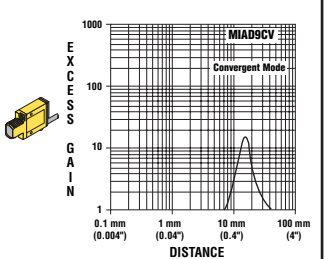
Range: 16 mm | LED: ●

Convergent Mode MINI-BEAM® *Expert*™



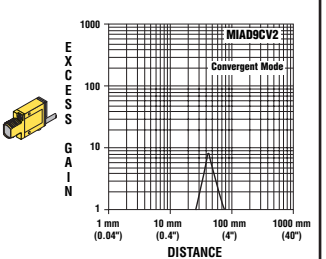
Range: 43 mm | LED: ●

Convergent Mode MINI-BEAM® NAMUR



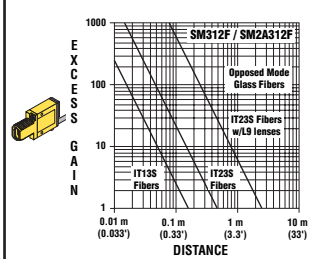
Range: 16 mm | LED: ●

Convergent Mode MINI-BEAM® NAMUR



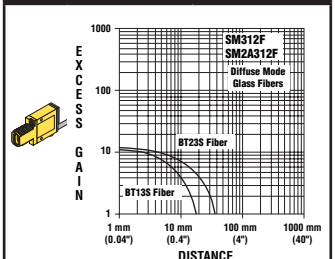
Range: 43 mm | LED: ●

Opposed Mode—Glass Fiber MINI-BEAM®



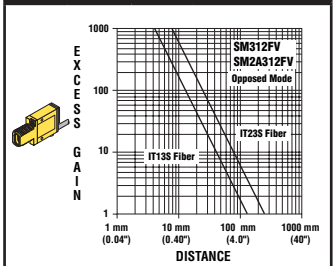
Range: Varies | LED: ○

Diffuse Mode—Glass Fiber MINI-BEAM®



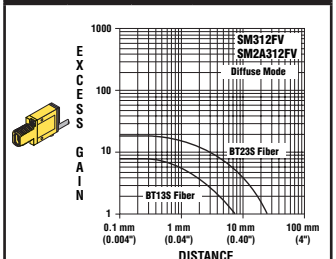
Range: Varies | LED: ○

Opposed Mode—Glass Fiber MINI-BEAM®



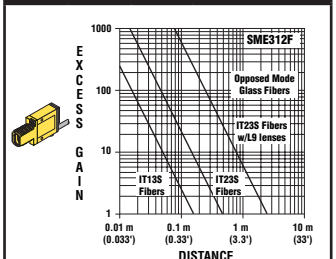
Range: Varies | LED: ●

Diffuse Mode—Glass Fiber MINI-BEAM®



Range: Varies | LED: ●

Opposed Mode—Glass Fiber MINI-BEAM® *Expert*™

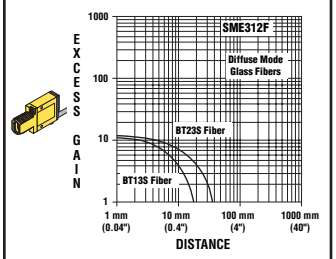


Range: Varies | LED: ○

Excess Gain Curves (Diffuse mode performance based on 90% reflectance white test card)

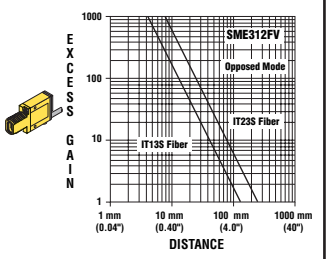
○ = Infrared LED ● = Visible Red LED

Diffuse Mode—Glass Fiber MINI-BEAM® *Expert*™



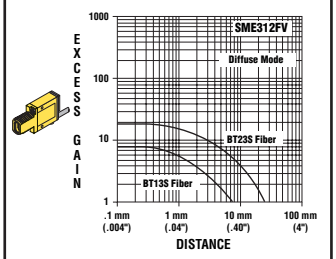
Range: Varies | LED: ○

Opposed Mode—Glass Fiber MINI-BEAM® *Expert*™



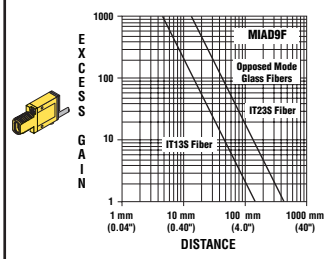
Range: Varies | LED: ●

Diffuse Mode—Glass Fiber MINI-BEAM® *Expert*™



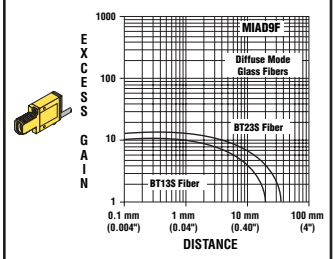
Range: Varies | LED: ●

Opposed Mode—Glass Fiber MINI-BEAM® NAMUR



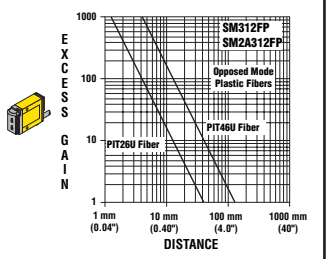
Range: Varies | LED: ○

Diffuse Mode—Glass Fiber MINI-BEAM® NAMUR



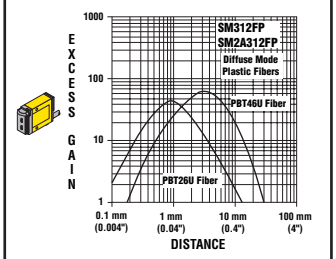
Range: Varies | LED: ○

Opposed Mode—Plastic Fiber MINI-BEAM®



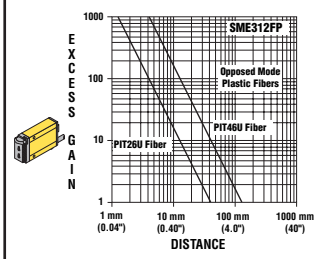
Range: Varies | LED: ●

Diffuse Mode—Plastic Fiber MINI-BEAM®



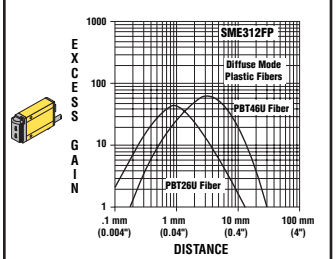
Range: Varies | LED: ●

Opposed Mode—Plastic Fiber MINI-BEAM® *Expert*™



Range: Varies | LED: ●

Diffuse Mode—Plastic Fiber MINI-BEAM® *Expert*™



Range: Varies | LED: ●

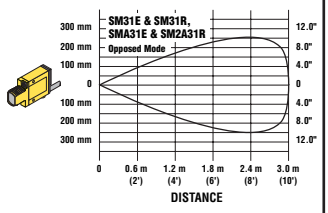
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Beam Patterns (Diffuse mode performance based on 90% reflectance white test card)

○ = Infrared LED ● = Visible Red LED P = Visible Red LED Polarized ■ = Visible Red Clear Object Detection Polarized

Opposed Mode MINI-BEAM®

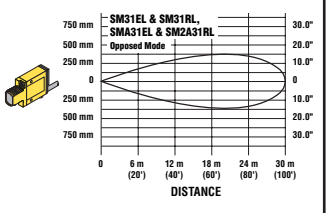
Effective Beam: 3.5 mm



Range: 3 m | LED: ○

Opposed Mode MINI-BEAM®

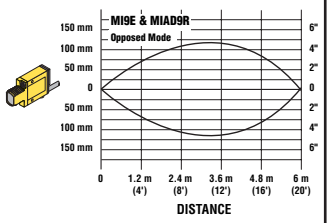
Effective Beam: 13 mm



Range: 30 m | LED: ○

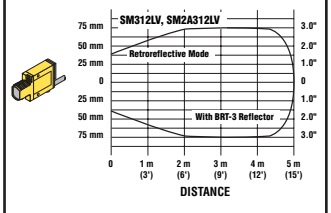
Opposed Mode MINI-BEAM® NAMUR

Effective Beam: 13 mm



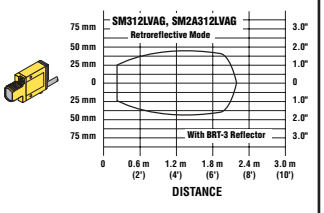
Range: 6 m | LED: ○

Retroreflective Mode MINI-BEAM®



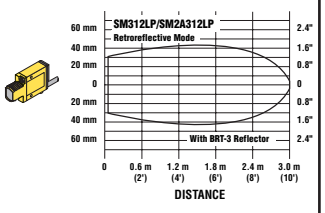
Range: 5 m | LED: ●

Polarized Retroreflective Mode MINI-BEAM®



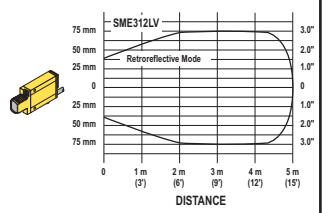
Range: 2 m | LED: P

Polarized Retroreflective Mode MINI-BEAM®



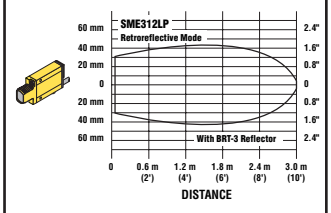
Range: 3 m | LED: P

Retroreflective Mode MINI-BEAM® *Expert*™



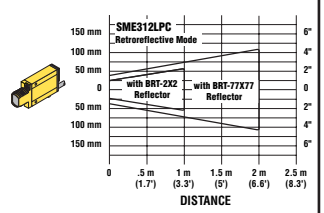
Range: 5 m | LED: ●

Polarized Retroreflective Mode MINI-BEAM® *Expert*™



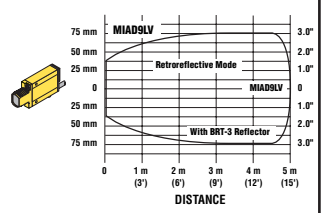
Range: 3 m | LED: P

Polarized Retroreflective Mode MINI-BEAM® *Expert*™



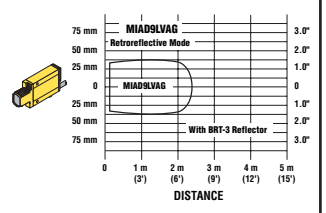
Range: 1 m | LED: ■

Retroreflective Mode MINI-BEAM® NAMUR



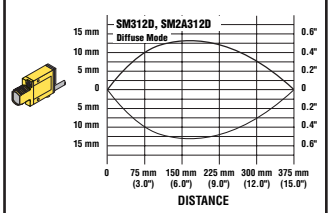
Range: 5 m | LED: ●

Polarized Retroreflective Mode MINI-BEAM® NAMUR



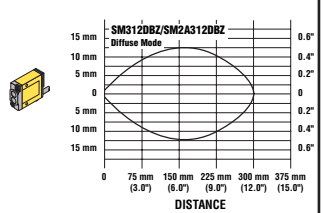
Range: 2 m | LED: P

Diffuse Mode MINI-BEAM®



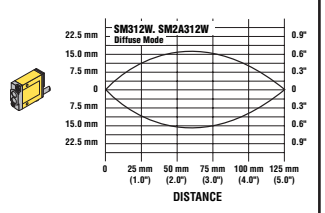
Range: 380 mm | LED: ○

Diffuse Mode MINI-BEAM®



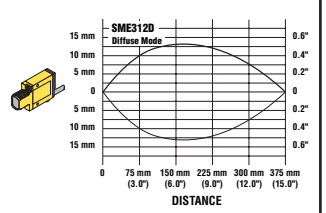
Range: 300 mm | LED: ○

Divergent Diffuse Mode MINI-BEAM®



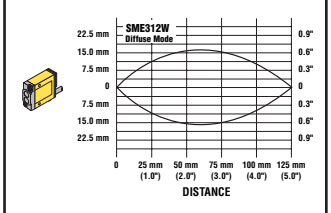
Range: 130 mm | LED: ○

Diffuse Mode MINI-BEAM® *Expert*™



Range: 380 mm | LED: ○

Diffuse Mode MINI-BEAM® *Expert*™

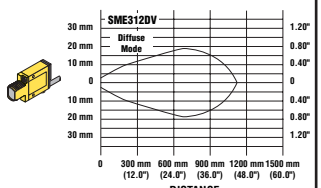


Range: 130 mm | LED: ○

Beam Patterns (Diffuse mode performance based on 90% reflectance white test card)

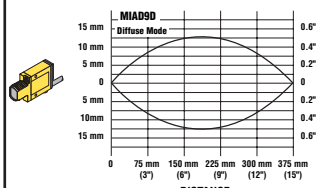
○ = Infrared LED ● = Visible Red LED

Diffuse Mode MINI-BEAM® *Expert*™



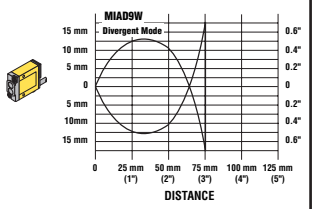
Range: 1100 mm | LED: ●

Diffuse Mode MINI-BEAM® NAMUR



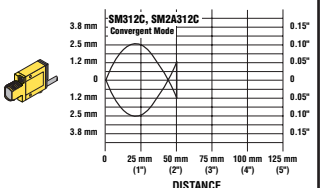
Range: 380 mm | LED: ○

Divergent Diffuse Mode MINI-BEAM® NAMUR



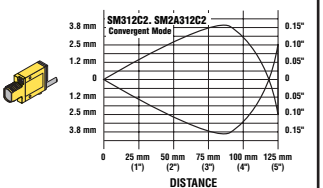
Range: 75 mm | LED: ○

Convergent Mode MINI-BEAM®



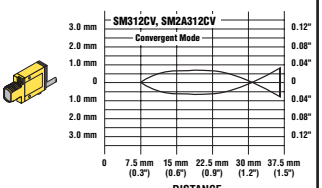
Range: 16 mm | LED: ○

Convergent Mode MINI-BEAM®



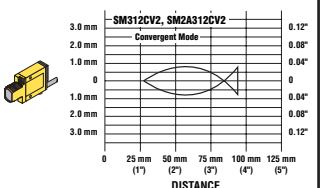
Range: 43 mm | LED: ○

Convergent Mode MINI-BEAM®



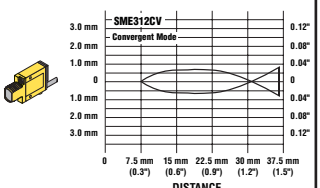
Range: 16 mm | LED: ●

Convergent Mode MINI-BEAM®



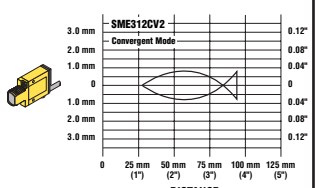
Range: 43 mm | LED: ●

Convergent Mode MINI-BEAM® *Expert*™



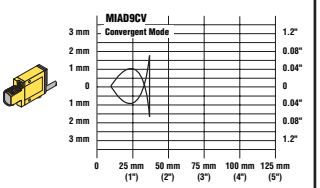
Range: 16 mm | LED: ●

Convergent Mode MINI-BEAM® *Expert*™



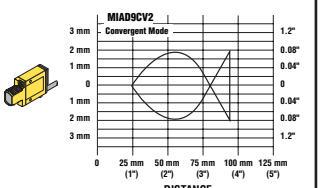
Range: 43 mm | LED: ●

Convergent Mode MINI-BEAM® NAMUR



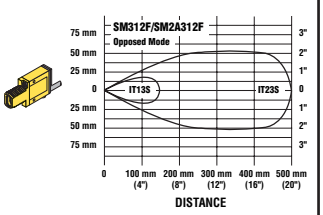
Range: 16 mm | LED: ●

Convergent Mode MINI-BEAM® NAMUR



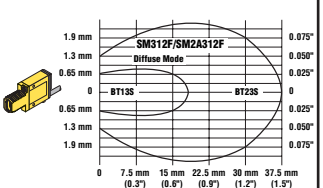
Range: 43 mm | LED: ●

Opposed Mode—Glass Fiber MINI-BEAM®



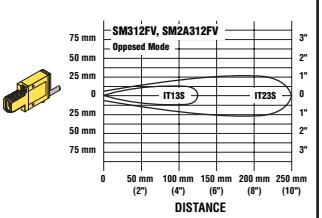
Fiber: Individual | LED: ○

Diffuse Mode—Glass Fiber MINI-BEAM®



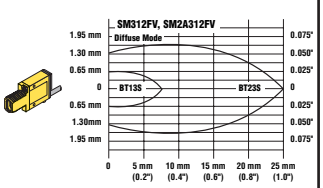
Range: Varies | LED: ○

Opposed Mode—Glass Fiber MINI-BEAM®



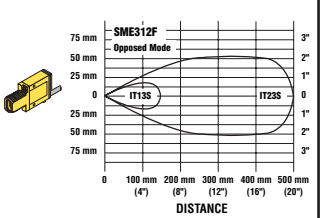
Range: Varies | LED: ●

Diffuse Mode—Glass Fiber MINI-BEAM®



Range: Varies | LED: ●

Opposed Mode—Glass Fiber MINI-BEAM® *Expert*™



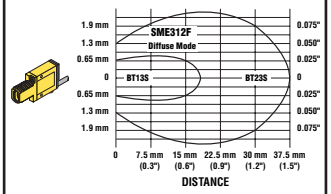
Range: Varies | LED: ○

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Beam Patterns (Diffuse mode performance based on 90% reflectance white test card)

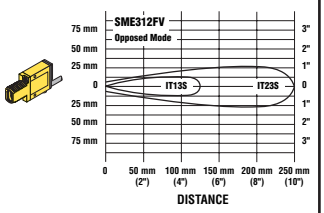
○ = Infrared LED ● = Visible Red LED

Diffuse Mode—Glass Fiber MINI-BEAM® *Expert*™



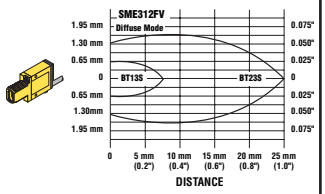
Range: Varies | LED: ○

Opposed Mode—Glass Fiber MINI-BEAM® *Expert*™



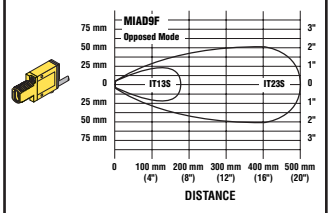
Range: Varies | LED: ●

Diffuse Mode—Glass Fiber MINI-BEAM® *Expert*™



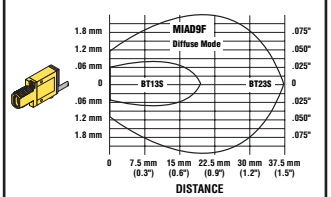
Range: Varies | LED: ●

Opposed Mode—Glass Fiber MINI-BEAM® NAMUR



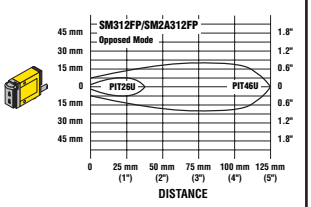
Range: Varies | LED: ○

Diffuse Mode—Glass Fiber MINI-BEAM® NAMUR



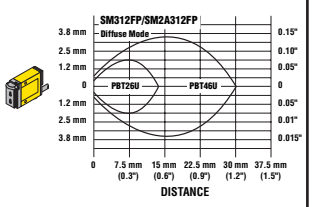
Range: Varies | LED: ○

Opposed Mode—Plastic Fiber MINI-BEAM®



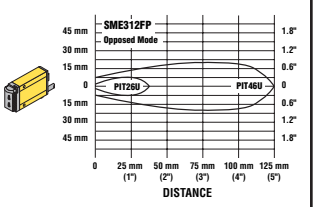
Range: Varies | LED: ●

Diffuse Mode—Plastic Fiber MINI-BEAM®



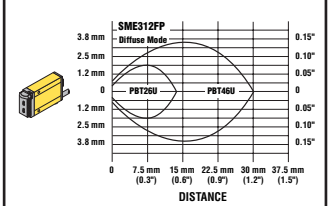
Range: Varies | LED: ●

Opposed Mode—Plastic Fiber MINI-BEAM® *Expert*™



Range: Varies | LED: ●

Diffuse Mode—Plastic Fiber MINI-BEAM® *Expert*™



Range: Varies | LED: ●

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



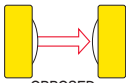
Q25
Right-Angle Base-Mount Rectangular Sensors

The Q25 sensor is completely epoxy-encapsulated for use in harsh sensing environments, including food and beverage applications.

- Available in opposed, retroreflective and fixed-field modes
- Wide operating range from -40° to +70° C
- Models rated to IP67 and IP69K to withstand harsh washdown environments
- Cordsets and brackets see page 136

Opposed Q25, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 OPPOSED	20 m	2 m	Q256E Emitter	
		4-pin Euro QD	Q256EQ Emitter	
		2 m	Q25SN6R	Q25SP6R
		4-pin Euro QD	Q25SN6RQ	Q25SP6RQ

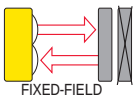
Polar Retro Q25, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 POLAR RETRO	2 m†	2 m	Q25SN6LP	Q25SP6LP
		4-pin Euro QD	Q25SN6LPQ	Q25SP6LPQ

Fixed-Field Q25, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 FIXED-FIELD	0 - 25 mm Cutoff	2 m	Q25SN6FF25	Q25SP6FF25
		4-pin Euro QD	Q25SN6FF25Q	Q25SP6FF25Q
	0 - 50 mm Cutoff	2 m	Q25SN6FF50	Q25SP6FF50
		4-pin Euro QD	Q25SN6FF50Q	Q25SP6FF50Q
	0 - 100 mm Cutoff	2 m	Q25SN6FF100	Q25SP6FF100
		4-pin Euro QD	Q25SN6FF100Q	Q25SP6FF100Q

For more specifications see page 137.

Connection options: A model with a QD requires a mating cordset (see page 136).

For 9 m cable, add suffix W/30 to the 2 m model number (example, Q25SN6LP W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector. Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories section for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



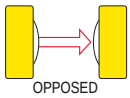
Q25 AC
AC-Operated Rectangular Sensors

The Q25 sensor is completely epoxy-encapsulated for use in harsh sensing environments, including food and beverage applications.

- Available in opposed, retroreflective and fixed-field modes
- Wide operating range from -40° to +70° C
- Models rated to IP67 and IP69K to withstand harsh washdown environments
- Cordsets and brackets see page 136

Opposed Q25, 20-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 OPPOSED	20 m	2 m	Q253E Emitter	
		4-pin Micro QD	Q253EQ1 Emitter	
		2 m	Q25AW3R	Q25RW3R
		4-pin Micro QD	Q25AW3RQ1	Q25RW3RQ1

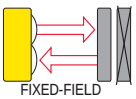
Polar Retro Q25, 20-250 V AC

Visible Red LED

Sensing Mode	Range	Connection	Models LO	Models DO
 POLAR RETRO	2 m†	2 m	Q25AW3LP	Q25RW3LP
		4-pin Micro QD	Q25AW3LPQ1	Q25RW3LPQ1

Fixed-Field Q25, 20-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 FIXED-FIELD	0 - 25 mm Cutoff	2 m	Q25AW3FF25	Q25RW3FF25
		4-pin Micro QD	Q25AW3FF25Q1	Q25RW3FF25Q1
	0 - 50 mm Cutoff	2 m	Q25AW3FF50	Q25RW3FF50
		4-pin Micro QD	Q25AW3FF50Q1	Q25RW3FF50Q1
	0 - 100 mm Cutoff	2 m	Q25AW3FF100	Q25RW3FF100
		4-pin Micro QD	Q25AW3FF100Q1	Q25RW3FF100Q1

For more specifications see page 138.

Connection options: A model with a QD requires a mating cordset (see page 136).

For 9 m cable, add suffix W/30 to the 2 m model number (example, Q25SN6LP W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector. Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories section for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA



Additional cordset information available. See page 904.

Micro QD (for Q1 models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQAC-406	MQAC-406RA
4.57 m	MQAC-415	MQAC-415RA
9.14 m	MQAC-430	MQAC-430RA





Brackets

Q25

See page 859	See page 860	See page 861
SMB18A	SMB18FA	SMB18SF



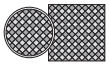




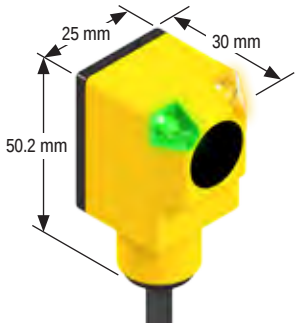
Additional brackets and information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966







Q25 Opposed, Retroreflective and Fixed-Field Models
Suffix E, R, LP, and FF

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q25 DC Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple); Supply current (exclusive of load current): **Opposed Emitters:** 25 mA **Opposed Receivers:** 20 mA **Polarized Retroreflective:** 30 mA **Fixed-Field:** 35 mA
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state complementary dc switch; NPN (current sinking) or PNP (current sourcing), depending on model. The Dark Operate (DO) output may be wired as a normally open marginal signal alarm output, depending upon hookup to the power supply.
Output Rating	150 mA max. (each) in standard hookup. When wired for alarm output, the total load may not exceed 150 mA **OFF-state leakage current:** less than 1 µA at 30 V dc **ON-state saturation voltage:** less than 1 V at 10 mA dc; less than 1.5 V at 150 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time	**Opposed:** 3 milliseconds ON, 1.5 milliseconds OFF **Polarized Retroreflective and Fixed-Field:** 3 milliseconds ON/OFF
Delay at Power-up	100 milliseconds; outputs do not conduct during this time
Repeatability	**Opposed:** 375 microseconds **Polarized Retroreflective and Fixed-Field:** 750 microseconds Repeatability and response are independent of signal strength
Indicators	Two LEDs: **Green:** Power ON **Yellow:** Light Operate (LO) output energized
Construction	Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; one jam nut included.
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9.
Connections	2 m or 9 m attached cable, or 4-pin Euro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 136.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max., double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	CE, CSA®, UL LISTED
Hookup Diagrams	**Emitters:** DC02 (p. 974) **NPN Models:** DC05 (p. 975) **PNP Models:** DC06 (p. 975)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q25 AC Specifications

Supply Voltage and Current	20 to 250 V ac (50/60 Hz) Average current: 20 mA Peak current: 200 mA at 20 V ac, 500 mA at 120 V ac, 750 mA at 250 V ac
Supply Protection Circuitry	Protected against transient voltages
Output Configuration	Solid-state ac switch; three-wire hookup; Choose Light Operate (LO) or Dark Operate (DO), depending on model Light Operate: Output conducts when the sensor sees its own (or the emitter's) modulated light Dark Operate: Output conducts when sensor sees dark
Output Rating	300 mA max. (continuous) Fixed-Field: derate 5 mA/° C above +50° C Inrush capability: 1 amp for 20 milliseconds, non-repetitive OFF-state leakage current: less than 100 µA ON-state voltage drop: 3 V at 300 mA ac; 2 V at 15 mA ac
Output Protection Circuitry	Protected against false pulse on power-up
Output Response Time	Opposed: 16 milliseconds ON, 8 milliseconds OFF Polarized Retroreflective and Fixed-Field: 16 milliseconds ON/OFF
Delay at Power-up	100 milliseconds
Repeatability	Opposed: 2 milliseconds; Polarized Retroreflective and Fixed-Field: 4 milliseconds Repeatability and response are independent of signal strength.
Indicators	Two LEDs: Green and Yellow Green: Power ON Yellow: Light sensed
Construction	Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; one jam nut included.
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9.
Connections	2 m or 9 m attached cable, or 4-pin Micro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 136.
Operating Conditions	Temperature: -40° to +70° C Relative humidity: 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max, double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	CE CSA® UL LISTED
Hookup Diagrams	Cabled Emitters: AC03 (p. 981) Other Cabled Models: AC05 (p. 982) QD Emitters: AC07 (p. 982) Other QD Models: AC06 (p. 982)

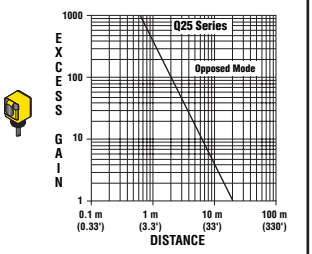
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

(Fixed-Field mode performance based on 90% reflectance white test card†)

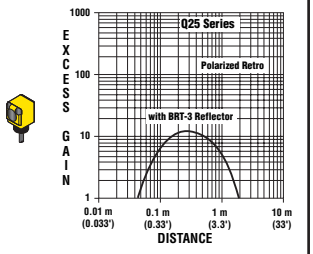
○ = Infrared LED P = Visible Red LED Polarized

Opposed Mode Q25



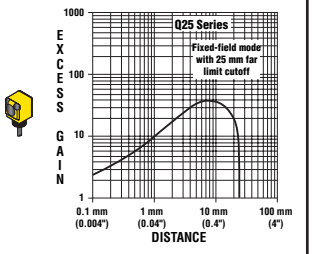
Range: 20 m | LED: ○

Polarized Retroreflective Mode Q25



Range: 2 m | LED: P

Fixed-Field Mode Q25

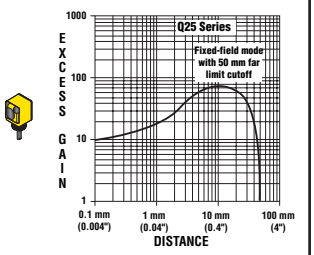


Cutoff: 25 mm | LED: ○

Ø 10 mm spot size @ 8 mm focus
Ø 10 mm spot size @ 25 mm cutoff

† Using 18% gray test card: Cutoff distance will be 95% of value shown.
† Using 6% black test card: Cutoff distance will be 90% of value shown.

Fixed-Field Mode Q25

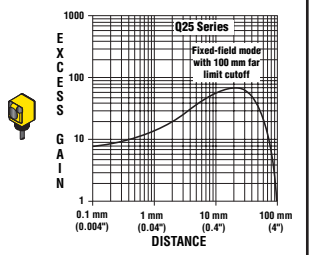


Cutoff: 50 mm | LED: ○

Ø 10 mm spot size @ 10 mm focus
Ø 10 mm spot size @ 50 mm cutoff

† Using 18% gray test card: Cutoff distance will be 90% of value shown.
† Using 6% black test card: Cutoff distance will be 85% of value shown.

Fixed-Field Mode Q25



Cutoff: 100 mm | LED: ○

Ø 10 mm spot size @ 20 mm focus
Ø 10 mm spot size @ 100 mm cutoff

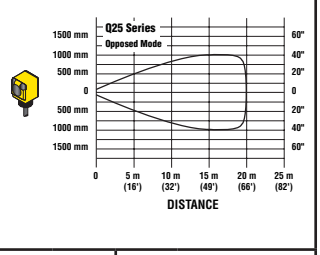
† Using 18% gray test card: Cutoff distance will be 85% of value shown.
† Using 6% black test card: Cutoff distance will be 75% of value shown.

Beam Patterns

○ = Infrared LED P = Visible Red LED Polarized

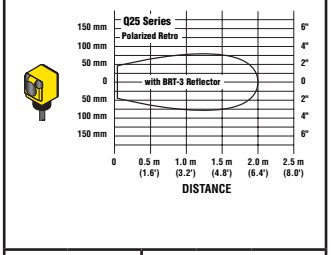
Opposed Mode Q25

Effective Beam: 23 mm



Range: 20 m | LED: ○

Polarized Retroreflective Mode Q25



Range: 2 m | LED: P

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



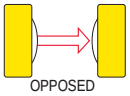
Q40
DC-Operated Long-Range Sensors

The Q40 Standard operates on DC voltage and offers long-range sensing with a 30 mm base.

- Reliable sensing without adjustments
- Completely epoxy-encapsulated for superior durability
- Long-range sensing in harsh environments
- Available in opposed, retroreflective and fixed-field modes
- Cordsets and brackets see page 142

Opposed Q40, 10-30 V DC

⇨ Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 OPPOSED	60 m	2 m	Q406E Emitter	
		4-Pin Euro QD	Q406EQ Emitter	
		2 m	Q40SN6R	Q40SP6R
		4-Pin Euro QD	Q40SN6RQ	Q40SP6RQ

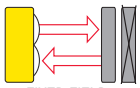
Polar Retro Q40, 10-30 V DC

➡ Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 POLAR RETRO	6 m†	2 m	Q40SN6LP	Q40SP6LP
		4-Pin Euro QD	Q40SN6LPQ	Q40SP6LPQ

Fixed-Field Q40, 10-30 V DC

⇨ Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 FIXED-FIELD	0 - 200 mm Cutoff	2 m	Q40SN6FF200	Q40SP6FF200
		4-Pin Euro QD	Q40SN6FF200Q	Q40SP6FF200Q
	0 - 400 mm Cutoff	2 m	Q40SN6FF400	Q40SP6FF400
		4-Pin Euro QD	Q40SN6FF400Q	Q40SP6FF400Q
	0 - 600 mm Cutoff	2 m	Q40SN6FF600	Q40SP6FF600
		4-Pin Euro QD	Q40SN6FF600Q	Q40SP6FF600Q

For more specifications see page 143.

Connection options: A model with a QD requires a mating cordset (see page 142).

For 9 m cable, add suffix W/30 to the 2 m model number (example, Q40SN6R W/30).

† Retroreflective range is specified using a BRT-3 retroreflector.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



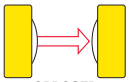
Q40 AC
AC-Operated Long-Range Sensors

The Q40 Standard operates on AC voltage and offers long-range sensing with a bigger base.

- Reliable sensing without adjustments
- Completely epoxy-encapsulated for superior durability
- Long-range sensing in harsh environments
- Available in opposed, retroreflective and fixed-field modes
- Cordsets and brackets see page 142

Opposed Q40, 20-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 OPPOSED	60 m	2 m	Q403E Emitter	
		4-Pin Micro QD	Q403EQ1 Emitter	
		2 m	Q40AW3R	Q40RW3R
		4-Pin Micro QD	Q40AW3RQ1	Q40RW3RQ1

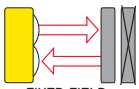
Polar Retro Q40, 20-250 V AC

Visible Red LED

Sensing Mode	Range	Connection	Models LO	Models DO
 POLAR RETRO	6 m†	2 m	Q40AW3LP	Q40RW3LP
		4-Pin Micro QD	Q40AW3LPQ1	Q40RW3LPQ1

Fixed-Field Q40, 20-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 FIXED-FIELD	0 - 200 mm Cutoff	2 m	Q40AW3FF200	Q40RW3FF200
		4-Pin Micro QD	Q40AW3FF200Q1	Q40RW3FF200Q1
	0 - 400 mm Cutoff	2 m	Q40AW3FF400	Q40RW3FF400
		4-Pin Micro QD	Q40AW3FF400Q1	Q40RW3FF400Q1
	0 - 600 mm Cutoff	2 m	Q40AW3FF600	Q40RW3FF600
		4-Pin Micro QD	Q40AW3FF600Q1	Q40RW3FF600Q1

For more specifications see page 144.

Connection options: A model with a QD requires a mating cordset (see page 142).

For 9 m cable, add suffix W/30 to the 2 m model number (example, Q40SN6R W/30).

† Retroreflective range is specified using a BRT-3 retroreflector.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA

Additional cordset information available.
See page 904.

Micro QD (for Q1 models)

See page 925

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQAC-406	MQAC-406RA
4.57 m	MQAC-415	MQAC-415RA
9.14 m	MQAC-430	MQAC-430RA

Brackets

Q25

See page 869	See page 869	See page 870	See page 870
SMB30A	SMB30FA..	SMB30SC	SMBAMS30P

Additional brackets and information available.
See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966

Opposed,
Polarized Retroreflective
and Fixed-Field Models
Suffix E, R, LP and FF

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q40 DC Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple); Supply current (exclusive of load current): **Opposed Emitters:** 25 mA **Opposed Receivers:** 20 mA **Polarized Retroreflective:** 30 mA **Fixed-Field:** 35 mA
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state complementary; choose NPN (current sinking) or PNP (current sourcing) models The Dark Operate (DO) output may be wired as a normally open marginal signal alarm output, depending upon hookup to the power supply
Output Rating	150 mA max. (each) in standard hookup; When wired for alarm output, the total load may not exceed 150 mA **OFF-state leakage current:** less than 1 µA at 30 V dc **ON-state saturation voltage:** less than 1 V at 10 mA dc; less than 1.5 V at 150 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time	**Opposed:** 3 milliseconds ON; 1.5 milliseconds OFF **Polarized Retroreflective and Fixed-Field:** 3 milliseconds ON/OFF
Delay at Power-up	100 milliseconds; outputs are non-conducting during this time
Repeatability	**Opposed:** 375 microseconds **Polarized Retroreflective and Fixed-Field:** 750 microseconds Repeatability and response are independent of signal strength
Indicators	**Two LEDs:** Green and Yellow **Green:** Power ON **Yellow:** Light Operate (LO) output energized See data sheet for detailed information
Construction	Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; one jam nut included.
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9.
Connections	2 m or 9 m attached cable, or 4-pin Euro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 142.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max., double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	CE, UL LISTED, CSA®
Hookup Diagrams	**Emitters:** DC02 (p. 974) **NPN Models:** DC05 (p. 975) **PNP Models:** DC06 (p. 975)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q40 AC Specifications

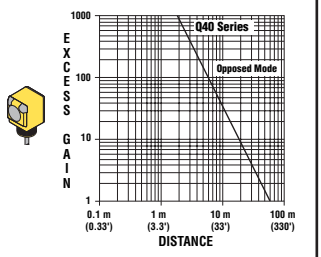
Supply Voltage and Current	20 to 250 V ac (50/60 Hz) **Average current:** 20 mA **Peak current:** 200 mA at 20 V ac, 500 mA at 120 V ac, 750 mA at 250 V ac
Supply Protection Circuitry	Protected against transient voltages
Output Configuration	Solid-state ac switch; three-wire hookup; choose Light Operate (LO) or Dark Operate (DO) models **Light Operate:** Output conducts when the sensor sees its own (or the emitter's) modulated light **Dark Operate:** Output conducts when sensor sees dark
Output Rating	300 mA max. (continuous) **Fixed-Field:** derate 5 mA/° C above +50° C **Inrush capability:** 1 amp for 20 milliseconds, non-repetitive **OFF-state leakage current:** less than 100 µA **ON-state voltage drop:** 3 V at 300 mA ac; 2 V at 15 mA ac
Output Protection Circuitry	Protected against false pulse on power-up
Output Response Time	**Opposed:** 16 milliseconds ON; 8 milliseconds OFF **Polarized Retroreflective and Fixed-Field:** 16 milliseconds ON/OFF
Delay at Power-up	100 milliseconds
Repeatability	**Opposed:** 2 milliseconds **Polarized Retroreflective and Fixed-Field:** 4 milliseconds Repeatability and response are independent of signal strength
Indicators	Two LEDs: **Green:** Power ON **Yellow:** Light sensed See data sheet for detailed information
Construction	Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; one jam nut included.
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9.
Connections	2 m or 9 m attached cable, or 4-pin Micro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 142.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max, double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	CE, UL LISTED, CSA®
Hookup Diagrams	**Cabled Emitters:** AC03 (p. 981) **Cabled Models:** AC05 (p. 982) **QD Emitters:** AC07 (p. 982) **QD Models:** AC06 (p. 982)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves (Fixed-Field mode performance based on 90% reflectance white test card)

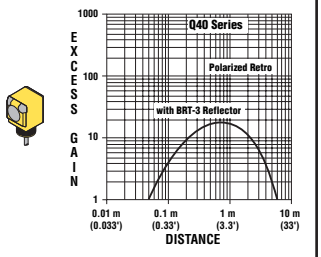
○ = Infrared LED P = Visible Red LED Polarized

Opposed Mode Q40



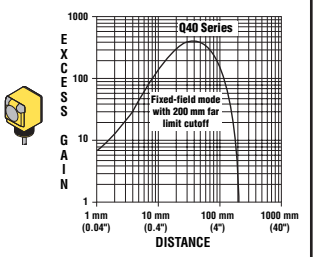
Range: 60 m | LED: ○

Polarized Retroreflective Q40



Range: 6 m | LED: P

Fixed-Field Mode Q40

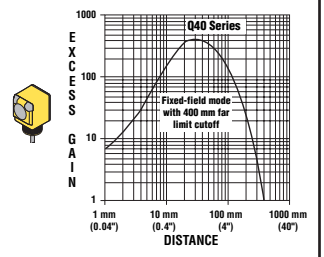


Ø 16 mm spot size @ 35 mm focus
Ø 20 mm spot size @ 200 mm cutoff

Using 18% gray test card: Cutoff distance will be 95% of value shown.
Using 6% black test card: Cutoff distance will be 90% of value shown.

Cutoff: 200 mm | LED: ○

Fixed-Field Mode Q40

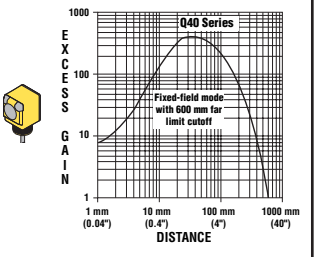


Ø 17 mm spot size @ 35 mm focus
Ø 25 mm spot size @ 400 mm cutoff

Using 18% gray test card: Cutoff distance will be 90% of value shown.
Using 6% black test card: Cutoff distance will be 85% of value shown.

Cutoff: 400 mm | LED: ○

Fixed-Field Mode Q40



Ø 17 mm spot size @ 35 mm focus
Ø 30 mm spot size @ 600 mm cutoff

Using 18% gray test card: Cutoff distance will be 85% of value shown.
Using 6% black test card: Cutoff distance will be 75% of value shown.

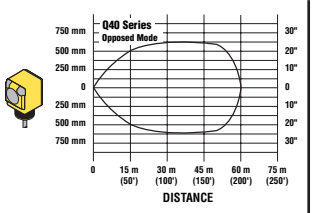
Cutoff: 600 mm | LED: ○

Beam Patterns

○ = Infrared LED P = Visible Red LED Polarized

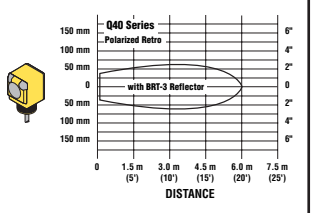
Opposed Mode Q40

Effective Beam: 23 mm



Range: 60 mm | LED: ○

Polarized Retroreflective Mode Q40



Range: 6 m | LED: P

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



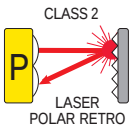
PicoDot®
Laser Precision Sensors

The PicoDot® is a convergent-mode laser sensor with extreme precision.

- Convergent-mode laser sensor delivers precise position detection, inspection and counting
- Powerful retroreflective models offer long-range retroreflective sensing and have a precise, narrow beam to sense small objects at close range or larger objects at 10.6 m
- Convergent models have precise 0.25 mm beam width and ignore objects beyond the maximum sensing distance
- All models have a gain sensitivity potentiometer for fine tuning sensor performance
- Cordsets and brackets see page 147

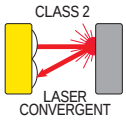
Laser Polar Retro PicoDot®, 10-30 V DC

Visible Red LED

Sensing Mode	Range or Focus	Connection	Housing Rating	NPN Models	PNP Models
	0.2 m - 10.6 m†	2 m 5-pin Euro Pigtail QD	IP54, NEMA 3	PD45VN6LLP PD45VN6LLPQ	PD45VP6LLP PD45VP6LLPQ
	0.2 m - 10.6 m†	2 m 5-pin Euro Pigtail QD	IP67, NEMA 6	PD49VN6LLP PD49VN6LLPQ	PD49VP6LLP PD49VP6LLPQ

Laser Convergent PicoDot®, 10-30 V DC

Visible Red LED

Sensing Mode	Range or Focus	Connection	Housing Rating	NPN Models	PNP Models
	50 mm	2 m 5-pin Euro Pigtail QD	IP54, NEMA 3	PD45VN6C50 PD45VN6C50Q	PD45VP6C50 PD45VP6C50Q
	50 mm	2 m 5-pin Euro Pigtail QD	IP67, NEMA 6	PD49VN6C50 PD49VN6C50Q	PD49VP6C50 PD49VP6C50Q
	102 mm	2 m 5-pin Euro Pigtail QD	IP54, NEMA 3	PD45VN6C100 PD45VN6C100Q	PD45VP6C100 PD45VP6C100Q
	102 mm	2 m 5-pin Euro Pigtail QD	IP67, NEMA 6	PD49VN6C100 PD49VN6C100Q	PD49VP6C100 PD49VP6C100Q
	203 mm	2 m 5-pin Euro Pigtail QD	IP54, NEMA 3	PD45VN6C200 PD45VN6C200Q	PD45VP6C200 PD45VP6C200Q
	203 mm	2 m 5-pin Euro Pigtail QD	IP67, NEMA 6	PD49VN6C200 PD49VN6C200Q	PD49VP6C200 PD49VP6C200Q
	305 mm	2 m 5-pin Euro Pigtail QD	IP54, NEMA 3	PD45VN6C300 PD45VN6C300Q	PD45VP6C300 PD45VP6C300Q
	305 mm	2 m 5-pin Euro Pigtail QD	IP67, NEMA 6	PD49VN6C300 PD49VN6C300Q	PD49VP6C300 PD49VP6C300Q

For more specifications see page 148.

Connection options: A model with a QD requires a mating cordset (see page 147).

For 9 m cable, add suffix W/30 to the 2 m model number (example, PD45VN6LLP W/30).

† Tested using a BRT-51X51BM retro target (included with each sensor). Actual range depends on the efficiency and size of the retroreflective target. Some targets have produced ranges up to 40 m.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 912

Length	Threaded 5-Pin	
	Straight	Right-Angle
0.5 m	MQDC1-501.5	—
1.83 m	MQDC1-506	MQDC1-506RA
4.57 m	MQDC1-515	MQDC1-515RA
9.14 m	MQDC1-530	MQDC1-530RA



Additional cordset information available. See page 904.

Brackets

PicoDot

See page 863	See page 864	See page 863	See page 864
SMB46A	SMB46S	SMB46L	SMB46U



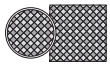


Additional brackets and information available. See page 846.

Other Accessories

Reflectors

See page 940

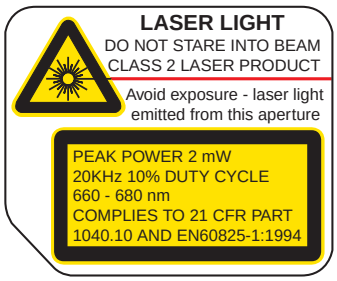


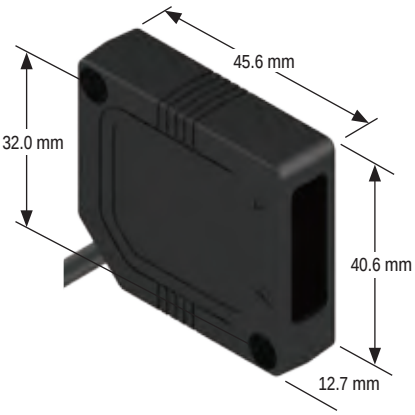
Class 2 Laser Safety Notes

Low-power lasers are by definition incapable of causing eye injury within the duration of the blink (aversion response) of 0.25 seconds. They also must emit only visible wavelengths (400 - 700 nm). Therefore, an ocular hazard can exist only if an individual overcomes their natural aversion to bright light and stares directly into the laser beam.

For safe laser use:

- Do not permit a person to stare at the laser from within the beam
- Do not point the laser at a person's eye at close range
- The beam emitted by a Class 2 laser product should be terminated at the end of its useful path. Open laser beam paths should be located above or below eye level where practical.





Laser Polarized Retroreflective and Laser Convergent Models Suffix LLP and C..

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

PicoDot® Specifications

Supply Voltage and Current	10 to 30 V dc (10% max ripple) at less than 20 mA, exclusive of load
Beam Size at Aperture	3.75 x 1.85 mm (Retroreflective Models)
Beam Divergence	Approx. 1 milliradian (Retroreflective Models)
Laser Classification	Class 2 safety (CDRH (FDA) 1040.10 and IEC 60875-1)
Supply Protection Circuitry	Protected against reverse polarity, over voltage, and transient voltages
Delay at Power-up	< 1 second
Output Configuration	Solid-state complementary; choose NPN (current sinking) or PNP (current sourcing) models
Output Rating	150 mA max. (each output) OFF-state leakage current: less than µA at 30 V dc ON-state saturation voltage: less than 0.3 V at 10 mA dc; less than 0.8 V at 150 mA dc
Output Protection	Protected against continuous overload or short-circuit of outputs; Overload trip point ≥ 220 milliamps
Output Response Time	0.2 milliseconds (200 microseconds) ON/OFF
Repeatability	50 microseconds; Rep Rate 20 KHz
Spot Size at Focus	0.25 mm
Range	C50 models: 25 to 58 mm; focus at 50 mm ± 5 mm C100 models: 25 to 115 mm; focus at 102 mm ± 5 mm C200 models: 25 to 216 mm; focus at 203 mm ± 5 mm C300 models: 25 to 317 mm; focus at 305 mm ± 5 mm LLP models: 0.2 to 10.6 m, using supplied retroreflective target
Adjustments	12-turn slotted brass Gain (sensitivity) adjustment potentiometer
Extinguishing Wire	Gray wire held "low" for laser operation; "high" to turn laser OFF; Low ≤ 1.0 V dc; High ≥ V_{supply} -4.0 V dc (< 30 V dc) or disconnect wire; 100 milliseconds delay upon enable
Indicators	Two LEDs: Green: Power ON Yellow: Light sensed; Light Operate (LO) output conducting See data sheet for detailed information
Construction	PD45: Housings are heat-resistant ABS, UL94-VO rated; acrylic lens cover PD49: Housings are sealed, heat resistant ABS/polycarbonate alloy, UL94-VO rated, acrylic lens cover
Environmental Rating	PD45: IP54; NEMA 3 PD49: IP67; NEMA 6
Connections	2 m or 9 m attached cable, or 5-pin Euro-style 150 mm pigtail quick-disconnect fitting; mating cordsets for QD models are ordered separately. See page 147.
Operating Conditions	Temperature: -10° to +45° C Relative humidity: 90% at 50° C (non-condensing)
Weight	PD45: Sensor only: 22 g Sensor plus 2 m cable: 62 g PD49: Sensor only: 28 g Sensor plus 2 m cable: 68 g
Application Notes	False pulse may occur less than 1 second after power-up
Certifications	CE
Hookup Diagrams	DC12 (p. 976)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

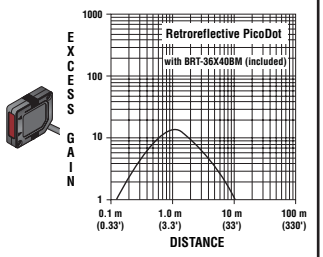
Excess Gain Curves

(Convergent mode performance based on 90% reflectance white test card)

LP = Visible Red Laser LED Polarized

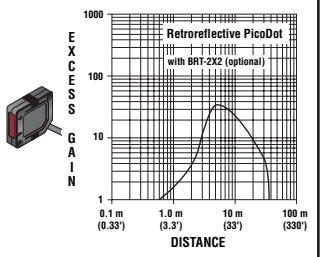
= Visible Red Laser LED

Retroreflective Mode PicoDot® Class 2 Laser



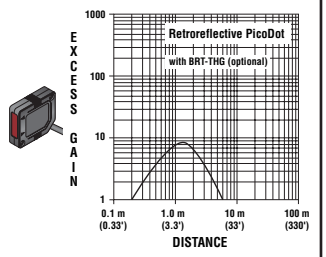
Range: 10.6 m | LED: LP

Retroreflective Mode PicoDot® Class 2 Laser



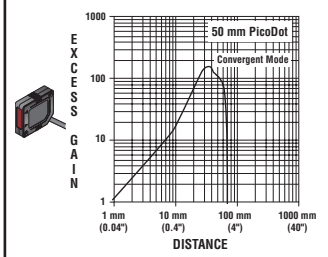
Range: 39.6 m | LED: LP

Retroreflective Mode PicoDot® Class 2 Laser



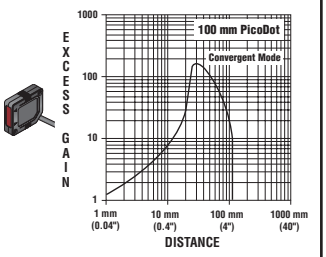
Range: 6 m | LED: LP

Convergent Mode PicoDot® Class 2 Laser



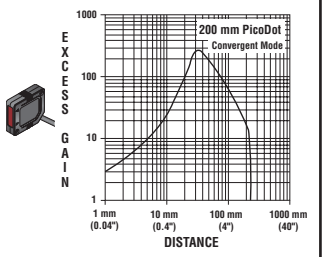
Range: 50 mm | LED:

Convergent Mode PicoDot® Class 2 Laser



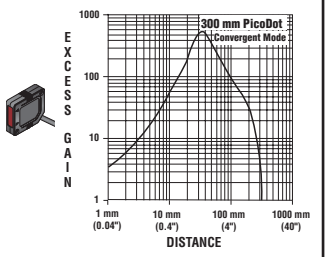
Range: 102 mm | LED:

Convergent Mode PicoDot® Class 2 Laser



Range: 203 mm | LED:

Convergent Mode PicoDot® Class 2 Laser



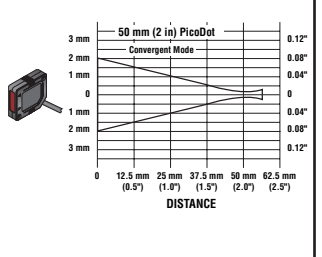
Range: 305 mm | LED:

Beam Patterns

(Convergent mode performance based on 90% reflectance white test card)

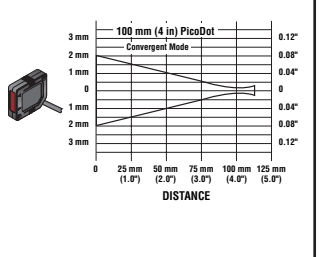
= Visible Red Laser LED

Convergent Mode PicoDot® Class 2 Laser



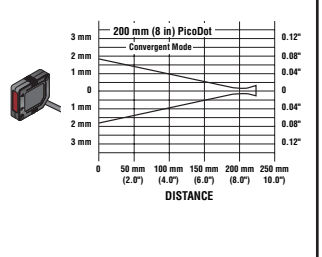
Range: 50 mm | LED:

Convergent Mode PicoDot® Class 2 Laser



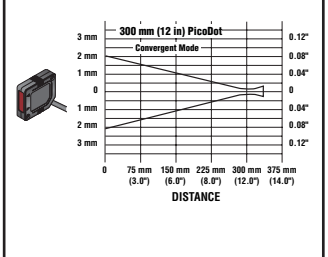
Range: 102 mm | LED:

Convergent Mode PicoDot® Class 2 Laser



Range: 203 mm | LED:

Convergent Mode PicoDot® Class 2 Laser



Range: 305 mm | LED:

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



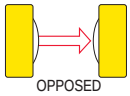
QM42
Right-Angle Sensor with Mounting Versatility

The QMT42 has a robust housing and is an ideal replacement for hundreds of other sensor styles. It is available in five modes with a compact housing for limited space setups.

- Versatile sensor with several mounting options
- Meets IP67 and NEMA 6 standards for harsh environment
- Universal housing design
- Cordsets and brackets see page 153

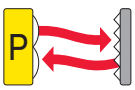
Opposed QM42, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 OPPOSED	10 m	2 m	QM426E Emitter	
		4-Pin Euro QD	QM426EQ Emitter	
		2 m	QM42VN6R	QM42VP6R
		4-Pin Euro QD	QM42VN6RQ	QM42VP6RQ

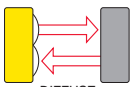
Polar Retro QM42, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 POLAR RETRO	3 m†	2 m	QM42VN6LP	QM42VP6LP
		4-Pin Euro QD	QM42VN6LPQ	QM42VP6LPQ

Diffuse QM42, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 DIFFUSE	400 mm	2 m	QM42VN6D	QM42VP6D
		4-Pin Euro QD	QM42VN6DQ	QM42VP6DQ

For more specifications see page 154.

Connection options: A model with a QD requires a mating cordset (see page 153).

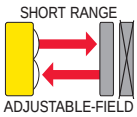
For 9 m cable, add suffix W/30 to the 2 m model number (example, QM42VN6LP W/30).

† Tested using a BRT-3 retroreflector. Actual range depends on the efficiency and reflective area of the retroreflector in use. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

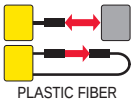
Adjustable-Field QM42, 10-30 V DC

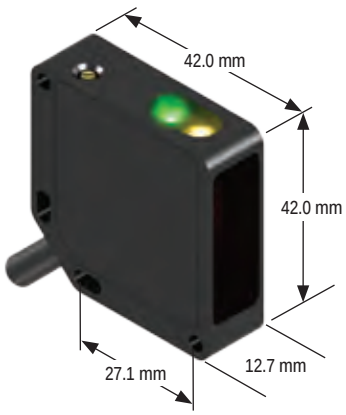
Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
	5 mm to Cutoff point (adjustable from 50 to 150 mm)	2 m	QM42VN6AFV150	QM42VP6AFV150
		4-Pin Euro QD	QM42VN6AFV150Q	QM42VP6AFV150Q

Plastic Fibers QM42, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
	Range varies by sensing mode and fiber optics used	2 m	QM42VN6FP	QM42VP6FP
		4-Pin Euro QD	QM42VN6FPQ	QM42VP6FPQ



QM42 Opposed, Retroreflective, Short-range Diffuse, and Short-range Adjustable-Field Model Suffix E, R, LP, D, AFV150 and FP

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



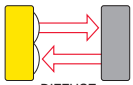
QMT42
Right-Angle Sensor with Mounting Versatility

The QMT42 has a robust housing and is an ideal replacement for hundreds of other sensor styles. It is available in three modes with a compact housing for limited space setups.

- Versatile sensor with several mounting options
- Meets IP67 and NEMA 6 standards for harsh environment
- Universal housing design
- All-purpose, go-to sensor for many application needs
- Cordsets and brackets see page 153

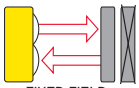
Diffuse QMT42, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 DIFFUSE	10 mm - 6 m	2 m	QMT42VN6DX	QMT42VP6DX
		4-Pin Euro QD	QMT42VN6DXQ	QMT42VP6DXQ

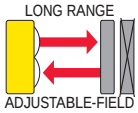
Fixed-Field QMT42, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 FIXED-FIELD	50 - 500 mm Cutoff	2 m	QMT42VN6FF500	QMT42VP6FF500
		4-Pin Euro QD	QMT42VN6FF500Q	QMT42VP6FF500Q
	50 - 750 mm Cutoff	2 m	QMT42VN6FF750	QMT42VP6FF750
		4-Pin Euro QD	QMT42VN6FF750Q	QMT42VP6FF750Q
	50 - 1000 mm Cutoff	2 m	QMT42VN6FF1000	QMT42VP6FF1000
		4-Pin Euro QD	QMT42VN6FF1000Q	QMT42VP6FF1000Q
	50 - 1500 mm Cutoff	2 m	QMT42VN6FF1500	QMT42VP6FF1500
		4-Pin Euro QD	QMT42VN6FF1500Q	QMT42VP6FF1500Q
	50 - 2000 mm Cutoff	2 m	QMT42VN6FF2000	QMT42VP6FF2000
		4-Pin Euro QD	QMT42VN6FF2000Q	QMT42VP6FF2000Q

Adjustable-Field QMT42, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 LONG RANGE ADJUSTABLE-FIELD	25 mm to Cutoff point (adjustable from 125 to 400 mm)	2 m	QMT42VN6AFV400	QMT42VP6AFV400
		4-Pin Euro QD	QMT42VN6AFV400Q	QMT42VP6AFV400Q

For more specifications see page 154.

Connection options: A model with a QD requires a mating cordset (see page 153).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QM42VN6LP W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA





Additional cordset information available. See page 904.

Brackets

Q25

See page 862	See page 864	See page 863
SMB30SK	SMB46S	SMB46L



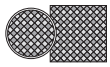




Additional brackets and information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966







QMT42 Long-range Diffuse,
Fixed-Field and Adjustable-Field Model
Suffix DX, FF and AFV400

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

QM42 and QMT42 Specifications

Sensing Beam	**Opposed, Diffuse, Retroreflective, Fixed-Field and Fiber Optic:** Infrared, 880 nm; Visible Red, 660 nm **Adjustable-Field:** Visible Red, 680 nm
Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at less than: **Opposed:** 30 mA (emitter), 10 mA (receiver) **Short-range diffuse and retroreflective:** 20 mA **Fiber optic:** 30 mA **Adjustable-Field:** 50 mA **Fixed-Field and long-range diffuse:** 40 mA
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state complementary; choose NPN (current sinking) or PNP (current sourcing) models
Output Rating	100 mA max. (each output) **OFF-state leakage current:** less than µA at 30 V dc **ON-state saturation voltage:** less than 1 V at 10 mA dc; less than 1.5 V at 100 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs Overload trip point ≥ 150 mA, typical at 20º C
Output Response Time	**Opposed:** 1 millisecond ON; 0.5 millisecond OFF **Diffuse, Retroreflective, Adjustable-Field and Fixed-Field:** 1 millisecond ON/OFF **Plastic Fiber Optic:** 0.25 millisecond ON/OFF
Delay at Power-up	100 milliseconds; outputs are non-conducting during this time
Repeatability	**Opposed:** 120 microseconds **Diffuse, Retroreflective, Adjustable-Field and Fixed-Field:** 250 microseconds **Fiber Optic:** 60 microseconds. Repeatability and response are independent of signal strength
Sensing Hysteresis	**Long-range diffuse:** less than 20% of set sensing distance **Adjustable-Field:** less than 7% of set cutoff distance **Fixed-Field:** **2000 mm models** – less than 5% of set cutoff distance **1500 mm models** – less than 4% of set cutoff distance **1000 mm models** – less than 3% of set cutoff distance **750 mm models** – less than 2% of set cutoff distance **500 mm models** – less than 1% of set cutoff distance
Cutoff Point Tolerance	**Fixed-Field:** ±10% of nominal cutoff distance
Adjustments	**All models (except emitters, Adjustable-Field, Fixed-Field and Long-range Diffuse):** 15-turn slotted brass GAIN (sensitivity) adjustment potentiometer **150 mm Adjustable-Field:** 12-turn slotted brass cutoff distance adjustment potentiometer **400 mm Adjustable-Field:** 15-turn slotted brass cutoff distance adjustment potentiometer **Long-range diffuse:** 4-turn slotted GAIN (sensitivity) adjustment potentiometer **Fixed-Field:** No adjustments See data sheet for detailed information
Indicators	**Two LEDs:** Green and Yellow **Green:** Power ON; Opposed emitters: Green power ON **Yellow:** Light sensed; Light Operate (LO) See data sheet for detailed information
Construction	Housings are die-cast zinc alloy with black acrylic polyurethane finish; lenses are acrylic
Environmental Rating	IP67; NEMA 6
Connections	2 m or 9 m attached cable, or 4-pin Euro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 153.
Operating Conditions	Temperature: **Long-range Diffuse, Adjustable-Field and Fixed-Field:** -20° to +55° C **All others:** -20° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Certifications	CE c UL us
Hookup Diagrams	**Emitters:** DC02 (p. 974) **All others:** DC03 (p. 974)

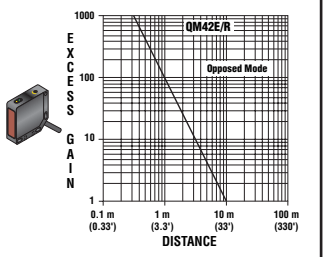
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

(Diffuse, Adjustable-Field and Fixed-Field mode performance based on 90% reflectance white test card)

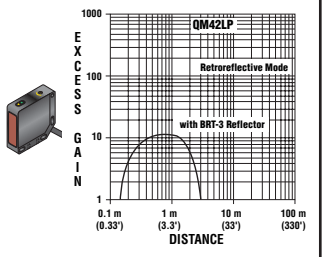
○ = Infrared LED ● = Visible Red LED P = Visible Red LED Polarized

Opposed Mode QM42



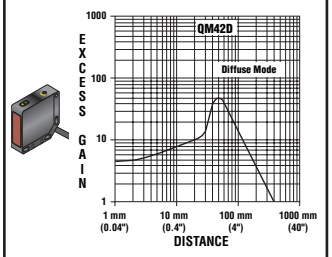
Range: 10 m | LED: ○

Polarized Retroreflective Mode QM42



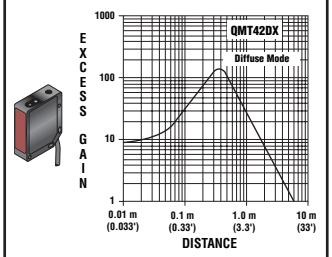
Range: 3 m | LED: P

Diffuse Mode QM42



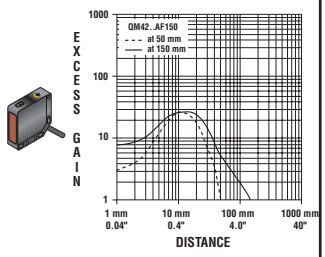
Range: 400 mm | LED: ○

Diffuse Mode QMT42



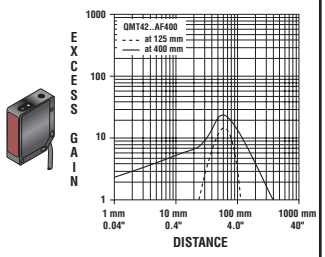
Range: 6 m | LED: ○

Adjustable-Field Mode QM42



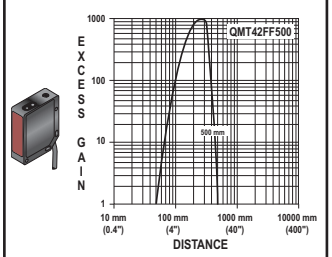
Cutoff: 50-150 mm | LED: ●

Adjustable-Field Mode QMT42



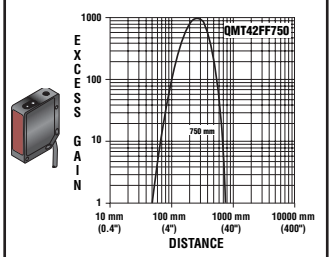
Cutoff: 125-400 mm | LED: ●

Fixed-Field Mode QMT42



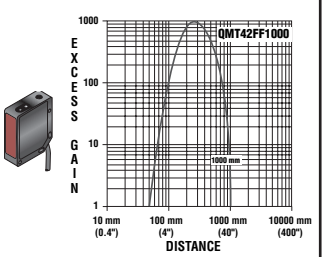
Cutoff: 500 mm | LED: ○

Fixed-Field Mode QMT42



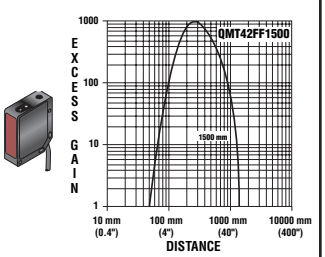
Cutoff: 750 mm | LED: ○

Fixed-Field Mode QMT42



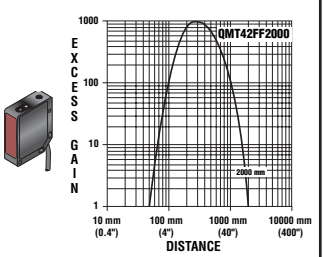
Cutoff: 1000 mm | LED: ○

Fixed-Field Mode QMT42



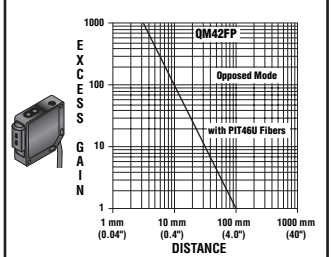
Cutoff: 1500 mm | LED: ○

Fixed-Field Mode QMT42



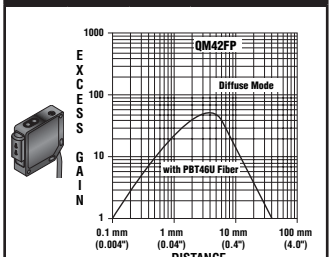
Cutoff: 2000 mm | LED: ○

Opposed Mode—Plastic Fiber QM42



Range: Varies | LED: ●

Diffuse Mode—Plastic Fiber QM42



Range: Varies | LED: ●

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

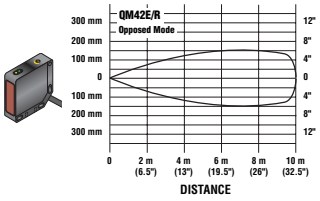
Beam Patterns

(Diffuse mode performance based on 90% reflectance white test card)

○ = Infrared LED ● = Visible Red LED P = Visible Red LED Polarized

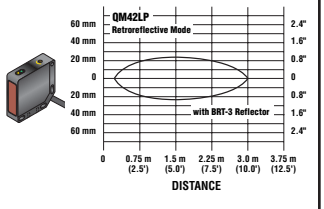
Opposed Mode QM42

Effective Beam: 8 mm



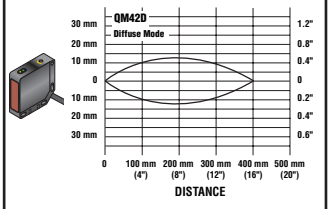
Range: 10 m | LED: ○

Polarized Retroreflective Mode QM42



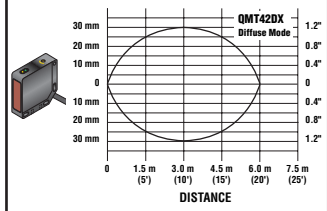
Range: 3 m | LED: P

Diffuse Mode QM42



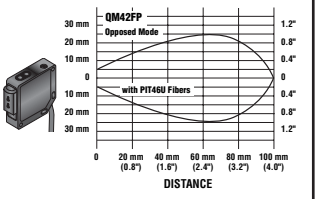
Range: 400 mm | LED: ○

Diffuse Mode QMT42



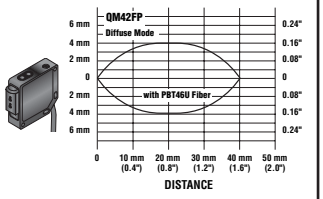
Range: 6 m | LED: ○

Opposed Mode—Plastic Fiber QM42



Range: Varies | LED: ●

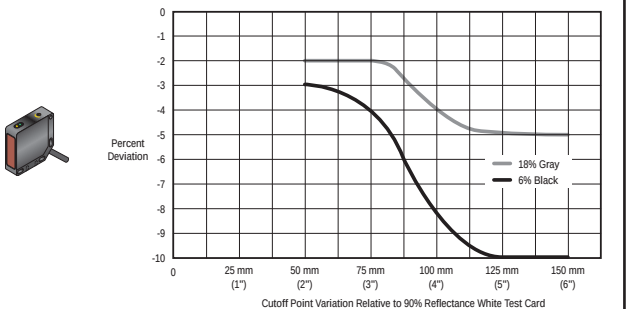
Diffuse Mode—Plastic Fiber QM42



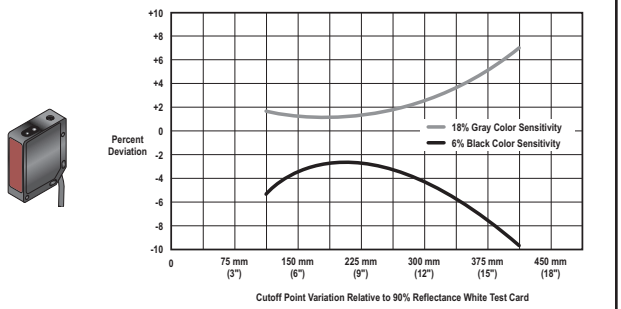
Range: Varies | LED: ●

Cutoff Point Deviations

QM42 Adjustable-Field – 150 mm



QMT42 Adjustable-Field – 400 mm



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

LOOKING FOR MORE



Q20 page 74

Versatile sensor with universal rectangular housing and multiple mounting options.



Q45 page 80

Eight sensing modes for solving most applications: opposed, retroreflective, convergent, diffuse, plastic and glass fiber optic, and adjustable-field and fixed-field.
High-performance sensing with visible long range
Class 1 and 2 lasers with narrow effective beam for small object detection and precise position control.



Q60 page 104

The Q60 is a long-range sensor with a sharp cut off and extremely high gain to detect dark targets, and a laser model to detect thin targets at maximum range.

WEB ONLY



OMNI-BEAM

Includes a sensor head and a power block; timing logic module is optional. Available in opposed, polarized and non-polarized retroreflective, diffuse, convergent, and glass or plastic fiber optic sensing modes.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Right Angle

Right angle sensors offer industry standard 30, 18, and 8 mm barrel mounting options. The right angle housing allows mounting in confined areas, and easy viewing of LED indicators.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Max Sensing Range	Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	T8 Compact sensor provides reliable sensing without adjustments. Page 160	Opposed: 2 m Diffuse: 100 mm	19 x 16.3 x 15.8 mm	IP67; NEMA 6	ABS	10 to 30 V dc
	T18 Epoxy-encapsulated right-angle barrel sensors provide reliable sensing without adjustments. Page 164	Opposed: 20 m Retro: 2 m Polarized Retro: 2 m Diffuse: 500 mm Fixed-Field: 100 mm	Varies by model	QD models: IP6K Other models: IP67; NEMA 6	Thermoplastic Polyester	10 to 30 V dc, 20 to 250 V ac
	TM18 Robust die-cast metal sensors provide reliable sensing without adjustments in high-pressure washdown environments. Page 172	Opposed: 20 m Polarized Retro: 5.5 m Diffuse: 500 mm Fixed-Field: 100 mm	41 x 30 x 30 mm	QD models: IP6K Other models: IP67; NEMA 6	Zinc die-cast with nickel plating	10 to 30 V dc
	T30 Compact sensor provides reliable sensing without adjustments. Page 178	Opposed: 60 m Polarized Retro: 6 m Fixed-Field: 600 mm	51.5 x 40 x 44.8 mm	QD models: IP6K Other models: IP67; NEMA 6	Thermoplastic Polyester	10 to 30 V dc, 20 to 250 V ac

OTHER AVAILABLE MODELS



QS18 page 30



QS30 page 52



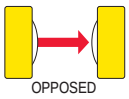
T8
Self-Contained, Right-Angle Barrel-Mount Sensors

Compact sensor provides reliable sensing without adjustments.

- Powerful optics
- Short-range background suppression
- Highly visible red sensing beam for easy alignment
- Easily replaces range-limited 8 mm inductive proximity sensors
- Cordsets and brackets see page 161

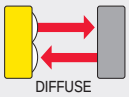
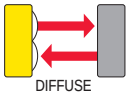
Opposed T8, 10-30 V dc

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 OPPOSED	2 m	2 m 3-Pin Pico Pigtail QD	—	T86EV Emitter	
				T86EVQ Emitter	
		2 m 3-Pin Pico Pigtail QD	LO	T8AN6R	T8AP6R
				T8AN6RQ	T8AP6RQ
		2 m 3-Pin Pico Pigtail QD	DO	T8RN6R	T8RP6R
				T8RN6RQ	T8RP6RQ

Diffuse T8, 10-30 V dc

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 DIFFUSE	50 mm	2 m 3-Pin Pico Pigtail QD	LO	T8AN6D50	T8AP6D50
				T8AN6D50Q	T8AP6D50Q
		2 m 3-Pin Pico Pigtail QD	DO	T8RN6D50	T8RP6D50
				T8RN6D50Q	T8RP6D50Q
 DIFFUSE	100 mm	2 m 3-Pin Pico Pigtail QD	LO	T8AN6D100	T8AP6D100
				T8AN6D100Q	T8AP6D100Q
		2 m 3-Pin Pico Pigtail QD	DO	T8RN6D100	T8RP6D100
				T8RN6D100Q	T8RP6D100Q

For more specifications see page 162.

Connection options: A model with a QD requires a mating cordset (see page 161.)

For 9 m cable, add suffix W/30 to the 2 m model number (example, T8AN6D50 W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Pico QD

See page 904

Length	Threaded 3-Pin	
	Straight	Right-Angle
2.00 m	PKG3M-2	PKW3M-2
5.00 m	PKG3M-5	—
7.00 m	PKG3M-7	—
9.00 m	PKG3M-9	PKW3M-9
10.0 m	PKG3M-10	—



Additional cordset information available.
See page 904.

Brackets

T8

See page 858

SMB8MM





Additional brackets and information available.
See page 846.



Opposed and Diffuse Models
Suffix E, R and D

T8 Specifications

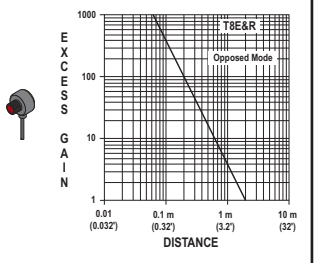
Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at less than 25 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state switch NPN (current sinking) or PNP (current sourcing), depending on model. Light Operate (LO) or Dark Operate (DO), depending on model
Output Rating	50 mA max. OFF-state leakage current: less than 1 µA at 24 V dc ON-state saturation voltage: less than 0.25 V at 10 mA dc; less than 0.5 V at 50 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs Overload trip point ≥ 100 mA
Output Response Time	1 millisecond ON; 0.5 milliseconds OFF
Delay at Power-up	Maximum 100 milliseconds (150 milliseconds for Diffuse); output does not conduct during this time
Repeatability	Opposed: 100 microseconds Diffuse: 160 microseconds
Indicators	Opposed: Receiver has Green and Red LED Emitter has one Green LED Green: power ON Red: light sensed Diffuse: Red: light is sensed
Construction	Reinforced polycarbonate/ABS alloy housing, acrylic window with 8 mm ABS nut
Environmental Rating	IEC IP67; NEMA 6
Connections	2 m or 9 m attached cable, or 150 mm pigtail with 3-pin Pico-style quick-disconnect fitting. QD cordsets are ordered separately. See page 161.
Operating Conditions	Temperature: -20° to +55° C Relative humidity: 80% at 50° C (non-condensing)
Vibration and Mechanical Shock	Vibration: All models meet IEC 60068-2-6, IEC 60947-5-2, UL491 Section 40, MIL-STD-202F Method 201A; 10 to 60 Hz, 0.5 mm peak to peak Shock: All models meet IEC 60068-2-27, IEC 60947-5-2; 30g peak acceleration, 11 millisecond pulse duration, half-sine wave pulse shape
Certifications	CE
Hookup Diagrams	Emitters: DC02 (p. 974) All others: DC01 (p. 974)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves (Diffuse mode performance based on 90% reflectance white test card)

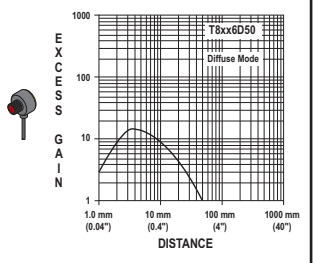
● = Visible Red LED

Opposed Mode T8



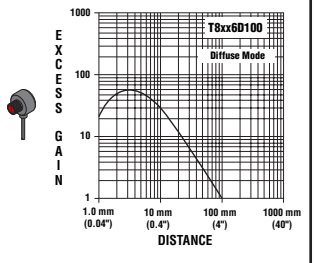
Range: 2 m | LED: ●

Diffuse Mode T8



Range: 50 mm | LED: ●

Diffuse Mode T8



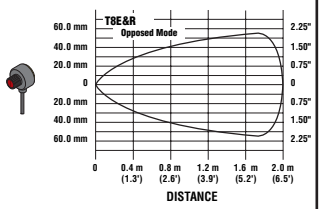
Range:100 mm | LED: ●

Beam Patterns (Diffuse mode performance based on 90% reflectance white test card)

● = Visible Red LED

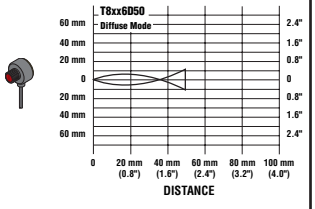
Opposed Mode T8

Effective Beam: 4.3 mm



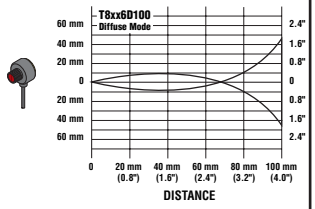
Range: 2 m | LED: ●

Diffuse Mode T8



Range: 50 mm | LED: ●

Diffuse Mode T8



Range: 100 mm | LED: ●



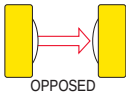
T18
DC-Operated Self-Contained Sensors

Completely epoxy-encapsulated barrel-mount sensors operate on dc supply voltage and withstand harsh sensing environments.

- Design rated NEMA 6P, IP67
- Wide operating range from -40° C to +70° C
- Advanced diagnostics warn of marginal sensing conditions or output overload
- Available in opposed, retroreflective, diffuse and fixed-field modes
- Cordsets and brackets see page 166

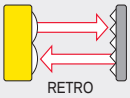
Opposed T18, 10-30 V DC

⇨ Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 OPPOSED	20 m	2 m	T186E Emitter	
		4-pin Euro QD	T186EQ Emitter	
		2 m	T18SN6R	T18SP6R
		4-pin Euro QD	T18SN6RQ	T18SP6RQ

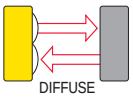
Retro & Polar Retro T18, 10-30 V DC

⇨ Infrared LED ➡ Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 RETRO	2 m†	2 m	T18SN6L	T18SP6L
		4-pin Euro QD	T18SN6LQ	T18SP6LQ
 POLAR RETRO	2 m†	2 m	T18SN6LP	T18SP6LP
		4-pin Euro QD	T18SN6LPQ	T18SP6LPQ

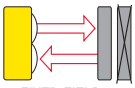
Diffuse T18, 10-30 V DC

⇨ Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 DIFFUSE	500 mm	2 m	T18SN6D	T18SP6D
		4-pin Euro QD	T18SN6DQ	T18SP6DQ

Fixed-Field T18, 10-30 V DC

⇨ Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 FIXED-FIELD	0 - 25 mm Cutoff	2 m	T18SN6FF25	T18SP6FF25
		4-pin Euro QD	T18SN6FF25Q	T18SP6FF25Q
	0 - 50 mm Cutoff	2 m	T18SN6FF50	T18SP6FF50
		4-pin Euro QD	T18SN6FF50Q	T18SP6FF50Q
	0 - 100 mm Cutoff	2 m	T18SN6FF100	T18SP6FF100
		4-pin Euro QD	T18SN6FF100Q	T18SP6FF100Q

For more specifications see page 168.

Connection options: A model with a QD requires a mating cordset (see page 166).

For 9 m cable, add suffix W/30 to the 2 m model number (example, T18SN6L W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector. Actual sensing range may differ, depending on the efficiency and reflective area of theretroreflector used. See Accessories section for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



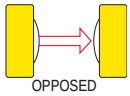
T18 AC
AC-Operated Self-Contained Sensors

Completely epoxy-encapsulated barrel-mount sensors operate on ac supply voltage and withstand harsh sensing environments.

- Design rated NEMA 6P, IP67
- Quick disconnect models rated to IP69K
- Wide operating range from -40° C to +70° C
- Available in opposed, retroreflective, diffuse and fixed-field modes
- Cordsets and brackets see page 166

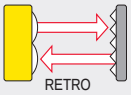
Opposed T18, 20-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 OPPOSED	20 m	2 m	T183E Emitter	
		4-pin Micro QD	T183EQ1 Emitter	
		2 m	T18AW3R	T18RW3R
		4-pin Micro QD	T18AW3RQ1	T18RW3RQ1

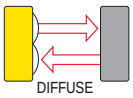
Retro & Polar Retro T18, 20-250 V AC

Infrared LED Visible Red LED

Sensing Mode	Range	Connection	Models LO	Models DO
 RETRO	2 m†	2 m	T18AW3L	T18RW3L
		4-pin Micro QD	T18AW3LQ1	T18RW3LQ1
 POLAR RETRO	2 m†	2 m	T18AW3LP	T18RW3LP
		4-pin Micro QD	T18AW3LPQ1	T18RW3LPQ1

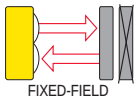
Diffuse T18, 20-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 DIFFUSE	300 mm	2 m	T18AW3D	T18RW3D
		4-pin Micro QD	T18AW3DQ1	T18RW3DQ1

T18, 20-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 FIXED-FIELD	0 - 25 mm Cutoff	2 m	T18AW3FF25	T18RW3FF25
		4-pin Micro QD	T18AW3FF25Q1	T18RW3FF25Q1
	0 - 50 mm Cutoff	2 m	T18AW3FF50	T18RW3FF50
		4-pin Micro QD	T18AW3FF50Q1	T18RW3FF50Q1
	0 - 100 mm Cutoff	2 m	T18AW3FF100	T18RW3FF100
		4-pin Micro QD	T18AW3FF100Q1	T18RW3FF100Q1

For more specifications see page 169.

Connection options: A model with a QD requires a mating cordset (see page 166).

For 9 m cable, add suffix W/30 to the 2 m model number (example, T18SN6L W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector. Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories section for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for ..Q8 or ..Q5 models)

See page 908

Length	Threaded 4-Pin Straight		Threaded 4-Pin Right-Angle	
1.83 m	MQDC-406		MQDC-406RA	
4.57 m	MQDC-415		MQDC-415RA	
9.14 m	MQDC-430		MQDC-430RA	


Additional cordset information available.
See page 904.

Micro QD (for Q1 models)

See page 925

Length	Threaded 4-Pin Straight		Threaded 4-Pin Right-Angle	
1.83 m	MQAC-406		MQAC-406RA	
4.57 m	MQAC-415		MQAC-415RA	
9.14 m	MQAC-430		MQAC-430RA	

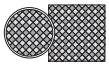
Brackets

T18

See page 866	See page 859	See page 860	See page 864
SMB1815SF	SMB18A	SMB18FM	SMBAMS18P
			


Additional brackets and information available.
See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966
	

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



DC Sensors (all models)



AC Sensors (all models)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

T18 DC Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple); Supply current (exclusive of load current): **Opposed Emitters:** 25 mA **Opposed Receivers:** 20 mA **Polarized Retroreflective:** 30 mA **Non-polarized Retroreflective:** 25 mA **Diffuse:** 25 mA **Fixed-Field:** 35 mA
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state complementary dc switch; NPN (current sinking) or PNP (current sourcing), depending on model. The Dark Operate (DO) output may be wired as a normally open marginal signal alarm output, depending upon hookup to the power supply.
Output Rating	150 mA max. (each) in standard hookup. When wired for alarm output, the total load may not exceed 150 mA. **OFF-state leakage current:** less than 1 µA at 30 V dc **ON-state saturation voltage:** less than 1 V at 10 mA dc; less than 1.5 V at 150 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time	**Opposed:** 3 milliseconds ON, 1.5 milliseconds OFF **Polarized Retroreflective, Non-polarized Retroreflective, Fixed-Field and Diffuse:** 3 milliseconds ON/OFF
Delay at Power-up	100 milliseconds; outputs are non-conducting during this time
Adjustments	T18 Series infrared non-polarized retroreflective and diffuse mode models (only) have a single-turn SENSITIVITY control for adjustment of system gain
Repeatability	**Opposed:** 375 microseconds **Polarized Retroreflective, Non-polarized Retroreflective, Fixed-Field and Diffuse:** 750 microseconds Repeatability and response are independent of signal strength
Indicators	**Two LEDs: Green:** Power ON **Yellow:** Light Operate (LO) output energized
Construction	Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; one jam nut included.
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9
Connections	2 m or 9 m attached cable, or 4-pin Euro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 166.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max., double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	CE, CSA®, UL LISTED
Hookup Diagrams	**Emitters:** DC02 (p. 974) **NPN Models:** DC05 (p. 975) **PNP Models:** DC06 (p. 975)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

T18 AC Specifications

Supply Voltage and Current	20 to 250 V ac (50/60 Hz) **Average current:** 20 mA **Peak current:** 200 mA at 20 V ac, 500 mA at 120 V ac, 750 mA at 250 V ac
Supply Protection Circuitry	Protected against transient voltages
Output Configuration	Solid-state ac switch; three-wire hookup; Light Operate (LO) or Dark Operate (DO), depending on model **Light Operate:** Output conducts when the sensor sees its own (or the emitter's) modulated light **Dark Operate:** Output conducts when sensor sees dark
Output Rating	300 mA max. (continuous) **Fixed-Field:** derate 5 mA/° C above +50° C **Inrush capability:** 1 amp for 20 milliseconds, non-repetitive **OFF-state leakage current:** less than 100 µA **ON-state voltage drop:** 3 V at 300 mA ac; 2 V at 15 mA ac
Output Protection Circuitry	Protected against false pulse on power-up
Output Response Time	**Opposed:** 16 milliseconds ON, 8 milliseconds OFF **Polarized Retroreflective, Non-polarized Retroreflective, Fixed-Field and Diffuse:** 16 milliseconds ON/OFF
Delay at Power-up	100 milliseconds
Repeatability	**Opposed:** 2 milliseconds **Polarized Retroreflective, Non-polarized Retroreflective, Fixed-Field and Diffuse:** 4 milliseconds Repeatability and response are independent of signal strength.
Adjustments	T18 Series infrared non-polarized retroreflective and diffuse mode models (only) have a single-turn SENSITIVITY control for adjustment of system gain
Indicators	**Two LEDs: Green:** Power ON **Yellow:** Light sensed
Construction	Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; one jam nut included.
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9.
Connections	2 m or 9 m attached cable, or 4 pin Micro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 166.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max, double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	CE, CSA®, UL LISTED
Hookup Diagrams	**Cabled Emitters:** AC03 (p. 981) **Other Cabled Models:** AC05 (p. 982) **QD Emitters:** AC07 (p. 982) **Other QD Models:** AC06 (p. 982)

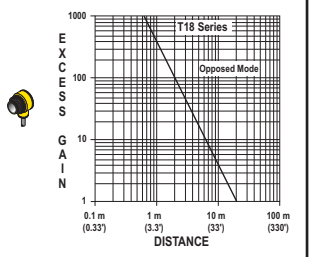
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

(Diffuse and Fixed-Field mode performance based on 90% reflectance white test card†)

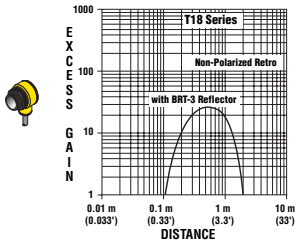
○ = Infrared LED P = Visible Red LED Polarized

Opposed Mode T18



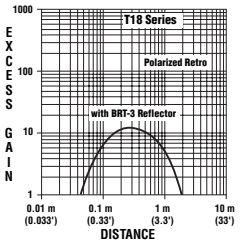
Range: 20 m | LED: ○

Retroreflective Mode T18



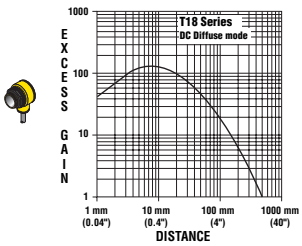
Range: 2 m | LED: ○

Polarized Retroreflective Mode T18



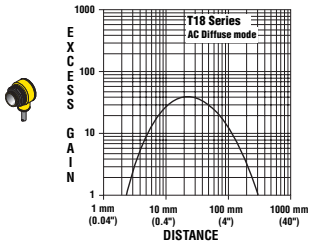
Range: 2 m | LED: P

Diffuse Mode T18



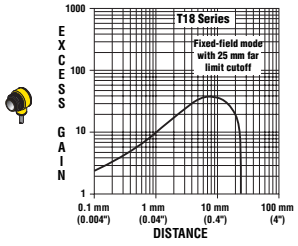
Range: 500 mm | LED: ○

Diffuse Mode T18



Range: 300 mm | LED: ○

Fixed-Field Mode T18

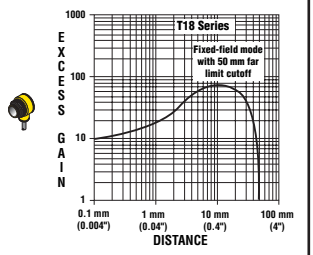


Ø 10 mm spot size @ 8 mm focus
Ø 10 mm spot size @ 25 mm cutoff

† Using 18% gray test card: Cutoff distance will be 95% of value shown.
† Using 6% black test card: Cutoff distance will be 90% of value shown.

Cutoff: 25 mm | LED: ○

Fixed-Field Mode T18

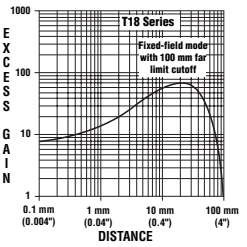


Ø 10 mm spot size @ 10 mm focus
Ø 10 mm spot size @ 50 mm cutoff

† Using 18% gray test card: Cutoff distance will be 90% of value shown.
† Using 6% black test card: Cutoff distance will be 85% of value shown.

Cutoff: 50 mm | LED: ○

Fixed-Field Mode T18



Ø 10 mm spot size @ 20 mm focus
Ø 10 mm spot size @ 100 mm cutoff

† Using 18% gray test card: Cutoff distance will be 85% of value shown.
† Using 6% black test card: Cutoff distance will be 75% of value shown.

Range: 100 mm | LED: ○

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

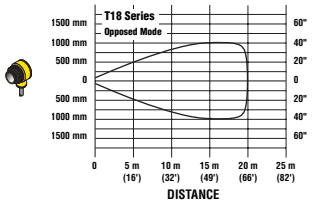
Beam Patterns

(Diffuse mode performance based on 90% reflectance white test card)

○ = Infrared LED P = Visible Red LED Polarized

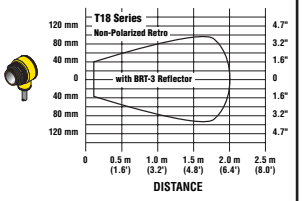
Opposed Mode T18

Effective Beam: 13 mm



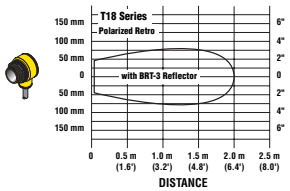
Range: 20 m | LED: ○

Retroreflective Mode T18



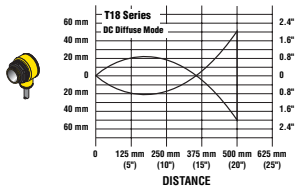
Range: 2 m | LED: ○

Polarized Retroreflective Mode T18



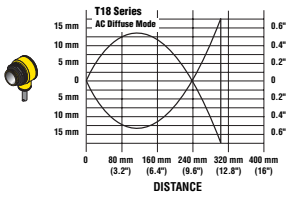
Range: 2 m | LED: P

Diffuse Mode T18



Range: 500 mm | LED: ○

Diffuse Mode T18



Range: 300 mm | LED: ○

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



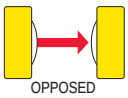
TM18
Heavy-Duty Metal Barrel Sensors

Robust die-cast metal sensors provide reliable sensing without adjustments in high-pressure washdown environments. The TM18 easily fits in tight places for added sensor protection.

- Extremely bright LED red sensing beam for easy alignment
- Quick-disconnect models available
- Fixed-field models have enhanced immunity to fluorescent lights
- Polarized/fixed-field models have crosstalk avoidance so two sensors can be in close proximity
- Cordsets and brackets see page 174

Opposed TM18, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 OPPOSED	20 m	2 m	—	TM186E Emitter	
		4-pin Euro QD		TM186EQ8 Emitter	
		2 m	LO	TM18AN6R	TM18AP6R
		4-pin Euro QD		TM18AN6RQ8	TM18AP6RQ8
		2 m	DO	TM18RN6R	TM18RP6R
		4-pin Euro QD		TM18RN6RQ8	TM18RP6RQ8
		2 m	LO/DO	TM18VN6R	TM18VP6R
		4-pin Euro QD		TM18VN6RQ8	TM18VP6RQ8

Polar Retro TM18, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 POLAR RETRO	5.5 m†	2 m	LO	TM18AN6LP	TM18AP6LP
		4-pin Euro QD		TM18AN6LPQ8	TM18AP6LPQ8
		2 m	DO	TM18RN6LP	TM18RP6LP
		4-pin Euro QD		TM18RN6LPQ8	TM18RP6LPQ8
		2 m	LO/DO	TM18VN6LP	TM18VP6LP
		4-pin Euro QD		TM18VN6LPQ8	TM18VP6LPQ8

For more specifications see page 175.

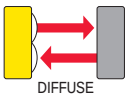
Connection options: A model with a QD requires a mating cordset (see page 174).

For 9 m cable, add suffix W/30 to the 2 m model number (example, TM186E W/30).
QD models: For a 4-pin 150 mm Euro-style pigtail QD, add suffix Q5 to the 2 m model number (example, TM186EQ5).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

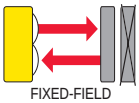
Diffuse TM18, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 DIFFUSE	500 mm	2 m 4-pin Euro QD	LO	TM18AN6DV	TM18AP6DV
				TM18AN6DVQ8	TM18AP6DVQ8
		2 m 4-pin Euro QD	DO	TM18RN6DV	TM18RP6DV
				TM18RN6DVQ8	TM18RP6DVQ8
		2 m 4-pin Euro QD	LO/DO	TM18VN6DV	TM18VP6DV
				TM18VN6DVQ8	TM18VP6DVQ8

Fixed-Field TM18, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 FIXED-FIELD	25 mm	2 m 4-pin Euro QD	LO	TM18AN6FF25	TM18AP6FF25
				TM18AN6FF25Q8	TM18AP6FF25Q8
		2 m 4-pin Euro QD	LO/DO	TM18VN6FF25	TM18VP6FF25
				TM18VN6FF25Q8	TM18VP6FF25Q8
	50 mm	2 m 4-pin Euro QD	LO	TM18AN6FF50	TM18AP6FF50
				TM18AN6FF50Q8	TM18AP6FF50Q8
		2 m 4-pin Euro QD	LO/DO	TM18VN6FF50	TM18VP6FF50
				TM18VN6FF50Q8	TM18VP6FF50Q8
	100 mm	2 m 4-pin Euro QD	LO	TM18AN6FF100	TM18AP6FF100
				TM18AN6FF100Q8	TM18AP6FF100Q8
		2 m 4-pin Euro QD	LO/DO	TM18VN6FF100	TM18VP6FF100
				TM18VN6FF5100Q8	TM18VP6FF100Q8

For more specifications see page 175.

Connection options: A model with a QD requires a mating cordset (see page 174).

For 9 m cable, add suffix W/30 to the 2 m model number (example, TM18AP6FF25 W/30).
QD models: For a 4-pin 150 mm Euro-style pigtail QD, add suffix Q5 to the 2 m model number (example, TM18AP6FF25Q5).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin			
	Straight		Right-Angle	
1.83 m	MQDC-406		MQDC-406RA	
4.57 m	MQDC-415		MQDC-415RA	
9.14 m	MQDC-430		MQDC-430RA	


Additional cordset information available.
See page 904.

Brackets

T18

See page 867	See page 859	See page 864
SMBT18Y	SMB18A	SMBAMS18P
		


Additional brackets and information available.
See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966
	



Opposed, Polar Retroreflective,
Diffuse and Fixed-Field Models
Suffix E, R, LP, DV and FF

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

TM18 Specifications

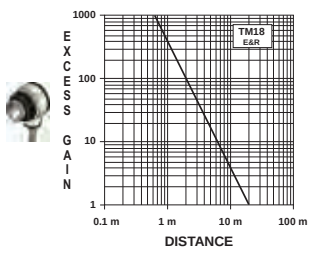
Supply Voltage and Current	10 to 30 V dc (10% max. ripple within specified limits); supply current (exclusive of load current): **Opposed Emitters:** 25 mA **Opposed Receivers:** 20 mA **Polarized Retroreflector**: 20 mA **Diffuse and Fixed-Field:** 35 mA
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state dc switch; NPN (current sinking) or PNP (current sourcing), depending on model **Light Operate:** Output conducts when sensor sees its own (or the emitter's) modulated light **Dark Operate:** Output conducts when sensor does not see its own (or the emitter's) modulated light
Output Rating	150 mA max. each output at 25° C, derated to 100mA at 70° C (derate about 1mA per °C) **OFF-state leakage current:** less than 1 mA @ 30 V dc **ON-state saturation voltage**: less than 1 V @ 10 mA dc; less than 1.5 V @ 150 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time	**Opposed:** 1.5 milliseconds ON, 0.75 milliseconds OFF **Polarized Retroreflective:** 1 milliseconds ON/OFF **Diffuse and Fixed-Field:** 3 milliseconds ON, 1.5 milliseconds OFF
Delay at Power-up	100 milliseconds Outputs do not conduct during this time.
Repeatability	**Opposed:** 190 microseconds **Polarized Retroreflective:** 195 microseconds **Diffuse and Fixed-Field:** 185 microseconds
Adjustments	**Diffuse models only:** single turn rear panel sensitivity control
Indicators	**Two LEDs: Green:** Power ON **Yellow:** Output energized
Construction	**Housing:** Zinc die-cast with nickel plating **Lens:** PC or PMMA **Black Cover:** PBT polyester housing; polycarbonate (opposed mode) or acrylic lens
Environmental Rating	Leakproof design rated NEMA 6; IP67, IP69K QD models and cable models when PVC jacket is protected
Connections	2 m or 9 m attached cable, or 4-pin Euro-style integral or pigtail QD, depending on model. QD cordsets are ordered separately. See page 174.
Operating Conditions	**Temperature:** −40° to +70° C **Relative humidity:** 90% @ 50° C
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max., double amplitude 0.06" acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	UL LISTED CE
Hookup Diagrams	**Emitters:** DC02 (p. 974) **NPN Models:** DC01 (p. 974) **PNP Models:** DC01 (p. 974) **All Others:** DC03 (p. 974)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

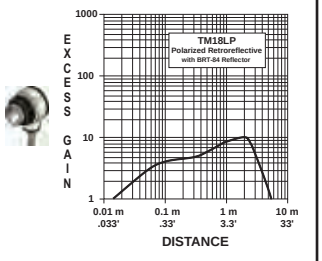
● = Visible Red LED P = Visible Red LED Polarized

Opposed Mode TM18



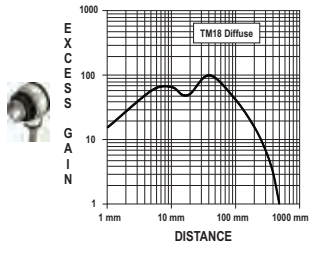
Range: 20 m | LED: ●

Polarized Retroreflective Mode TM18



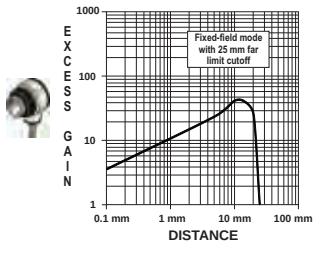
Range: 5.5 m | LED: P

Diffuse Mode TM18



Range: 500 mm | LED: ●

Fixed-Field Mode TM18

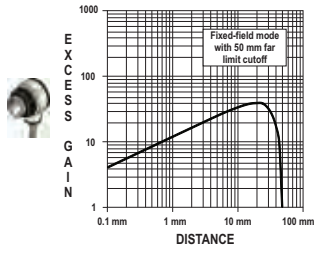


Ø 10 mm spot size @ 10 mm focus
Ø 10 mm spot size @ 25 mm cutoff

† Using 18% gray test card: Cutoff distance will be 95% of value shown.
† Using 6% black test card: Cutoff distance will be 90% of value shown.

Cutoff: 25 mm | LED: ●

Fixed-Field Mode TM18

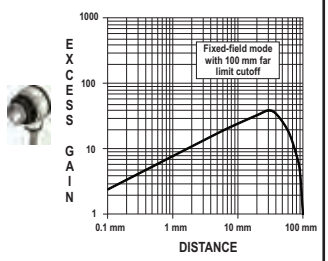


Ø 10 mm spot size @ 25 mm focus
Ø 10 mm spot size @ 50 mm cutoff

† Using 18% gray test card: Cutoff distance will be 90% of value shown.
† Using 6% black test card: Cutoff distance will be 85% of value shown.

Cutoff: 50 mm | LED: ●

Fixed-Field Mode TM18



Ø 10 mm spot size @ 50 mm focus
Ø 10 mm spot size @ 100 mm cutoff

† Using 18% gray test card: Cutoff distance will be 85% of value shown.
† Using 6% black test card: Cutoff distance will be 75% of value shown.

Cutoff: 100 mm | LED: ●

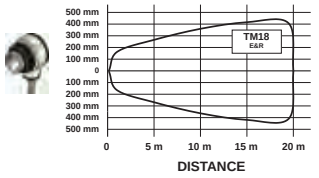
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Beam Patterns

● = Visible Red LED P = Visible Red LED Polarized

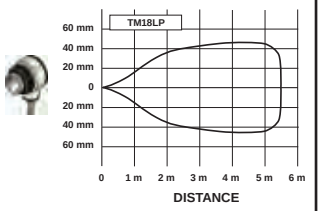
Opposed Mode TM18

Effective Beam: 13 mm



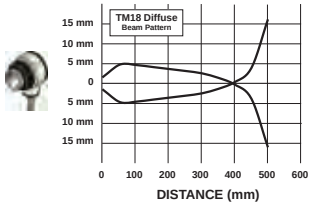
Range: 20 m | LED: ●

Polarized Retroreflective Mode TM18



Range: 5.5 m | LED: P

Diffuse Mode TM18



Range: 500 m | LED: ●



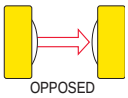
T30
DC-Operated Long-Range with Superior Durability

Epoxy-encapsulated sensors provide reliable sensing without adjustments.

- Features 30 mm plastic threaded barrel
- Available in opposed, retroreflective and fixed-field modes
- Designed for use in harsh sensing environments
- Advanced diagnostics warn of marginal sensing conditions or output overload
- Cordsets and brackets see page 180

Opposed T30, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 OPPOSED	60 m	2 m	T306E Emitter	
		4-Pin Euro QD	T306EQ Emitter	
		2 m	T30SN6R	T30SP6R
		4-Pin Euro QD	T30SN6RQ	T30SP6RQ

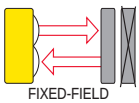
Polar Retro T30, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 POLAR RETRO	6 m†	2 m	T30SN6LP	T30SP6LP
		4-Pin Euro QD	T30SN6LPQ	T30SP6LPQ

Fixed-Field T30, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 FIXED-FIELD	0 - 200 mm Cutoff	2 m	T30SN6FF200	T30SP6FF200
		4-Pin Euro QD	T30SN6FF200Q	T30SP6FF200Q
	0 - 400 mm Cutoff	2 m	T30SN6FF400	T30SP6FF400
		4-Pin Euro QD	T30SN6FF400Q	T30SP6FF400Q
	0 - 600 mm Cutoff	2 m	T30SN6FF600	T30SP6FF600
		4-Pin Euro QD	T30SN6FF600Q	T30SP6FF600Q

For more specifications see page 181.

Connection options: A model with a QD requires a mating cordset (see page 180).

For 9 m cable, add suffix W/30 to the 2 m model number (example, T30SN6LP W/30).

† Retroreflective range is specified using a BRT-3 retroreflector.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



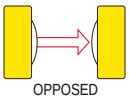
T30 AC
AC-Operated Long-Range with Superior Durability

Epoxy-encapsulated sensors provide reliable sensing without adjustments.

- Features 30 mm plastic threaded barrel
- Available in opposed, retroreflective and fixed-field modes
- Designed for use in harsh sensing environments
- Uses innovative dual-indicator system to reduce complexity of monitoring sensor performance
- Cordsets and brackets see page 180

Opposed T30, 20-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 OPPOSED	60 m	2 m	T303E Emitter	
		4-Pin Micro QD	T303EQ1 Emitter	
		2 m	T30AW3R	T30RW3R
		4-Pin Micro QD	T30AW3RQ1	T30RW3RQ1

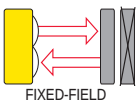
Polar Retro T30, 20-250 V AC

Visible Red LED

Sensing Mode	Range	Connection	Models LO	Models DO
 POLAR RETRO	6 m†	2 m	T30AW3LP	T30RW3LP
		4-Pin Micro QD	T30AW3LPQ1	T30RW3LPQ1

Fixed-Field T30, 20-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 FIXED-FIELD	0 - 200 mm Cutoff	2 m	T30AW3FF200	T30RW3FF200
		4-Pin Micro QD	T30AW3FF200Q1	T30RW3FF200Q1
	0 - 400 mm Cutoff	2 m	T30AW3FF400	T30RW3FF400
		4-Pin Micro QD	T30AW3FF400Q1	T30RW3FF400Q1
	0 - 600 mm Cutoff	2 m	T30AW3FF600	T30RW3FF600
		4-Pin Micro QD	T30AW3FF600Q1	T30RW3FF600Q1

For more specifications see page 182.

Connection options: A model with a QD requires a mating cordset (see page 180).

For 9 m cable, add suffix W/30 to the 2 m model number (example, T30AW3LP W/30).

† Retroreflective range is specified using a BRT-3 retroreflector.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

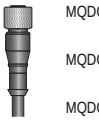
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA




Additional cordset information available. See page 904.

Micro QD (for Q1 models)

See page 925

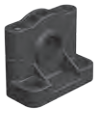
Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQAC-406	MQAC-406RA
4.57 m	MQAC-415	MQAC-415RA
9.14 m	MQAC-430	MQAC-430RA




Brackets

T30

See page 866	See page 869	See page 869	See page 870
SMB1815SF	SMB30A	SMB30FA..	SMBAMS30P






Additional brackets and information available. See page 866.

Other Accessories

Reflectors	Apertures
See page 940	See page 966






Opposed, Polarized Retroreflective and
Fixed-field Models
Suffix E, R, LP and FF

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

T30 DC Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple); Supply current (exclusive of load current): **Opposed Emitters:** 25 mA **Opposed Receivers:** 20 mA **Polarized Retroreflective:** 30 mA **Fixed-Field:** 35 mA
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state dc switch; three-wire hookup; choose Light Operate (LO) or Dark Operate (DO) models **Light Operate:** Output conducts when the sensor sees its own (or the emitter's) modulated light **Dark Operate:** Output conducts when sensor sees dark
Output Rating	150 mA max. (each) in standard hookup; When wired for alarm output, the total load may not exceed 150 mA **OFF-state leakage current:** less than 1 µA at 30 V dc **ON-state saturation voltage:** less than 1 V at 10 mA dc; less than 1.5 V at 150 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time	**Opposed:** 3 milliseconds ON; 1.5 milliseconds OFF **Polarized Retroreflective and Fixed-Field:** 3 milliseconds ON/OFF
Delay at Power-up	100 milliseconds; outputs are non-conducting during this time
Repeatability	**Opposed:** 375 microseconds **Polarized Retroreflective and Fixed-Field** 750 microseconds Repeatability and response are independent of signal strength.
Indicators	Two LEDs: **Green:** Power ON **Yellow:** Light operate (LO) output energized
Construction	Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; one jam nut included.
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9.
Connections	2 m or 9 m attached cable, or 4-pin Euro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 180.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max., double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	CE UL LISTED
Hookup Diagrams	**Emitters:** DC02 (p. 974) **NPN Models:** DC05 (p. 975) **PNP Models:** DC06 (p. 975)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

T30 AC Specifications

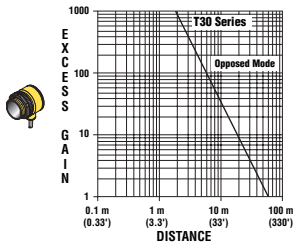
Supply Voltage and Current	20 to 250 V ac (50/60 Hz). **Average current:** 20 mA **Peak current:** 200 mA at 20 V ac, 500 mA at 120 V ac, 750 mA at 250 V ac
Supply Protection Circuitry	Protected against transient voltages
Output Configuration	Solid-state ac switch; three-wire hookup; choose Light Operate (LO) or Dark Operate (DO) models **Light Operate:** Output conducts when the sensor sees its own (or the emitter's) modulated light **Dark Operate:** Output conducts when sensor sees dark
Output Rating	300 mA max. (continuous) **Fixed-Field:** derate 5 mA/° C above +50° C **Inrush capability:** 1 amp for 20 milliseconds, non-repetitive **OFF-state leakage current:** less than 100 µA **ON-state voltage drop:** 3 V at 300 mA ac; 2 V at 15 mA ac
Output Protection Circuitry	Protected against false pulse on power-up
Output Response Time	**Opposed:** 16 milliseconds ON; 8 milliseconds OFF **Polarized Retroreflective and Fixed-Field:** 16 milliseconds ON/OFF
Delay at Power-up	100 milliseconds
Repeatability	**Opposed:** 2 milliseconds **Polarized Retroreflective and Fixed-Field:** 4 milliseconds Repeatability and response are independent of signal strength
Indicators	Two LEDs: **Green:** Power ON **Yellow:** Light sensed
Construction	Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; one jam nut included.
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9.
Connections	2 m or 9 m attached cable, or 4-pin Micro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 180.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max, double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	CE, UL LISTED
Hookup Diagrams	**Cabled Emitters:** AC03 (p. 981) **Cabled Models:** AC05 (p. 982) **QD Emitters:** AC07 (p. 982) **QD Models:** AC06 (p. 982)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves (Fixed-Field mode performance based on 90% reflectance white test card)

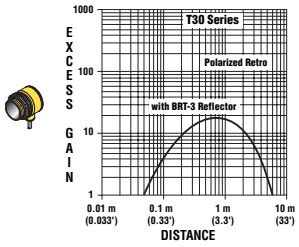
○ = Infrared LED P = Visible Red LED Polarized

Opposed Mode T30



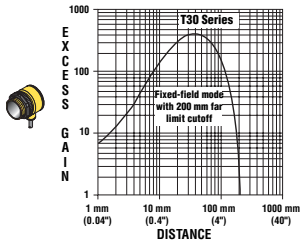
Range: 60 m | LED: ○

Polarized Retroreflective Mode T30



Range: 6 m | LED: P

Fixed-Field Mode T30

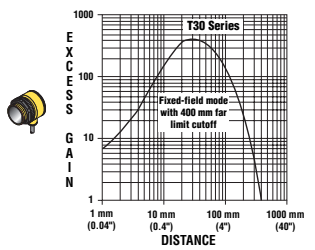


Ø 16 mm spot size @ 35 mm focus
Ø 20 mm spot size @ 200 mm cutoff

Using 18% gray test card: cutoff distance will be 95% of value shown.
Using 6% black test card: cutoff distance will be 90% of value shown.

Cutoff: 200 mm | LED: ○

Fixed-Field Mode T30

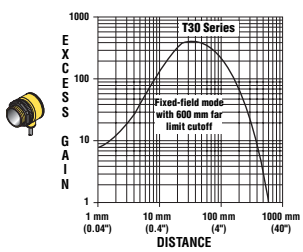


Ø 17 mm spot size @ 35 mm focus
Ø 25 mm spot size @ 400 mm cutoff

Using 18% gray test card: cutoff distance will be 90% of value shown.
Using 6% black test card: cutoff distance will be 85% of value shown.

Cutoff: 400 mm | LED: ○

Fixed-Field Mode T30



Ø 17 mm spot size @ 35 mm focus
Ø 30 mm spot size @ 600 mm cutoff

Using 18% gray test card: cutoff distance will be 85% of value shown.
Using 6% black test card: cutoff distance will be 75% of value shown.

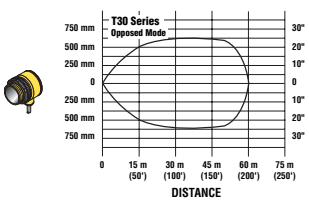
Cutoff: 600 mm | LED: ○

Beam Patterns

○ = Infrared LED P = Visible Red LED Polarized

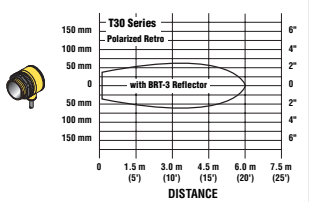
Opposed Mode T30

Effective Beam: 23 mm



Range: 60 m | LED: ○

Polarized Retroreflective Mode T30



Range: 6 m | LED: P

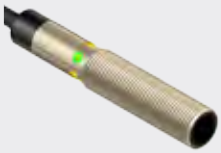
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



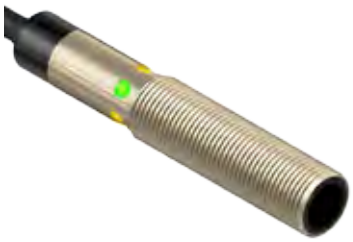
Barrel Sensors

Barrel sensors are available in industry standard 30, 18 and 12 mm barrel mounting options. The compact barrel size allows for easy replacement and easy viewing of LED indicators.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Max Sensing Range	Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	M12 Rugged, threaded metal sensor with fully encapsulated electronics. Page 186	Opposed: 5 m Retro: 2.5 m Polarized Retro: 1.5 m Diffuse: 400 mm Fixed-Field: 75 mm	12 ø x 67.5 mm	IEC IP67; NEMA 6, IEC IP68 and 1200 PSI washdown	Nickel-plated brass	10 to 30 V dc
	S12-2/S12 Barrel sensors provide reliable sensing without adjustments. Page 193	Opposed: 20 m	S12-2: 30.4 x ø 12 mm S12: 64 x ø 12 mm	IEC IP67; NEMA 6	Thermoplastic Polyester	10 to 30 V dc
	SB12/SB12T Economical sensors provide reliable sensing without adjustments. Page 196	Opposed: 1.5 m	SB12: 15.8 ø x 31 mm SB12T: 15.8 ø x 30.4 mm	IEC IP67; NEMA 6	Thermoplastic Polyester	10 to 30 V dc
	S18-2 A self-contained powerful sensor with bright visible red emitter beam for easy alignment and set-up. Page 198	Opposed: 25 m Polarized Retro: 6m Diffuse: 750 mm	Varies by model	IEC IP67; NEMA 6	Thermoplastic Polyester	10 to 30 V dc, 24 to 250 V ac
	M18 Epoxy-encapsulated metal barrel sensors provide reliable sensing without adjustments. Page 204	Opposed: 20 m Retro: 2 m Polarized Retro: 2 m Diffuse: 300 mm Fixed-Field: 100 mm	18 ø x 59.2 mm	QD models: IP69K Other models: IEC IP67; NEMA 6	Stainless steel	10 to 30 V dc,
	S30 Epoxy-encapsulated sensors provide superior durability and reliable sensing over a long range. Page 212	Opposed: 60 m Polarized Retro: 6 m Fixed-Field: 600 mm	Varies by model	QD models: IP69K Other models: IEC IP67; NEMA 6	Thermoplastic Polyester	10 to 30 V dc, 20 to 250 V ac
	SM30 Powerful epoxy-encapsulated sensor with a long range and the stainless steel model can be used in abusive environments. Page 218	Opposed: 150 m	30 ø x 102 mm	IEC IP67; NEMA 6	Thermoplastic Polyester or Stainless steel	10 to 30 V dc, 2 to 240 V ac

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



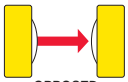
M12
Metal Barrel-Mount Sensors

The M12 is a rugged, 12 mm threaded metal sensor with fully encapsulated electronics.

- Easily replaces inductive sensors when target is too close to the sensor
- Available in NEMA 6P, IP67, IP69K and up to 1200 psi washdown depending on model
- Highly visible red sensing beam for easy alignment
- Provides single-turn sensitivity adjustment on opposed, retroreflective and diffuse models
- Cordsets and brackets see page 188

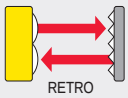
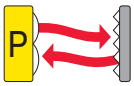
Opposed M12, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 OPPOSED	5 m	2 m	M12E Emitter	
		4-Pin Euro QD	M12EQ8 Emitter	
		2 m	M12NR	M12PR
		4-Pin Euro QD	M12NRQ8	M12PRQ8

Retro & Polar Retro M12, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 RETRO	2.5 m†	2 m	M12NLV	M12PLV
		4-Pin Euro QD	M12NLVQ8	M12PLVQ8
 POLAR RETRO	1.5 m†	2 m	M12NLP	M12PLP
		4-Pin Euro QD	M12NLPQ8	M12PLPQ8

For more specifications see page 189.

Connection options: A model with a QD requires a mating cordset (see page 188).

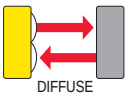
For 9 m cable, add suffix W/30 to the 2 m model number (example, M12PD W/30).
QD models: For a 4-pin 150 mm Euro-style pigtail QD, add suffix Q5 (example, M12PDQ5).

† Retroreflective range is specified using a BRT-84 retroreflector.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

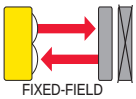
Diffuse M12, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 DIFFUSE	400 mm	2 m	M12ND	M12PD
		4-Pin Euro QD	M12NDQ8	M12PDQ8

Fixed-Field M12, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 FIXED-FIELD	25 mm Cutoff	2 m	M12NFF25	M12PFF25
		4-Pin Euro QD	M12NFF25Q8	M12PFF25Q8
	50 mm Cutoff	2 m	M12NFF50	M12PFF50
		4-Pin Euro QD	M12NFF50Q8	M12PFF50Q8
	75 mm Cutoff	2 m	M12NFF75	M12PFF75
		4-Pin Euro QD	M12NFF75Q8	M12PFF75Q8

For more specifications see page 189.

Connection options: A model with a QD requires a mating cordset (see page 188).

For 9 m cable, add suffix W/30 to the 2 m model number (example, M12PD W/30).
QD models: For a 4-pin 150 mm Euro-style pigtail QD, add suffix Q5 (example, M12PDQ5).

Cordsets

Euro QD (for ..Q8 or ..Q5 models)

See page 908

Length	Threaded 4-Pin Straight		Threaded 4-Pin Right-Angle	
1.83 m		MQDC-406		MQDC-406RA
4.57 m		MQDC-415		MQDC-415RA
9.14 m		MQDC-430		MQDC-430RA


Additional cordset information available.
See page 904.

Brackets

M12

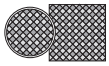
See page 859

SMBQS12PD




Additional brackets and information available.
See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966
	



Opposed, Retroreflective
Diffuse and Fixed-Field Models
Suffix E, R, LP, LV, D and FF

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

M12 Specifications

Sensing Beam	**Fixed-Field:** 680 nm visible red **All others:** 660 nm visible red
Supply Voltage and Current	10 to 30 V dc (10% max. ripple) @ 20 mA max current (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Complementary (1 normally open and 1 normally closed) solid-state, NPN or PNP, depending on model
Output Ratings	100 mA total across both outputs with overload and short circuit protection **OFF-state leakage current:** **NPN:** less than 200 µA @ 30 V dc (see Application Note) **PNP:** less than 10 µA @ 30 V dc **ON-state saturation voltage:** **NPN:** less than 1.6 V @ 100 mA **PNP:** less than 3.0 V @ 100 mA
Output Protection Circuitry	Protected against false pulse on power-up, short-circuit protected
Output Response Time	**Opposed:** 625 microsecond ON/375 microseconds OFF **All others:** 500 microseconds ON/OFF
Delay at Power-up	100 milliseconds; outputs do not conduct during this time
Repeatability	**Opposed:** 85 microseconds **All others:** 95 microseconds
Indicators	**2 LED indicators: Green**–power ON **Yellow**–light sensed
Adjustments	**Fixed-Field:** none **All others:** single-turn Gain (sensitivity) potentiometer
Construction	**Housing:** Nickel-plated brass **Lenses:** PMMA **Cable endcap and Gain potentiometer adjuster:** PBT
Environmental Rating	IEC IP67; NEMA 6, IEC IP68 and 1200 PSI washdown, NEMA 1CS 5 Annex F-2002
Connections	2 m or 9 m 4-wire PVC-jacketed cable, 4-pin integral Euro-style QD (Q8), or 150 mm pigtail with 4-pin Euro-style quick-disconnect fitting (Q5), depending on model. QD cordsets ordered separately. See page 188.
Operating Conditions	**Operating temperature:** –20° to +60° C **Relative humidity:** 90% max @ +50° C
Application Notes	NPN off-state leakage current is < 200 µA for load resistances > 3 kΩ or optically isolated loads. For load current of 100 mA, leakage is < 1% of load current
Certifications	CE
Hookup Diagrams	**Emitters:** DC02 (p. 974) **All others:** DC03 (p. 974)

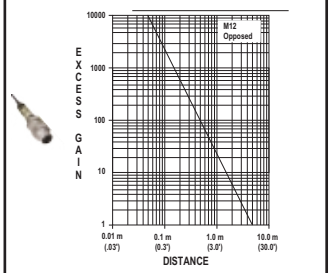
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

(Diffuse and Fixed-Field mode performance based on 90% reflectance white test card)

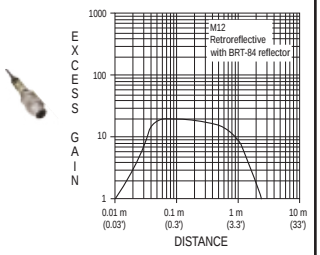
● = Visible Red LED P = Visible Red LED Polarized

Opposed Mode M12



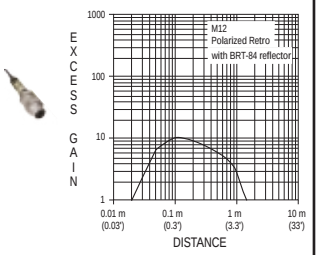
Range: 5 m | LED: ●

Retroreflective Mode M12



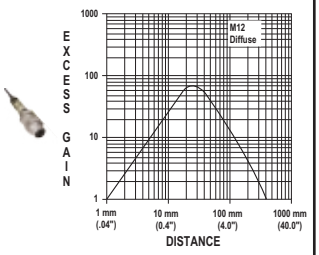
Range: 2.5 m | LED: ●

Polarized Retroreflective Mode M12



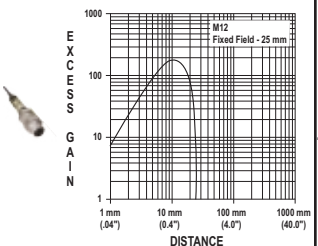
Range: 1.5 m | LED: P

Diffuse Mode M12



Range: 400 mm | LED: ●

Fixed-Field Mode M12



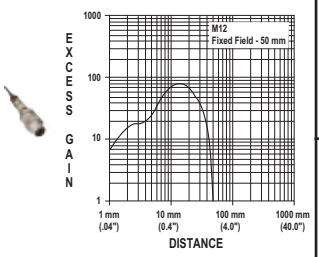
90% white test card:
Ø 2 mm spot size @ 25 mm focus
Ø 2 mm spot size @ 25 mm cutoff

Using 18% gray test card: cutoff distance will be 96% of value shown.

Using 6% black test card: cutoff distance will be 94% of value shown.

Cutoff: 25 mm | LED: ●

Fixed-Field Mode M12



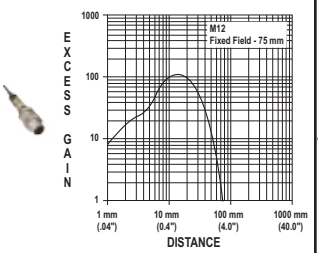
90% white test card:
Ø 2 mm spot size @ 25 mm focus
Ø 7 mm spot size @ 50 mm cutoff

Using 18% gray test card: cutoff distance will be 90% of value shown.

Using 6% black test card: cutoff distance will be 85% of value shown.

Cutoff: 50 mm | LED: ●

Fixed-Field Mode M12



90% white test card:
Ø 2 mm spot size @ 25 mm focus
Ø 13 mm spot size @ 75 mm cutoff

Using 18% gray test card: cutoff distance will be 80% of value shown.

Using 6% black test card: cutoff distance will be 70% of value shown.

Cutoff: 75 mm | LED: ●

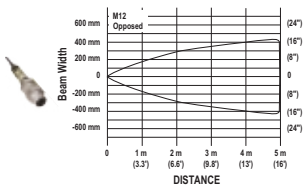
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Beam Patterns (Diffuse mode performance based on 90% reflectance white test card)

● = Visible Red LED P = Visible Red LED Polarized

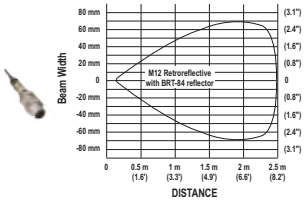
Opposed Mode M12

Effective Beam: 10 mm



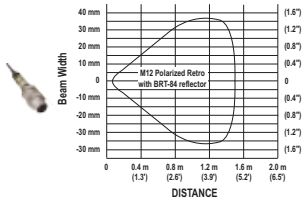
Range: 5 m | LED: ●

Retroreflective Mode M12



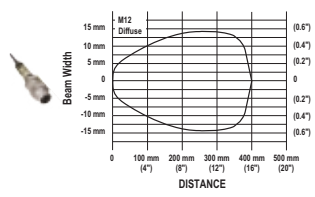
Range: 2.5 m | LED: ●

Retroreflective Mode M12



Range: 1.5 m | LED: P

Diffuse Mode M12



Range: 400 mm | LED: ●

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



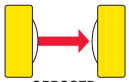
S12
Plastic Barrel-Mount Sensors

The S12 Barrel sensors provide reliable sensing without adjustments.

- Housing rated to IP67 for heavy-duty industrial sensing
- Sensing range up to 15 m
- Visible red LED
- Available in opposed mode
- Cordsets and brackets see page 194

Opposed S12, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 OPPOSED	15 m	2 m	S126E Emitter S12SN6R	S12SP6R

For more specifications see page 195.

Connection options: A model with a QD requires a mating cordset (see page 194).

QD models: For a 4-pin 150 mm Pico-style pigtail QD, add suffix QP (example, S12SN6RQP).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



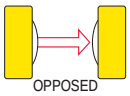
S12-2
Plastic Barrel-Mount Sensors

The S12-2 Barrel sensors provide reliable sensing without adjustments.

- Housing rated to IP67 for heavy-duty industrial sensing
- Sensing range up to 20 m
- Wide beam pattern makes sensor alignment easy at long ranges
- Available in opposed mode
- Cordsets and brackets see page 194

S12-2, 10-30 V DC

Infrared LED

Sensing Mode	Range	Input	Connection	Models NPN	Models PNP
 OPPOSED	20 m	—	2 m	S12-2NAEL-2M Emitter NEW	
		Beam Inhibit		S12-2NAEJ-2M Emitter NEW	
		—		S12-2ANRL-2M NEW	S12-2APRL-2M NEW
		—		S12-2RNRL-2M NEW	S12-2RPRL-2M NEW

For more specifications see page 195.

Connection options: A model with a QD requires a mating cordset (see page 194).

QD models: For a 4-pin 150 mm Pico-style pigtail QD, add suffix QP (example, S12SN6RQP).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Pico QD (for S12 models)

See page 906

Length	Snap-on 4-Pin	
	Straight	Right-Angle
2.00 m	PKG4-2 	PKW4Z-2 

Additional cordset information available. See page 904.

Pico QD (for S12-2 models)

See page 904

Length	Threaded 3-Pin	
	Straight	Right-Angle
2.00 m	PKG3M-2 	PKW3M-2 
5.00 m	PKG3M-5	PKW3M-5
9.00 m	PKG3M-9	PKW3M-9

Brackets

S12 & S12-2

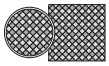
See page 859

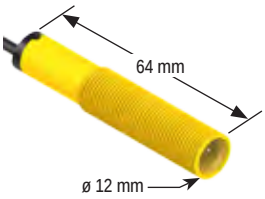
SMB12MM



Additional brackets and information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966
	



S12
Opposed Models



S12-2
Opposed Models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

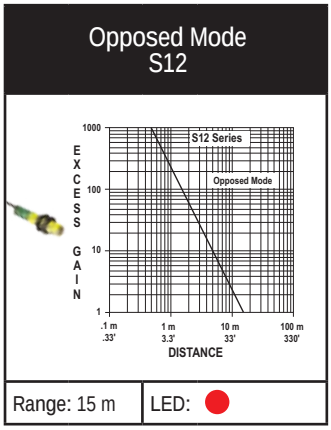
S12 & S12-2 Specifications

Supply Voltage and Current	S12: 10 to 30 V dc (10% max. ripple); 25 mA (emitters) or 20 mA (receivers) exclusive of load S12-2: 10 to 30 V dc; < 25 mA (emitters) or 15 mA (receivers) exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	S12: Complementary solid-state dc switch; choose NPN (current sinking) or PNP (current sourcing) models Light Operate: N.O. output conducts when the sensor sees the emitter's modulated light Dark Operate: N.C. output conducts when the sensor sees dark; The N.C. (normally closed) output may be wired as a normally open marginal signal alarm output, depending upon hookup to the power supply S12-2: One solid state output, NPN (sinking) or PNP (sourcing), depending on model
Output Ratings	100 mA maximum (each) in standard hookup; when wired for alarm output, the total load may not exceed 100 mA OFF-state leakage current: less than 1 µA @ 30 V dc ON-state saturation voltage: less than 1 V @ 10 mA; less than 1.5 V @ 150 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time	S12: 3 milliseconds ON, 1.5 milliseconds OFF S12-2: 11 milliseconds ON, 7 milliseconds OFF
Delay at Power-up	100 millisecond; outputs are non-conducting during this time
Repeatability	S12: 375 microseconds S12-2: 1.5 microseconds
Indicators	Green LED (emitter and receiver): power ON Amber LED (receiver only): light sensed
Construction	Housings are reinforced thermoplastic polyester; lenses are Lexan®; Polyurethane end cap
Environmental Rating	Leakproof design rated NEMA 6P (IEC IP67)
Connections	S12: 2 m or 9 m cable, or a 150 mm pigtail with 4-pin Pico-style QD S12-2: 2 m or 9 m cable, or a 150 mm pigtail with 3-pin Pico-style QD QD cordset ordered separately. See page 194.
Operating Conditions	S12: Temperature: -20º to +50º C Maximum relative humidity: 90% at 50°C (non-condensing) S12-2: Temperature: -25º to +50º C Maximum relative humidity: 90% at 50°C (non-condensing)
Vibration and Mechanical Shock	Meets Mil. Std. 202F requirements. Method 201A (Vibration: frequency 10 to 60 Hz, max., double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation).
Certifications	CE
Hookup Diagrams	Emitters: DC02 (p. 974) S12 Receivers NPN: DC05 (p. 975) S12 Receivers PNP: DC06 (p. 975) S12-2 Beam Inhibit: DC024 (p. 980) S12-2 Receivers NPN/PNP: DC01 (p. 974)

Lexan® is a registered trademark of General Electric Co.

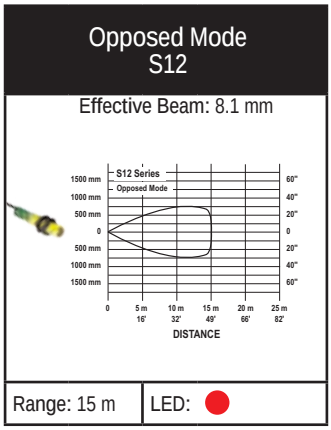
Excess Gain Curves

● = Visible Red LED



Beam Patterns

● = Visible Red LED



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



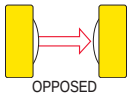
SB12 & SB12T
Plastic Barrel-Mount Sensors

Economical sensors provide reliable sensing without adjustments.

- Narrow beam for precise leading edge detection
- Ideal for compact areas
- No adjustment necessary
- SB12T has a threaded housing for robust monitoring in applications with vibration, rough handling or vandalism

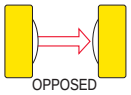
Opposed SB12, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Output	Models NPN	Models PNP
 OPPOSED	1.5 m	2 m	–	SB12E1 Emitter	
			LO	SB12ANR	SB12APR
			DO	SB12RNR	SB12RPR

Opposed SB12T, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Output	Models NPN	Models PNP
 OPPOSED	1.5 m	2 m	–	SB12TE1 Emitter	
			LO	SB12TANR	SB12TAPR
			DO	SB12TRNR	SB12TRPR

Connection options: A model with a QD requires a mating cordset

QD models: For a 3-pin 150 mm Pico-style pigtail QD, add suffix Q3 (example, SB12E1Q3).

Cordsets

Pico QD (for Q3 models)

See page 904

Length	Straight 3-Pin	Right-Angle 3-Pin
2.00 m	PKG3M-2	PKG3M-2
5.00 m	PKG3M-5	PKG3M-5
7.00 m	PKG3M-7	PKG3M-7
9.00 m	PKG3M-9	PKG3M-9
10.0 m	PKG3M-10	PKG3M-10





Additional cordset information available. See page 904.

Pico QD (for Q7 models)

See page 906

Length	Snap-on 4-Pin Straight	Snap-on 4-Pin Right-Angle
2.00 m	PKG4-2	PKW4Z-2





Brackets

SB12

See page 859

SMB12MM



Additional brackets and information available. See page 846.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SB12/SB12T Specifications

Supply Voltage and Current	10 to 30 V dc; less than 15 mA max exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	One solid state output, NPN (sinking) or PNP (sourcing), depending on model
Output Ratings	SB12/SB12T: 100 mA OFF-state leakage current: < 10 µA ON-state saturation voltage: < 0.2 V @ 10 mA; < 0.6 V @ 100 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time	2.5 milliseconds ON, 1.75 milliseconds OFF
Delay at Power-up	Less than 1 second
Repeatability	350 microseconds
Switching Frequency	235 Hz
Indicators	Green LED (emitter and receiver): power ON Amber LED (receiver only): light sensed
Construction	SB12/SB12T: Housing: ABS Lens: Polycarbonate; epoxy encapsulant Cable: PVC-jacketed
Environmental Rating	SB12: IP65 SB12T: IP67
Connections	2 m cable or 150 mm pigtail with 3-pin Pico-style QD. QD cordset ordered separately. See page 196.
Operating Conditions	Temperature: -20º to +50º C Maximum relative humidity: 90% at 50°C (non-condensing)
Certifications	CE
Hookup Diagrams	Emitters: DC02 (p. 974) SB12/SB12T Receivers: DC01 (p. 974)



SB12
Opposed Models



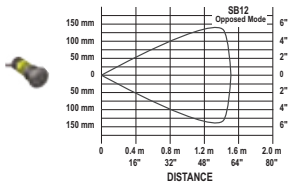
SB12T
Opposed Models

Beam Patterns

○ = Infrared LED

Opposed Mode SB12/SB12T

Effective Beam: 8.1 mm



Range: 1.5 m	LED: ○

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



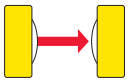
S18-2
Plastic Barrel-Mount Sensors

A self-contained powerful sensor with bright visible red emitter beam for easy alignment and set-up.

- Available in multiple operating modes
- Wide operating range from -40° C to +70° C
- High performance sensing
- Cordsets and brackets see page 206

Opposed S18-2, 10-30 V DC

Visible Red LED

Sensing Mode	Range*	Adjustment	Connection	Models NPN		Models PNP	
 OPPOSED	25 m	—	2 m	S18-2NAEL-2M Emitter			NEW
		—	4-pin Euro QD	S18-2NAEL-2MQ5 Emitter			NEW
		Beam Inhibit	2 m	S18-2NAEJ-2M Emitter			NEW
		Beam Inhibit	4-pin Euro QD	S18-2NAEJ-2MQ5 Emitter			NEW
		Intensity adjust	2 m	S18-2NAES-2M Emitter			NEW
		Intensity adjust	4-pin Euro QD	S18-2NAES-2MQ5 Emitter			NEW
		—	2 m	S18-2VNRL-2M	NEW	S18-2VPRL-2M	NEW
		—	4-pin Euro QD	S18-2VNRL-2MQ5	NEW	S18-2VPRL-2MQ5	NEW
		Sensitivity adjust	2 m	S18-2VNRS-2M	NEW	S18-2VPRS-2M	NEW
		Sensitivity adjust	4-pin Euro QD	S18-2VNRS-2MQ5	NEW	S18-2VPRS-2MQ5	NEW

Polar Retro S18-2, 10-30 V DC

Visible Red LED

Sensing Mode	Range*		Connection	Models NPN		Models PNP	
 POLAR RETRO	6 m	—	2 m	S18-2VNLP-2M	NEW	S18-2VPLP-2M	NEW
		—	4-pin Euro QD	S18-2VNLP-2MQ5	NEW	S18-2VPLP-2MQ5	NEW
		Sensitivity adjust	2 m	S18-2VNLPC-2M	NEW	S18-2VPLPC-2M	NEW
		Sensitivity adjust	4-pin Euro QD	S18-2VNLPC-2MQ5	NEW	S18-2VPLPC-2MQ5	NEW

For more specifications see page 207.

Connection options: A model with a QD requires a mating cordset (see page 206).

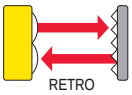
For 9 m cable, add suffix 9M to the 2 m model number (example, S18-2NAEL-9M).

* Range specified with BRT-84 reflector

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

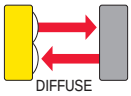
Retro S18-2, 10-30 V DC

Visible Red LED

Sensing Mode	Range*	Input	Connection	Models NPN		Models PNP	
 RETRO	7.5 m	Sensitivity adjust	2 m	S18-2VNLV-2M	NEW	S18-2VPLV-2M	NEW
		Sensitivity adjust	4-pin Euro QD	S18-2VNLV-2MQ5	NEW	S18-2VPLV-2MQ5	NEW

Diffuse S18-2, 10-30 V DC

Visible Red LED

Sensing Mode	Range*	Connection	Models NPN		Models PNP	
 DIFFUSE	750 mm	2 m	S18-2VNDL-2M	NEW	S18-2VPDL-2M	NEW
		4-pin Euro QD	S18-2VNDL-2MQ5	NEW	S18-2VPDL-2MQ5	NEW

For more specifications see page 207.

Connection options: A model with a QD requires a mating cordset (see page 206).

For 9 m cable, add suffix 9M to the 2 m model number (example, S18-2VNDL-9M).

* Range specified with BRT-84 reflector

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



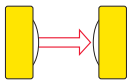
S18
DC-Operated Barrel-Mount Sensors

Epoxy-encapsulated barrel sensors operate on dc voltage and provide reliable sensing without adjustments.

- Available in multiple operating modes
- Meets IP69K standards
- Wide operating range from -40° C to +70° C
- High performance sensing
- Cordsets and brackets see page 206

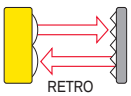
Opposed S18, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 OPPOSED	20 m	2 m	S186E Emitter	
		4-pin Euro QD	S186EQ Emitter	
		2 m	S18SN6R	S18SP6R
		4-pin Euro QD	S18SN6RQ	S18SP6RQ

Retro and Polar Retro S18, 10-30 V DC

Infrared LED Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 RETRO	2 m*	2 m	S18SN6L	S18SP6L
		4-pin Euro QD	S18SN6LQ	S18SP6LQ
 POLAR RETRO	2 m*	2 m	S18SN6LP	S18SP6LP
		4-pin Euro QD	S18SN6LPQ	S18SP6LPQ

For more specifications see page 207.

Connection options: A model with a QD requires a mating cordset (see page 206).

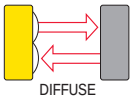
For 9 m cable, add suffix W/30 to the 2 m model number (example, S18SP6R W/12).

* Retroreflective range is specified using one model BRT-3 retroreflector, unless otherwise noted. Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories section for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

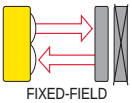
Diffuse S18, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 DIFFUSE	100 mm	2 m 4-pin Euro QD	S18SN6D S18SN6DQ	S18SP6D S18SP6DQ
	300 mm	2 m 4-pin Euro QD	S18SN6DL S18SN6DLQ	S18SP6DL S18SP6DLQ

Fixed-Field S18, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 FIXED-FIELD	0 - 25 mm Cutoff	2 m 4-pin Euro QD	S18SN6FF25 S18SN6FF25Q	S18SP6FF25 S18SP6FF25Q
	0 - 50 mm Cutoff	2 m 4-pin Euro QD	S18SN6FF50 S18SN6FF50Q	S18SP6FF50 S18SP6FF50Q
	0 - 100 mm Cutoff	2 m 4-pin Euro QD	S18SN6FF100 S18SN6FF100Q	S18SP6FF100 S18SP6FF100Q

For more specifications see page 207.

Connection options: A model with a QD requires a mating cordset (see page 206).

For 9 m cable, add suffix W/30 to the 2 m model number (example, S18SP6R W/12).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



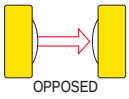
S18 AC
AC-Operated Barrel-Mount Sensors

Epoxy-encapsulated barrel sensors operated on ac voltage and provide reliable sensing without adjustments.

- Available in multiple operating modes
- Meets IP69K standards
- Wide operating range from -40° C to +70° C
- High performance sensing
- Cordsets and brackets see page 206

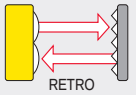
Opposed S18, 20-250 V AC

⇨ Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 OPPOSED	20 m	2 m	S183E Emitter	
		4-pin Micro QD	S183EQ1 Emitter	
		2 m	S18AW3R	S18RW3R
		4-pin Micro QD	S18AW3RQ1	S18RW3RQ1

Retro & Polar Retro S18, 20-250 V AC

⇨ Infrared LED ➡ Visible Red LED

Sensing Mode	Range	Connection	Models LO	Models DO
 RETRO	2 m†	2 m	S18AW3L	S18RW3L
		4-pin Micro QD	S18AW3LQ1	S18RW3LQ1
 POLAR RETRO	2 m†	2 m	S18AW3LP	S18RW3LP
		4-pin Micro QD	S18AW3LPQ1	S18RW3LPQ1

For more specifications see page 208.

Connection options: A model with a QD requires a mating cordset (see page 206).

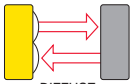
For 9 m cable, add suffix W/30 to the 2 m model number (example, S183E W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector, unless otherwise noted.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories section for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

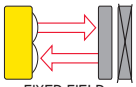
Diffuse S18, 20-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 DIFFUSE	100 mm	2 m 4-pin Micro QD	S18AW3D S18AW3DQ1	S18RW3D S18RW3DQ1
	300 mm	2 m 4-pin Micro QD	S18AW3DL S18AW3DLQ1	S18RW3DL S18RW3DLQ1

Fixed-Field S18, 20-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 FIXED-FIELD	0 - 25 mm Cutoff	2 m 4-pin Micro QD	S18AW3FF25 S18AW3FF25Q1	S18RW3FF25 S18RW3FF25Q1
	0 - 50 mm Cutoff	2 m 4-pin Micro QD	S18AW3FF50 S18AW3FF50Q1	S18RW3FF50 S18RW3FF50Q1
	0 - 100 mm Cutoff	2 m 4-pin Micro QD	S18AW3FF100 S18AW3FF100Q1	S18RW3FF100 S18RW3FF100Q1

For more specifications see page 208.



Connection options: A model with a QD requires a mating cordset (see page 206).

For 9 m cable, add suffix W/30 to the 2 m model number (example, S18AW3FF25 W/12).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



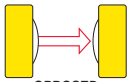
M18
Metal Barrel-Mount Sensors

Epoxy-encapsulated metal barrel sensors provide reliable sensing without adjustments.

- Available in multiple operating modes
- Meets IP69K standards
- Wide operating range from -40° C to +70° C
- High performance sensing
- Cordsets and brackets see page 206

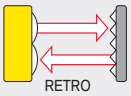
Opposed M18, 10-30 V DC

Infrared LED | Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 OPPOSED	20 m	2 m	M186E Emitter	
		4-pin Euro QD	M186EQ Emitter	
		2 m	M18SN6R	M18SP6R
		4-pin Euro QD	M18SN6RQ	M18SP6RQ

Retro & Polar Retro M18, 10-30 V DC

Infrared LED | Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 RETRO	2 m†	2 m	M18SN6L	M18SP6L
		4-pin Euro QD	M18SN6LQ	M18SP6LQ
 POLAR RETRO	2 m†	2 m	M18SN6LP	M18SP6LP
		4-pin Euro QD	M18SN6LPQ	M18SP6LPQ

For more specifications see page 209.

Connection options: A model with a QD requires a mating cordset (see page 206).

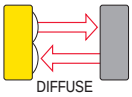
For 9 m cable, add suffix W/30 to the 2 m model number (example, M18SP6D W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector, unless otherwise noted.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories section for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

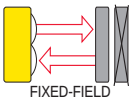
Diffuse M18, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 DIFFUSE	100 mm	2 m	M18SN6D	M18SP6D
		4-pin Euro QD	M18SN6DQ	M18SP6DQ
	300 mm	2 m	M18SN6DL	M18SP6DL
		4-pin Euro QD	M18SN6DLQ	M18SP6DLQ

Fixed-Field M18, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 FIXED-FIELD	0 - 25 mm Cutoff	2 m	M18SN6FF25	M18SP6FF25
		4-pin Euro QD	M18SN6FF25Q	M18SP6FF25Q
	0 - 50 mm Cutoff	2 m	M18SN6FF50	M18SP6FF50
		4-pin Euro QD	M18SN6FF50Q	M18SP6FF50Q
	0 - 100 mm Cutoff	2 m	M18SN6FF100	M18SP6FF100
		4-pin Euro QD	M18SN6FF100Q	M18SP6FF100Q

For more specifications see page 209.

Connection options: A model with a QD requires a mating cordset (see page 206).

For 9 m cable, add suffix W/30 to the 2 m model number (example, M18SP6D W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight		Threaded 4-Pin Right-Angle	
1.83 m	MQDC-406		MQDC-406RA	
4.57 m	MQDC-415		MQDC-415RA	
9.14 m	MQDC-430		MQDC-430RA	

Micro QD (for Q1 models)

See page 925

Length	Threaded 4-Pin Straight		Threaded 4-Pin Right-Angle	
1.83 m	MQAC-406		MQAC-406RA	
4.57 m	MQAC-415		MQAC-415RA	
9.14 m	MQAC-430		MQAC-430RA	

Additional cordset information available. See page 904.

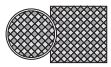
Brackets

M18 & S18

See page 860	See page 859	See page 861	See page 864
SMB18FA..	SMB18A	SMB3018SC	SMBAMS18P
			

Additional brackets and information available. See page 846.

Other Accessories

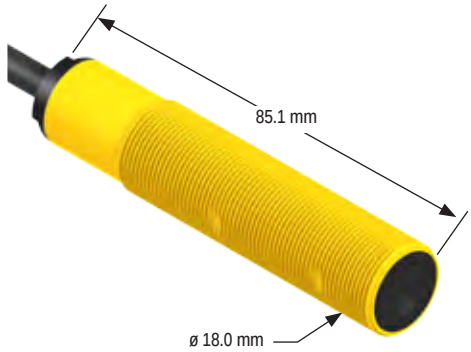
Reflectors	Apertures
See page 940	See page 966
	



S18-2 dc Polarized Retroreflective and Fixed-Field Models
Suffix LP and FF



S18 dc Opposed, Non-polarized Retroreflective and Diffuse Models
Suffix E, R, L and D



S18 ac Opposed, Retroreflective, Polarized Retroreflective, Diffuse and Fixed-Field Models
Suffix E, R, L, LP, D and FF



M18 Opposed, Non-polarized Retroreflective and Diffuse Models
Suffix E, R, L, D and DL

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

S18-2 and S18 DC Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple); Supply current (exclusive of load current): S18-2: Opposed Emitters: 17 mA; Opposed Receivers: 8 mA; Polarized Retroreflective: 16 mA; Diffuse: 16 mA S18: Opposed Emitters: 25 mA; Opposed Receivers: 20 mA; Polarized Retroreflective: 30 mA; Non-polarized Retroreflective: 25 mA; Fixed-Field: 35 mA; Diffuse: 25 mA
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state complementary dc switch; NPN (current sinking) or PNP (current sourcing), depending on model The Dark Operate (DO) output may be wired as a normally open marginal signal alarm output, depending upon hookup to the power supply
Output Rating	150 mA max. (each) in standard hookup. When wired for alarm output, the total load may not exceed 150 mA OFF-state leakage current: S18-2: less than 50 µA at 30 V dc S18: less than 1 µA at 30 V dc ON-state saturation voltage: S18-2: less than 1.5 V at 10 mA dc; less than 2.75 V at 100 mA dc S18: less than 1 V at 10 mA dc; less than 1.5 V at 150 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time	S18-2: Opposed: 1.5 milliseconds ON, 1.0 milliseconds OFF Polarized Retroreflective and Diffuse: 1.5 milliseconds ON, 0.75 milliseconds OFF S18: Opposed: 3 milliseconds ON, 1.5 milliseconds OFF Polarized Retroreflective, Non-polarized Retroreflective, Fixed-Field and Diffuse: 3 milliseconds ON/OFF
Delay at Power-up	100 milliseconds; outputs are non-conducting during this time
Repeatability	S18-2: Opposed: 170 microseconds Polarized Retroreflective and Diffuse: 100 microseconds S18: Opposed: 375 microseconds Polarized Retroreflective, Non-polarized Retroreflective, Fixed-Field and Diffuse: 750 microseconds. Repeatability and response are independent of signal strength.
Indicators	S18-2: Three LED's: Green: Power is ON; Green Flashing: Marginal sensing signal; Yellow: Pin 4 (black wire) output conducting S18: Two LEDs: Green: Power is ON; Green Flashing: Output overloaded; Yellow: Light Operate (LO) output is energized
Construction	S18-2 models: ABS housing S18 models: thermoplastic polyester housing Lenses are polycarbonate or acrylic; S18 models come with two jam nuts
Environmental Rating	S18-2: IEC 60529 IP67 S18: Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9.
Connections	2 m or 9 m attached cable, or 4-pin Euro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 206.
Operating Conditions	Temperature: -40° to +70° C; Relative humidity: 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max., double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	S18-2, S18 models: CE; S18 models: CSA, UL LISTED
Hookup Diagrams	Emitters: DC02 (p. 974); NPN Models: DC05 (p. 975); PNP Models: DC06 (p. 975) S18-2 Emitter with High Beam Inhibit: DC26 (p. 980)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

S18 AC Specifications

Supply Voltage and Current	20 to 250 V ac (50/60 Hz). **Average current:** 20 mA. **Peak current:** 200 mA at 20 V ac, 500 mA at 120 V ac, 750 mA at 250 V ac
Supply Protection Circuitry	Protected against transient voltages
Output Configuration	Solid-state ac switch; three-wire hookup; Light Operate (LO) or Dark Operate (DO), depending on model **Light Operate:** Output conducts when the sensor sees its own (or the emitter's) modulated light **Dark Operate:** Output conducts when sensor sees dark
Output Rating	300 mA max. (continuous) **Fixed-Field:** derate 5 mA/° C above +50° C **Inrush capability:** 1 amp for 20 milliseconds, non-repetitive **OFF-state leakage current:** less than 100 µA **ON-state voltage drop:** 3 V at 300 mA ac; 2 V at 15 mA ac
Output Protection Circuitry	Protected against false pulse on power-up
Output Response Time	**Opposed:** 16 milliseconds ON, 8 milliseconds OFF **Polarized Retroreflective, Non-polarized Retroreflective, Fixed-Field and Diffuse:** 16 milliseconds ON/OFF
Delay at Power-up	100 milliseconds
Repeatability	**Opposed:** 2 milliseconds **Polarized Retroreflective, Non-polarized Retroreflective, Fixed-Field and Diffuse:** 4 milliseconds Repeatability and response are independent of signal strength.
Indicators	**Two LEDs: Green:** Power ON **Yellow:** Light sensed **Yellow Flashing:** Marginal excess gain
Construction	Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; two jam nuts included.
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9.
Connections	2 m or 9 m attached cable, or 4-pin Micro-style quick-disconnect fitting. QD cordsets are ordered separately. See page "Cordsets" on page 206.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max, double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	CE CSA® UL LISTED
Hookup Diagrams	**Cabled Emitters:** AC03 (p. 981) **Other Cabled Models:** AC05 (p. 982) **QD Emitters:** AC07 (p. 982) **Other QD Models:** AC06 (p. 982)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

M18 DC Specifications

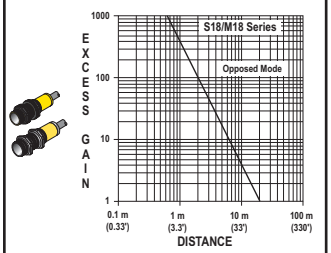
Supply Voltage and Current	10 to 30 V dc (10% max. ripple); Supply current (exclusive of load current): **Opposed Emitters:** 25 mA **Opposed Receivers:** 20 mA **Polarized Retroreflective:** 30 mA **Non-polarized Retroreflective:** 25 mA **Fixed-Field:** 35 mA **Diffuse:** 25 mA
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state complementary dc switch; NPN (current sinking) or PNP (current sourcing), depending on model The Dark Operate (DO) output may be wired as a normally open marginal signal alarm output, depending upon hookup to the power supply
Output Rating	150 mA max. (each) in standard hookup. When wired for alarm output, the total load may not exceed 150 mA **OFF-state leakage current:** less than 1 µA at 30 V dc **ON-state saturation voltage:** less than 1 V at 10 mA dc; less than1.5 V at 150 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time	**Opposed:** 3 milliseconds ON, 1.5 milliseconds OFF **Polarized Retroreflective, Non-polarized Retroreflective, Fixed-Field and Diffuse:** 3 milliseconds ON/OFF
Delay at Power-up	100 milliseconds; outputs are non-conducting during this time
Repeatability	**Opposed:** 375 microseconds **Polarized Retroreflective, Non-polarized Retroreflective, Fixed-Field and Diffuse:** 750 microseconds. Repeatability and response are independent of signal strength.
Indicators	**Two LEDs: Green:** Power is ON **Yellow:** Light Operate (LO) output is energized
Construction	**M18 models:** stainless steel housing Lenses are polycarbonate or acrylic; M18 models come with two jam nuts
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9.
Connections	2 m or 9 m attached cable, or 4-pin Euro-style quick-disconnect fitting. QD cordsets are ordered separately. See page “Cordsets” on page 206.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max., double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	M18 models: CE
Hookup Diagrams	**Emitters:** DC02 (p. 974) **NPN Models:** DC05 (p. 975) **PNP Models:** DC06 (p. 975)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves (Diffuse and Fixed-Field mode performance based on 90% reflectance white test card†)

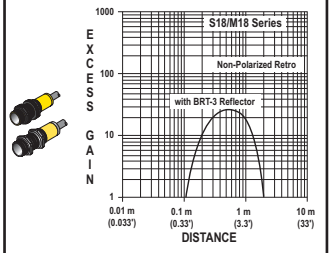
○ = Infrared LED P = Visible Red LED Polarized

Opposed Mode S18/M18



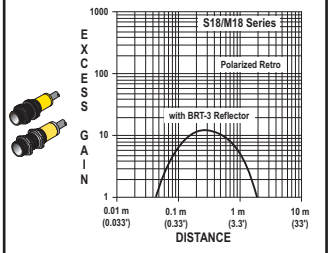
Range: 20 m | LED: ○

Retroreflective Mode S18/M18



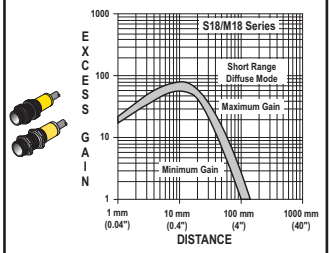
Range: 2 m | LED: ○

Polarized Retroreflective Mode S18/M18



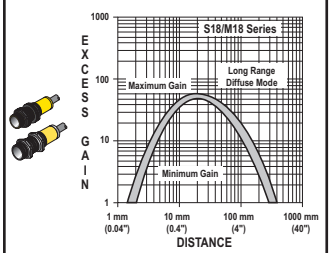
Range: 2 m | LED: P

Diffuse Mode S18/M18



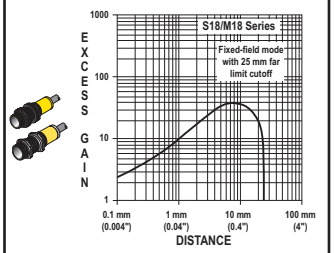
Range: 100 mm | LED: ○

Diffuse Mode S18/M18



Range: 300 mm | LED: ○

Fixed-Field Mode S18/M18

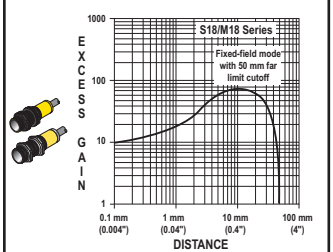


Cutoff: 25 mm | LED: ○

Ø 10 mm spot size @ 8 mm focus
Ø 10 mm spot size @ 25 mm cutoff

† Using 18% gray test card: Cutoff distance will be 95% of value shown.
† Using 6% black test card: Cutoff distance will be 90% of value shown.

Fixed-Field Mode S18/M18

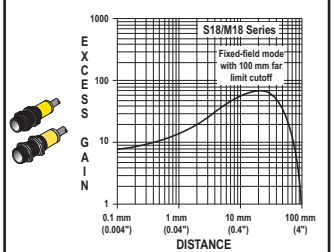


Cutoff: 50 mm | LED: ○

Ø 10 mm spot size @ 10 mm focus
Ø 10 mm spot size @ 50 mm cutoff

† Using 18% gray test card: Cutoff distance will be 90% of value shown.
† Using 6% black test card: Cutoff distance will be 85% of value shown.

Fixed-Field Mode S18/M18



Cutoff: 100 mm | LED: ○

Ø 10 mm spot size @ 20 mm focus
Ø 10 mm spot size @ 100 mm cutoff

† Using 18% gray test card: Cutoff distance will be 85% of value shown.
† Using 6% black test card: Cutoff distance will be 75% of value shown.

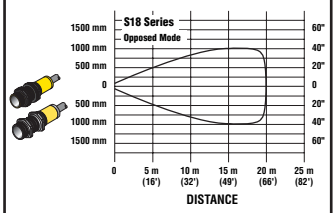
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Beam Patterns (Diffuse mode performance based on 90% reflectance white test card)

○ = Infrared LED P = Visible Red LED Polarized

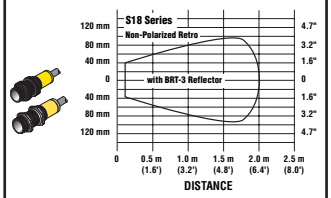
Opposed Mode S18/M18

Effective Beam: 13 mm



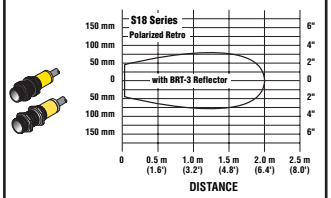
Range: 20 m | LED: ○

Retroreflective Mode S18/M18



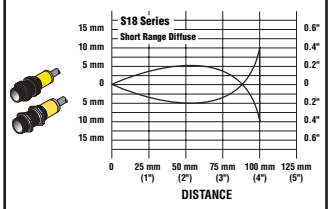
Range: 2 m | LED: ○

Polarized Retroreflective Mode S18/M18



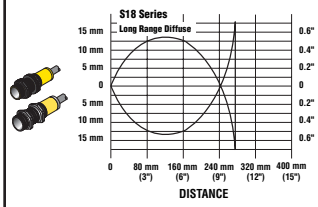
Range: 2 m | LED: P

Diffuse Mode S18/M18



Range: 100 mm | LED: ○

Diffuse Mode S18/M18



Range: 300 mm | LED: ○

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



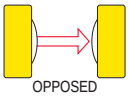
S30 dc
Highly Durable, DC-Operated Plastic Barrel-Mount Sensors

Epoxy-encapsulated sensors provide superior durability and reliable sensing over a long range.

- Long-range opposed mode
- Features 30 mm plastic threaded barrel
- Available in opposed, retroreflective and fixed-field modes
- Ideal for use in harsh sensing environments
- Cordsets and brackets see page 214

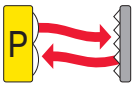
Opposed S30, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 OPPOSED	60 m	2 m	S306E Emitter	
		4-Pin Euro QD	S306EQ Emitter	
		2 m	S30SN6R	S30SP6R
		4-Pin Euro QD	S30SN6RQ	S30SP6RQ

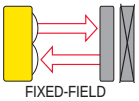
Polar Retro S30, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 POLAR RETRO	6 m†	2 m	S30SN6LP	S30SP6LP
		4-Pin Euro QD	S30SN6LPQ	S30SP6LPQ

Fixed-Field S30, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 FIXED-FIELD	0 - 200 mm Cutoff	2 m	S30SN6FF200	S30SP6FF200
		4-Pin Euro QD	S30SN6FF200Q	S30SP6FF200Q
	0 - 400 mm Cutoff	2 m	S30SN6FF400	S30SP6FF400
		4-Pin Euro QD	S30SN6FF400Q	S30SP6FF400Q
	0 - 600 mm Cutoff	2 m	S30SN6FF600	S30SP6FF600
		4-Pin Euro QD	S30SN6FF600Q	S30SP6FF600Q

For more specifications see page 215.

Connection options: A model with a QD requires a mating cordset (see page 214).

For 9 m cable, add suffix W/30 to the 2 m model number (example, S30SP6LP W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



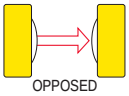
S30 ac
Highly Durable, AC-Operated Plastic Barrel-Mount Sesnors

Epoxy-encapsulated sensors provide superior durability and reliable sensing over a long range.

- Long-range opposed mode
- Features 30 mm plastic threaded barrel
- Available in opposed, retroreflective and fixed-field modes
- Ideal for use in harsh sensing environments
- Cordsets and brackets see page 214

Opposed S30, 20-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 OPPOSED	60 m	2 m	S303E Emitter	
		4-Pin Micro QD	S303EQ1 Emitter	
		2 m	S30AW3R	S30RW3R
		4-Pin Micro QD	S30AW3RQ1	S30RW3RQ1

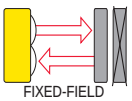
Polar Retro S30, 20-250 V AC

Visible Red LED

Sensing Mode	Range	Connection	Models LO	Models DO
 POLAR RETRO	6 m†	2 m	S30AW3LP	S30RW3LP
		4-Pin Micro QD	S30AW3LPQ1	S30RW3LPQ1

Fixed-Field S30, 20-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 FIXED-FIELD	0 - 200 mm Cutoff	2 m	S30AW3FF200	S30RW3FF200
		4-Pin Micro QD	S30AW3FF200Q1	S30RW3FF200Q1
	0 - 400 mm Cutoff	2 m	S30AW3FF400	S30RW3FF400
		4-Pin Micro QD	S30AW3FF400Q1	S30RW3FF400Q1
	0 - 600 mm Cutoff	2 m	S30AW3FF600	S30RW3FF600
		4-Pin Micro QD	S30AW3FF600Q1	S30RW3FF600Q1

For more specifications see page 216.

Connection options: A model with a QD requires a mating cordset (see page 214).

For 9 m cable, add suffix W/30 to the 2 m model number (example, S30SP6LP W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector, unless otherwise noted.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories section for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight		Threaded 4-Pin Right-Angle	
1.83 m	MQDC-406		MQDC-406RA	
4.57 m	MQDC-415		MQDC-415RA	
9.14 m	MQDC-430		MQDC-430RA	

Micro QD (for Q1 models)

See page 925

Length	Threaded 4-Pin Straight		Threaded 4-Pin Right-Angle	
1.83 m	MQAC-406		MQAC-406RA	
4.57 m	MQAC-415		MQAC-415RA	
9.14 m	MQAC-430		MQAC-430RA	

Additional cordset information available. See page 904.

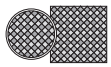
Brackets

S30

See page 869	See page 869	See page 870	See page 870
SMB30A	SMB30FA..	SMB30SC	SMBAMS30P
			

Additional brackets and information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966
	



S30 DC Opposed, Polarized Retroreflective and Fixed-Field Models
Suffix E, R, LP and FF



S30 AC Opposed, Polarized Retroreflective and Fixed-Field Models
Suffix E, R, LP and FF

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

S30 DC Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple); Supply current (exclusive of load current): **Opposed Emitters:** 25 mA **Opposed Receivers:** 20 mA **Polarized Retroreflective:** 30 mA **Fixed-Field:** 35 mA
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state complementary; choose NPN (current sinking) or PNP (current sourcing) models. The Dark Operate (DO) output may be wired as a normally open marginal signal alarm output, depending upon hookup to the power supply.
Output Rating	150 mA max. (each) in standard hookup; When wired for alarm output, the total load may not exceed 150 mA **OFF-state leakage current:** less than 1 µA at 30 V dc **ON-state saturation voltage:** less than 1 V at 10 mA dc; less than 1.5 V at 150 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time	**Opposed:** 3 milliseconds ON; 1.5 milliseconds OFF **Polarized Retroreflective and Fixed-Field:** 3 milliseconds ON/OFF
Delay at Power-up	100 milliseconds; outputs are non-conducting during this time
Repeatability	**Opposed:** 375 microseconds **Polarized Retroreflective and Fixed-Field:** 750 microseconds Repeatability and response are independent of signal strength
Indicators	Two LEDs: **Green:** Power ON **Yellow:** Light Operate (LO) energized See data sheet for detailed information
Construction	Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; two jam nuts included.
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9.
Connections	2 m or 9 m attached cable, or 4-pin Euro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 214.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max., double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	CE, UL LISTED, CSA®
Hookup Diagrams	**Emitters:** DC02 (p. 974) **NPN Models:** DC05 (p. 975) **PNP Models:** DC06 (p. 975)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

S30 AC Specifications

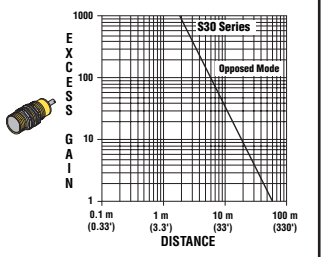
Supply Voltage and Current	20 to 250 V ac (50/60 Hz). **Average current:** 20 mA **Peak current:** 200 mA at 20 V ac, 500 mA at 120 V ac, 750 mA at 250 V ac
Supply Protection Circuitry	Protected against transient voltages
Output Configuration	Solid-state ac switch; three-wire hookup; choose Light Operate (LO) or Dark Operate (DO) models; **Light Operate:** Output conducts when the sensor sees its own (or the emitter's) modulated light **Dark Operate:** Output conducts when sensor sees dark
Output Rating	300 mA max. (continuous) **Fixed-Field:** derate 5 mA/° C above +50° C **Inrush capability:** 1 amp for 20 milliseconds, non-repetitive **OFF-state leakage current:** less than 100 µA **ON-state voltage drop:** 3 V at 300 mA ac; 2 V at 15 mA ac
Output Protection Circuitry	Protected against false pulse on power-up
Output Response Time	**Opposed:** 16 milliseconds ON; 8 milliseconds OFF **Polarized Retroreflective and Fixed-Field:** 16 milliseconds ON/OFF
Delay at Power-up	100 milliseconds
Repeatability	**Opposed:** 2 milliseconds **Polarized Retroreflective and Fixed-Field:** 4 milliseconds Repeatability and response are independent of signal strength
Indicators	Two LEDs: **Green:** Power ON **Yellow:** Light sensed See data sheet for detailed information
Construction	Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; two jam nuts included
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9
Connections	2 m or 9 m attached cable, or 4-pin Micro-style quick-disconnect fitting QD cordsets are ordered separately. See page 214.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max, double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation).
Certifications	CE, UL LISTED, CSA®
Hookup Diagrams	**Cabled Emitters:** AC03 (p. 981) **Cabled Models:** AC05 (p. 982) **QD Emitters:** AC07 (p. 982) **QD Models:** AC06 (p. 982)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves (Fixed-Field mode performance based on 90% reflectance white test card)

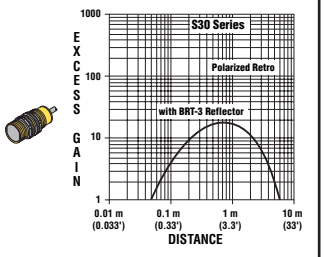
○ = Infrared LED P = Visible Red LED Polarized

Opposed Mode S30



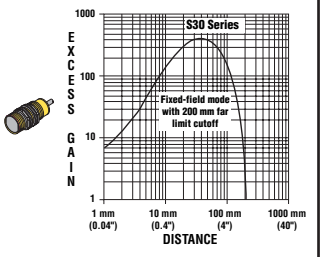
Range: 60 m | LED: ○

Polarized Retroreflective Mode S30



Range: 6 m | LED: P

Fixed-Field Mode S30

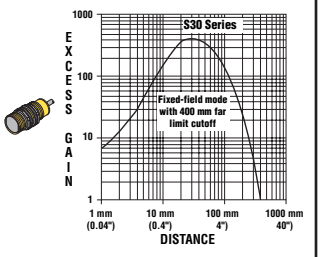


Ø 16 mm spot size @ 35 mm focus
Ø 20 mm spot size @ 200 mm cutoff

Using 18% gray test card: Cutoff distance will be 95% of value shown.
Using 6% black test card: Cutoff distance will be 90% of value shown.

Cutoff: 200 mm | LED: ○

Fixed-Field Mode S30

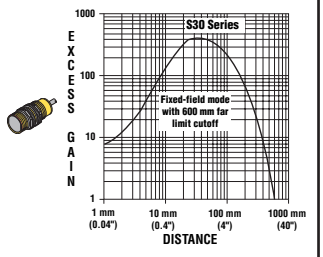


Ø 17 mm spot size @ 35 mm focus
Ø 25 mm spot size @ 400 mm cutoff

Using 18% gray test card: Cutoff distance will be 90% of value shown.
Using 6% black test card: Cutoff distance will be 85% of value shown.

Cutoff: 400 mm | LED: ○

Fixed-Field Mode S30



Ø 17 mm spot size @ 35 mm focus
Ø 30 mm spot size @ 600 mm cutoff

Using 18% gray test card: Cutoff distance will be 85% of value shown.
Using 6% black test card: Cutoff distance will be 75% of value shown.

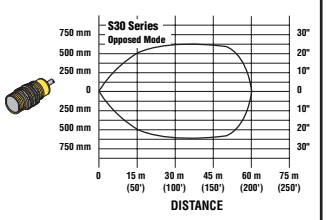
Cutoff: 600 mm | LED: ○

Beam Patterns

○ = Infrared LED P = Visible Red LED Polarized

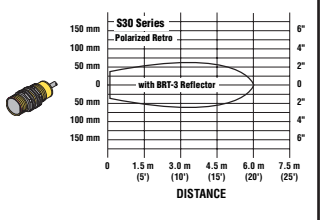
Opposed Mode S30

Effective Beam: 23 mm



Range: 60 m | LED: ○

Polarized Retroreflective Mode S30



Range: 6 m | LED: P

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



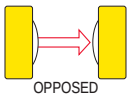
SM30
High-Power, Long-Range, Opposed-Mode Barrel Sensors

The SM30 is a powerful sensor with a long range for different frequencies and the stainless steel model can be used in abusive environments.

- Available with ac or dc supply voltages
- Ideal in equipment washdown environments
- Epoxy-encapsulated and stainless steel model available
- Sensing range up to 200 m

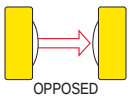
Opposed SM30 Emitters, 10-30 V DC or 12-240 V AC, Frequency A†

⇨ Infrared LED

Sensing Mode	Housing	Range	Connection	Output Type	Models
 OPPOSED	Plastic	150 m	2 m 3-Pin Mini QD	N/A	SMA30PEL SMA30PELQD
	Stainless Steel	150 m	2 m 3-Pin Mini QD	N/A	SMA30SEL SMA30SELQD

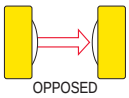
Opposed SM30 Receivers, 10-30 V DC Frequency A†

⇨ Infrared LED

Sensing Mode	Housing	Range	Connection	Output Type	Models
 OPPOSED	Plastic	150 m	2 m 4-Pin Mini QD	Bi-Modal™ NPN or PNP	SM30PRL SM30PRLQD
	Stainless Steel	150 m	2 m 4-Pin Mini QD	Bi-Modal™ NPN or PNP	SM30SRL SM30SRLQD

Opposed SM30 Receivers, 24-240 V AC, Frequency A†

⇨ Infrared LED

Sensing Mode	Housing	Range	Connection	Output Type	Models
 OPPOSED	Plastic	150 m	2 m 3-Pin Mini QD	LO	SM2A30PRL SM2A30PRLQD
	Stainless Steel	150 m	2 m 3-Pin Mini QD	LO	SM2A30SRL SM2A30SRLQD
	Plastic	150 m	2 m 3-Pin Mini QD	DO	SM2A30PRLNC SM2A30PRLNCQD
	Stainless Steel	150 m	2 m 3-Pin Mini QD	DO	SM2A30SRLNC SM2A30SRLNCQD

For more specifications see page 220.

Connection options: A model with a QD requires a mating cordset (see page 219).

For 9 m cable, add suffix W/30 to the 2 m model number (example, SMA30PEL W/30).

† Modulation frequency "A" is standard; frequencies "B" and "C" are also available to minimize optical crosstalk potential between adjacent pairs and are specified by adding "B" or "C" at the end of the standard model number (example, SMA30PELB or SMA30PELC).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Mini QD

See page 928

Length	3-Pin Threaded Straight
1.83 m	SM30CC-306
3.66 m	SM30CC-312
9.14 m	–



Additional cordset information available.
See page 904.

Brackets

SM30

See page 869	See page 869	See page 870	See page 870
SMB30A	SMB30FA..	SMB30SC	SMBAMS30P

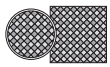





Additional brackets and information available.
See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966






Opposed Models—All Frequencies
Suffix E and R
(Metal Housing Shown)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

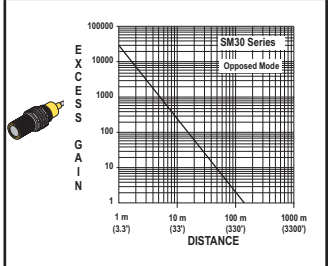
SM30 Specifications

Supply Voltage and Current	**Emitters:** 12 to 240 V ac (50/60 Hz) or 10 to 30 V dc (10% max. ripple) at 20 mA **DC Receivers:** 10 to 30 V dc (10% max. ripple) at 10 mA max, exclusive of load **AC Receivers:** 24 to 240 V ac (50/60 Hz)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**DC Receivers:** Bi-Modal™ output (PNP sourcing or NPN sinking). Selection of sourcing or sinking configuration depends upon receiver's power supply hookup polarity. Once wired, the unit performs as a solid-state switch. **AC Receivers:** Solid-state switch offer Light Operate (LO) or Dark Operate (DO) by model
Output Rating	**DC Receivers:** 250 mA continuous **Output saturation voltage:** (PNP & NPN configuration) less than 1 volt at 10 mA; less than 2 volts at 250 mA **OFF-state leakage current:** less than 10 µA **AC Receivers:** Max. steady-state load capability is 500 mA **Inrush capability:** 10 amps for 1 second (non-repeating) **OFF-state leakage:** current less than 1.7 mA rms **ON-state voltage drop:** less than 3.5 volts rms across a 500 mA load; less than 5 volts rms across a 15 mA load
Output Protection Circuitry	Outputs of dc receivers are short circuit protected
Output Response Time	10 milliseconds ON/OFF
Repeatability	**"A" frequency units:** 1 millisecond **"B" frequency units:** 1.5 milliseconds **"C" frequency units:** 2.3 milliseconds
Indicators	Internal Red LED, visible through the lens or from side of the sensor. **Emitters:** Red "Power ON" indicator LED **DC Receivers:** Lights whenever receiver sees its modulated light source **AC Receivers:** Lights whenever receiver's output is conducting
Construction	Fully epoxy-encapsulated tubular threaded housing, positive sealed at both ends, quad-ring sealed acrylic lens **Plastic models:** 30 mm diameter thermoplastic polyester housing and jam nuts **Stainless Steel models:** 30 mm diameter 303 stainless steel housing and jam nuts
Environmental Rating	Exceeds NEMA 6P; IEC IP67 standards
Connections	PVC-jacketed 2 m or 9 m cables or Mini-style quick-disconnect (QD) fitting are available. QD cordsets are ordered separately. See page 219.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Certifications	
Hookup Diagrams	**Cabled Emitters:** UN10 (p. 986) **QD Emitters:** AC04 (p. 981) **AC Cabled Receivers:** AC10 (p. 983) **AC QD Receivers:** AC11 (p. 983) **DC Receivers:** DC20 & DC21 (pp. 978 & 979)

Excess Gain Curves

○ = Infrared LED

Opposed Mode SM30



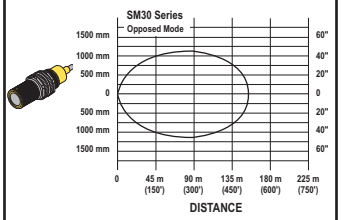
Range: 150 m | LED: ○

Beam Patterns

○ = Infrared LED

Opposed Mode SM30

Effective Beam: 19 mm



Range: 150 m | LED: ○

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

LOOKING FOR MORE



SMI30 page 484

The SMI30 is an extremely rugged and powerful intrinsically safe barrel sensor designed for the most demanding hazardous area sensing applications.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Slot & Area

Slot sensors, also known as fork sensors, provide easy and reliable opposed-mode sensing of objects as small as 0.3 mm. Slot sensors are offered in a wide variety of sizes to meet your application needs.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Max Sensing Range	Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	SLM Easy to mount, focus-beamed sensors with powerful optics. Page 224	Opposed: 220 mm	Varies by model	IP67; NEMA 6	Die-cast zinc with yellow paint or nickel plating	10 to 30 V dc
	SL30 & SL10 A fixed-distance slot sensor with a slot that offers high speed sensing with expert push-button TEACH options. Page 228	Opposed: 30 mm	72 x 52 x 18.8 mm	IP67; NEMA 6	ABS/polycarbonate	10 to 30 V dc
	LX Part-Sensing Arrays provides wide area detection used for detecting small parts on conveyors, part ejection verification and leading edge detection. Page 232	Opposed: 200 mm	Varies by model	IP65	Aluminum housing, die-cast zinc with black e-coated painted endcaps	10 to 30 V dc

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



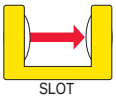
SLM
Rugged Metal Fixed-Distance Slot Sensors

The SLM are easy to mount, focus-beamed sensors with powerful optics.

- Powerful optics for detecting between sheets of plastic
- Requires no alignment, with easy and economical mounting that uses molded in-beam guides to simplify beam placement
- Rugged metal housing rated to IP67
- Ideal for counting, sensing parts on conveyor rails and belts, detecting edges and many other applications
- Cordsets and brackets see page 226

SLM, 10-30 V DC

Visible Red LED

Sensing Mode	Slot Width/ Depth	Width (W)	Depth (D)	Connection	Response	Models NPN	Models PNP
 SLOT	10 mm/ 60.8 mm	42 mm	80 mm	2 m	500 µs	SLM10B6 (Bipolar NPN/PNP)	
				4-Pin Euro Pigtail QD		SLM10B6QPMA (Bipolar NPN/PNP)	
				3-Pin Pico QD		SLM10N6Q	SLM10P6Q
	20 mm/ 60.8 mm	52 mm	80 mm	2 m	500 µs	SLM20B6 (Bipolar NPN/PNP)	
				4-Pin Euro Pigtail QD		SLM20B6QPMA (Bipolar NPN/PNP)	
				3-Pin Pico QD		SLM20N6Q	SLM20P6Q
	30 mm/ 60.8 mm	62 mm	80 mm	2 m	500 µs	SLM30B6 (Bipolar NPN/PNP)	
				4-Pin Euro Pigtail QD		SLM30B6QPMA (Bipolar NPN/PNP)	
				3-Pin Pico QD		SLM30N6Q	SLM30P6Q
	50 mm/ 60.8 mm	82 mm	80 mm	2 m	500 µs	SLM50B6 (Bipolar NPN/PNP)	
				4-Pin Euro Pigtail QD		SLM50B6QPMA (Bipolar NPN/PNP)	
				3-Pin Pico QD		SLM50N6Q	SLM50P6Q
	80 mm/ 60.8 mm	112 mm	80 mm	2 m	500 µs	SLM80B6 (Bipolar NPN/PNP)	
				4-Pin Euro Pigtail QD		SLM80B6QPMA (Bipolar NPN/PNP)	
				3-Pin Pico QD		SLM80N6Q	SLM80P6Q
	120 mm/ 120.7 mm	152 mm	140 mm	2 m	500 µs	SLM120B6 (Bipolar NPN/PNP)	
				4-Pin Euro Pigtail QD		SLM120B6QPMA (Bipolar NPN/PNP)	
				3-Pin Pico QD		SLM120N6Q	SLM120P6Q
	180 mm/ 120.7 mm	202 mm	140 mm	2 m	500 µs	SLM180B6 (Bipolar NPN/PNP)	
				4-Pin Euro Pigtail QD		SLM180B6QPMA (Bipolar NPN/PNP)	
				3-Pin Pico QD		SLM180N6Q	SLM180P6Q
	220 mm/ 120.7 mm	252 mm	140 mm	2 m	500 µs	SLM220B6 (Bipolar NPN/PNP)	
				4-Pin Euro Pigtail QD		SLM220B6QPMA (Bipolar NPN/PNP)	
				3-Pin Pico QD		SLM220N6Q	SLM220P6Q

For more specifications see page 227.

Connection options: A model with a QD requires a mating cordset (see page 226).

For 9 m cable, add suffix W/30 to the 2 m model number (example, SLM10B6 W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



SLM Nickel-Plated

Rugged, Nickel-Plated, Fixed-Distance Slot Sensors

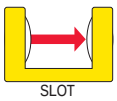
The nickel-plated SLMs are easy to mount, focus-beamed sensors with powerful optics.

- Powerful optics for detecting between sheets of plastic
- Requires no alignment, with easy and economical mounting that uses molded in-beam guides to simplify beam placement
- Rugged metal housing rated to IP67
- Ideal for counting, sensing parts on conveyor rails and belts, detecting edges and many other applications
- Cordsets and brackets see page 226

SLM Nickel-Plated, 10-30 V DC

Visible Red LED

Sensing Mode	Slot Width/ Depth	Width (W)	Depth (D)	Connection	Response	Models NPN	Models PNP
	10 mm/ 60.8 mm	42 mm	80 mm	2 m	500 µs	SLM10B6N (Bipolar NPN/PNP)	
				4-Pin Euro Pigtail QD		SLM10B6QPMAN (Bipolar NPN/PNP)	
				3-Pin Pico QD		SLM10N6QN	SLM10P6QN
	20 mm/ 60.8 mm	52 mm	80 mm	2 m	500 µs	SLM20B6N (Bipolar NPN/PNP)	
				4-Pin Euro Pigtail QD		SLM20B6QPMAN (Bipolar NPN/PNP)	
				3-Pin Pico QD		SLM20N6QN	SLM20P6QN
	30 mm/ 60.8 mm	62 mm	80 mm	2 m	500 µs	SLM30B6N (Bipolar NPN/PNP)	
				4-Pin Euro Pigtail QD		SLM30B6QPMAN (Bipolar NPN/PNP)	
				3-Pin Pico QD		SLM30N6QN	SLM30P6QN
	50 mm/ 60.8 mm	82 mm	80 mm	2 m	500 µs	SLM50B6N (Bipolar NPN/PNP)	
				4-Pin Euro Pigtail QD		SLM50B6QPMAN (Bipolar NPN/PNP)	
				3-Pin Pico QD		SLM50N6QN	SLM50P6QN
	80 mm/ 60.8 mm	112 mm	80 mm	2 m	500 µs	SLM80B6N (Bipolar NPN/PNP)	
				4-Pin Euro Pigtail QD		SLM80B6QPMAN (Bipolar NPN/PNP)	
				3-Pin Pico QD		SLM80N6QN	SLM80P6QN
	120 mm/ 120.7 mm	152 mm	140 mm	2 m	500 µs	SLM120B6N (Bipolar NPN/PNP)	
				4-Pin Euro Pigtail QD		SLM120B6QPMAN (Bipolar NPN/	
				3-Pin Pico QD		SLM120N6QN	SLM120P6QN
	180 mm/ 120.7 mm	202 mm	140 mm	2 m	500 µs	SLM180B6N (Bipolar NPN/PNP)	
				4-Pin Euro Pigtail QD		SLM180B6QPMAN (Bipolar NPN/	
				3-Pin Pico QD		SLM180N6QN	SLM180P6QN
	220 mm/ 120.7 mm	252 mm	140 mm	2 m	500 µs	SLM220B6N (Bipolar NPN/PNP)	
				4-Pin Euro Pigtail QD		SLM220B6QPMAN (Bipolar NPN/	
				3-Pin Pico QD		SLM220N6QN	SLM220P6QN



For more specifications see page 227.

Connection options: A model with a QD requires a mating cordset (see page 226).

For 9 m cable, add suffix W/30 to the 2 m model number (example, SLM10B6N W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Pico QD (for Q models)

See page 904

Length	Straight 3-Pin	Right-Angle 3-Pin
2.00 m	PKG3M-2	PKW3M-2
5.00 m	PKG3M-5	PKW3M-5
7.00 m	PKG3M-7	—
9.00 m	PKG3M-9	PKW3M-9
10.0 m	PKG3M-10	—

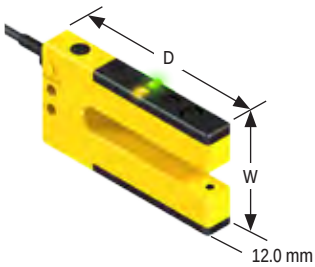


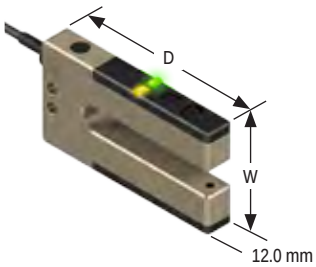
Additional cordset information available.
See page 904.

Euro QD (for Q8 models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA





Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SLM Specifications

Slot Opening	10, 20, 30, 50, 80, 120, 180 or 220 mm (depending on model); beam is 5 mm from outer edge							
Supply Voltage and Current	10 to 30 V dc (10% ripple) @ less than 25 mA, exclusive of load							
Supply Protection Circuitry	Protected against reverse polarity and transient voltages							
Output Configuration	**Cabled and Euro-style QD models: Bipolar:** One current sourcing (PNP) and one current sinking (NPN) **Pico-style QD models:** Current sourcing (PNP) or current sinking (NPN), depending on model							
Output Rating	100 mA with short circuit protection **OFF-state leakage current:** less than 10 µA sourcing; less than 200 µA sinking **ON-state saturation voltage:** NPN: 1.6 V @ 100 mA PNP: 2.0 V @ 100 mA							
Output Protection Circuitry	Protected against output short-circuit and false pulse on power up. 100 milliseconds max. delay at power up; outputs do not conduct during this time.							
Minimum Object Detection* at Max. Gain	SLM10…	SLM20...	SLM30…	SLM50…	SLM80…	SLM120…	SLM180…	SLM220…
	1.00 mm	1.25 mm	1.50 mm	1.65 mm	1.80 mm	1.80 mm	1.80 mm	2.40 mm
Minimum Object Detection* at 2X Excess Gain	0.30 mm	0.30 mm	0.40 mm	0.60 mm	0.75 mm	0.90 mm	0.90 mm	1.00 mm
Hysteresis**	0.10 mm	0.10 mm	0.10 mm	0.10 mm	0.20 mm	0.20 mm	0.20 mm	0.20 mm
Repeatability***	0.02 mm	0.02 mm	0.02 mm	0.04 mm	0.06 mm	0.08 mm	0.08 mm	0.08 mm
Output Response Time	500 microseconds							
Repeatability	95 microseconds							
Adjustments	1-turn potentiometer Sensitivity adjustment Light Operate / Dark Operate Selection switch							
Indicators	**Two LED Indicators:** **Green:** Power ON **Yellow:** Output activated See data sheet for detailed information							
Construction	**Housing:** Die-cast zinc with yellow paint; models with "N" at the end of the model number have nickel plating **Endcaps:** ABS **Optic windows:** Acrylic							
Environmental Rating	IEC IP67; NEMA 6							
Connections	**Cabled models:** 2 m or 9 m 4-conductor, PVC-jacketed cable **Pico-style QD models:** 3-pin, threaded (see page 226) **Euro-style QD models:** 4-pin, threaded 150 mm pigtail with polyurethane (PUR) cable (see page 226)							
Operating Conditions	**Temperature:** -20° to +60° C **Relative humidity:** 95% @ 55° C (non-condensing)							
Certifications	CE							
Hookup Diagrams	**Bipolar Models:** DC04 (p. 974) **All others:** DC01 (p. 974)							

* **Minimum Object Detection:** Smallest diameter rod that can be detected when passed slowly through sensing beam.
NOTE: Minimum object detection is measured midway between the emitter and receiver. For best results, objects to be detected should be placed in the midway position when possible. The minimum object detection size may increase if the object is very close to the receiver side.

** **Hysteresis:** Distance an object must move to toggle between output OFF and output ON conditions.

*** **Repeatability:** Variation in switching distance for a standard target at controlled sensing conditions.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



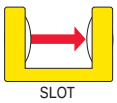
SL30
Rugged Fixed-Distance Slot Sensors

The SL30 is a fixed-distance slot sensor with a 30 mm-wide sensing slot that offers high speed sensing with expert push-button TEACH options.

- Uses molded in-beam guides to simplify beam placement
- Provides easy-to-use self-contained opposed-mode sensor pair in rugged U-shaped housing
- Features manual sensitivity adjustment or easy push-button TEACH-mode setup, depending on model
- Ideal for registration mark detection, hole detection, gear tooth detection, edge guiding and counting
- Cordsets and brackets see page 230

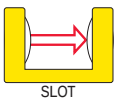
SL30, 10-30 V DC

Visible Red LED

Sensing Mode	Slot Width	Connection	Output Type	Response	Repeatability	Models
 SLOT	30 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	1 ms	250 µs	SL30VB6V SL30VB6VQ
		2 m 5-Pin Euro QD		300 µs	75 µs	SL30VB6VY SL30VB6VYQ

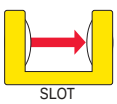
SLO30, 10-30 V DC

Infrared LED

Sensing Mode	Slot Width	Connection	Output Type	Response	Repeatability	Models
 SLOT	30 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	1 ms	250 µs	SLO30VB6 SLO30VB6Q
		2 m 5-Pin Euro QD		300 µs	75 µs	SLO30VB6Y SLO30VB6YQ

SLE30 *Expert*™, 10-30 V DC

Visible Red LED

Sensing Mode	Slot Width	Connection	Output Type	Response	Repeatability	Models
 SLOT	30 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	500 µs	100 µs	SLE30B6V SLE30B6VQ
		2 m 5-Pin Euro QD		150 µs	75 µs	SLE30B6VY SLE30B6VYQ

For more specifications see page 231.

Connection options: A model with a QD requires a mating cordset (see page 230).

For 9 m cable, add suffix W/30 to the 2 m model number (example, SL30VB6V W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



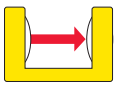
SL10
Rugged Fixed-Distance Slot Sensors

The SL10 is a fixed-distance slot sensor with a 10 mm-wide sensing slot, offering high speed sensing in a rugged U-shaped housing.

- Uses molded in-beam guides to simplify beam placement
- Provides easy-to-use self-contained opposed-mode sensor pair
- Features manual sensitivity adjustment or easy push-button TEACH-mode setup, depending on model
- Ideal for registration mark detection, hole detection, gear tooth detection, edge guiding and counting
- Cordsets and brackets see page 230

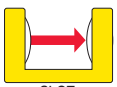
SL10, 10-30 V DC

Visible Red LED

Sensing Mode	Slot Width	Connection	Output Type	Response	Repeatability	Models
 SLOT	10 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	1 ms	250 µs	SL10VB6V
						SL10VB6VQ
		2 m 5-Pin Euro QD		300 µs	75 µs	SL10VB6VY
						SL10VB6VYQ

SLE10 *Expert*™, 10-30 V DC

Visible Red LED

Sensing Mode	Slot Width	Connection	Output Type	Response	Repeatability	Models
 SLOT	10 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	500 µs	100 µs	SLE10B6V
						SLE10B6VQ
		2 m 5-Pin Euro QD		150 µs	75 µs	SLE10B6VY
						SLE10B6VYQ

For more specifications see page 231.

Connection options: A model with a QD requires a mating cordset (see page 230).

For 9 m cable, add suffix W/30 to the 2 m model number (example, SL10VB6V W/30).

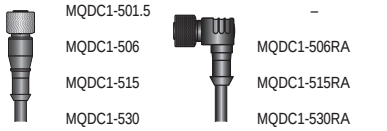
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 912

Length	Threaded 5-Pin	
	Straight	Right-Angle
0.50 m	MQDC1-501.5	–
1.83 m	MQDC1-506	MQDC1-506RA
4.57 m	MQDC1-515	MQDC1-515RA
9.14 m	MQDC1-530	MQDC1-530RA



Additional cordset information available. See page 904.

Brackets

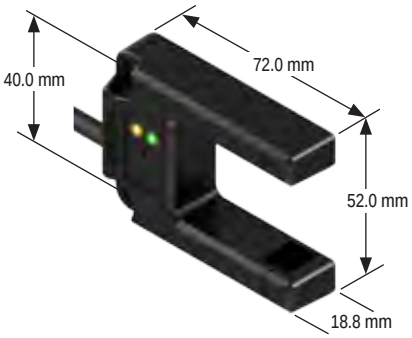
SL

See page 874

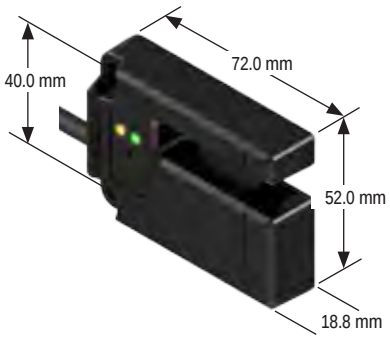
SMBSL



Additional brackets and information available. See page 846.



SL30, SLO30 and SLE30 Models



SL10 and SLE10 Models

SL30, SL10 and SLO30 Specifications

Supply Voltage and Current	10 to 30 V dc, 30 mA
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Bipolar:** One current sinking (NPN) and one current sourcing (PNP) open-collector transistor
Output Rating	150 mA, each output
Output Protection Circuitry	Protected against false pulse on power-up and short-circuit of outputs
Output Response Time	1 millisecond or 300 microseconds, depending on model
Repeatability	250 microseconds or 75 microseconds, depending on model
Adjustments	**SL30 and SL10:** 4-turn clutched potentiometer sensitivity adjustment **SLO30:** None
Indicators	**Green:** Power ON/OFF indicator **Yellow:** Signal condition indicator
Construction	**Housing:** ABS/polycarbonate **Lenses:** Acrylic
Environmental Rating	IP67; NEMA 6
Connections	2 m or 9 m 5-conductor PVC-jacketed attached cable, or 5-pin Euro-style quick-disconnect (QD) fitting. QD cordsets are ordered separately. See page 230.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% @ 50° C (non-condensing)
Certifications	CE
Hookup Diagrams	SP03 (p. 987)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SLE30 and SLE10 *Expert*™ Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at less than 45 mA, exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Bipolar:** One current sourcing (PNP) and one current sinking (NPN) open-collector transistor
Output Rating	150 mA max. each output at 25° C, derated to 100 mA at 70° C (derate ≈1 mA per ° C) **OFF-state leakage current:** less than 5 µA @ 30 V dc **ON-state saturation current:** less than 1 V @ 10 mA; less than 1.5 V @ 150 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs
Output Response Time	Sensors will respond to either a "light" or a "dark" signal of 500 microseconds (or 150 microseconds, depending on model) or longer duration, 1 kHz max
Delay at Power-up	1 second; outputs are non-conducting during this time
Repeatability	100 microseconds or 75 microseconds, depending on model
Adjustments	Push-button TEACH-mode sensitivity setting; remote TEACH-mode input
Indicators	**Two LEDs:** Yellow and Bicolor Green/Red **Green (RUN Mode):** ON when power is applied Flashes when received light level approaches the switching threshold **Red (TEACH Mode):** OFF when no signal is received. Pulses to indicate signal strength (received light level). Rate is proportional to signal strength (the stronger the signal, the faster the pulse rate). This is a function of Banner's Alignment Indicating Device (AID™). **Alternating Red/Green:** Microprocessor memory error **Flashing** **Yellow (Static TEACH):** ON to indicate sensor is ready to learn output ON condition OFF to indicate sensor is ready to learn output OFF condition **Yellow (Dynamic TEACH):** Pulses at 0.5 Hz when ready to sample ON to indicate Dynamic TEACH sampling OFF to indicate sampling was accepted **Yellow (RUN Mode):** ON when outputs are conducting
Construction	**Housing:** ABS/polycarbonate **Lenses:** Acrylic
Environmental Rating	IEC IP67; NEMA 6
Connections	PVC-jacketed 5-conductor 2 m or 9 m unterminated cable, or 5-pin Euro-style quick-disconnect (QD) fitting. QD cordsets are ordered separately. See page 230.
Operating Conditions	**Temperature:** -20° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Application Notes	The first condition presented during TEACH mode becomes the output ON condition
Certifications	CE
Hookup Diagrams	DC08 (p. 975)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



LX
High-Speed Part-Sensing Array

The LX Part-Sensing Arrays provides wide area detection used for detecting small parts on conveyors, part ejection verification and leading edge detection.

- Detects objects as small as 5.6 mm and extremely flat objects passing anywhere through the screen
- Responds in 0.8 to 6.5 milliseconds, faster than comparable products even at the slowest speed
- Features rugged silver anodized housing rated to IP65
- Uses integrated T-slot mounting channel for unique mounting flexibility
- Cordsets and brackets see page 233

LX Light Screens Short-Range (75-200 mm), 10-30 V DC

Sensing Array Length	Connection	Output Type	Min object detection size: 5.6 mm dia. Emitters	Receivers
67 mm	2 m	Bipolar NPN/PNP	LX3ESR	LX3RSR
143 mm			LX6ESR	LX6RSR
295 mm			LX12ESR	LX12RSR

For more specifications see page 235.

Connection options: A model with a QD requires a mating cordset (see page 233).

For 5-pin 150 mm Euro-style Pigtail QD, add suffix Q to the 2 m model number (example, LX3ESRQ).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

LX Light Screens Standard Range (150 mm-2 m), 10-30 V DC

Sensing Array Length	Connection	Output Type	Min object detection size: 9.5 mm dia. Emitters	Receivers
67 mm	2 m	Bipolar NPN/PNP	LX3E	LX3R
143 mm			LX6E	LX6R
218 mm			LX9E	LX9R
295 mm			LX12E	LX12R
371 mm			LX15E	LX15R
447 mm			LX18E	LX18R
523 mm			LX21E	LX21R
599 mm			LX24E	LX24R

For more specifications see page 235.

Connection options: A model with a QD requires a mating cordset (see page 233).

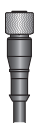
For 5-pin 150 mm Euro-style Pigtail QD, add suffix Q to the 2 m model number (example, LX3EQ).

Cordsets

Euro QD (with Shield)

See page 913

Length	Threaded 5-Pin Straight	Threaded 5-Pin Right-Angle
1.83 m	MQDEC2-506	MQDEC2-506RA
4.57 m	MQDEC2-515	MQDEC2-515RA
9.14 m	MQDEC2-530	MQDEC2-530RA





Additional cordset information available. See page 904.

Brackets

LX

See page 874 | See page 874

SMBLX	SMBLXR



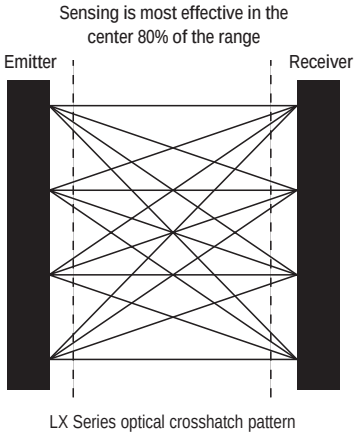


Additional brackets and information available. See page 846.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Models	Length (L)
LX3	113.4 mm
LX6	189.6 mm
LX9	265.8 mm
LX12	342.0 mm
LX15	418.2 mm
LX18	494.4 mm
LX21	570.6 mm
LX24	646.8 mm



LX Series optical crosshatch pattern

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

LX Specifications

Sensing Range	Normal (see hookups) / Reduced Short-range models: 100 to 200 mm / 75 to 150 mm Standard-range models: 300 mm to 2 m / 150 to 600 mm
Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at less than 1 watt each for emitter and receiver (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Bipolar:** One current sourcing (PNP) and one current sinking (NPN) open-collector transistor
Output Rating	125 mA max. each output **OFF-state leakage current:** less than 5 µA **Output saturation voltage (PNP output):** less than 1 volt at 10 mA and less than 1.5 volts at 100 mA **Output saturation voltage (NPN output):** less than 0.5 volts at 10 mA and less than 0.6 volts at 100 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time	**LX3:** 0.8 milliseconds ON-time; 6 milliseconds OFF-time (5 milliseconds OFF-delay) **LX6:** 1.6 milliseconds ON-time; 7 milliseconds OFF-time (5 milliseconds OFF-delay) **LX9:** 2.4 milliseconds ON-time; 7.5 milliseconds OFF-time (5 milliseconds OFF-delay) **LX12:** 3.2 milliseconds ON-time; 8.5 milliseconds OFF-time (5 milliseconds OFF-delay) **LX15:** 4.0 milliseconds ON-time; 9 milliseconds OFF-time (5 milliseconds OFF-delay) **LX18:** 4.8 milliseconds ON-time; 10 milliseconds OFF-time (5 milliseconds OFF-delay) **LX21:** 5.6 milliseconds ON-time; 11 milliseconds OFF-time (5 milliseconds OFF-delay) **LX24:** 6.4 milliseconds ON-time; 11.5 milliseconds OFF-time (5 milliseconds OFF-delay)
Minimum Object Detection Size	Smallest diameter rod that can be detected in sensing range: 5.6 mm (short-range) or 9.5 mm (standard-range), depending on model
Indicators	**Emitter:** LED1 (Green): ON: Power ON, good sensor; OFF: Reduced Range — LED2 (Red): ON: Reduced range; OFF: Normal range; Flashing: Emitter hardware failure **Receiver:** LED1 (Yellow): ON: Output conducting; OFF: Output not conducting — LED2 (Bicolor Green/Red): Green: Normal range; Red: Reduced range; Flashing Red: Receiver hardware failure
Construction	Aluminum housing, die-cast zinc with black e-coated painted encaps, acrylic lens window
Environmental Rating	IEC IP65
Connections	2 m 5-conductor (with drain) PVC-jacketed cable or 150 mm pigtail with 5-pin Euro-style quick-disconnect fitting, depending on model. Cordsets are ordered separately. See page 233.
Operating Conditions	**Temperature:** -20° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Application Notes	1. The best sensing resolution occurs within the center 80% of the sensing range 2. Low-profile packages can be reliably detected 3. Outputs are active while the light screen is interrupted 4. For reliable detection, successive parts must be spaced up to the total of ON-time plus OFF-time apart. (i.e., 12 milliseconds for the LX12)
Certifications	CE cULus
Hookup Diagrams	SP02 (p. 987)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Miniature

Miniature photoelectric sensors are extremely compact, conveniently fitting into limited spaces with barrel and right angle housings. Sensors have high-power performance for close range detection. Six sensing modes are available with an opposed mode sensing range up to 4 meters.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Max Sensing Range	Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	VSM Series Heavy-duty metal sensors that are compact and ideal for use in confined areas. Page 238	Opposed: 250 mm Diffuse: 200 mm	Varies by model	IP67; NEMA 6P	Stainless steel	10 to 30 V dc
	VS1 Small, high performance sensor can easily be embedded into the application. Page 244	Convergent: 15 mm	25.7 x 8.3 x 11.6 mm	IP54, NEMA3	ABS/ polycarbonate	10 to 30 V dc
	VS2 Ultra-thin VS2 miniature sensors are suited to work well in confined areas while providing high performance. Page 248	Opposed: 3 m Convergent: 30 mm	25.1 x 12 x 4.3 mm	IP67; NEMA 6P	ABS	10 to 30 V dc
	VS3 Provides coaxial optics for close-range retro detection of the sensor. Page 252	Coaxial Retro: 250 mm Coaxial Polar Retro: 250 mm	25.4 x 9 x 15.6 mm	IP67; NEMA 6P	ABS	10 to 30 V dc

OTHER AVAILABLE MODELS



Q12 page 68

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



VSM Series
Self-Contained, High Performance Metal Sensors

The VSM sensors are heavy-duty, compact, metal sensors that are ideal for use in confined areas.

- Sapphire lens
- Tough 300 series stainless steel body withstands a wide variety of chemicals and cutting fluids
- Smooth barrel models are ideal for hygienic applications that require frequent cleaning
- Advanced optical design provides high performance with repeatable sensing



VSMQ

A high-performance, heavy-duty metal photoelectric sensor with a well-focused, narrow beam.



VSM4

Smooth, stainless steel barrel sensor is ideal for hygienic applications that require routine cleaning.



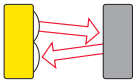
VSM5

Advanced optical design provides high performance.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

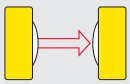
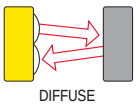
VSMQ (Flat-Pack, Side-Looker), 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 DIFFUSE	20-50 mm	2 m	LO	VSMQAN6CV20	VSMQAP6CV20
	50-140 mm			VSMQAN6CV50	VSMQAP6CV50
	90-200 mm			VSMQAN6CV90	VSMQAP6CV90

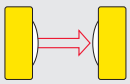
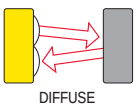
VSM4 (4 mm Smooth Barrel), 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 OPPOSED	250 mm	2 m	—	VSM46E Emitter	
		3-Pin Pico QD		VSM46EQ7 Emitter	
		2 m	DO	VSM4RN6R	VSM4RP6R
		3-Pin Pico QD		VSM4RN6RQ7	VSM4RP6RQ7
 DIFFUSE	10-30 mm	2 m	LO	VSM4AN6CV10	VSM4AP6CV10
		3-Pin Pico QD		VSM4AN6CV10Q7	VSM4AP6CV10Q7
	20-50 mm	2 m		VSM4AN6CV20	VSM4AP6CV20
		3-Pin Pico QD		VSM4AN6CV20Q7	VSM4AP6CV20Q7
	50-140 mm	2 m		VSM4AN6CV50	VSM4AP6CV50
		3-Pin Pico QD		VSM4AN6CV50Q7	VSM4AP6CV50Q7

VSM5 (5 mm Threaded Barrel), 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 OPPOSED	250 mm	2 m	—	VSM56E Emitter	
		3-Pin Pico QD		VSM56EQ7 Emitter	
		2 m	DO	VSM5RN6R	VSM5RP6R
		3-Pin Pico QD		VSM5RN6RQ7	VSM5RP6RQ7
 DIFFUSE	10-30 mm	2 m	LO	VSM5AN6CV10	VSM5AP6CV10
		3-Pin Pico QD		VSM5AN6CV10Q7	VSM5AP6CV10Q7
	20-50 mm	2 m		VSM5AN6CV20	VSM5AP6CV20
		3-Pin Pico QD		VSM5AN6CV20Q7	VSM5AP6CV20Q7
	50-140 mm	2 m		VSM5AN6CV50	VSM5AP6CV50
		3-Pin Pico QD		VSM5AN6CV50Q7	VSM5AP6CV50Q7

For more specifications see page 241.

 **Connection options**: A model with a QD requires a mating cordset (see page 240).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Pico QD (for Q7 models)

See page 904

Length	Threaded 3-Pin Straight		Threaded 3-Pin Right-Angle	
2.00 m		PKG3M-2		PKW3M-2
5.00 m		PKG3M-5		PKW3M-5
9.00 m		PKG3M-9		PKW3M-9



Additional cordset information available. See page 904.

Brackets

VSM

SMBVSM4





VSMQ
Diffuse Models



VSM4
Opposed and
Diffuse Models



VSM5
Opposed and
Diffuse Models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

VSM Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Single-output:** 1 NPN or 1 PNP, Light Operate (LO) or Dark Operate (DO), depending on model
Output Rating	100 mA max. **OFF-state leakage current:** less than 1 µA **ON-state saturation voltage:** less than 2 V @ 100 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs Overload trip point ≥ 100 mA
Response Time	2.5 milliseconds
Delay at Power-up	20 milliseconds
Repeatability	1 millisecond
Indicators	**Yellow LED:** light sensed
Construction	300 series stainless steel with sapphire lens and PVC cable
Environmental Rating	IP67
Connections	2 m PVC-jacketed cable or 3-pin Pico-style integral QD (Q7), depending on model. QD cordsets ordered separately. See page 240.
Operating Conditions	**Operating temperature:** 0° to +55° C
Hookup Diagram	**Emitters:** DC02 (p. 974) **Receivers:** DC01 (p. 974)
Certification	CE UL LISTED

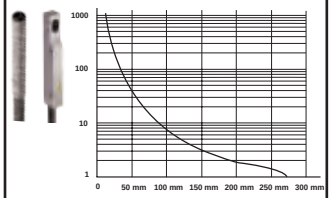
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

(Convergent performance based on 90% reflectance white test card)

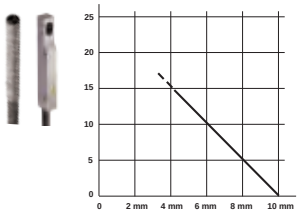
○ = Infrared LED

Opposed Mode VSM4 & VSM5



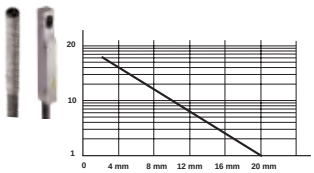
Range: 250 mm | LED: ○

Diffuse Mode VSM4 & VSM5



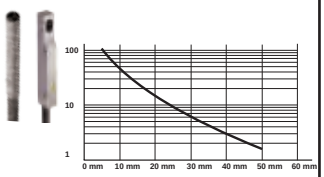
Range: 10 mm | LED: ○

Diffuse Mode VSM4 & VSM5



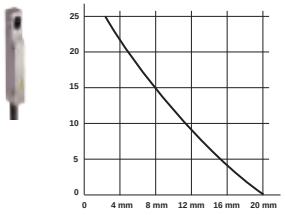
Range: 20 mm | LED: ○

Diffuse Mode VSM4 & VSM5



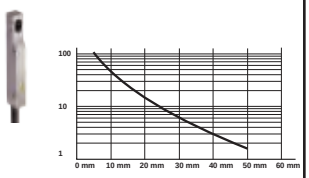
Range: 50 mm | LED: ○

Diffuse Mode VSMQ



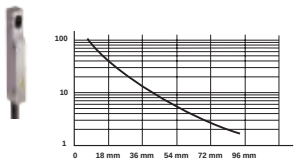
Range: 20 mm | LED: ○

Diffuse Mode VSMQ



Range: 50 mm | LED: ○

Diffuse Mode VSMQ



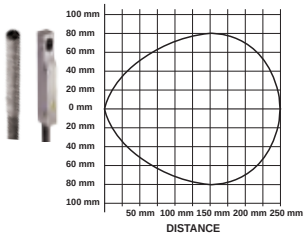
Range: 90 mm | LED: ○

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Beam Patterns (Convergent performance based on 90% reflectance white test card)

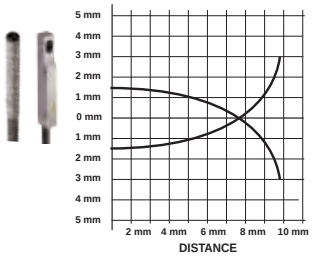
○ = Infrared LED

Opposed Mode VSM4 & VSM5



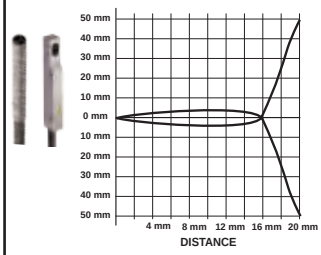
Range: 250 mm | LED: ○

Diffuse Mode VSM4 & VSM5



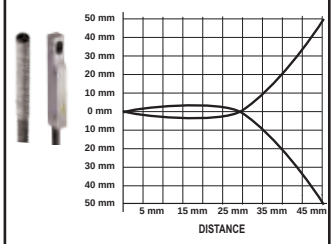
Range: 10 mm | LED: ○

Diffuse Mode VSM4 & VSM5



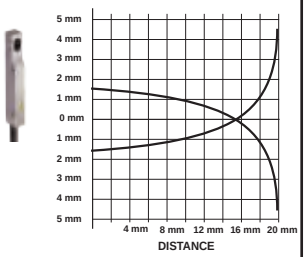
Range: 20 mm | LED: ○

Diffuse Mode VSM4 & VSM5



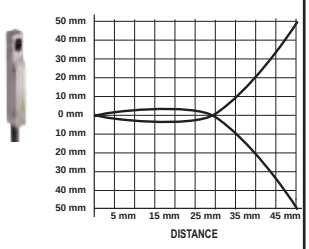
Range: 50 mm | LED: ○

Diffuse Mode VSMQ



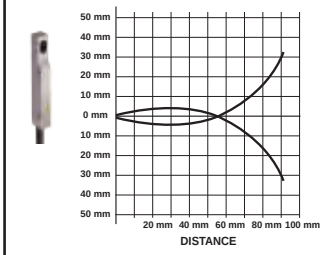
Range: 20 mm | LED: ○

Diffuse Mode VSMQ



Range: 50 mm | LED: ○

Diffuse Mode VSMQ



Range: 90 mm | LED: ○

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



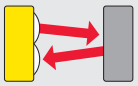
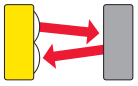
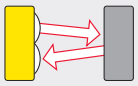
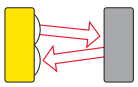
VS1
Miniature Self-Contained, Convergent-Mode Sensors

Small, high performance sensor can easily be embedded into the application.

- Small housing for powerful sensing performance in confined areas
- High-quality, low-cost replacement for competitive miniature sensors
- Available with 10 or 15 mm focal length
- Reliable sensing without adjustments
- Cordsets and brackets see page 245

Convergent VS1, 10-30 V DC

Red LED Infrared LED

Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 CONVERGENT	10 mm focus	2 m 3-Pin Pico Pigtail QD	LO	VS1AN5CV10 VS1AN5CV10Q	VS1AP5CV10 VS1AP5CV10Q
		2 m 3-Pin Pico Pigtail QD	DO	VS1RN5CV10 VS1RN5CV10Q	VS1RP5CV10 VS1RP5CV10Q
 CONVERGENT	15 mm focus	2 m 3-Pin Pico Pigtail QD	LO	VS1AN5CV20 VS1AN5CV20Q	VS1AP5CV20 VS1AP5CV20Q
		2 m 3-Pin Pico Pigtail QD	DO	VS1RN5CV20 VS1RN5CV20Q	VS1RP5CV20 VS1RP5CV20Q
 CONVERGENT	10 mm focus	2 m 3-Pin Pico Pigtail QD	LO	VS1AN5C10 VS1AN5C10Q	VS1AP5C10 VS1AP5C10Q
		2 m 3-Pin Pico Pigtail QD	DO	VS1RN5C10 VS1RN5C10Q	VS1RP5C10 VS1RP5C10Q
 CONVERGENT	15 mm focus	2 m 3-Pin Pico Pigtail QD	LO	VS1AN5C20 VS1AN5C20Q	VS1AP5C20 VS1AP5C20Q
		2 m 3-Pin Pico Pigtail QD	DO	VS1RN5C20 VS1RN5C20Q	VS1RP5C20 VS1RP5C20Q

For more specifications see page 246.

Connection options: A model with a QD requires a mating cordset (see page 245).

For 9 m cable, add suffix W/30 to the 2 m model number (example, VS1AN5CV10 W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Pico QD (for Q models)

See page 904

Length	Threaded 4-Pin Straight		Threaded 4-Pin Right-Angle	
2.00 m		PKG3M-2		PKW3M-2
5.00 m		PKG3M-5		PKW3M-5
9.00 m		PKG3M-9		PKW3M-9



Additional cordset information available.
See page 904.

Brackets

VS1

See page 856	See page 856	See page 855	See page 855
SMBVS1T	SMBVS1TC	SMBVS1S	SMBVS1SC
			



Additional brackets and information available.
See page 846.



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

VS1 Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at less than 25 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state switch NPN (current sinking) or PNP (current sourcing), depending on model Light Operate (LO) or Dark Operate (DO) models
Output Rating	50 mA max. OFF-state leakage current: less than 1 µA at 24 V dc ON-state saturation voltage: less than 0.25 V at 10 mA dc; less than 0.5 V at 50 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs Overload trip point ≥ 100 mA
Output Response Time	1 millisecond ON/OFF
Repeatability	250 microseconds
Indicators	Two LEDs: Green: power ON Yellow: light sensed
Construction	Black ABS/polycarbonate housing with clear acrylic lens
Environmental Rating	IP54; NEMA 3
Connections	2 m or 9 m attached cable, or 150 mm pigtail with 3-pin Pico-style quick-disconnect fitting. QD cables are ordered separately. See page 245.
Operating Conditions	Temperature: -20° to +55° C Relative humidity: 80% at 50° C (non-condensing)
Application Notes	M2 stainless steel mounting hardware is included. Optional mounting brackets are available. See page 245.
Certifications	CE
Hookup Diagrams	DC01 (p. 974)

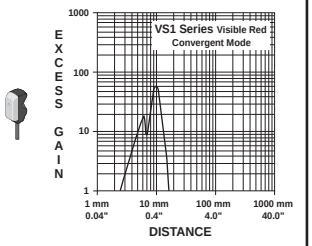
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

(Convergent performance based on 90% reflectance white test card)

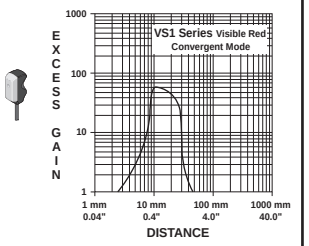
● = Visible Red LED ○ = Infrared LED

Convergent Mode VS1



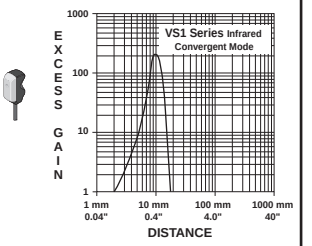
Range: 10 mm | LED: ●

Convergent Mode VS1



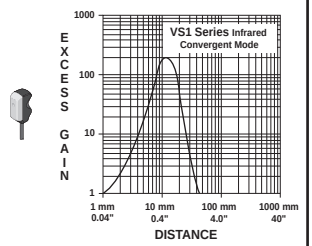
Range: 15 mm | LED: ●

Convergent Mode VS1



Range: 10 mm | LED: ○

Convergent Mode VS1



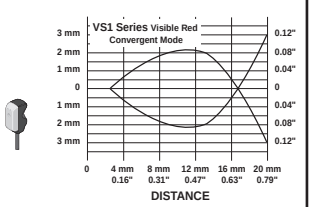
Range: 15 mm | LED: ○

Beam Patterns

(Convergent performance based on 90% reflectance white test card)

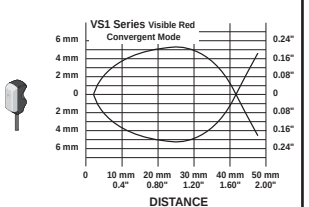
● = Visible Red LED ○ = Infrared LED

Convergent Mode VS1



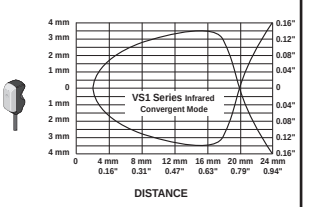
Range: 10 mm | LED: ●

Convergent Mode VS1



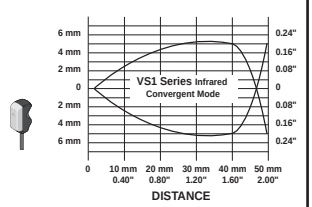
Range: 15 mm | LED: ●

Convergent Mode VS1



Range: 10 mm | LED: ○

Convergent Mode VS1



Range: 15 mm | LED: ○

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



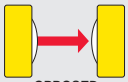
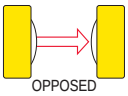
VS2
Economical, High-Quality Miniature Sensors

Ultra-thin VS2 miniatures sensors are suited to work well in confined areas while providing high performance.

- Offers flat-front mounting or optional bracket
- Reliable sensing without adjustments
- Models available in opposed or convergent modes
- Cordsets and brackets see page 249

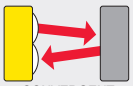
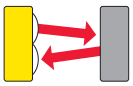
Opposed VS2, 10-30 V DC

Visible Red LED | Infrared LED

Sensing Mode	Range	Connection	Output Type	Models† NPN	Models† PNP
 OPPOSED	Optimum up to 600 mm, 1.2 m max.	2 m 3-Pin Pico Pigtail QD	—	VS25EV Emitter	
				VS25EVQ Emitter	
		2 m 3-Pin Pico Pigtail QD	LO	VS2AN5R	VS2AP5R
				VS2AN5RQ	VS2AP5RQ
		2 m 3-Pin Pico Pigtail QD	DO	VS2RN5R	VS2RP5R
				VS2RN5RQ	VS2RP5RQ
 OPPOSED	3.0 m	2 m 3-Pin Pico Pigtail QD	—	VS25E Emitter	
				VS25EQ Emitter	
		2 m 3-Pin Pico Pigtail QD	LO	VS2AN5R	VS2AP5R
				VS2AN5RQ	VS2AP5RQ
		2 m 3-Pin Pico Pigtail QD	DO	VS2RN5R	VS2RP5R
				VS2RN5RQ	VS2RP5RQ

Convergent VS2, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 CONVERGENT	15 mm ±5 mm	2 m 3-Pin Pico Pigtail QD	LO	VS2AN5CV15	VS2AP5CV15
				VS2AN5CV15Q	VS2AP5CV15Q
		2 m 3-Pin Pico Pigtail QD	DO	VS2RN5CV15	VS2RP5CV15
				VS2RN5CV15Q	VS2RP5CV15Q
 CONVERGENT	30 mm ±10 mm	2 m 3-Pin Pico Pigtail QD	LO	VS2AN5CV30	VS2AP5CV30
				VS2AN5CV30Q	VS2AP5CV30Q
		2 m 3-Pin Pico Pigtail QD	DO	VS2RN5CV30	VS2RP5CV30
				VS2RN5CV30Q	VS2RP5CV30Q

For more specifications see page 250.

Connection options: A model with a QD requires a mating cordset (see page 249).

For 9 m cable, add suffix W/30 to the 2 m model number (example, VS2RP5R W/30).

† Opposed-mode models also sold as pairs. Contact factory for more information 1-888-373-6767.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Pico QD (for Q models)

See page 904

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
2.00 m	PKG3M-2	PKW3M-2
5.00 m	PKG3M-5	PKW3M-5
7.00 m	PKG3M-7	—
9.00 m	PKG3M-9	PKW3M-9
10.0 m	PKG3M-10	—







Additional cordset information available. See page 904.

Brackets

VS2

See page 856

SMBVS2RA





Additional brackets and information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966







Opposed Models
Suffix E and R



Convergent Models
Suffix C

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

VS2 Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple) **Emitter:** 25 mA (visible red); 30 mA (infrared) **Convergent:** at less than 25 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state switch NPN (current sinking) or PNP (current sourcing), depending on model Light Operate (LO) or Dark Operate (DO), depending on model
Output Rating	50 mA max. **OFF-state leakage current:** less than 1 µA at 24 V dc **ON-state saturation voltage:** less than 0.25 V at 10 mA dc; less than 0.5 V at 50 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs Overload trip point ≥ 100 mA
Output Response Time	**Opposed:** 1 millisecond ON; 0.5 millisecond OFF **Convergent:** 1 millisecond ON; OFF
Delay at Power-up	Maximum 100 millisecond (opposed) and 150 millisecond (convergent); output does not conduct during this time
Repeatability	**Opposed:** 100 microseconds **Convergent:** 160 microseconds
Indicators	Two LEDs: **Green:** power ON **Yellow:** light sensed
Construction	**Opposed:** Black ABS housing with clear MABS lens **Convergent:** Black ABS housing with acrylic lens
Environmental Rating	IEC IP67; NEMA 6
Connections	2 m or 9 m attached cable or 150 mm pigtail with 3-pin Pico-style quick-disconnect fitting. QD cordsets are ordered separately. See page 249.
Operating Conditions	**Temperature:** -20° to +55° C **Relative humidity:** 80% at 50° C (non-condensing)
Vibration and Mechanical Shock	**Vibration:** All models meet IEC 60068-2-6, IEC 60947-5-2, UL491 Section 40, MIL-STD-202F Method 201A; 10 to 60 Hz, 0.5 mm peak to peak **Shock:** All models meet IEC 60068-2-27, IEC 60947-5-2; 30g peak acceleration, 11 millisecond pulse duration, half-sine wave pulse shape
Application Notes	M2 stainless steel mounting hardware is included. Optional mounting brackets are available. See page 249.
Certifications	CE
Hookup Diagrams	**Emitters:** DC02 (p. 974) **All others:** DC01 (p. 974)

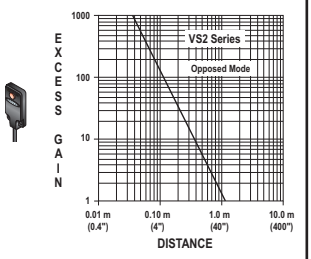
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

(Convergent mode performance based on 90% reflectance white test card)

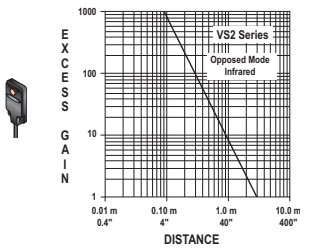
● = Visible Red LED ○ = Infrared LED

Opposed Mode VS2



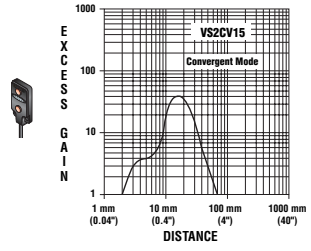
Range: 1.2 m | LED: ●

Opposed Mode VS2



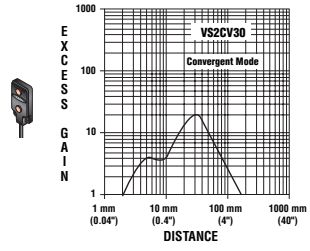
Range: 3 m | LED: ○

Convergent Mode VS2



Range: 15 mm | LED: ●

Convergent Mode VS2



Range: 30 mm | LED: ●

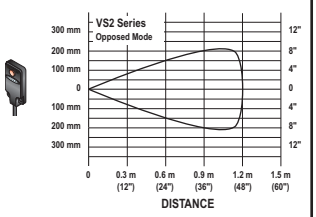
Beam Patterns

(Convergent mode performance based on 90% reflectance white test card)

● = Visible Red LED ○ = Infrared LED

Opposed Mode VS2

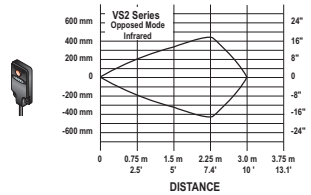
Effective Beam: 3 mm



Range: 1.2 m | LED: ●

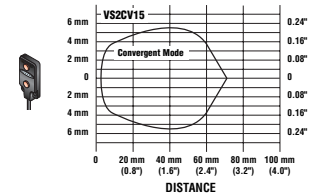
Opposed Mode VS2

Effective Beam: 3 mm



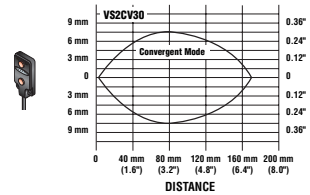
Range: 3 m | LED: ○

Convergent Mode VS2



Range: 15 mm | LED: ●

Convergent Mode VS2



Range: 30 mm | LED: ●

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

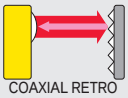


VS3
Miniature Sensors with Advanced Optics

The VS3 provides coaxial optics for close-range retro detection of the sensor.

- Reliable sensing without adjustments
- Uses coaxial optics to eliminate blind areas at close range
- Accurately detects shiny objects
- Visible sensing beam for easy alignment
- Cordsets and brackets see page 253

Coaxial & Coaxial Polar Retro VS3, 10-30 V DC

Sensing Mode	Range	Connection	Output Type	Models NPN †	Models PNP †
 COAXIAL RETRO	250 mm	2 m	LO	VS3AN5XLV	VS3AP5XLV
		3-Pin Pico QD		VS3AN5XLVQ	VS3AP5XLVQ
		2 m	DO	VS3RN5XLV	VS3RP5XLV
		3-Pin Pico QD		VS3RN5XLVQ	VS3RP5XLVQ
 P COAXIAL POLAR RETRO	250 mm	2 m	LO	VS3AN5XLP	VS3AP5XLP
		3-Pin Pico QD		VS3AN5XLPQ	VS3AP5XLPQ
		2 m	DO	VS3RN5XLP	VS3RP5XLP
		3-Pin Pico QD		VS3RN5XLPQ	VS3RP5XLPQ

For more specifications see page 254.

Connection options: A model with a QD requires a mating cordset (see page 253).

For 9 m cable, add suffix W/30 to the 2 m model number (example, VS3AN5XLV W/30).

† Retroflective range is specified using one model BRT-32X20AM retroreflector. Actual sensing range may differ, depending on efficiency and reflective area of the retroreflector in use. See accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Pico QD (for Q models)

See page 904

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
2.00 m	PKG3M-2	PKW3M-2
5.00 m	PKG3M-5	PKW3M-5
7.00 m	PKG3M-7	—
9.00 m	PKG3M-9	PKW3M-9
10.0 m	PKG3M-10	—





Additional cordset information available. See page 904.

Brackets

VS3

See page 856	See page 857
SMBVS3S	SMBVS3T



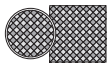




Additional brackets and information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966







Non-Polarized Retroreflective Models
Suffix LV

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

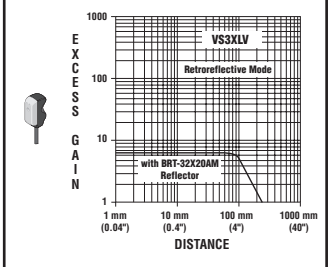
VS3 Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at less than 25 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state switch NPN (current sinking) or PNP (current sourcing), depending on model Light Operate (LO) or Dark Operate (DO), depending on model
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs Overload trip point ≥ 100 mA
Output Rating	50 mA max. **OFF-state leakage current:** less than 1 µA at 24 V dc **ON-state saturation voltage:** less than 0.25 V at 10 mA dc; less than 0.5 V at 50 mA dc
Output Response Time	1 millisecond ON/OFF
Delay at Power-up	150 millisecond; output does not conduct during this time
Repeatability	160 microseconds
Indicators	Two LEDs: Green: power ON Yellow: light sensed
Construction	**Non-polarized Retroreflective:** Black ABS housing with acrylic lens **Polarized Retroreflective:** Black ABS housing with glass lens and acrylic cover
Environmental Rating	IEC IP67; NEMA 6
Connections	2 m or 9 m attached cable, or 3-pin Pico-style quick-disconnect fitting. QD cordsets are ordered separately. See page 253.
Operating Conditions	**Temperature:** -20° to +55° C **Relative humidity:** 80% at 50° C (non-condensing)
Vibration and Mechanical Shock	**Vibration:** All models meet IEC 60068-2-6, IEC 60947-5-2, UL491 Section 40, MIL-STD-202F Method 201A; 10 to 60 Hz, 0.5 mm peak to peak **Shock:** All models meet IEC 60068-2-27, IEC 60947-5-2; 30g peak acceleration, 11 millisecond pulse duration, half-sine wave pulse shape
Application Notes	M3 stainless steel mounting hardware is included. Optional mounting brackets are available. See page 253.
Certifications	CE
Hookup Diagrams	**Emitters:** DC02 (p. 974) **All others:** DC01 (p. 974)

Excess Gain Curves

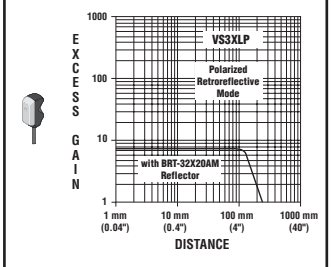
● = Visible Red LED P = Visible Red LED Polarized

Retroreflective Mode VS3



Range: 250 mm | LED: ●

Polarized Retroreflective Mode VS3

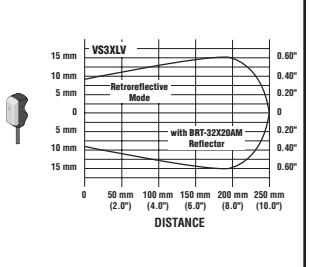


Range: 250 mm | LED: P

Beam Patterns

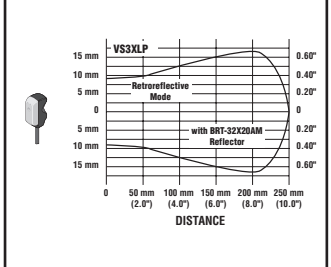
● = Visible Red LED P = Visible Red LED Polarized

Retroreflective Mode VS3



Range: 250 mm | LED: ●

Polarized Retroreflective Mode VS3



Range: 250 mm | LED: P

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

LOOKING FOR MORE



Q12 page 68

The Q12 sensor is a small sensor with high performance for powerful sensing in confined spaces.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Fiber Optic

Fiber optic cables are ideal for harsh conditions including high vibration, extreme heat, noisy, wet, corrosive or explosive environments. Fiber optic sensors have thin profiles, allowing for close mounting of multiple units and mounting in confined areas. Sensors can be positioned precisely where needed with flexible fibers.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Output Response Time	Dimensions H x W x D	Housing Material	Power Supply
	DF-G1 Easy to read dual display fiber amplifier page 260	High Speed: 200 µs Long Range: 2 ms Extra Long Range: 5 ms	33.0 x 72.0 x 10.0 mm	Black ABS/polycarbonate alloy	NPN/PNP models: 10 to 30 V dc IO-Link models: 18 to 30 V dc
	D10 Advanced fiber optic amplifier page 268	(depending on model)	35.9 x 68.1 x 10.0 mm	Black ABS/polycarbonate alloy	12 to 24 V dc
	D12 Plastic and glass fiber optic sensor page 278	500 µs (depending on model)	30.0 x 64.0 x 12.0 mm	Black ABS	10 to 30 V dc
	R55F Plastic and glass fiber optic sensor page 284	50 µs	85.4 x 30.0 x 25.0 mm	Black ABS/polycarbonate blend	10 to 30 V dc

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

The broadest selection of fiber systems in the world

When to Use Fiber Systems

- **Confined areas.** The small size and flexibility of fibers allows precise positioning where space is limited.
- **High temperatures.** Fiber optic assemblies can tolerate elevated temperatures—in some cases as high as 480° C.
- **High vibration and shock.** The low mass of fibers enables them to withstand extreme vibration and mechanical shock.
- **Corrosive and wet environments.** Special-purpose fibers withstand corrosive materials, moisture and even repeated washdown.
- **Explosive environments.** Fibers are passive and can safely pipe light to and from hazardous areas.
- **Noisy environments.** Fibers are non-electronic mechanical components and are completely immune to electrical noise.
- **Unique target shapes and requirements.** Fiber optic sensing heads can be custom designed and optimally shaped to the physical and optical requirements of a specific application.

Typical Applications

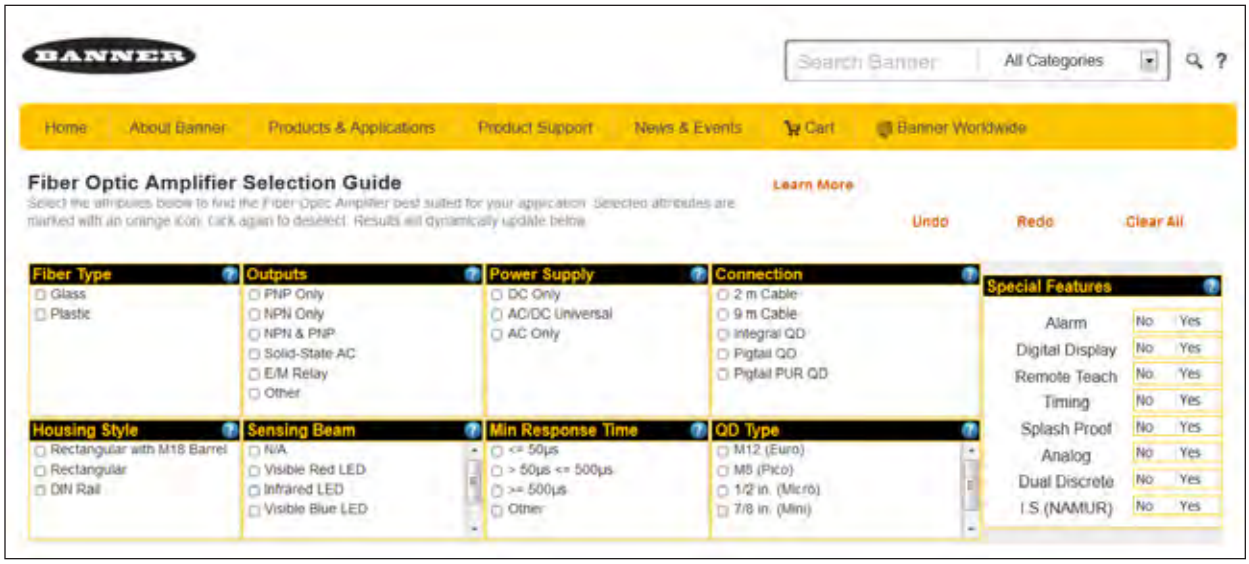
- Punch presses
- Vibratory feeders
- Conveyors
- Web control
- Tablet counting
- Ovens
- Semiconductor processing equipment
- Liquid level

Sealed Machine Mountable Sensors for use with Fibers

Sensor Model	Models for Plastic Fibers	Models for Glass Fibers	Page Number
WORLD-BEAM® QS18			page 30
MINI-BEAM®			page 112
QM42			page 150
Q45			page 80
OMNI-BEAM™			web only
FI22			web only
ECONO-BEAM®			web only
MAXI-BEAM®			web only
MULTI-BEAM®			web only
PC44			web only
VALU-BEAM®			web only

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Fiber Optic Amplifier Selection Tool



The Fiber Optic Amplifier Selection Guide at *bannerengineering.com/selectionguide/fiberamp* is a tool that allows you to quickly and easily refine your search by selecting key model criteria. Relevant model results will be displayed dynamically as you choose different criteria from the selection tool. If you cannot find what you are looking for, contact a Banner Application Engineer at 1-888-3-SENSOR.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

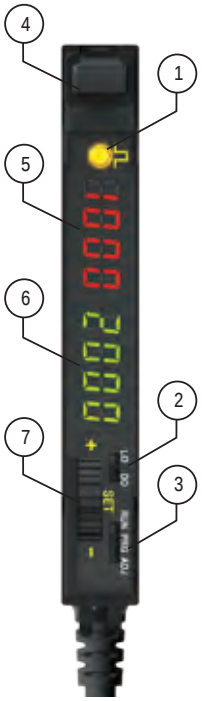


DF-G1

Expert™ Dual-Display Fiber Amplifier

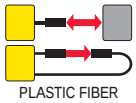
The DF-G1 Series has a simple user interface to ensure easy sensor set-up and programming via displays and switches/buttons, remote input teach wire or IO-Link.

- Easy-to-read dual digital displays shows signal level and threshold simultaneously
- Expert TEACH and SET methods available
- End user has full control over operating parameters, including Light/Dark Operate, output timing functions, gain level and response speed
- Cross talk avoidance algorithm allows multiple sensors to operate in close proximity
- Visible red LED sensing beam for easy alignment

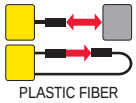


1 Output LED
2 LO/DO Switch
3 RUN/PRG/ADJ Mode Switch
4 Lever Action Fiber Clamp
5 Red Signal Level
6 Green Threshold
7 +/Set/- Rocker Button

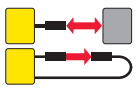
DF-G1, 10-30 V DC

Sensing Mode	Connection	Range	Output	Model
 PLASTIC FIBER	2 m	Range varies by Speed Selection used and with fiber optics used. See fibers section on page 303 or reference website for range information.	NPN	DF-G1-NS-2M
			PNP	DF-G1-PS-2M
	Integral M8 Pico connector		NPN	DF-G1-NS-Q7
			PNP	DF-G1-PS-Q7

DF-G1 with IO-Link, 10-30 V DC

Sensing Mode	Connection	Range	Output	Model	
 PLASTIC FIBER	2 m	Range varies by Speed Selection used and with fiber optics used. See fibers section on page 303 or reference website for range information.	IO-Link	DF-G1-KS-2M	NEW
	150 mm PVC pigtail, M12 Euro connector		IO-Link	DF-G1-KS-Q5	NEW
	Integral M8 Pico connector		IO-Link	DF-G1-KS-Q7	NEW

DF-G1 Light Receiver, 10-30 V DC

Sensing Mode	Connection	Range	Output	Model	
 PLASTIC FIBER	2 m	Range varies by response speed used, gain setting, target light source intensity, ambient light level and with fiber optics used. See fibers section on page 303 or reference website for range information.	NPN	DF-G1-NR-2M	NEW
			PNP	DF-G1-PR-2M	NEW
	Integral M8 Pico connector		NPN	DF-G1-NR-Q7	NEW
			PNP	DF-G1-PR-Q7	NEW

For more specifications see page 262.

Connection options: A model with a QD requires a mating cordset (see page 261).

For 9 m cable, change the suffix 2M to 9M in the 2 m model number (example, DF-G1-NS-9M).
For M8 Pico pigtail change the suffix 2M to Q3 in the 2 m model number (example, DF-G1-NS-Q3).
For M12 Euro pigtail change the suffix 2M to Q5 in the 2 m model number (example, DF-G1-NS-Q5).

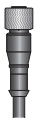
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q5 models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA





Additional cordset information available.
See page 904.

Pico QD (for Q3 models)

See page 906

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
2.00 m	PKG4M-2	PKW4M-2
5.00 m	PKG4M-5	PKW4M-5
9.00 m	PKG4M-9	PKW4M-9





Brackets

DF-G1

See page 854

DIN-35..



See page 854

SA-DIN-BRACKET



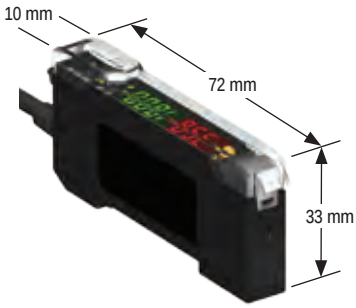
Additional bracket information available.
See page 846.

Clamps

DF-G1

SA-DIN-CLAMP





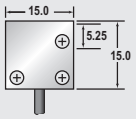
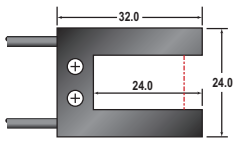
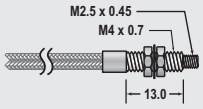
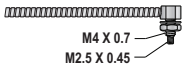
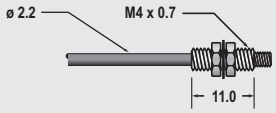
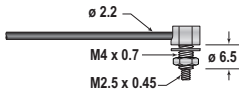
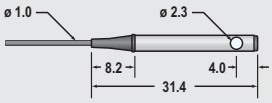
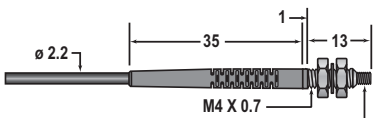
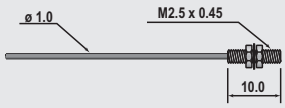
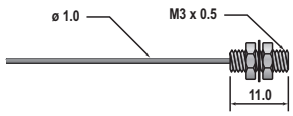
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DF-G1 Specifications

Supply Voltage and Current	NPN/PNP Models: 10 to 30 V dc (10% max ripple) IO-Link Models: 18 to 30 V dc (10% max ripple) Standard Mode: 960 mW, Current consumption < 40 mA @ 24 V dc ECO Display Mode: 720 mW, Current consumption < 30 mA @ 24 V dc
Supply Protection Circuitry	Protected against reverse polarity, over voltage, and transient voltages
Output Configuration	NPN/PNP Models: 1 current sourcing (PNP) or 1 current sinking (NPN) output, depending on model IO-Link Models: 1 push-pull and 1 PNP (complementary outputs)
Output Rating	100 mA max. load (derate 1 mA per ° C above 30° C) OFF-state leakage current: NPN/PNP: < 5 µA at 30 V dc IO-Link: < 50 µA at 30 V dc ON-state saturation voltage: NPN: < 1.5 V PNP: < 2 V IO-Link: < 2 V
Output Protection Circuitry	Protected against output short-circuit, continuous overload, transient over-voltages, and false pulse on power up
Output Response Time	High Speed: 200 us Standard: 500 us Long Range: 2 ms Extra Long Range: 5 ms
Delay at Power-up	500 milliseconds max.; outputs do not conduct during this time
Adjustments	3-way RUN/PRG/ADJ Mode Switch 2-way LO/DO Switch 3-way +/SET/- Rocker Button See data sheet for detailed information.
Indicators	Red 4-digit Display: Signal Level Green 4-digit Display: Threshold (In Program Mode, Red and Green displays are used for programming menus) Yellow LED: Output conducting
Construction	Black ABS/polycarbonate alloy (UL94 V-0 rated) housing, clear polycarbonate cover
Environmental Rating	IEC IP50, NEMA 1
Connections	PVC-jacketed 2 or 9 m 4-wire integral cable, integral 4-pin Pico-style QD, Pico-style QD or Euro QD. See page 261.
Operating Conditions	Temperature: -10° to +55° C Storage: -20° to +85° C Relative Humidity: 90% @ 60° C (non-condensing)
Certifications	CE, cULus LISTED 3T.J.J IND. CONT. EQ, IO-Link®
Hookup Diagrams	DC07 (p. 975)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

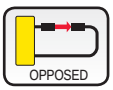
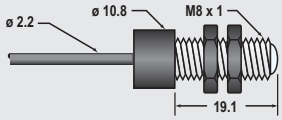
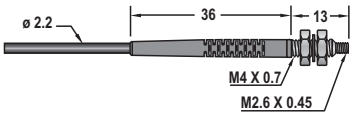
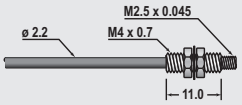
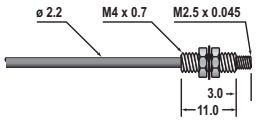
DF-G1 Range with Selected Opposed Plastic Fiber Optics (See page 286 for other fibers)

Fiber Mode	End Tip (mm)	Features	Typical Range (mm)	Model
Array OPPOSED		• 16X 0.265 mm core diameter • 25 mm bend radius • Ultra-compact head; side exit; 5.25 mm width	Standard or High Speed: 240 Long Range: 490 Extra Long Range: 640	PIRS1X166U
Slot OPPOSED		• 1.0 mm core diameter • 25 mm bend radius • Easy mount “fork” head; DURA-BEND fiber	Standard or High Speed: 12 Long Range: 12 Extra Long Range: 12	PDIS46UM12
SteelSkin™ OPPOSED		• 1.0 mm core diameter • 12 mm bend radius • Threaded • Stainless steel	Standard or High Speed: 280 Long Range: 580 Extra Long Range: 740	PIT43TMB5
		• 1.0 mm core diameter • 12 mm bend radius • Threaded right angle • Stainless steel	Standard or High Speed: 280 Long Range: 580 Extra Long Range: 470	PIAT43TMB5MTA
High-Flex OPPOSED		• 1.0 mm core diameter • 1.0 mm bend radius • Threaded • Lens models available	Standard or High Speed: 170 Long Range: 340 Extra Long Range: 440	PIT46UHF
		• 1.0 mm core diameter • 2 mm bend radius • Right angle; threaded • Lens models available	Standard or High Speed: 190 Long Range: 390 Extra Long Range: 490	PIAT46UHFMTA
Standard OPPOSED		• 0.5 mm core diameter • 12 mm bend radius • Low beam divergence angle of 2° • Ideal for wafer mapping	Standard or High Speed: 860 Long Range: 1690 Extra Long Range: 2090	PLIS-1
		• 0.5 mm core diameter • 12 mm bend radius • Threaded • Overmold flex relief	Standard or High Speed: 60 Long Range: 170 Extra Long Range: 220	PIT26UMFR
		• 0.25 mm core diameter • 8 mm bend radius • Threaded	Standard or High Speed: 20 Long Range: 47 Extra Long Range: 58	PIT16U
		• 0.5 mm core diameter • 12 mm bend radius • Threaded	Standard or High Speed: 60 Long Range: 170 Extra Long Range: 220	PIT26U

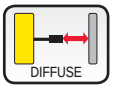
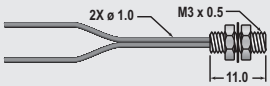
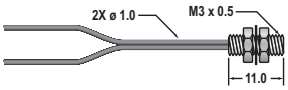
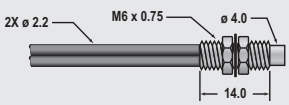
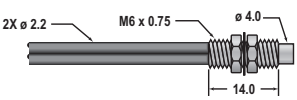
Indicates lens available for model. See page 309 for details.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DF-G1 Range with Selected Opposed Plastic Fiber Optics (See page 286 for other fibers)

Fiber Mode	End Tip (mm)	Features	Typical Range (mm)	Model
Standard 		• 1.0 mm core diameter • 25 mm bend radius • Plastic lens; ultra-long range	Standard or High Speed: 2000 Long Range: 3000 Extra Long Range: 4000	PIL46U
		• 1.0 mm core diameter • 25 mm bend radius • Lens models available • Threaded	Standard or High Speed: 300 Long Range: 640 Extra Long Range: 840	PIT46UMFR
		• 1.0 mm core diameter • 25 mm bend radius • Lens models available • Threaded	Standard or High Speed: 300 Long Range: 630 Extra Long Range: 820	PIT46U
		• 1.5 mm core diameter • 38 mm bend radius • Lens models available • Threaded	Standard or High Speed: 400 Long Range: 1130 Extra Long Range: 1320	PIT66U

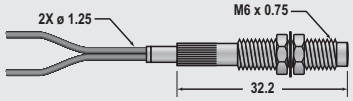
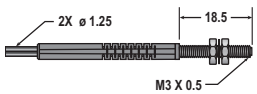
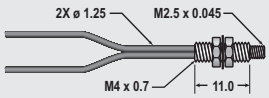
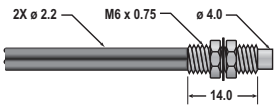
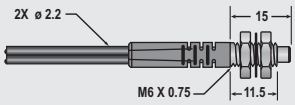
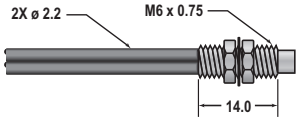
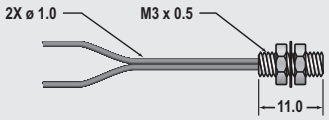
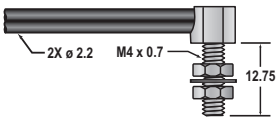
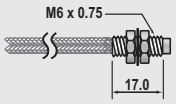
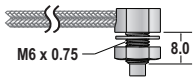
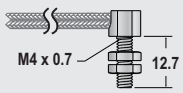
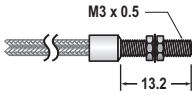
DF-G1 Range with Selected Diffuse Plastic Fiber Optics (See page 286 for other fibers)

Fiber Mode	End Tip (mm)	Features	Typical Range (mm)	Model
Standard 		• 0.25 mm core diameter • 8 mm bend radius • Thread	Standard or High Speed: 5 Long Range: 10 Extra Long Range: 12	PBT16U
		• 0.5 mm core diameter • 12 mm bend radius • Thread	Standard or High Speed: 20 Long Range: 70 Extra Long Range: 80	PBT26U
		• 1.0 mm core diameter • 25 mm bend radius • Thread	Standard or High Speed: 100 Long Range: 190 Extra Long Range: 220	PBT46U
		• 1.5 mm core diameter • 38 mm bend radius • Thread; long range	Standard or High Speed: 160 Long Range: 270 Extra Long Range: 310	PBT66U

 Indicates lens available for model. See page 309 for details.

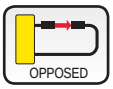
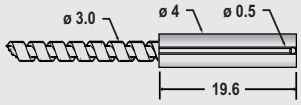
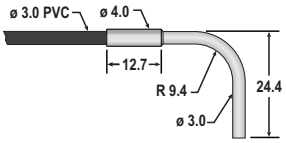
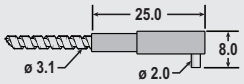
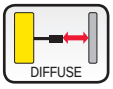
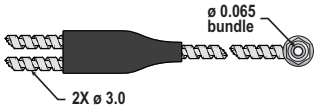
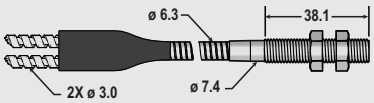
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DF-G1 Range with Selected Diffuse Plastic Fiber Optics (See page 286 for other fibers)

Fiber Mode	End Tip (mm)	Features	Typical Range (mm)	Model
Coaxial DIFFUSE		• 0.5 (9X 0.25) mm core diameter • 12 mm bend radius • Anodized AL tip; ø 0.5-3.2 mm beam spot • Glass lens	Standard or High Speed: 50 Long Range: 50 Extra Long Range: 50	PLI-A10
		• 0.5 (10X 0.25) mm core diameter • 12 mm bend radius • Thread • Overmolded flex relief	Standard or High Speed: 42 Long Range: 75 Extra Long Range: 80	PBCT26UMFR
		• 0.5 (9X 0.25) mm core diameter • 12 mm bend radius • Thread	Standard or High Speed: 44 Long Range: 80 Extra Long Range: 90	PBCT26UM4M2.5
		• 1.0 (16X 0.265) mm core diameter • 25 mm bend radius • Thread	Standard or High Speed: 100 Long Range: 190 Extra Long Range: 220	PBCT46U
		• 1.0 (16X 0.265) mm core diameter • 25 mm bend radius • Thread • Overmolded flex relief	Standard or High Speed: 100 Long Range: 110 Extra Long Range: 230	PBCT46UMFR
High Flex DIFFUSE		• 1.0 mm core diameter • 1.0 mm bend radius • Thread	Standard or High Speed: 65 Long Range: 120 Extra Long Range: 140	PBT46UHF
		• 0.5 mm core diameter • 1.0 mm bend radius • Thread	Standard or High Speed: 20 Long Range: 35 Extra Long Range: 40	PBT26UHF
		• 1.0 mm core diameter • 2.0 mm bend radius • Threaded right angle • Stainless Steel	Standard or High Speed: 60 Long Range: 100 Extra Long Range: 120	PBAT46UHFMTA
SteelSkin™ DIFFUSE		• 1.0 mm core diameter • 12 mm bend radius • Threaded • Stainless Steel	Standard or High Speed: 80 Long Range: 180 Extra Long Range: 230	PBT43TMB5
		• 1.0 mm core diameter • 12 mm bend radius • Threaded right angle • Stainless Steel	Standard or High Speed: 70 Long Range: 160 Extra Long Range: 210	PBAT43TMB5MTA
		• 0.5 & 9X 0.25 mm core diameter • 12 mm bend radius • Threaded right angle • Stainless Steel • Coaxial	Standard or High Speed: 30 Long Range: 60 Extra Long Range: 80	PBCT23TMB5MTA
		• 0.5 & 9X 0.25 mm core diameter • 12 mm bend radius • Threaded • Stainless Steel • Coaxial	Standard or High Speed: 40 Long Range: 80 Extra Long Range: 110	PBCT23TMB5

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DF-G1 Range with Selected Glass Fiber Optics (See page 286 for other fibers)

Fiber Mode	End Tip (mm)	Features	Typical Range (mm)	Model
Standard 		• 0.9 mm core diameter • 12 mm bend radius • Smooth ferrule • Side exit • Stainless steel	Standard or High Speed: 65 Long Range: 130 Extra Long Range: 170	IA.31.7ST5ETA
		• 1.3 mm core diameter • 16 mm bend radius • Smooth ferrule • 90° angle • Stainless steel	Standard or High Speed: 290 Long Range: 620 Extra Long Range: 810	IA.82.5PT5
		• 1.3 mm core diameter • 12 mm bend radius • Smooth ferrule • Side exit • Stainless steel	Standard or High Speed: 300 Long Range: 640 Extra Long Range: 810	IA.83.3ST5ETA
Standard 		• 1.7 mm core diameter • 12 mm bend radius • Threaded right angle • Stainless steel	Standard or High Speed: 110 Long Range: 230 Extra Long Range: 270	BAT16.6ST5MTA
		• 1.5 mm core diameter • 19 mm bend radius • Threaded • Stainless steel	Standard or High Speed: 100 Long Range: 200 Extra Long Range: 240	BT13.5ST5

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DF-G2 High-Speed Expert™ Dual-Display Fiber Amplifier



The DF-G2 has a 10 microsecond response time and 5 microsecond repeatability. It is an easy-to-use sensor with a dual display and single output.

- Fast response time
- Precise repeatability
- Detect fast transitions or short event duration
- Ideal for applications such as wafer position, wire/thread break detection, registration mark sensing



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



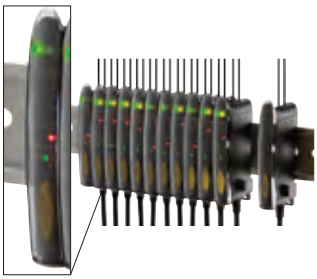
D10 Series
High-Performance Fiber Optic Sensing

- Features advanced fiber optic amplifier for use with plastic fibers
- Available with a numeric or bargraph display on *Expert*™ models
- Delivers high-performance, low-contrast sensing with automatic TEACH options or manual adjustment
- Available with visible red or green beam
- Available in Light or Dark Operate
- Includes specially designed models for reliable detection of objects as small as 1.5 mm
- Features bussable models for side-by-side mounting and simplified wiring of up to 16 sensors
- Features thin 10 mm housing for standard 35 mm DIN-rail mounting
- Cordsets and brackets see page 272



D10 *Expert*™ with Numeric Display

- Numeric display of signal strength and operating status
- Two output options: two discrete outputs in the same sensor; or discrete output and either a 4-20 mA current or a 0-10 V dc voltage analog output in the same sensor
- Push buttons for easy-to-set static, dynamic light set, dark set and window set programming
- Manual fine tuning and remote configuration using TEACH wire
- Four mode power and speed selection with automatic crosstalk avoidance circuity
- Response times as fast as 50 microseconds



D10 *Expert*™ with Bargraph Display

- Easy-to-read 8-segment light bar display indicator for TEACH and signal strength
- Bipolar discrete outputs: one current sourcing (PNP) and one current sinking (NPN)
- Push buttons for easy-to-set static, dynamic light set, dark set and window set programming
- Manual fine tuning
- Bussable power models with improved temperature compensation for side-by-side mounting and simplified wiring of up to 16 sensors
- Selectable high-speed mode option for 200 microsecond response



D10—Discrete Output

- 12-turn manual sensitivity adjustment
- Pulse rate LED indicator for signal strength
- Bipolar discrete outputs: one current sourcing (PNP) and one current sinking (NPN)
- Response time as fast as 200 microseconds



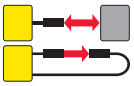
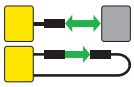
D10 *Expert*™ Small Object Counter

- Reliable low-contrast sensing for small object counting
- Easy-to-set selectable threshold with automatic compensation algorithm to compensate for dust or contamination on the fiber optic array and for ambient temperature changes
- Single discrete output plus Health mode output to indicate preventative maintenance is required
- A choice of three standard size fiber optic assemblies
- Custom size fibers for your application
- User-configurable Dynamic Event Stretcher (DES) to prevent double counting of objects
- Push buttons or remote wire for easy sensor configuration

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

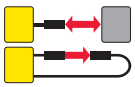
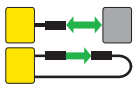
D10 *Expert*™ with Numeric Display—Dual Discrete, 12-24 V DC

Visible Red LED
Visible Green LED

Sensing Mode	Range	Connection	Models Dual NPN	Models Dual PNP
 PLASTIC FIBER	Range varies by Power Level/Speed Selection used and with fiber optics used. See data sheet for range information.	2 m	D10DNFP	D10DPFP
		6-pin Snap-on Pico QD	D10DNFPQ	D10DPFPQ
 PLASTIC FIBER		2 m	D10DNFPG	D10DPFPG
		6-pin Snap-on Pico QD	D10DNFPGQ	D10DPFPGQ

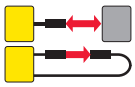
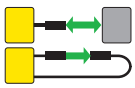
D10 *Expert*™ with Numeric Display—Analog/Discrete, 12-24 V DC

Visible Red LED
Visible Green LED

Sensing Mode	Range	Connection	Analog Output	Models NPN	Models PNP
 PLASTIC FIBER	Range varies by Power Level/Speed Selection used and with fiber optics used. See data sheet for range information.	2 m	4-20 mA	D10INFP	D10IPFP
		6-pin Snap-on Pico QD	4-20 mA	D10INFPQ	D10IPFPQ
 PLASTIC FIBER		2 m	4-20 mA	D10INFPG	D10IPFPG
		6-pin Snap-on Pico QD	4-20 mA	D10INFPGQ	D10IPFPGQ

D10 *Expert*™ with Numeric Display—Analog/Discrete, 15-24 V DC

Visible Red LED
Visible Green LED

Sensing Mode	Range	Connection	Analog Output	Models NPN	Models PNP
 PLASTIC FIBER	Range varies by Power Level/Speed Selection used and with fiber optics used. See fibers section on page 303 or reference data sheet for range information.	2 m	0-10V	D10UNFP	D10UPFP
		6-pin Snap-on Pico QD	0-10V	D10UNFPQ	D10UPFPQ
 PLASTIC FIBER		2 m	0-10V	D10UNFPG	D10UPFPG
		6-pin Snap-on Pico QD	0-10V	D10UNFPGQ	D10UPFPGQ

For more specifications see pages 272-276.

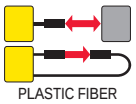
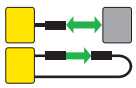
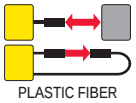
Connection options: A model with a QD requires a mating cordset (see page 272).

For 9 m cable, add suffix W/30 to the 2 m model number (example, D10DNFP W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

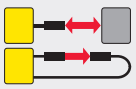
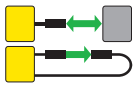
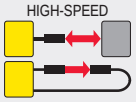
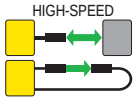
D10 *Expert*™ with Bargraph Display—Discrete

Visible Red LED Visible Green LED

Sensing Mode	Range	Connection	Output Type	Supply Voltage	Description	Models
 PLASTIC FIBER	Range varies by Power Level/ Speed Selection used and with fiber optics used. See fibers section on page 303 or reference data sheet for range information.	2 m	Bipolar NPN/PNP	10 to 30 V dc	Standard models	D10BFP
		6-pin Snap-on Pico QD	Bipolar NPN/PNP	10 to 30 V dc	Standard models	D10BFPQ
 PLASTIC FIBER		2 m	Bipolar NPN/PNP	10 to 30 V dc	Standard models	D10BFPG
		6-pin Snap-on Pico QD	Bipolar NPN/PNP	10 to 30 V dc	Standard models	D10BFPGQ
Bussable Power Models						
 PLASTIC FIBER	Range varies by Power Level/ Speed Selection used and with fiber optics used. See fibers section on page 303 or reference data sheet for range information.	2 m	Bipolar NPN/PNP	12 to 30 V dc	Main unit	D10B5FP
		2 m	PNP	12 to 30 V dc	Sub unit	D10B2PFP
		2 m	NPN	12 to 30 V dc	Sub unit	D10B2NFP

D10—Discrete, 10-30 V DC

Visible Red LED Visible Green LED

Sensing Mode	Range	Connection	Output Type	Response Time	Models
 PLASTIC FIBER	Range varies by Power Level/Speed Selection used and with fiber optics used. See fibers section on page 303 or reference data sheet for range information.	2 m	Bipolar NPN/PNP	500 microseconds	D10AFP
		4-pin Snap-on Pico QD	Bipolar NPN/PNP	500 microseconds	D10AFPQ
 PLASTIC FIBER		2 m	Bipolar NPN/PNP	500 microseconds	D10AFPG
		4-pin Snap-on Pico QD	Bipolar NPN/PNP	500 microseconds	D10AFPGQ
 HIGH-SPEED PLASTIC FIBER	Range varies by Power Level/Speed Selection used and with fiber optics used. See fibers section on page 303 or reference data sheet for range information.	2 m	Bipolar NPN/PNP	200 microseconds	D10AFPY
		4-pin Snap-on Pico QD	Bipolar NPN/PNP	200 microseconds	D10AFPYQ
 HIGH-SPEED PLASTIC FIBER		2 m	Bipolar NPN/PNP	200 microseconds	D10AFPGY
		4-pin Snap-on Pico QD	Bipolar NPN/PNP	200 microseconds	D10AFPGYQ

For more specifications see pages 272-276.

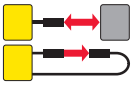
Connection options: A model with a QD requires a mating cordset (see page 272).

For 9 m cable, add suffix W/30 to the 2 m model number (example, D10UNFP W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

D10 *Expert*™ Small Object Counter with Numeric Display—Discrete, 12-24 V DC

Visible Red LED

Sensing Mode/LED	Connection	Output	Sensor Models
 PLASTIC FIBER	2 m	NPN	D10DNCFP
	6-pin Snap-on Pico QD		D10DNCFPQ
	2 m	PNP	D10DPCFP
	6-pin Snap-on Pico QD		D10DPCFPQ

Fiber Optic Arrays

Detection Window Dimensions**	Fiber Exit	Minimum Object Detection†	Array Models*
10 x 25 mm	Side Exit	1.5 mm	PFCVA-10X25-S
	End Exit		PFCVA-10X25-E
25 x 25 mm	Side Exit	3 mm	PFCVA-25X25-S
	End Exit		PFCVA-25X25-E
34 x 25 mm	Side Exit	4 mm	PFCVA-34X25-S
	End Exit		PFCVA-34X25-E

For more specifications see pages 272-276.

Connection options: A model with a QD requires a mating cordset (see page 272).

For 9 m cable, add suffix W/30 to the 2 m model number (example, D10DNDFP W/30).

* Custom fiber arrays and mounting configurations are possible. Consult factory for assistance with your small object counting application.
** For detailed dimension drawings of fibers see below.
† With 2% Threshold Offset Percentage



D10 *Expert*™ Models with Numeric Display



D10—Discrete Models



D10 *Expert*™ Models with Bargraph Display

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Pico QD (for ..Q7 or ..Q models)

See page 906

Length	Snap-on				
	4-Pin Straight	6-Pin Straight	4-Pin Right-Angle	6-Pin Right-Angle
2.00 m	PKG4-2	PKG6Z-2	PKW4Z-2	PKW6Z-2
2.00 m	—	PKG6Z-9	—	PKW6Z-9

Additional cordset information available. See page 904.

Brackets

D10

See page 854	See page 855	See page 855
DIN-35...	SMBR55F01	SMBR55FRA





Additional brackets and more information available. See page 846.

D10 *Expert*™ with Numeric Display—Dual-Discrete Specifications

Required Fiber Optic Cable	Banner P-Series plastic fibers (See Plastic Fiber Optic section, page 286)
Supply Voltage and Current	12 to 24 V dc (10% max. ripple) at less than 65 mA, exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient voltage
Output Configuration	Two independently configured current sourcing (PNP) or current sinking (NPN) solid-state transistors, depending on model
Output Rating	150 mA max. load OFF-state leakage current: less than 10 µA at 24 V dc ON-state saturation voltage: NPN: less than 1.5 V at 150 mA load PNP: less than 2.5 V at 150 mA load
Output Protection Circuitry	Protected against false pulse on power-up and continuous short-circuit
Output Response Time	Programmable, 50 microseconds, 200 microseconds, 1 millisecond, 2.5 milliseconds
Delay at Power-up	Less than 1 second; outputs do not conduct during this time
Adjustments	Two push buttons or remote programming of (TEACH) switching threshold response time, OFF-delay, Light/Dark Operate, and display
Indicators	Four-digit digital display plus LED indicators for active channel, push-button lockout, OFF-delay and Light/Dark Operate selection; two yellow LED output indicators
Construction	Black ABS/polycarbonate alloy (UL94 V-0 rated) housing, clear polycarbonate cover
Environmental Rating	IEC IP50; NEMA 1
Connections	PVC-jacketed 2 m or 9 m 6-wire integral cable, or integral 6-pin Pico-style quick-disconnect fitting. QD cordsets are ordered separately. See page page 272.
Operating Conditions	Temperature: -20° to +55° C Storage Temperature: -20° to +80° C Relative humidity: 90% @ 50° C

Number of Devices Stacked	Ambient Temperature Rating	Load Specification
3	55° C	150 mA
7	50° C	50 mA
10	45° C	50 mA

Installation	35 mm DIN rail or included mounting bracket
Certifications	CE cULus
Hookup Diagrams	DC15 (p. 977)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

D10 *Expert*™ with Numeric Display—Analog/Discrete Specifications

Required Fiber Optic Cable	Banner P-Series plastic fibers (See Plastic Fiber Optic section, page 286)		
Supply Voltage and Current	4-20 mA Analog Models: 12-24 V dc (10% max. ripple) at less than 65 mA exclusive of load 0-10 V dc Analog Models: 15-24 V dc (10% max. ripple) at less than 70 mA exclusive of load		
Supply Protection Circuitry	Protected against reverse polarity and transient voltage		
Output Configuration	Two independently configurable outputs, depending on model: NPN w/analog (4-20 mA or 0-10 V) or PNP w/analog (4-20 mA or 0-10 V)		
Output Rating	Discrete Output: 150 mA, max. load OFF-state leakage current: less than 10 µA at 24 V dc ON-state saturation voltage: NPN: < 1.5 V @ 150 mA PNP: < 2.5 V @ 150 mA	Analog Output: 4-20 mA or 0-10 V dc Load: 4-20 mA Models: 100Ω max. impedance 0-10 V dc Models: 1 MΩ min. impedance	
Output Protection Circuitry	Protected against false pulse on power-up and continuous short-circuit		
Output Response Time	Discrete Output: Programmable, 50 microseconds, 200 microseconds, 1 millisecond, 2.5 milliseconds Analog Output: 1 millisecond		
Delay at Power-up	Less than 1 second; outputs do not conduct during this time		
Adjustments	Push-button or remote programming of (TEACH) switching threshold response time, OFF-delay, Light/Dark Operate, and display		
Indicators	Four-digit digital display plus LED indicators for active channel, push-button lockout, OFF-delay and Light/Dark Operate selection; two yellow output indicators		
Construction	Black ABS/polycarbonate alloy (UL94 V-0 rated) housing, clear polycarbonate cover		
Environmental Rating	IEC IP50; NEMA 1		
Connections	PVC-jacketed 2 m or 9 m 6-wire integral cable, or integral 6-pin Pico-style quick-disconnect. QD cordsets are ordered separately. See page 272.		
Operating Conditions	Temperature: -20° to +55° C	Storage Temperature: -20° to +80° C	Relative humidity: 90% @ 50° C
	Number of Devices Stacked	Ambient Temperature Rating	Load Specification
	3	55° C	150 mA
	7	50° C	50 mA
	10	45° C	50 mA
Installation	35 mm DIN rail or included mounting bracket		
Certifications	CE cULus		
Hookup Diagrams	NPN Models: DC16 (p. 977) PNP Models: DC17 (p. 978)		

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

D10 *Expert*™ with Bargraph Display—Discrete Specifications

	Standard Sensors	Models with Bussable Power
Required Fiber Optic Cable	Banner P-Series plastic fibers (See Plastic Fiber Optic section, page 286)	
Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at less than 45 mA, exclusive of load	12 to 30 V dc (10% max. ripple) at less than 45 mA, exclusive of load
Supply Protection Circuitry	Protected against reverse polarity, over voltage and transient voltage	
Delay at Power Up	200 milliseconds max.; outputs do not conduct during this time	850 milliseconds max.; outputs do not conduct during this time
Output Configuration	Bipolar: 1 current sourcing (PNP) and 1 current sinking (NPN)	Main units: Bipolar; 1 current sourcing (PNP) and 1 current sinking (NPN) Sub-units: 1 current sourcing (PNP) or 1 current sinking (NPN) output, depending on model
Output Rating	150 mA max. load @ 25° C (derate 1 mA per ° C increase) OFF-state leakage current: less than 5 µA at 30 V dc ON-state saturation voltage: NPN: less than 200 mV at 10 mA and 1 V at 150 mA load PNP: less than 1 V at 10 mA and 1.5 V at 150 mA load	100 mA max. load (derate 1 mA per ° C) OFF-state leakage current: less than 5 µA at 30 V dc ON-state saturation voltage: NPN: less than 1.5 V PNP: less than 2 V Less than 15 V supply (9 m cable): up to 4 units with 100 mA outputs up to 8 units with 50 mA outputs
Output Protection Circuitry	Protected against output short-circuit, continuous overload, transient over-voltages, and false pulse on power-up	
Output Response Time	500 microseconds (normal mode) or 200 microseconds (high-speed mode)	
Repeatability	100 microseconds (normal mode) or 66 microseconds (high-speed mode)	
Adjustments	Two push buttons and remote wire • *Expert* -style configuration (Static and Dynamic TEACH, light SET, dark SET and Windows SET) • Manually Adjust (+/–) sensitivity (from buttons only) • LO/DO, OFF-Delay, and response speed configurable (from buttons or remote wire) • Push-button lockout (from remote wire only) Factory Default Settings: Light Operate, Normal Speed, No Delay	
Indicators	8-segment red bargraph* Green Status Indicators: LO, DO, High Speed (HS) and OFF-Delay Green LED: Power ON Yellow LED: Output conducting *See data sheet for detailed information	
Construction	Black ABS/polycarbonate alloy (UL94 V-0 rated) housing, clear polycarbonate cover	
Environmental Rating	IEC IP50, NEMA 1	
Connections	PVC-jacketed 2 m or 9 m 6-wire integral cable, or integral 6-pin Pico-style quick-disconnect. QD cordsets are ordered separately. See page 272.	Main units: PVC-jacketed 2 m or 9 m 5-wire integral cable Sub-units: PVC-jacketed 2 m or 9 m 2-wire integral cable
Operating Conditions	Temperature: -10° to +55° C Storage Temperature: -20° to +85° C Relative humidity: 90% @ 55° C	
Installation	35 mm DIN rail or included mounting bracket	
Certifications		
Hookup Diagrams	Standard Models and Main Unit: DC08 (p. 975) Sub-Units: DC09 (p. 976)	

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

D10—Discrete Specifications

Required Fiber Optic Cable	Banner P-Series plastic fibers (See Plastic Fiber Optic section, page 286)
Supply Voltage & Current	10 to 30 V dc (10% max. ripple) @ less than 25 mA, exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient voltage
Output Configuration	**Bipolar:** 1 current sourcing (PNP) and 1 current sinking (NPN)
Output Rating	100 mA per output with short circuit protection **OFF-state leakage current:** less than 10 µA sourcing; 200 µA sinking **ON-state saturation voltage:** **NPN:** 1.6 V @ 100 mA **PNP:** 2.0 V @ 100 mA
Output Protection Circuitry	Protected against output short-circuit and false pulse on power up
Delay at Power-up	Max. 100 milliseconds; outputs do not conduct during this time
Output Response Time	**Standard models (with crosstalk avoidance circuitry):** 500 microseconds **High-speed models:** 200 microseconds
Repeatability	**Standard models:** 95 microseconds **High-speed models:** 50 microseconds
Adjustments	12-turn Sensitivity potentiometer with relative position indicator; LO/DO Selection switch; 0 or 40 milliseconds OFF-delay switch NOTE: Use proper ESD techniques while making adjustments under cover
Indicators	**Two LEDs:** Green and Yellow **Green:** Power ON **Yellow:** Light Sensed Signal strength indicator See data sheet for detailed information
Construction	Black ABS/polycarbonate alloy (UL94 V-0 rated) housing, clear polycarbonate cover
Environmental Rating	IEC IP50; NEMA 1
Connections	PVC-jacketed 2 m or 9 m attached cable, or 4-pin Pico-style quick-disconnect fitting. QD cordsets are ordered separately. See page 272.
Operating Conditions	**Temperature:** -10° to +55° C **Storage:** -20° to +85° C **Relative humidity:** 90% @ 55° C (non-condensing)
Certifications	CE c UL us
Hookup Diagrams	DC04 (p. 974)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

D10 *Expert*™ Small Object Counter—Numeric Display Specifications

Required Fiber Optics	PFCVA models (Custom fiber arrays and mounting configurations are possible. Consult factory for assistance with your small object counting application.)
Sensing Beam	Visible red, 680 nm
Supply Voltage and Current	12 to 24 V dc (10% maximum ripple) at less than 65 mA, exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient voltage
Output Configuration	2 NPN or 2 PNP, depending on model
Output Rating	150 mA maximum load OFF-state leakage current: < 10 µA at 24 V dc ON-state saturation voltage: NPN < 1.5 V at 150 mA load PNP < 2.5 V at 150 mA load
Output Protection Circuitry	Protected against false pulse on power-up and continuous short-circuit
Output Response Time	Programmable, 150 microseconds, 225 microseconds, 300 microseconds
Delay at Power-up	Less than 1 second; outputs do not conduct during this time
Adjustments	Push-button or remote programming of threshold offset percentage, Light/Dark Operate, Dynamic Event Stretcher (DES), display, and power/speed
Indicators	Four-digit digital display, 2 arrow icons, push-button lockout, Dynamic Event Stretcher, Light/Dark Operate selection and 2 amber output LEDs
Construction	Black ABS/polycarbonate alloy (UL94 V-0 rated) housing, clear polycarbonate cover
Environmental Rating	NEMA 1; IEC IP50
Connections	PVC-jacketed 2 m or 9 m 6-wire integral cable or integral 6-pin Pico-style quick-disconnect. QD cordsets are ordered separately. See page 272.
Operating Conditions	Temperature: -20° to +55° C Storage Temperature: -20° to +80° C Relative Humidity: 90% @ 50° C (non-condensing)

Number of Devices, Stacked	Ambient Temperature Rating	Load Specification
3	55° C	150 mA
7	50° C	50 mA
10	45° C	50 mA

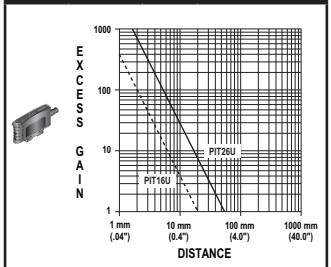
Installation	35 mm DIN rail or included mounting bracket
Certifications	CE
Hookup Diagrams	DC18 (p. 978)

Excess Gain Curves

(Diffuse-mode performance based on 90% reflectance white test card)

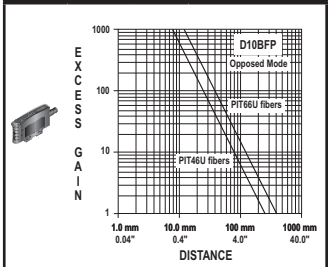
● = Visible Red LED ● = Visible Green LED

Opposed Mode D10 *Expert*™ with Bargraph



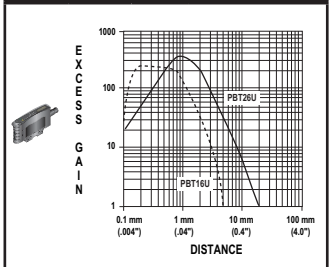
Range: Varies | LED: ●

Opposed Mode D10 *Expert*™ with Bargraph



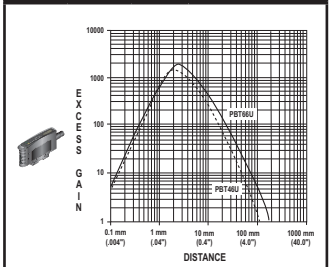
Range: Varies | LED: ●

Diffuse Mode D10 *Expert*™ with Bargraph



Range: Varies | LED: ●

Diffuse Mode D10 *Expert*™ with Bargraph



Range: Varies | LED: ●

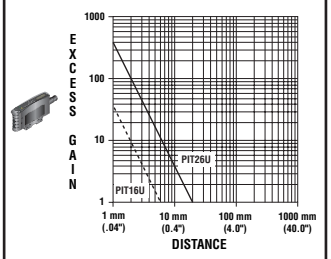
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

(Diffuse-mode performance based on 90% reflectance white test card)

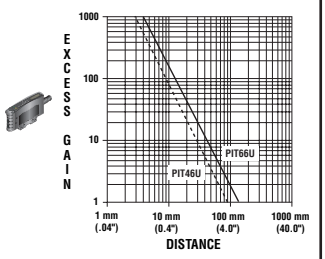
● = Visible Red LED ● = Visible Green LED

Opposed Mode D10 *Expert*™ with Bargraph



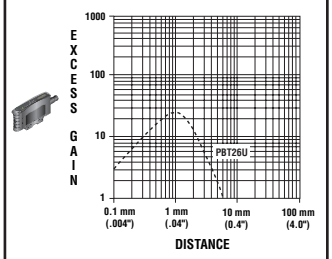
Range: Varies | LED: ●

Opposed Mode D10 *Expert*™ with Bargraph



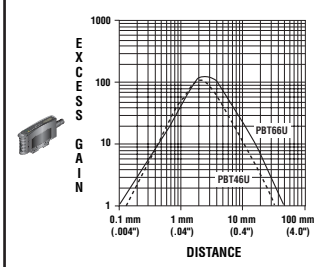
Range: Varies | LED: ●

Diffuse Mode D10 *Expert*™ with Bargraph



Range: Varies | LED: ●

Diffuse Mode D10 *Expert*™ with Bargraph



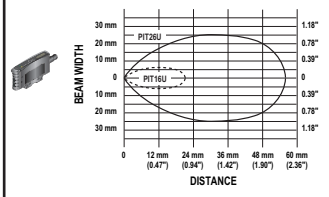
Range: Varies | LED: ●

Beam Patterns

(Diffuse-mode performance based on 90% reflectance white test card)

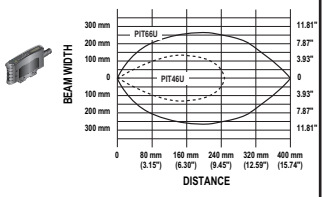
● = Visible Red LED ● = Visible Green LED

Opposed Mode D10 *Expert*™ with Bargraph



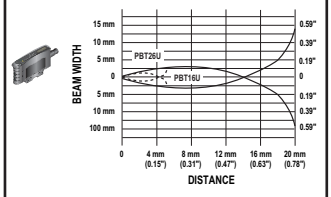
Range: Varies | LED: ●

Opposed Mode D10 *Expert*™ with Bargraph



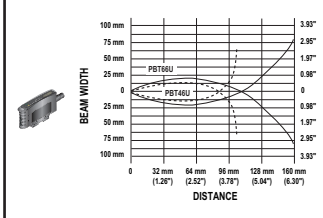
Range: Varies | LED: ●

Diffuse Mode D10 *Expert*™ with Bargraph



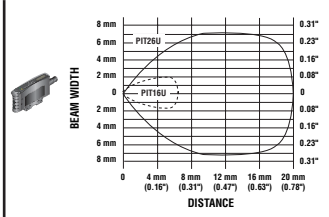
Range: Varies | LED: ●

Diffuse Mode D10 *Expert*™ with Bargraph



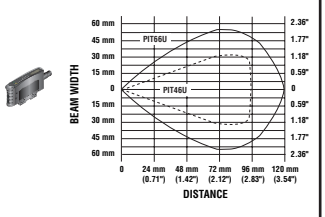
Range: Varies | LED: ●

Opposed Mode D10 *Expert*™ with Bargraph



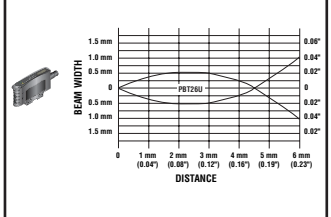
Range: Varies | LED: ●

Opposed Mode D10 *Expert*™ with Bargraph



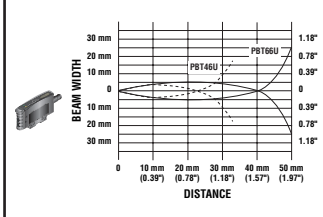
Range: Varies | LED: ●

Diffuse Mode D10 *Expert*™ with Bargraph



Range: Varies | LED: ●

Diffuse Mode D10 *Expert*™ with Bargraph



Range: Varies | LED: ●

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



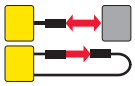
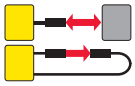
D12
Plastic and Glass Fiber Optic Sensors

The D12 features an LED bargraph that indicates signal strength, sensing contrast, programming status and diagnostic warnings.

- Includes marginal gain indicator with alarm output
- Available in high-speed and high-power models
- Features easy push-button TEACH-mode setup on D12E *Expert*™ models
- Easily mounts to standard 35 mm DIN-rail mounting
- Cordsets and brackets see page 280

D12 *Expert*™, 10-30 V DC

Visible Red LED

Sensing Mode	Maximum Range	Switching Threshold Setting	Connection	Models NPN	Models PNP
 GLASS FIBER	Range varies by sensing mode and fiber optics used. See data sheet for maximum range specifications.	Just above the “dark” condition	2 m	D12EN6FV	D12EP6FV
		Midway between “dark” and “light” conditions	2 m	D12E2N6FV	D12E2P6FV
 PLASTIC FIBER		Just above the “dark” condition	2 m	D12EN6FP	D12EP6FP
		Midway between “dark” and “light” conditions	2 m	D12E2N6FP	D12E2P6FP

For more specifications see page 280.

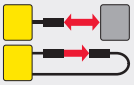
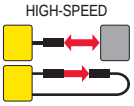
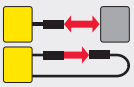
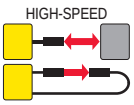
Connection options: A model with a QD requires a mating cordset (see page 280).

For 9 m cable, add suffix W/30 to the 2 m model number (example, D12EN6FV W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

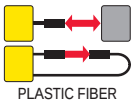
D12 and D12 High-Speed, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Response	Models NPN	Models PNP
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m	500 µs	D12SN6FV	D12SP6FV
		4-Pin Pico Pigtail QD		D12SN6FVQ	D12SP6FVQ
 HIGH-SPEED GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m	Selectable 50 µs or 500 µs*	D12SN6FVY	D12SP6FVY
		4-Pin Pico Pigtail QD		D12SN6FVYQ	D12SP6FVYQ
		2 m		D12SN6FVY1†	D12SP6FVY1†
		4-Pin Pico Pigtail QD		D12SN6FVY1Q†	D12SP6FVY1Q†
 PLASTIC FIBER	Range varies by sensing mode and fiber optics used	2 m	500 µs	D12SN6FP	D12SP6FP
		4-Pin Pico Pigtail QD		D12SN6FPQ	D12SP6FPQ
 HIGH-SPEED PLASTIC FIBER	Range varies by sensing mode and fiber optics used	2 m	Selectable 50 µs or 500 µs*	D12SN6FPY	D12SP6FPY
		4-Pin Pico Pigtail QD		D12SN6FPYQ	D12SP6FPYQ
		2 m		D12SN6FPY1†	D12SP6FPY1†
		4-Pin Pico Pigtail QD		D12SN6FPY1Q†	D12SP6FPY1Q†

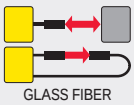
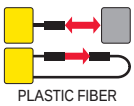
D12 High-Power, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Response	Models NPN	Models PNP
 PLASTIC FIBER	Range varies by sensing mode and fiber optics used	2 m	500 µs	D12SN6FPH	D12SP6FPH
		4-Pin Pico Pigtail QD		D12SN6FPHQ	D12SP6FPHQ

D12 AC-Coupled, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Output Response	Models
 GLASS FIBER	Range varies by Power Level/ Speed Selection used and with fiber optics used. See data sheet for range information.	2 m	Bipolar NPN/PNP	50 µs	D12DAB6FV
		4-Pin Pico Pigtail QD			D12DAB6FVQ
 PLASTIC FIBER	Range varies by Power Level/ Speed Selection used and with fiber optics used. See data sheet for range information.	2 m	Bipolar NPN/PNP	50 µs	D12DAB6FP
		4-Pin Pico Pigtail QD			D12DAB6FPQ

For more specifications see page 280-281.

Connection options: A model with a QD requires a mating cordset (see page 280).

For 9 m cable, add suffix W/30 to the 2 m model number (example, D12SN6FV W/30).

† Y1 models have 20 milliseconds output pulse stretcher.

* When 50 microseconds is selected, bargraph is disabled.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Pico QD (for ..Q models)

See page 906

Length	Snap-on 4-Pin	
	Straight	Right-Angle
2.00 m	PKG4-2	PKW4Z-2




Additional cordset information available. See page 904.

Brackets

D12

See page 854	See page 855	See page 855
DIN-35...	SMBR55F01	SMBR55FRA





Additional brackets and more information available. See page 846.

D12 *Expert*™ Specifications

Supply Voltage and Current	10 to 30 V dc at 45 mA max. (exclusive of load); 10% max. ripple
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	NPN open collector (both outputs) or PNP open collector (both outputs), depending on model Load output: Normally open and programmable Light or Dark Operate; Alarm output: Normally open
Output Rating	150 mA max. each output OFF-state leakage current: less than 10 µA at 30 V dc ON-state saturation voltage: less than 1 volt at 10 mA dc; less than 1.5 volts at 150 mA dc The total load may not exceed 150 mA
Output Protection Circuitry	Protected against false pulse on power-up and short circuit of outputs (trips at 175 mA)
Output Response Time	200 microseconds ON/OFF (40 milliseconds OFF when OFF-delay selected) NOTE: False pulse protection circuit causes a 0.1 second delay on power-up
Output Operation Mode	Light or Dark Operate: selected by push button
Output Timing Functions	ON/OFF (no delay) or fixed 40 millisecond OFF-delay; selected by push button
Repeatability	66 microseconds
Adjustments	Push-button TEACH-mode sensitivity setting; Remote teaching input is provided
Indicators	Green: power ON and flashes when ready for TEACH mode Yellow: output conducting 7-segment moving dot red LED See data sheet for detailed information
Mounting Bracket	D12 Sensors mount directly to a standard DIN rail, or may be through-hole mounted using the supplied mounting bracket and M3 x 0.5 hardware
Construction	Black ABS housing with acrylic cover, stainless steel M3 x 0.5 hardware for use with thermoplastic polyester mounting bracket (supplied); the plastic fiber clamping element is acetal
Environmental Rating	IEC IP11; NEMA 2
Connections	PVC-jacketed 2 m or 9 m cables, or 150 mm pigtail with 4-pin Pico-style quick-disconnect (QD) are available. QD cordsets are ordered separately. See page 280.
Operating Conditions	Temperature: -20° to +70° C Relative humidity: 90% at 50° C (non-condensing)
Certifications	CE c UL US
Hookup Diagrams	DC19 (p. 978)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

D12 Standard, High-Speed and High-Power Specifications

Supply Voltage and Current	10 to 30 V dc at 45 mA max. (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Outputs are NPN (sinking) or PNP (sourcing), depending on model Complementary: one normally open (NO) and the other normally closed (NC); NC output may be wired as diagnostic alarm output by reversing power supply connections except high speed "Y" and "Y1" suffix models (see hookups)
Output Rating	150 mA max. each output OFF-state leakage current: less than 10 µA at 30 V dc ON-state saturation voltage: less than 1 V at 10 mA dc; less than 1.5 V at 150 mA dc The total load may not exceed 150 mA
Output Protection Circuitry	Protected against false pulse on power-up and short circuit of outputs
Output Response Time	Standard and High-Power Models: 500 microseconds ON/OFF High-Speed Models: selectable 50 or 500 microseconds ON/OFF NOTE: False pulse protection circuit causes a 0.1 second delay on power-up
Output Timing Functions	"Y1" models have fixed 20 milliseconds pulse stretcher (OFF-delay) when 50 microseconds mode is used
Repeatability	130 microseconds; "Y" and "Y1" models have selectable 50 microseconds/500 microseconds response; repeatability in 50 microseconds mode is 15 microseconds
Adjustments	15-turn adjustment sensitivity; "Y" and "Y1" (high-speed models) also have a response mode selector switch
Indicators	Two top-mounted LED indicators: one yellow and one green, and one 7-segment red LED moving dot bargraph; Note that the 7-segment bargraph and marginal excess gain indication (bargraph segment #7) are inoperative in the 50 µs response mode of "Y" and "Y1" models Green: LED lights for DC Power ON Yellow: LED lights for normally open output conducting On all models in 500 microseconds response mode, the 7-segment moving dot red LED bargraph lights to indicate relative received light signal strength; On all models in 50 and 500 microseconds response mode, segment #1 flashes to indicate OUTPUT OVERLOAD; On all models in the 500 microseconds response mode, segment #7 flashes to indicate MARGINAL EXCESS GAIN; On standard and high-power models, a flashing LED corresponds to the "ON" state of the alarm output; (Alarm output not available on Y & Y1 models)
Mounting Bracket	D12 Sensors mount directly to a standard DIN rail, or may be through-hole mounted using the supplied mounting bracket and M3 x 0.5 hardware
Construction	Black ABS housing with acrylic cover, stainless steel M3 x 0.5 hardware for use with thermoplastic polyester mounting bracket (supplied); the plastic fiber clamping element is acetal
Environmental Rating	IEC IP11; NEMA 2
Connections	PVC-jacketed 2 m or 9 m cables, or 150 mm pigtail with 4-pin Pico-style quick-disconnect (QD) are available. QD cordsets are ordered separately. See page 280.
Operating Conditions	Temperature: -20° to +70° C Relative humidity: 90% at 50° C (non-condensing)
Certifications	CE c UL us
Hookup Diagrams	NPN Models: DC05 (p. 975) PNP Models: DC06 (p. 975)



Plastic Fiber Models
Suffix FP and FPY

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

D12 AC-Coupled Specifications

Supply Voltage and Current	10 to 30 V dc at 60 mA max. (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Bipolar: one NPN (current sinking) and one PNP (current sourcing) open-collector transistor
Output Rating	150 mA max. each output OFF-state leakage current: less than 10 µA at 30 V dc ON-state saturation voltage: less than 1 volt at 10 mA dc; less than 1.5 volts at 150 mA dc The total load may not exceed 150 mA
Output Protection Circuitry	Protected against false pulse on power-up and short circuit of outputs
Output Response Time	50 microseconds ON/OFF NOTE: False pulse protection circuit causes a 0.1 second delay on power-up
Output Operation Mode	Light Operate or Dark operate: selected by switch
Output Timing Functions	Pulse output; adjustable from 1 to 70 milliseconds
Repeatability	15 microseconds ON
Adjustments	Three top-panel controls: SENSITIVITY control (15-turn slotted brass screw, clutched at both ends of adjustment), a Light- or Dark-Operate select switch, and an OUTPUT PULSE adjustment (3/4-turn potentiometer)
Indicators	Three top-mounted LED indicators: Green LED: Lights to indicate dc Power ON Yellow LED: Lights for Output Conducting Red LED: Lights whenever AGC system is locked onto the signal
Mounting Bracket	D12 Sensors mount directly to a standard DIN rail, or may be through-hole mounted using the supplied mounting bracket and M3 x 0.5 hardware
Construction	Black ABS housing with acrylic cover, stainless steel M3 x 0.5 hardware for use with thermoplastic polyester mounting bracket (supplied); the plastic fiber clamping element is acetal
Environmental Rating	IEC IP11; NEMA 2
Connections	PVC-jacketed 2 m or 9 m cables, or 150 mm pigtail with 4-pin Pico-style quick-disconnect (QD) are available. QD cordsets are ordered separately. See page 280.
Operating Conditions	Temperature: -40° to +70° C Relative humidity: 90% at 50° C (non-condensing)
Application Note	D12 AC-coupled sensors should not be used in areas of known electrical “noise” or RF fields.
Certifications	CE c UL us
Hookup Diagrams	DC04 (p. 974)

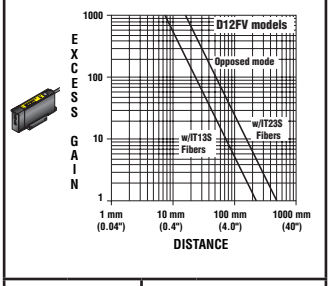
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

(Diffuse-mode performance based on 90% reflectance white test card)

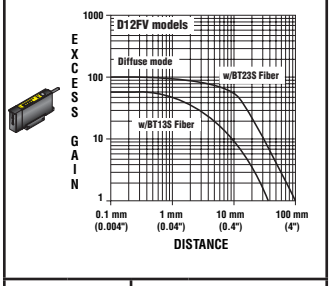
● = Visible Red LED

Opposed Mode—Glass Fiber D12 Standard



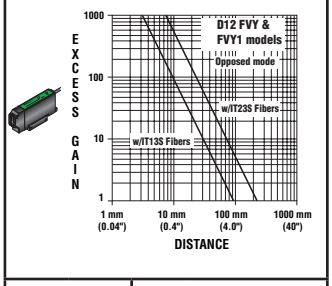
Range: Varies | LED: ●

Diffuse Mode—Glass Fiber D12 Standard



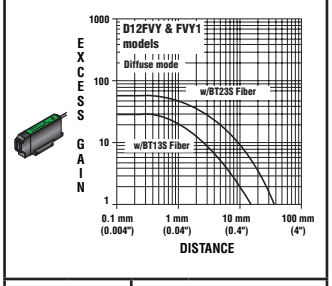
Range: Varies | LED: ●

Opposed Mode—Glass Fiber D12 High Speed



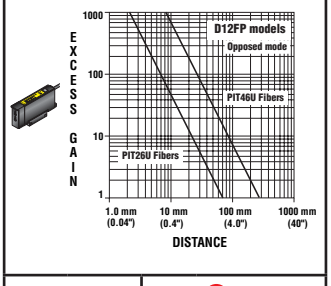
Range: Varies | LED: ●

Diffuse Mode—Glass Fiber D12 High Speed



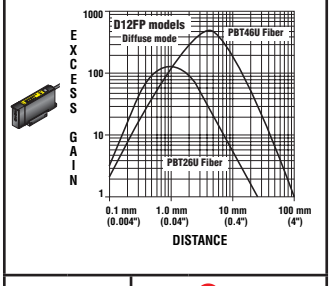
Range: Varies | LED: ●

Opposed Mode—Plastic Fiber D12 Standard



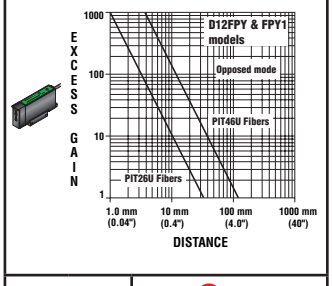
Range: Varies | LED: ●

Diffuse Mode—Plastic Fiber D12 Standard



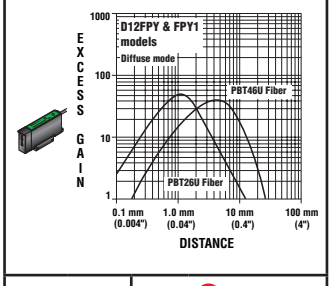
Range: Varies | LED: ●

Opposed Mode—Plastic Fiber D12 High Speed



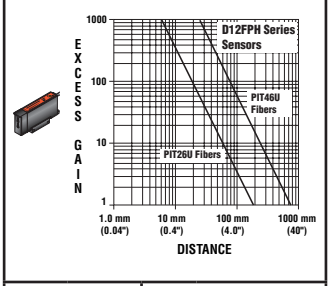
Range: Varies | LED: ●

Diffuse Mode—Plastic Fiber D12 High Speed



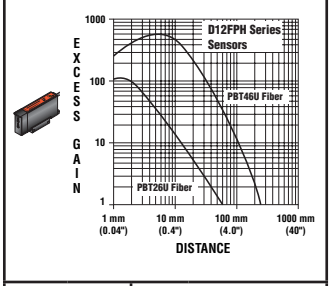
Range: Varies | LED: ●

Opposed Mode—Plastic Fiber D12 High Power



Range: Varies | LED: ●

Diffuse Mode—Plastic Fiber D12 High Power



Range: Varies | LED: ●



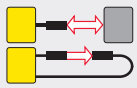
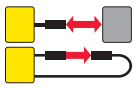
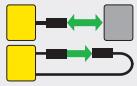
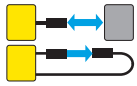
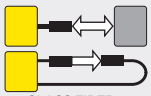
R55F
Glass or Plastic Fiber Optic Sensors

Delivers outstanding color contrast sensitivity

- Features innovative TEACH function with two options for setting the sensing threshold
- Reliably detects 16 levels of grayscale at up to 10,000 actuations per second
- Available in two fiber types: economical plastic for repeated flexing and glass for harsh conditions
- Easily mounts in confined areas, either flat or to 35 mm DIN rail
- Provides bipolar (NPN/PNP) outputs with delay settings of 0, 20 and 40 milliseconds
- Clearly displays relative received signal strength with 10-element indicator bargraph

R55F Fiber Optic, 10-30 V DC

Visible Green LED | Visible Blue LED | Visible White LED | Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models Glass	Models Plastic
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m	Bipolar NPN/PNP	R55F	—
		5-pin Euro QD		R55FQ	—
 GLASS FIBER		2 m		R55FV	R55FP
		5-pin Euro QD		R55FVQ	R55FPQ
 GLASS FIBER		2 m		R55FVG	R55FPG
		5-pin Euro QD		R55FVGQ	R55FPGQ
 GLASS FIBER		2 m		R55FVB	R55FPB
		5-pin Euro QD		R55FVBQ	R55FPBQ
 GLASS FIBER		2 m		R55FVW	R55FPW
		5-pin Euro QD		R55FVWQ	R55FPWQ

For plastic models change V to P (example R55PV)

Connection options: A model with a QD requires a mating cordset (see page 285).

For 9 m cable, add suffix W/30 to the 2 m model number (example, R55F W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

R55F Fiber Optic Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at less than 70 mA, exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Bipolar:** One current sourcing (PNP) and one current sinking (NPN) open-collector transistor
Output Rating	150 mA max each output @ 25° C (derate ≈ 1 mA per ° C increase) **OFF-state leakage current:** less than 5 µA @ 30 V dc **ON-state saturation voltage:** PNP: less than 1 V @ 10 mA; 1.5 V @ 150 mA NPN: less than 200 mV @ 10 mA; 1 V @ 150 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs
Output Response Time	50 microseconds
Delay at Power-up	100 milliseconds; outputs do not conduct during this time
Adjustments	**Using push buttons ("+" Dynamic and "-" Static):** Manually adjust Switch Point using "+" or "-" buttons Dynamic TEACH (teach on-the-fly) sensitivity adjustment Static TEACH sensitivity adjustment Static Single-Point TEACH Light Operate/Dark Operate OFF-Delay select: 0 milliseconds, 20 milliseconds or 40 milliseconds **Using Remote TEACH input (gray wire):** Dynamic TEACH (teach on-the-fly) sensitivity adjustment Static TEACH sensitivity adjustment Static Single-Point TEACH Light Operate/Dark Operate OFF-Delay select: 0 milliseconds, 20 milliseconds or 40 milliseconds Push button lockout for security
Indicators	**10-segment light bar indicates signal strength** **Light Operate:** Green **Dark Operate:** Green **Outputs Conducting:** Yellow **OFF-Delay (Green): SETUP Mode:** OFF–no delay; Flashing–20 milliseconds delay; ON–40 milliseconds delay **RUN Mode:** OFF–no delay; ON–20 or 40 milliseconds delay
Construction	Black ABS/polycarbonate blend; nylon fiber clip mounts to standard 35 mm DIN rail. 1 stainless steel right angle bracket and 1 PBT polyester bracket for mounting to flat surfaces also included with sensor.
Environmental Rating	IEC IP67; NEMA 6
Connections	2 m or 9 m PVC-jacketed 5-conductor cable, or 5-pin Euro-style quick-disconnect (QD) fitting. QD cordsets are ordered separately. See page 285. **Fibers:** Fiber clip (no tool required)
Operating Conditions	**Temperature:** -10° to +55° C **Relative humidity:** 90% at 50° C (non-condensing)
Application Notes	• Do not mount the fiber tip directly perpendicular to shiny surfaces; position it at approximately a 15° angle in relation to the sensing target • Minimize web or product "flutter" whenever possible to maximize sensing reliability
Certifications	CE
Hookup Diagrams	DC08 (p. 975)

Cordsets

Euro QD (for Q models)

See page 912

Length	Threaded 5-Pin Straight	Threaded 5-Pin Right-Angle
1.83 m	MQDC1-506	MQDC1-506RA
4.57 m	MQDC1-515	MQDC1-515RA
9.14 m	MQDC1-530	MQDC1-530RA

Additional cordset information available. See page 904.

Brackets

R55F

See page 854	See page 855	See page 855
DIN-35...	SMBR55F01	SMBR55FRA





Additional brackets and more information available. See page 846.

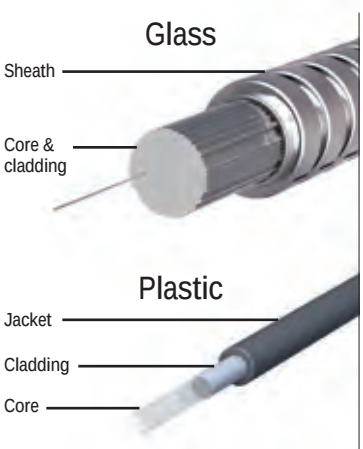


Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Plastic Fiber Optics

- Provide an economical alternative to glass fiber optics for piping photoelectric sensing light to and from confined areas with suitable environments
- Ideal for detecting small objects
- Withstand repeated flexing and bending
- Available in individual or bifurcated styles*
- Available with optional DURA-BEND™ fibers for improved flexibility in difficult-to-access locations,without the decreased performance to which excessively bent standard plastic fibers optics are prone
- Available with core diameters of 0.25, 0.50, 0.75, 1.0 and 1.5 mm



Fiber Construction

Core:	Thin glass or plastic center of the fiber through which light travels
Cladding:	Outer optical material surrounding the core that reflects light back into the core
Jacket/ Sheath:	Protective layer to protect fiber from damage and moisture

Choosing Plastic or Glass

Plastic fibers are for general purpose use. They tolerate severe flexing, can be cut to length in the field and cost less than glass fibers. Glass fibers are the best choice for challenging environments such as high temperatures, corrosive materials and moisture.



Plastic fibers page 286

- Inexpensive and easily cut to length during installation
- Bend for a precise fit
- Available in high-flex models to withstand flexing
- Offered with special jackets that withstand corrosion, impact and abrasion
- Available in coiled versions for applications requiring articulated or reciprocating motion
- Available in diameters of 0.25, 0.5, 1.0 or 1.5 mm
- Can be quickly custom designed and built for your unique applications



Glass fibers page 306

- Solve numerous challenging sensing requirements
- Ideal for hostile environments such as high temperatures to 480° C, corrosive materials and extreme moisture
- Withstand high levels of shock and vibration
- Inherently immune to extreme electrical noise
- Available with choice of sheathings: standard stainless-steel flexible conduit, PVC or other flexible tubing
- Can be quickly custom designed

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Model Key

P	I	T	4	6	U	

PLASTIC FIBER FAMILY designator

Same for all plastic fibers

ASSEMBLY STYLE designator

I = Individual fiber*
DI = Dual Individual fiber*
B = Bifurcated fiber

SENSING END designator

A = 90° Angle
AT = 90° Angle/Thread
CF = Coaxial Ferrule
CT = Coaxial Thread
E = Encapsulated
EFP =Extended Ferrule Probe
F = Ferrule
FM = Ferrule Miniature
FMP = Ferrule Miniature Probe
L = Lensed
P = Probe
PF = Probe Ferrule
PMSB = Probe Miniature Side-view Bendable
PS = Probe Side-view
PSB = Probe Side-view Bendable
PSM = Probe Side-view Miniature
R = Rectangular
RS = Rectangular Side-view
T = Thread
TA = Thread/90° Angle
TP = Thread/Probe

FIBER CORE DIAMETER designator

1 = 0.25 mm
2 = 0.50 mm
3 = 0.75 mm
4 = 1.00 mm
6 = 1.50 mm
1x4 = 4 x 0.25 mm
1x16 = 16 x 0.265 mm
1x32 = 32 x 0.265 mm

FIBER LENGTH designator

3 = 1 m (1000 mm)
6 = 2 m (2000 mm)
15 = 5 m (5000 mm)
30 = 10 m (10,000 mm)
100 = 30 m (30,480 mm)

CONTROL END designator

U = Unterminated straight cable**
UC = Unterminated Coiled cable
UHF = Unterminated DURA-BEND™ multi-core cable
T5 = Terminated
TMB5 = STEELSKIN™ braiding over monocoil reinforcement

MODIFICATIONS designator†

MFR = Flex relief
MSW = Slot width
MTA = Tight angle
MTL = Thread length
MAL = Array length
MPL = Probe length
MFL = Ferrule length

* All individual plastic fiber optics are sold and used in pairs. Bifurcated fibers are two-way fibers with a single sensing end that both emits and receives light and with dual-control sensor ends that attach separately to the sensor's LED and photodetector.
** Plastic fibers with "U" in the suffix of the model numbers have unterminated control ends; cut them to the required length using the supplied cutter.
† Not all modifications can be applied to all fiber assemblies. Please consult factory for verification of modifications.

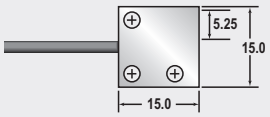
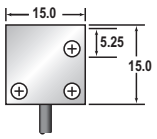
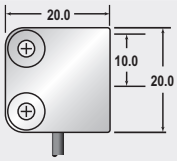
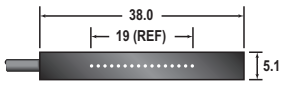
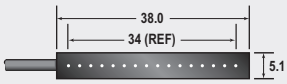
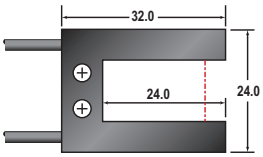
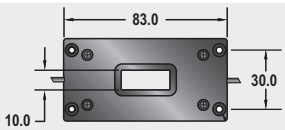
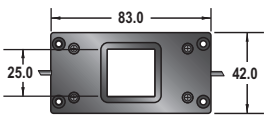
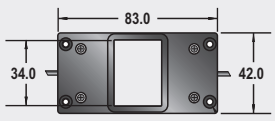
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



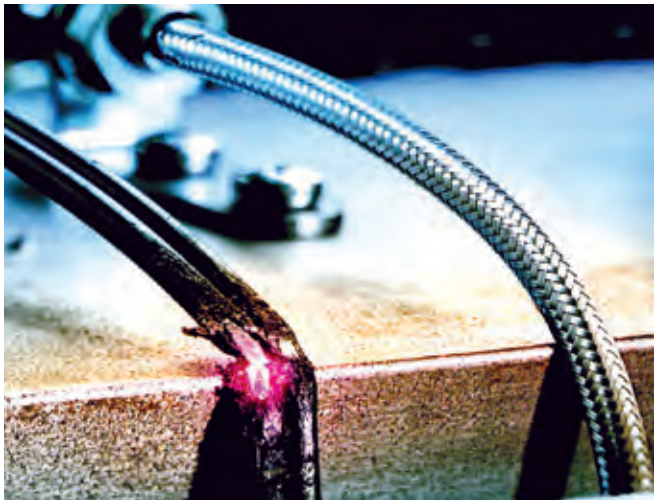
Array and Slot Fibers

Array and slot fibers are customizable for a simple setup and provide an optimal solution for small part counting applications. Array fibers are ideal for broad spectrum detection and slot fibers are pre-aligned and easy to install.

- Quick and easy setup and alignment
- Small part counting applications
- Multiple beams can be customized for different array lengths
- Wide area detection
- Ideal for tracking applications, profiling parts, edge guiding, finding the edge of objects

Fiber Mode	End Tip	Features	Typical Range (mm)		Model
OPPOSED		• Ultra-compact head • 5.25 mm straight exit • Aluminium	DF-G1 D10D D10B D10A	640 840 300 260	PIR1X166U
		• Ultra-compact head • 5.25 mm side exit • Aluminium	DF-G1 D10D D10B D10A	640 840 300 260	PIRS1X166U
		• 16 x 0265 mm core diameter • 25 mm bend radius • Compact head • 10 mm side exit • Aluminium	DF-G1 D10D D10B D10A	760 860 300 260	PIRS1X166UM.4
		• 16 x 0265 mm core diameter • 25 mm bend radius • 19 mm side exit	DF-G1 D10D D10B D10A	770 880 340 270	PIRS1X166UMP.75
		• 16 x 0265 mm core diameter • 25 mm bend radius • 34 mm side exit	DF-G1 D10D D10B D10A	680 1000 300 260	PIRS1X166UMPMAL
		• 2.0 mm core diameter • 25 mm bend radius • Easy mount “fork” head	DF-G1 D10D D10B D10A	12 12 12 12	PDIS46UM12
		• 10 x 25 mm coverage • Side or end exit • Min. object detection of 1.5 mm†	DF-G1 D10D D10B D10A	25 25 25 25	PFCVA-10X25-S PFCVA-10X25-E
		• 25 x 25 mm coverage • Side or end exit • Min. object detection of 3 mm†	DF-G1 D10D D10B D10A	25 25 25 25	PFCVA-25X25-S PFCVA-25X25-E
		• 34 x 25 mm coverage • Side or end exit • Min. object detection of 4 mm†	DF-G1 D10D D10B D10A	34 34 34 34	PFCVA-34X25-S PFCVA-34X25-E

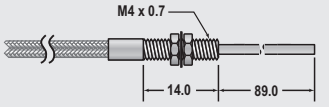
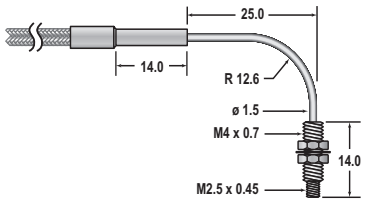
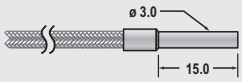
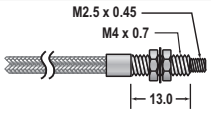
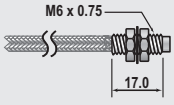
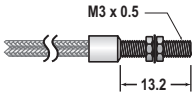
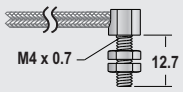
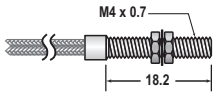
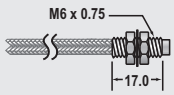
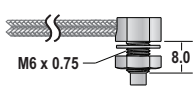
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



STEELSKIN™ Fibers

STEELSKIN™ rugged fiber models resist kinking, cutting and snagging and have a low profile to easily embed in machines. With a strong, solid sheathing, they are great for mechanical protection in applications where standard plastic fibers would not hold up. Ideal for busy assembly stations, embedded in stations, part presence or places where equipment is constantly moved on and off a production line.

- Abrasion resistant while maintaining flexibility
- Bend to tighter radius and thinner than standard plastic fiber optics
- Solid, smooth and sturdy sheathing
- Superior resistance to wear, chemicals and other environmental conditions
- Assembly stations, part presence, busy assembly cells

Fiber Mode	End Tip	Features	Typical Range (mm)		Model
OPPOSED		• 1.0 mm core diameter • 12 mm bend radius • Individual • Bendable tip	DF-G1 D10D D10B D10A	740 1000 380 350	PITP43TMB5
		• 1.0 mm core diameter • 12 mm bend radius • Individual • 90° angle thread	DF-G1 D10D D10B D10A	740 1000 380 350	PIAT43TMB5
		• 1.0 mm core diameter • 12 mm bend radius • Individual • Ferrule	DF-G1 D10D D10B D10A	740 1000 380 350	PIF43TMB5
		• 1.0 mm core diameter • 12 mm bend radius • Individual	DF-G1 D10D D10B D10A	740 1000 380 350	PIT43TMB5
DIFFUSE		• 1.0 mm core diameter • 12 mm bend radius • Bifurcated	DF-G1 D10D D10B D10A	230 250 90 80	PBT43TMB5
		• 12 mm bend radius • Coaxial • Thread	DF-G1 D10D D10B D10A	110 180 52 40	PBCT23TMB5
		• 12 mm bend radius • Coaxial • Miniature thread	DF-G1 D10D D10B D10A	80 135 40 30	PBCT23TMB5MTA
		• 12 mm bend radius • Coaxial • Thread	DF-G1 D10D D10B D10A	110 180 52 40	PBCT23TMB5M4
		• 1.0 mm core diameter • 12 mm bend radius • Bifurcated • Bendable tip	DF-G1 D10D D10B D10A	740 250 94 85	PBTP43TMB5
		• 12 mm bend radius • Bifurcated • Thread right angle • Stainless steel	DF-G1 D10D D10B D10A	210 305 90 80	PBAT43TMB5MTA

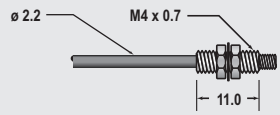
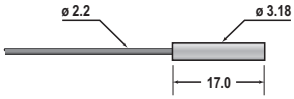
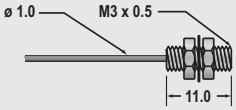
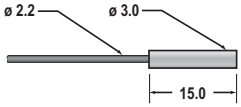
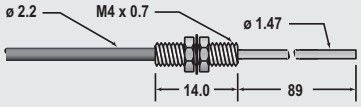
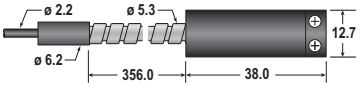
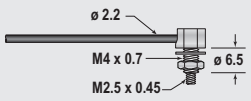
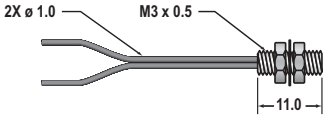
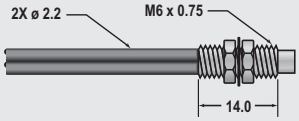
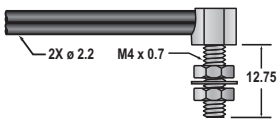
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



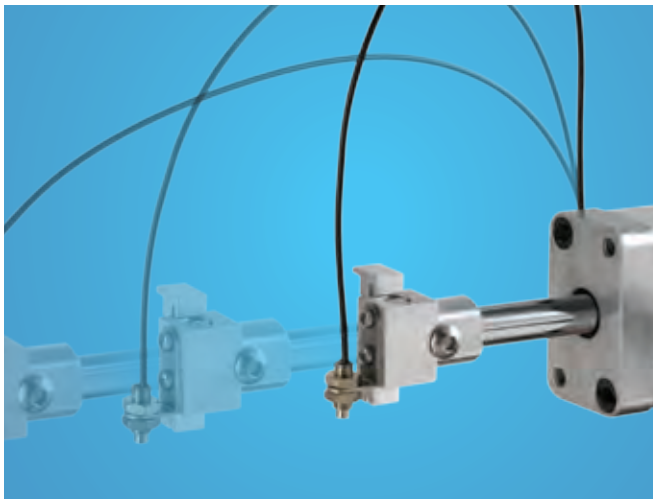
DURA-BEND™ Fibers

DURA-BEND™ fiber models provide improved flexibility for limited space setups and difficult-to-access locations. These fibers are best for use when fibers need to be integrated into a small fixture where a great deal of bending in tight spaces is needed.

- Minimal transmission loss under extreme bend radius
- Maintains performance regardless of flexing
- Multicore assemblies available
- Can almost kink fiber without affecting performance
- Works well in constant flexing applications

Fiber Mode	End Tip	Features	Typical Range (mm)	Model
OPPOSED		• 1.0 mm core diameter • 1.0 mm bend radius • Thread	DF-G1 440 D10D 1000 D10B 330 D10A 230	PIT46UHF
		• 1.0 mm core diameter • 1.0 mm bend radius • Smooth ferrule	DF-G1 440 D10D 1000 D10B 330 D10A 230	PIF46UHF
		• 0.5 mm core diameter • 1.0 mm bend radius • Thread • Min. bend radius 1 mm	DF-G1 120 D10D 260 D10B 80 D10A 65	PIT26UHF
		• 1.0 mm core diameter • Smooth ferrule • Miniature tip • Min. bend radius 1 mm	DF-G1 440 D10D 1000 D10B 330 D10A 230	PIFM46UHF
		• 1.0 mm core diameter • 1.0 mm bend radius • Thread • Bendable tip	DF-G1 440 D10D 1000 D10B 330 D10A 230	PIP46UHF
		• Right angle • Low profile	DF-G1 400 D10D 900 D10B 300 D10A 200	PIA46UHFMBMPMS
		• 1.0 mm core diameter • 2 mm bend radius • Right angle • Threaded	DF-G1 440 D10D 1000 D10B 330 D10A 230	PIAT46UHFMTA
DIFFUSE		• 1.0 mm core diameter • 1.0 mm bend radius • Thread	DF-G1 40 D10D 55 D10B 20 D10A 18	PBT26UHF
		• 1.0 mm core diameter • 1 mm bend radius • Thread	DF-G1 140 D10D 250 D10B 80 D10A 70	PBT46UHF
		• 1.0 mm core diameter • 2.0 mm bend radius • Right Angle • Threaded	DF-G1 120 D10D 225 D10B 80 D10A 70	PBAT46UHFMTA

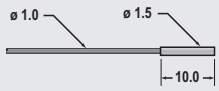
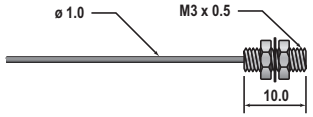
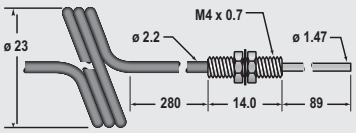
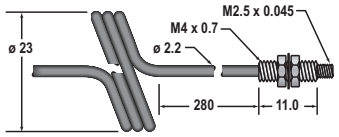
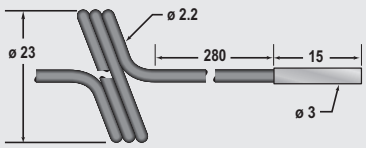
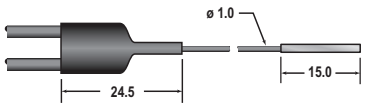
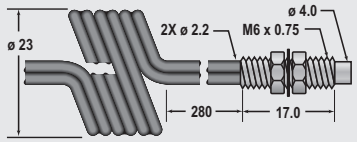
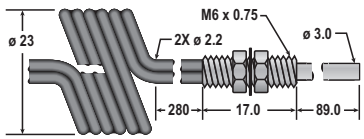
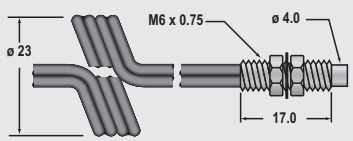
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



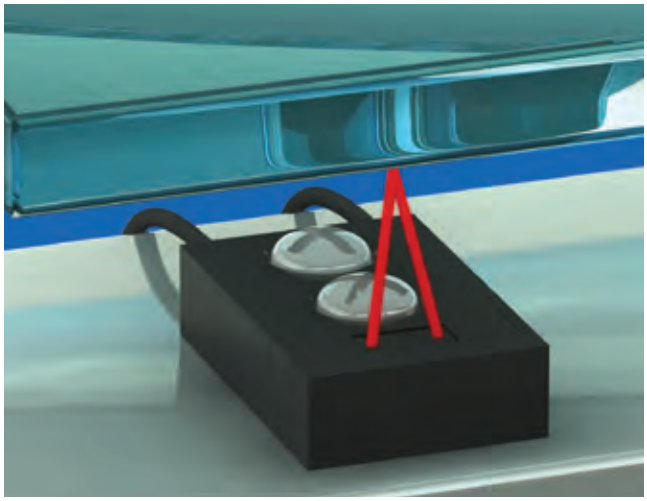
High-Flex Fibers

High-flex fibers are ideal for machines with reciprocating motions and when fibers need to be repeatedly bent. With a higher elasticity rating, high-flex fibers are best for use on moving machines, such as robotic arms.

- Highly durable for thousands of cycles of reciprocated motion
- Higher elasticity rating
- Repeated flexing and bending
- Provides additional resistance to prevent fiber damage
- Ideal for robotic arm applications and use on moving machines

Fiber Mode	End Tip	Features	Typical Range (mm)	Model
OPPOSED		• 4 x 0.25 mm core diameter • 8.0 mm bend radius • Best for repetitive flexing (1,000s of cycles)	DF-G1 250 D10D 350 D10B 84 D10A 72	PIFM1X46U
		• 4 x 0.25 mm core diameter • 8.0 mm bend radius • Best for repetitive flexing (1,000s of cycles)	DF-G1 250 D10D 350 D10B 84 D10A 72	PIT1X46U
		• 1.0 mm core diameter • 25 mm bend radius • For applications involving reciprocating motion	DF-G1 540 D10D 780 D10B 320 D10A 260	PIP46UC
		• 1.0 mm core diameter • 25 mm bend radius • For applications involving reciprocating motion	DF-G1 540 D10D 780 D10B 320 D10A 280	PIT46UC
		• 1.0 mm core diameter • 25 mm bend radius • Ferrule	DF-G1 540 D10D 780 D10B 320 D10A 280	PIF46UC
DIFFUSE		• 4 x 0.25 mm core diameter • 8.0 mm bend radius • Best for repetitive flexing (1,000s of cycles)	DF-G1 35 D10D 50 D10B 18 D10A 15	PBFM1X43T5
		• 1.0 mm core diameter • 25 mm bend radius • For applications involving reciprocating motion	DF-G1 75 D10D 110 D10B 40 D10A 32	PBT46UC
		• 1.0 mm core diameter • 25 mm bend radius • For applications involving reciprocating motion	DF-G1 75 D10D 110 D10B 40 D10A 32	PBP46UC
		• 1.0 mm core diameter • 25 mm bend radius • For applications involving reciprocating motion	DF-G1 75 D10D 110 D10B 40 D10A 32	PBT46UC

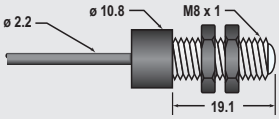
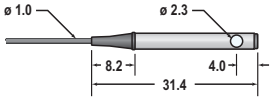
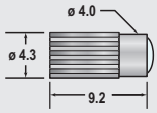
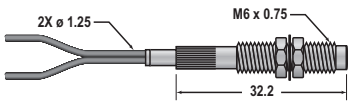
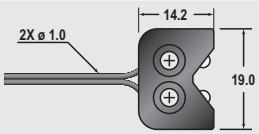
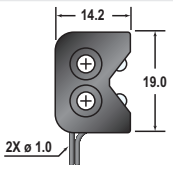
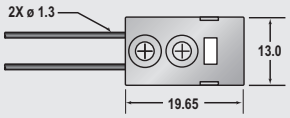
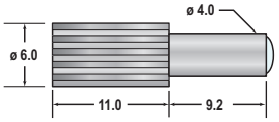
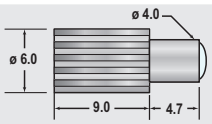
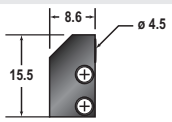
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



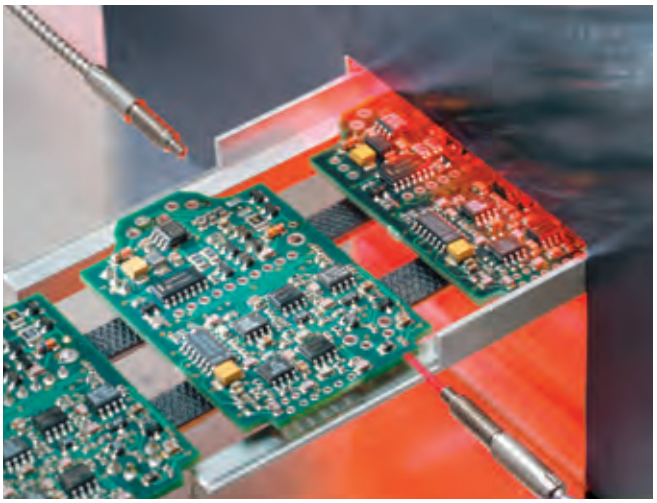
Focused & Extended Range Fibers

Lensed fiber models work well in confined areas, providing increased performance and reliability. They are also ideal for longer range applications, such as sensing in an intrinsically safe area, or applications requiring a focused beam for small features or objects.

- Range extension
- Fixed or adjustable lengths
- Small part counting and intrinsically safe area applications
- Longer range with opposed mode and shorter range with convergent mode
- Fiber and lens models available

Fiber Mode	End Tip	Features	Typical Range (mm)	Model
OPPOSED		• 1.0 mm core diameter • 25 mm bend radius • Ultra-long range	DF-G1 4000 D10D 4000 D10B 4000 D10A 4000	PIL46U
		• 0.5 mm core diameter • 12 mm bend radius • Low beam divergence angle of ± 2° • Ideal for wafer mapping	DF-G1 2090 D10D 1500 D10B 860 D10A 800	PLIS-1
		• 1.0 mm core diameter • 25 mm bend radius • Range-extending lens • M2.5 thread	DF-G1 4000 D10D 4000 D10B 4000 D10A 4000	L2 w/PIT46U
DIFFUSE		• Anodized Aluminium tip • Beam spot ø 0.5-3.2 mm • Glass lens	DF-G1 32 D10D 32 D10B 32 D10A 32	PLI-A10
		• 0.5 mm core diameter • 12 mm bend radius • Straight exit • DURA-BEND fiber	DF-G1 D10D D10B D10A Straight side exit with lenses; 3 mm focal distance	P22-C1
		• 0.5 mm core diameter • 12 mm bend radius • Side exit • DURA-BEND fiber	DF-G1 D10D D10B D10A Straight side exit with lenses; 3 mm focal distance	P12-C1
		• 0.5 mm core diameter • 25 mm bend radius • Flat mount	DF-G1 D10D D10B D10A Flat mount 6 mm focal distance, lenses convergent optics	P32-C6
		• Anodized Aluminium • Beam spot ø 0.25 mm @ 6 mm • Fixed focus	DF-G1 6 D10D 6 D10B 6 D10A 6	L4C6 w/PBCT26U
		• Anodized Aluminium • Beam spot ø 4 mm @ 20 mm • Fixed focus	DF-G1 20 D10D 20 D10B 20 D10A 20	L4C20 w/PBCT26U
		• Anodized Aluminium • Beam spot ø 0.5 - 3.2 mm • Adjustable focus	DF-G1 32 D10D 32 D10B 32 D10A 32	LZ3C8 w/PBTCT26UM3

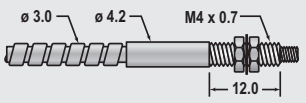
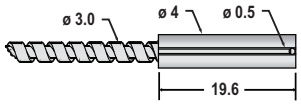
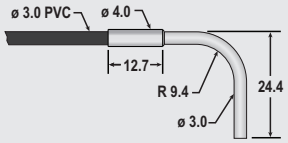
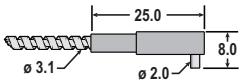
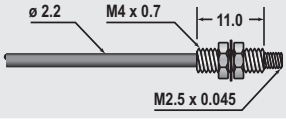
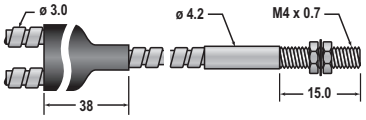
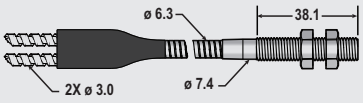
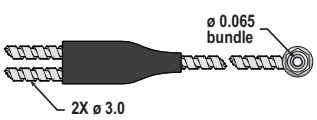
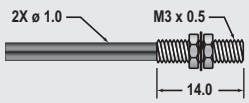
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



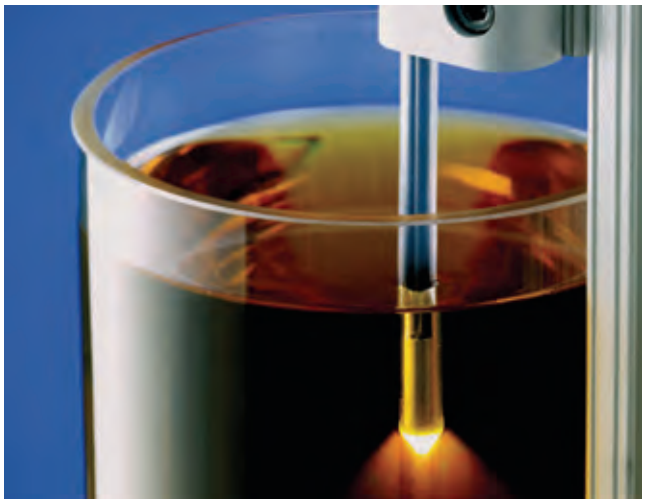
High Temp Fibers

High temp fiber optics are used in situations where the temperature is above a certain limit for most plastic fibers. These are usually used in thermal process applications and Banner offers the widest selection of plastic and glass fibers for high temperature situations.

- For high temp applications above 100° C
- Thermal process applications
- For sensing near manufacturing ovens
- Manufacturing of solar panels, colored glass and ceramics
- Widest selection of plastic and glass fibers for high temp applications

Fiber Mode	End Tip	Features	Typical Range (mm)		Model
OPPOSED		• 1.27 mm core diameter • 19 mm bend radius • Miniature thread • End tip withstands 315° C	DF-G1 D10D D10B D10A	774 1767 400 325	IMT.756.6S-HT
		• Smooth ferrule • Side exit • Stainless steel • 480° C	DF-G1 D10D D10B D10A	170 305 72 53	IA.31.7ST5ETA
		• Smooth ferrule • 90° angle • Stainless steel • 480° C	DF-G1 D10D D10B D10A	810 1200 430 312	IA.82.5PT5
		• Smooth ferrule • Side exit • Stainless steel • 480° C	DF-G1 D10D D10B D10A	810 1200 410 300	IA.83.3ST5ETA
		• 1.0 mm core diameter • 25 mm bend radius • Thread; withstands 105° C	DF-G1 D10D D10B D10A	600 850 270 210	PIT46UHT1
DIFFUSE		• 1.5 mm core diameter • 19 mm bend radius • Miniature thread • End tip withstands 315° C	DF-G1 D10D D10B D10A	50 67 19 15	BMT16.6S-HT
		• 1.5 mm core diameter • Threaded • Stainless steel • 480° C	DF-G1 D10D D10B D10A	240 NA NA NA	BT13.5ST5
		• 1.7 mm core diameter • 12 mm bend radius • Thread right angle • Stainless steel • 480° C	DF-G1 D10D D10B D10A	270 NA NA NA	BAT16.6ST5MTA
		• Thread; withstands 105° C	DF-G1 D10D D10B D10A	52 60 22 18	PBT26UHT2

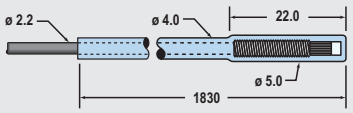
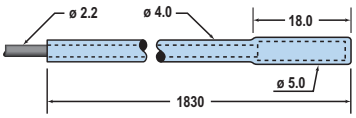
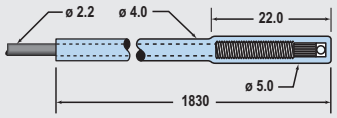
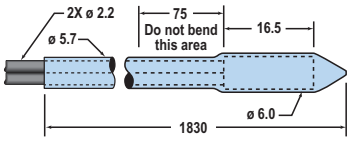
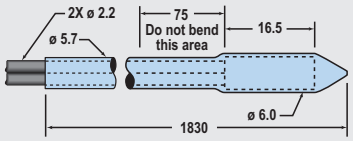
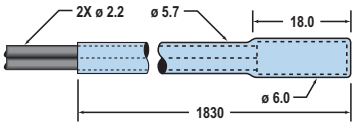
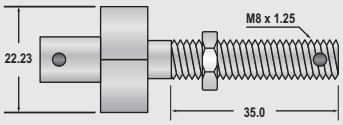
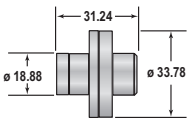
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



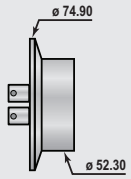
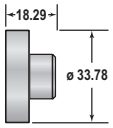
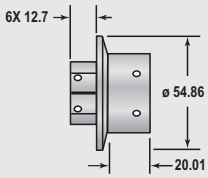
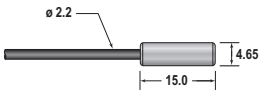
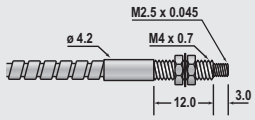
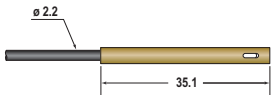
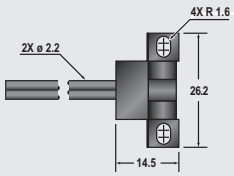
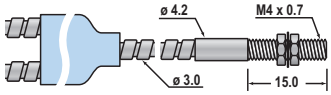
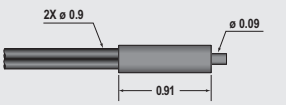
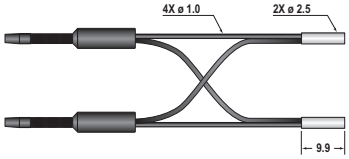
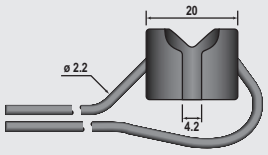
Specialty Fibers

Specialty and custom fibers are designed for specific sensing applications. Many of the standard fibers can be customized and ready for use in days, not weeks. Banner excels in customization and will work with you to find the right solution.

- Custom design
- Chemical resistance
- Extreme environments
- Liquid level detection
- Customize bifurcations, material, lengths and other fiber features

Fiber Mode	End Tip	Features	Typical Range (mm)	Model
OPPOSED		• 1.0 mm core diameter • 25 mm bend radius • Fluoropolymer encapsulated; lens	DF-G1 1900 D10D 2700 D10B 2000 D10A 1600	PIE46UT
		• 1.5 mm core diameter • 38 mm bend radius • Fluoropolymer encapsulated; lens	DF-G1 950 D10D 1400 D10B 440 D10A 300	PIE66UTMNL
		• 1.0 mm core diameter • 25 mm bend radius • Fluoropolymer encapsulated; side-view prism	DF-G1 400 D10D 575 D10B 300 D10A 280	PIES46UT
DIFFUSE		• 1.0 mm core diameter • 25 mm bend radius • Fluoropolymer encapsulated • Sensor switches when tip of fiber is immersed in liquid	DF-G1 D10D D10B D10A	N/A	PBE46UTMLLP
		• Fluoropolymer encapsulated • Sensor switches when tip of fiber is immersed in liquid • End tip withstands 105° C	DF-G1 D10D D10B D10A	N/A	PBE46UTMLLPHT1
		• 1.0 mm core diameter • 25 mm bend radius • Fluoropolymer encapsulated; tip	DF-G1 220 D10D 360 D10B 75 D10A 12	PBE46UTMNL
		• Stainless steel • Vacuum feed through	DF-G1 D10D D10B D10A	N/A Varies by fiber	VFT-M8MVS
		• Stainless steel • Vacuum feed through • For use with PIL45U or LO8FP	DF-G1 D10D D10B D10A	N/A Varies by fiber	VFT-1.3MRWM8

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Fiber Mode	End Tip	Features	Typical Range (mm)	Model
		• Stainless steel • Vacuum feed through	DF-G1, D10D, D10B, D10A: N/A Varies by fiber	DVFT-2.ONWQ50
		• Aluminum • Vacuum feed through	DF-G1, D10D, D10B, D10A: N/A Varies by fiber	VFT-1.3MVSA
		• Stainless steel • Vacuum feed through	DF-G1, D10D, D10B, D10A: N/A Varies by fiber	HVFT-1.5NWQ40
OPPOSED		• For use with Vacuum feed through on ambient side	DF-G1 1320 D10D 2400 D10B 600 D10A 525	PIF66UMVFA
		• 1.27 mm core diameter • 19 mm bend radius • Miniature thread • Entire cable withstands 480° C	DF-G1, D10D, D10B, D10A: Range dependent upon amplifier setting and feed through used.	IMT.753SMVF
		• Flat sides for easy alignment • Brass housing	DF-G1 680 D10D 1000 D10B 440 D10A 350	PIPS66UMSQMAP
		• 1.0 mm core diameter • 25 mm bend radius • Specialty slot sensor • 90° angle; compact “fork” head	DF-G1 5 D10D 5 D10B 5 D10A 5	PDISM46UM5MA
		• 1.57 mm core diameter • 19 mm bend radius • Miniature thread • Entire cable withstands 480° C	DF-G1, D10D, D10B, D10A: Range dependent upon amplifier setting and feed through used.	BMT13SMVF
DIFFUSE		• Coaxial ferrule probe • Non-metalic end tip	DF-G1 220 D10D 345 D10B 145 D10A 120	PBCFP46UMLR
		• Dual bifurcated • Light “OR” or Dark “AND” logic	DF-G1 50 D10D 100 D10B 35 D10A 25	PDBF26T5
		• 1.0 mm core diameter • 1.0 mm bend radius • Clear tube mount	DF-G1, D10D, D10B, D10A: Sensor switches when liquid meniscus reaches optical axis	PDI46U-LLD

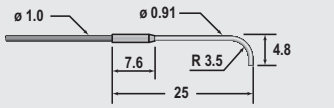
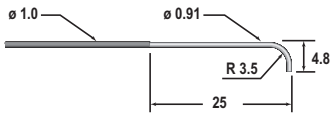
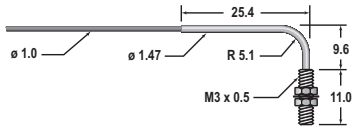
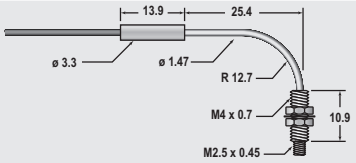
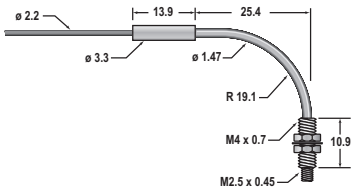
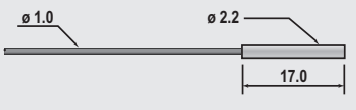
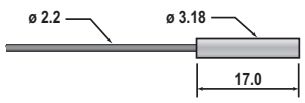
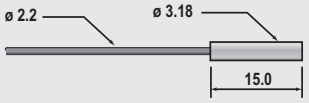
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



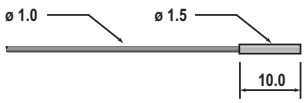
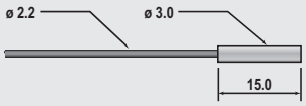
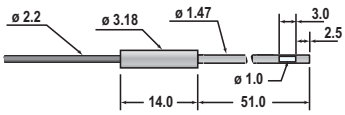
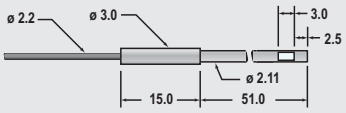
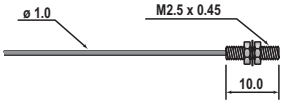
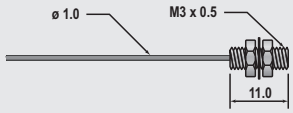
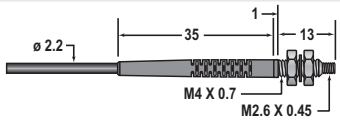
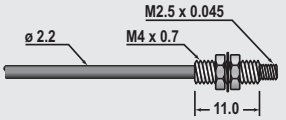
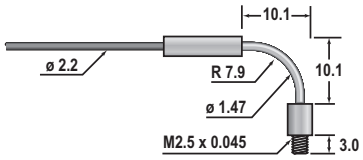
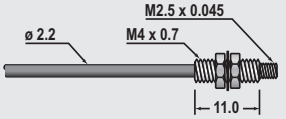
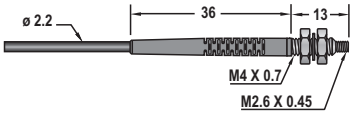
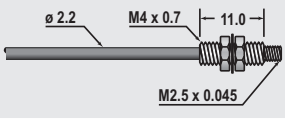
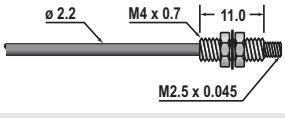
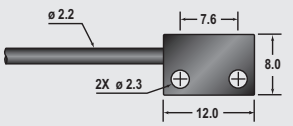
Standard Fibers

Standard fiber optics come in a variety of materials with standard fiber tips in various sizes. With the breadth of the product line, if a standard fiber does not meet your application requirements, modifications can be made to give you a customized solution.

- Plastic individual fibers ideal for use in small, confined areas
- Available in side view/right angles
- Available in bifurcated models
- Various tip and fiber sizes depending on application
- Widest selection of plastic fibers

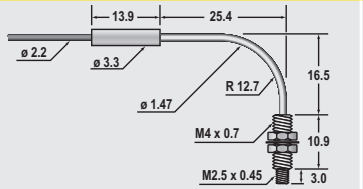
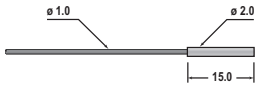
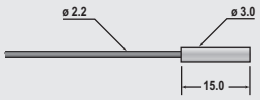
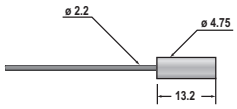
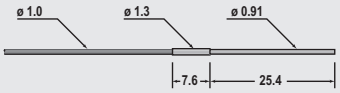
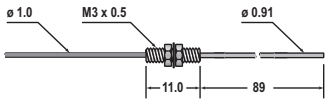
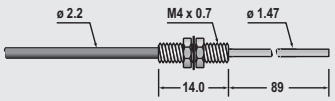
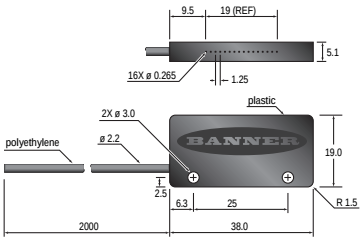
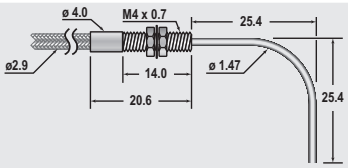
Fiber Mode	End Tip	Features	Typical Range (mm)	Model
OPPOSED		• 0.25 mm core diameter • 8 mm bend radius • 90° angle	DF-G1 28 D10D 40 D10B 18 D10A 15	PIA16U
		• 0.5 mm core diameter • 12 mm bend radius • 90° angle	DF-G1 120 D10D 180 D10B 70 D10A 50	PIA26U
		• 0.25 mm core diameter • 8 mm bend radius • 90° angle • Thread	DF-G1 60 D10D 90 D10B 18 D10A 12	PIAT16U
		• 0.5 mm core diameter • 12 mm bend radius • Thread • 90° angle	DF-G1 200 D10D 280 D10B 100 D10A 50	PIAT26U
		• 1.0 mm core diameter • 25 mm bend radius • 90° angle • Thread	DF-G1 840 D10D 1200 D10B 320 D10A 275	PIAT46U
		• 1.5 mm core diameter • 38 mm bend radius • 90° angle • Thread • Long range	DF-G1 1280 D10D 2400 D10B 410 D10A 350	PIAT66U
		• 0.5 mm core diameter • 12 mm bend radius • Smooth ferrule	DF-G1 220 D10D 400 D10B 95 D10A 75	PIF26U
		• 1.0 mm core diameter • 25 mm bend radius • Smooth ferrule	DF-G1 820 D10D 1200 D10B 320 D10A 300	PIF46U
		• 1.5 mm core diameter • 38 mm bend radius • Smooth ferrule • Long range	DF-G1 1320 D10D 2400 D10B 600 D10A 525	PIF66U

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

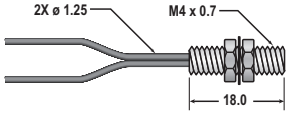
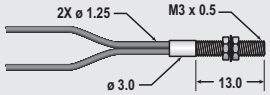
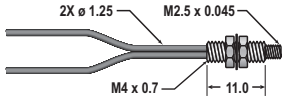
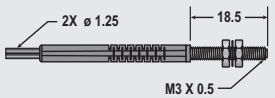
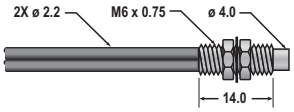
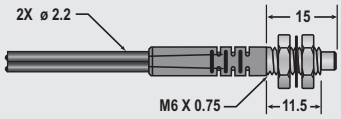
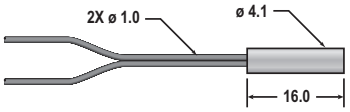
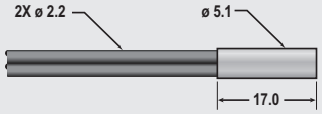
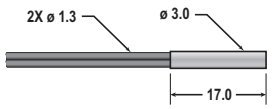
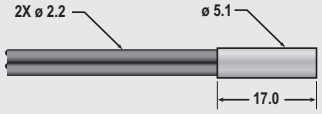
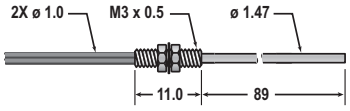
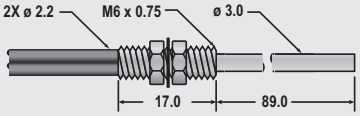
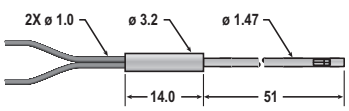
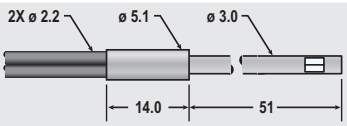
Fiber Mode	End Tip	Features	Typical Range (mm)	Model
OPPOSED		• 4 x 0.25 mm core diameter • 8 mm bend radius • Best for repetitive flexing (1,000s of cycles)	DF-G1 250 D10D 350 D10B 84 D10A 72	PIFM1X46U
		• 1.0 mm core diameter • 25 mm bend radius • Smooth ferrule • Miniature tip	DF-G1 820 D10D 1200 D10B 360 D10A 300	PIFM46U
		• 1.0 mm core diameter • 25 mm bend radius • Smooth ferrule • Non-bendable tip	DF-G1 350 D10D 500 D10B 200 D10A 160	PIPS46U
		• 1.5 mm core diameter • 38 mm bend radius • Smooth ferrule • Non-bendable tip	DF-G1 680 D10D 1000 D10B 440 D10A 350	PIPS66U
		• 0.25 mm core diameter • 8 mm bend radius • Thread	DF-G1 58 D10D 90 D10B 20 D10A 15	PIT16U
		• 0.5 mm core diameter • 12 mm bend radius • Thread	DF-G1 220 D10D 400 D10B 95 D10A 75	PIT26U
		• 0.5 mm core diameter • 12 mm bend radius • Thread • Overmolded flex relief	DF-G1 220 D10D 400 D10B 95 D10A 75	PIT26UMFR
		• Thread • 15' length	DF-G1 690 D10D 1020 D10B 271 D10A 240	PIT415U
		• 1.0 mm core diameter • 25 mm bend radius • 90° angle • Thread	DF-G1 840 D10D 1200 D10B 320 D10A 220	PIAT46UM.4X.4MT
		• 1.0 mm core diameter • 25 mm bend radius • Thread	DF-G1 820 D10D 1200 D10B 320 D10A 300	PIT46U
		• 1.0 mm core diameter • 25 mm bend radius • Thread • Overmolded flex relief	DF-G1 840 D10D 1200 D10B 320 D10A 260	PIT46UMFR
		• 1.5 mm core diameter • 38 mm bend radius • Thread • Long range	DF-G1 1320 D10D 2400 D10B 600 D10A 525	PIT66U
		• Thread • Long range	DF-G1 1120 D10D 2040 D10B 510 D10A 450	PIT615U
		• 1.0 mm core diameter • 2 mm bend radius • Right angle; side exit; Delrin	DF-G1 440 D10D 1000 D10B 330 D10A 230	PIA46UHFMB8X12

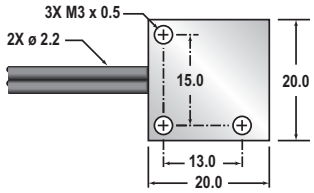
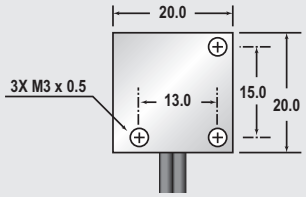
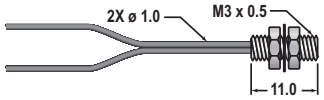
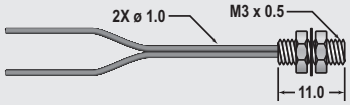
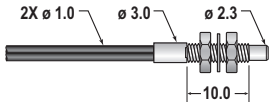
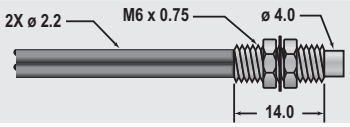
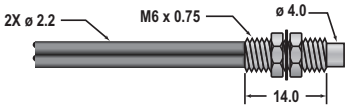
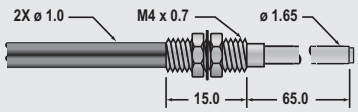
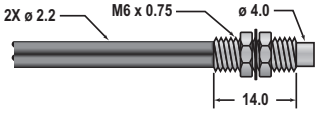
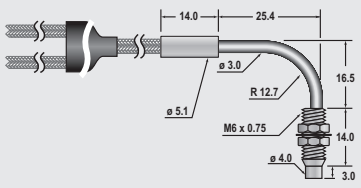
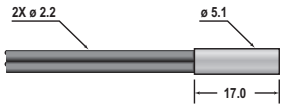
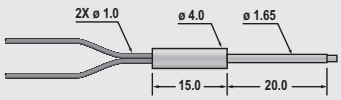
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

OPPOSED

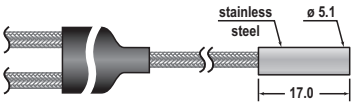
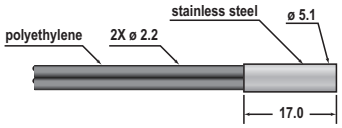
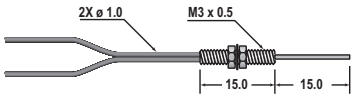
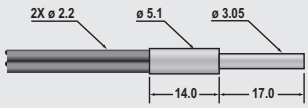
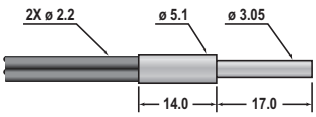
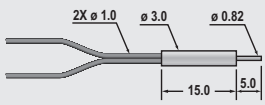
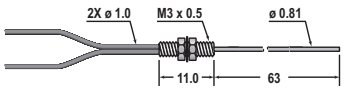
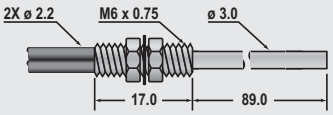
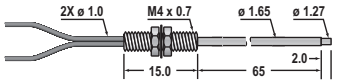
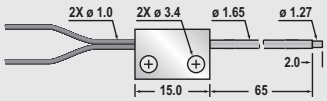
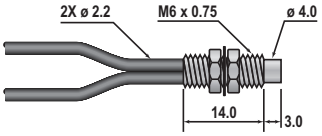
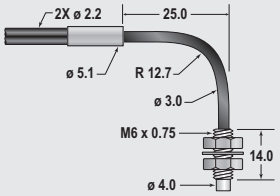
Fiber Mode	End Tip	Features	Typical Range (mm)	Model
		• 1.0 mm core diameter • 1.0 mm bend radius • 90° angle/thread	DF-G1 600 D10D 904 D10B 241 D10A 211	PIAT46UHF
		• 0.25 mm core diameter • 8 mm bend radius • Smooth ferrule	DF-G1 66 D10D 100 D10B 27 D10A 23	PIF16U
		• 0.5 mm core diameter • 12 mm bend radius • Smooth ferrule • Thick jacket (ø 2.2 mm)	DF-G1 219 D10D 329 D10B 88 D10A 77	PIF26UMLS
		• 1.5 mm core diameter • 38 mm bend radius • For use with VFT-M8MVS (ambient side)	DF-G1 1320 D10D 2400 D10B 600 D10A 525	PIF66UM.52M.19D
		• 0.25 mm core diameter • 8 mm bend radius • Smooth ferrule; non-bendable tip	DF-G1 66 D10D 97 D10B 27 D10A 23	PIP16U
		• 0.5 mm core diameter • 12 mm bend radius • Thread; non-bendable tip	DF-G1 235 D10D 353 D10B 94 D10A 82	PIP26U
		• 1.0 mm core diameter • 25 mm bend radius • Thread; non-bendable tip	DF-G1 757 D10D 1135 D10B 303 D10A 265	PIP46U
		• 16X 0.265 mm core diameter • 25 mm bend radius • Side exit; 19 mm width	DF-G1 692 D10D 1038 D10B 277 D10A 242	PIRS1X166UMPM.75
		• 1.0 mm core diameter • 12 mm bend radius	DF-G1 823 D10D 1235 D10B 329 D10A 288	PITA43TMB5

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Fiber Mode	End Tip	Features	Typical Range (mm)	Model
DIFFUSE		• 12 mm bend radius • Coaxial • Thread	DF-G1 90 D10D 180 D10B 55 D10A 40	PBCT26U
		• 12 mm bend radius • Coaxial • Miniature thread	DF-G1 90 D10D 180 D10B 55 D10A 40	PBCT26UM3
		• 12 mm bend radius • Coaxial • Miniature thread	DF-G1 90 D10D 180 D10B 55 D10A 40	PBCT26UM4M2.5
		• 12 mm bend radius • Coaxial • Thread • Overmolded flex relief	DF-G1 80 D10D 160 D10B 50 D10A 35	PBCT26UMFR
		• 12 mm bend radius • Coaxial • Thread	DF-G1 220 D10D 345 D10B 145 D10A 120	PBCT46U
		• 12 mm bend radius • Coaxial • Thread • Overmolded flex relief	DF-G1 200 D10D 310 D10B 130 D10A 110	PBCT46UMFR
		• 0.5 mm core diameter • 12 mm bend radius • Smooth ferrule	DF-G1 80 D10D 150 D10B 38 D10A 25	PBF26U
		• 1.0 mm core diameter • 25 mm bend radius • Smooth ferrule	DF-G1 220 D10D 300 D10B 100 D10A 85	PBF46U
		• 1.0 mm core diameter • 25 mm bend radius • Smooth ferrule • Thin jacket (ø 1.3)	DF-G1 220 D10D 300 D10B 100 D10A 85	PBF46UM3MJ1.3
		• 1.5 mm core diameter • 38 mm bend radius • Smooth ferrule • Long range	DF-G1 310 D10D 475 D10B 200 D10A 170	PBF66U
		• 0.5 mm core diameter • 12 mm bend radius • Thread • Bendable tip	DF-G1 80 D10D 150 D10B 38 D10A 25	PBP26U
		• 1.0 mm core diameter • 25 mm bend radius • Thread • Bendable tip	DF-G1 220 D10D 300 D10B 100 D10A 85	PBP46U
		• 0.5 mm core diameter • 12 mm bend radius • Smooth ferrule • Bendable tip • Side exit	DF-G1 30 D10D 45 D10B 18 D10A 16	PBPS26U
		• 25 mm bend radius • Smooth ferrule • Bendable tip • Side exit	DF-G1 100 D10D 150 D10B 64 D10A 50	PBPS46U

Fiber Mode	End Tip	Features	Typical Range (mm)	Model
DIFFUSE		• 32 x 0.265 mm core diameter • 25 mm bend radius • Rectangular tip	DF-G1 200 D10D 300 D10B 80 D10A 65	PBR1X326U
		• 32 x 0.265 mm core diameter • 25 mm bend radius • Rectangular tip • Side sensing	DF-G1 200 D10D 300 D10B 80 D10A 65	PBRS1X326U
		• 0.25 mm core diameter • 8 mm bend radius • Thread	DF-G1 12 D10D 30 D10B 7 D10A 5	PBT16U
		• 0.5 mm core diameter • 12 mm bend radius • Thread	DF-G1 80 D10D 150 D10B 38 D10A 25	PBT26U
		• Thread	DF-G1 80 D10D 150 D10B 38 D10A 25	PBT26UMSSMFF
		• 1.0.mm core diameter • 25 mm bend radius • Thread	DF-G1 220 D10D 300 D10B 100 D10A 85	PBT46U
		• 1.5 mm core diameter • 38 mm bend radius • Thread • Long range	DF-G1 310 D10D 475 D10B 200 D10A 170	PBT66U
		• Probe ferrule • 15 foot length	DF-G1 68 D10D 120 D10B 32 D10A 27	PBPF215U
		• Thread • 15 foot length	DF-G1 180 D10D 250 D10B 85 D10A 72	PBT415U
		• 1.0 mm core diameter • 12 mm bend radius • 90° angle/thread	DF-G1 245 D10D 367 D10B 98 D10A 86	PBAT43TMB5
		• 1 (16X 0.265) mm core diameter • 25 mm bend radius	DF-G1 275 D10D 413 D10B 110 D10A 96	PBCF46U
		• 0.5 mm core diameter • 12 mm bend radius • Smooth ferrule	DF-G1 100 D10D 150 D10B 40 D10A 35	PBEFP26U

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Fiber Mode	End Tip	Features	Typical Range (mm)	Model
DIFFUSE		• 1.0 mm core diameter • 12 mm bend radius • Smooth ferrule	DF-G1 275 D10D 413 D10B 110 D10A 96	PBF43TMB5
		• 1.0 mm core diameter • 12 mm bend radius • Smooth ferrule	DF-G1 186 D10D 278 D10B 74 D10A 65	PBF46UHF
		• 0.25 mm core diameter • 8 mm bend radius • Smooth ferrule	DF-G1 22 D10D 32 D10B 9 D10A 8	PBFM16U
		• 1 mm core diameter • 25 mm bend radius • Smooth ferrule	DF-G1 256 D10D 384 D10B 102 D10A 90	PBFM46U
		• 1.0 mm core diameter • 1.0 mm bend radius • Smooth ferrule	DF-G1 184 D10D 276 D10B 74 D10A 64	PBFM46UHF
		• 0.5 mm core diameter • 8 mm bend radius	DF-G1 692 D10D 1038 D10B 277 D10A 242	PBFMP16UMP.2
		• 0.25 mm core diameter • 8 mm bend radius	DF-G1 14 D10D 20 D10B 5 D10A 5	PBP16U
		• 1.0 mm core diameter • 1.0 mm bend radius • Thread; bendable tip	DF-G1 189 D10D 283 D10B 76 D10A 66	PBP46UHF
		• 0.5 mm core diameter • 12 mm bend radius	DF-G1 80 D10D 150 D10B 38 D10A 25	PBPF26U
		• 0.5 mm core diameter • 12 mm bend radius	DF-G1 80 D10D 150 D10B 38 D10A 25	PBPF26UMB
		• 0.5 mm core diameter • 12 mm bend radius • Quartz probe; polypropylene housing • Sensor switches when tip of quartz is immersed in liquid	DF-G1 95 D10D 143 D10B 38 D10A 33	PBT26UM6M.1
		• 90° angle • Thread	DF-G1 120 D10D 225 D10B 80 D10A 70	PBAT46U

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Plastic Fiber Optics Specifications

Construction	**Optical Fiber:** Acrylic (PMMA) monofilament, except as noted **Protective Jacket:** Black polyethylene, except as noted **Threaded End Tips and Hardware:** Nickel-plated brass, except as noted **Probe End Tips:** Annealed (bendable) 304 stainless steel **Angled End tips:** Hardened 304 stainless steel **Ferrule End Tips:** 303 stainless steel
Sensing Range	Refer to the specific fiber optic/sensor combination
Implied Dimensional Tolerance	**All dimensions are in millimeters:** x = ±2.5 mm, x.x = ±0.25 mm and x.xx = ±0.12 mm, unless specified "L" = ±40 mm per meter
Minimum Bend Radius	8 mm for 0.25 mm diameter fibers 12 mm for 0.5 mm diameter fibers (except DURA-BEND™) 25 mm for 1.0 mm diameter fibers (except DURA-BEND™) 38 mm for 1.5 mm diameter fibers
Repeat Bending/Flexing	Life expectancy of plastic fiber optic cable is in excess of one million cycles at bend radii of no less than the minimum and a bend of 90° or less. Avoid stress at the point where the cable enters the sensor ("control end") and at the sensing end tip. Coiled plastic fiber optic assemblies are recommended for any application requiring reciprocating fiber motion.
Chemical Resistance	The acrylic core of the monofilament optical fiber will be damaged by contact with acids, strong bases (alkalis) and solvents. The polyethylene jacket will protect the fiber from most chemical environments. However, materials may migrate through the jacket with long term exposure. Samples of fiber optic material are available from Banner for testing and evaluation.
Temperature Extremes	Temperatures below -30° C will cause embrittlement of the plastic materials but will not cause transmission loss. Temperatures above +70° C will cause both transmission loss and fiber shrinkage.
Operating Temperature	-30° to +70° C, unless otherwise specified

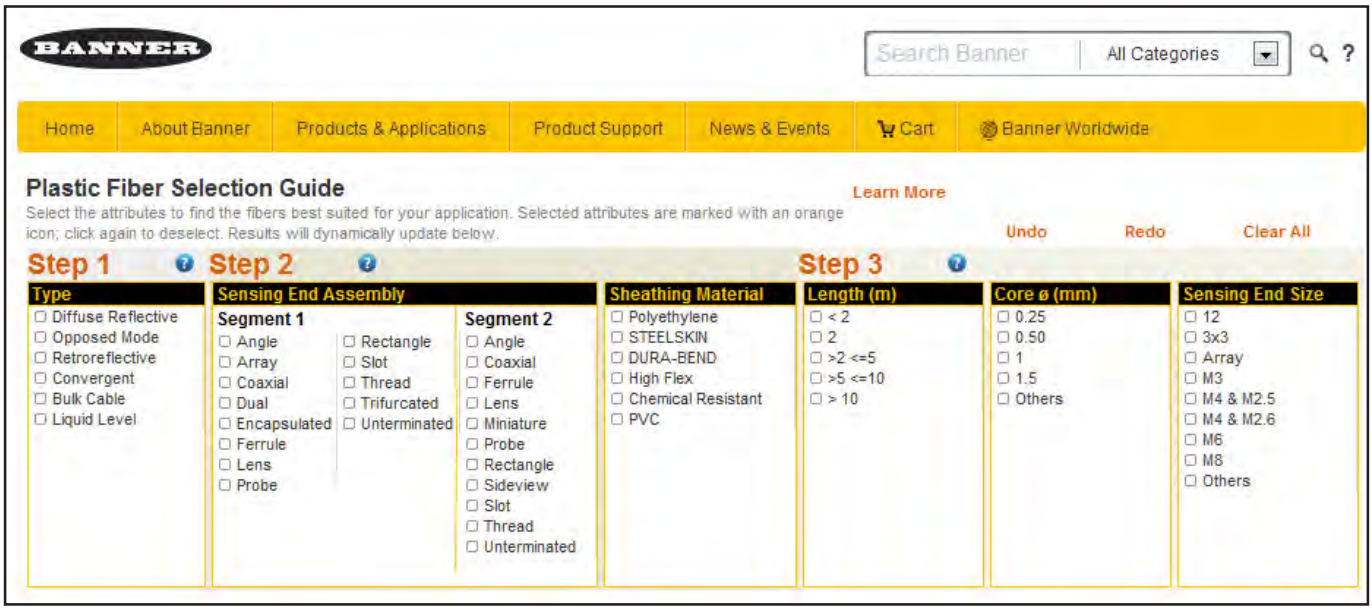
Fiber Core Diameter Comparison

 PIT16U	 PBT16U	N/A
 PIT26U	 PBT26U	 PBCT26U
 PIT46U	 PBT46U	 PBCT46U
 PIT66U	 PBT66U	N/A

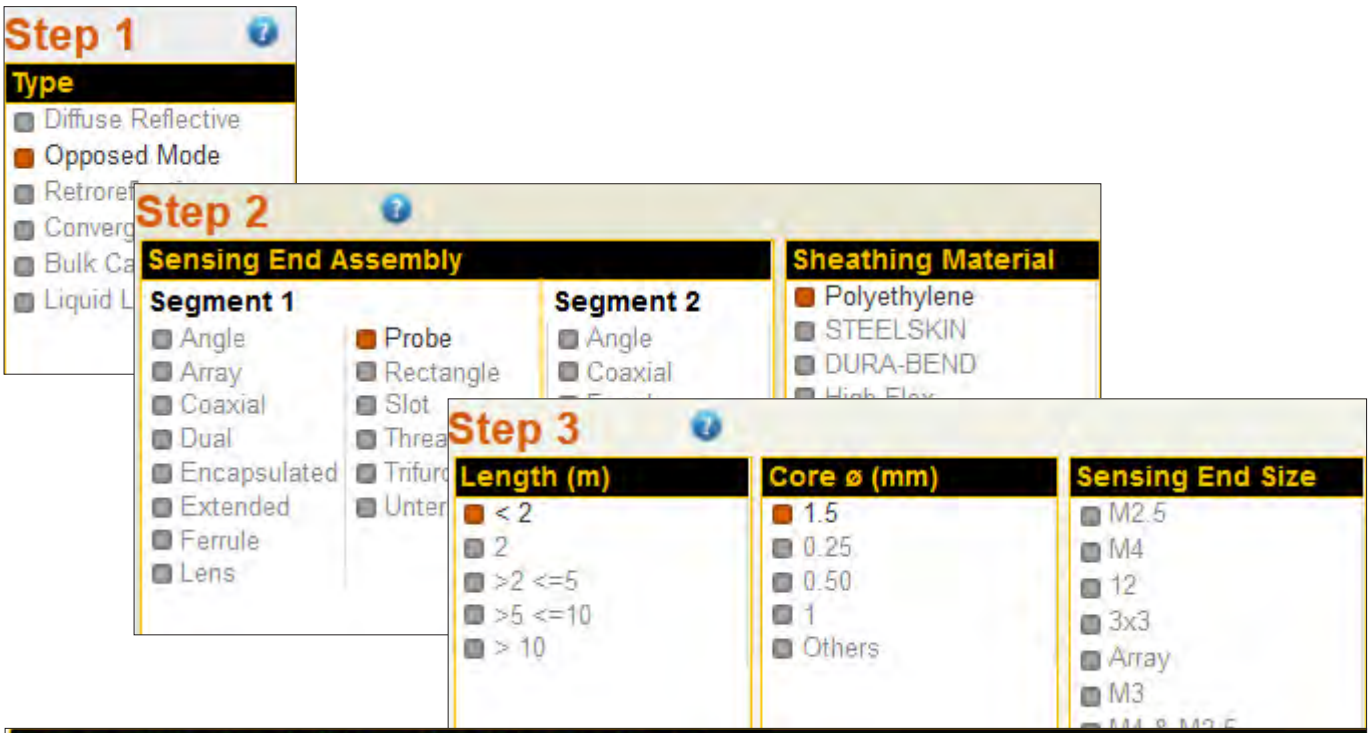
⚠ Application Notes and Warnings ⚠

1. Plastic fiber assemblies with "U" in the suffix of the model numbers have unterminated control ends (the end that is coupled to the photoelectric sensor). The customer can cut these fiber optic assemblies to the required length using the supplied cutter. Use only the supplied cutter to ensure optimal light coupling efficiency.
2. Terminated plastic fiber assemblies are optically ground and polished and cannot be shortened, spliced or otherwise modified.
3. Do not subject the plastic fibers to sharp bends, pinching, high tensile loads or high levels of radiation.
4. When ordering fiber lengths in excess of 2 m, take into account light signal attenuation due to the additional length.
5. Due to their light transmission properties, plastic fiber optics are recommended for use only with visible light fiber optic sensors.
6. Use caution when applying fiber optics in hazardous locations. Although fiber optic assemblies are, by themselves, intrinsically safe, the sensor and associated electronics must be LOCATED IN A SAFE ENVIRONMENT. Alternatively, fiber optics may be used with NAMUR sensor model Q45AD9FP (page 90). Fiber optics do not necessarily provide a hermetic seal between a hazardous environment and the safe environment.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



The Plastic Fiber Selection Guide at *bannerengineering.com/selectionguide/plastic_fibers* is a tool that allows you to quickly and easily refine a search from hundreds of models by selecting key fiber criteria. Relevant model results will be displayed dynamically as you choose different criteria from the selection tool. The online Plastic Fiber Selection Guide is available in multiple languages for convenient use to help you find the right fiber that meets your needs. If you cannot find what you are looking for, contact a Banner Application Engineer at 1-888-3-SENSOR to find out more about our custom fibers.

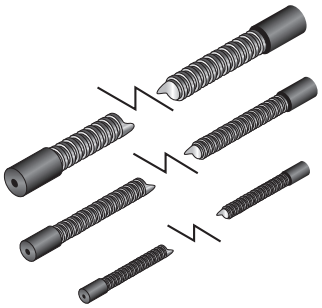
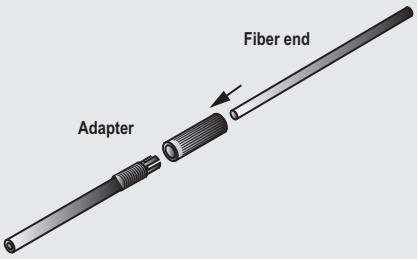


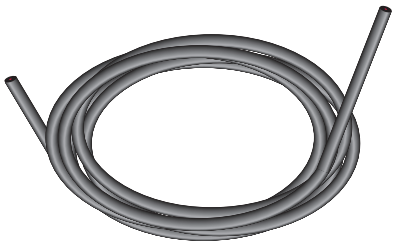
Results: 3 Double click the column header to sort

Model Number	Featured	Drawing	Type	Sensing Assembly	Length (m)	Termination	She Mat
PIPS6.38UMPUE		PDF	Opposed Mode	Probe, Sideview	0.11	Free Cut	Poly
PIPS6.8UMPUE		PDF	Opposed Mode	Probe, Sideview	0.24	Free Cut	Poly
PIPS61.5UMSQMAP		PDF	Opposed Mode	Probe, Sideview	0.45	Free Cut	Poly

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

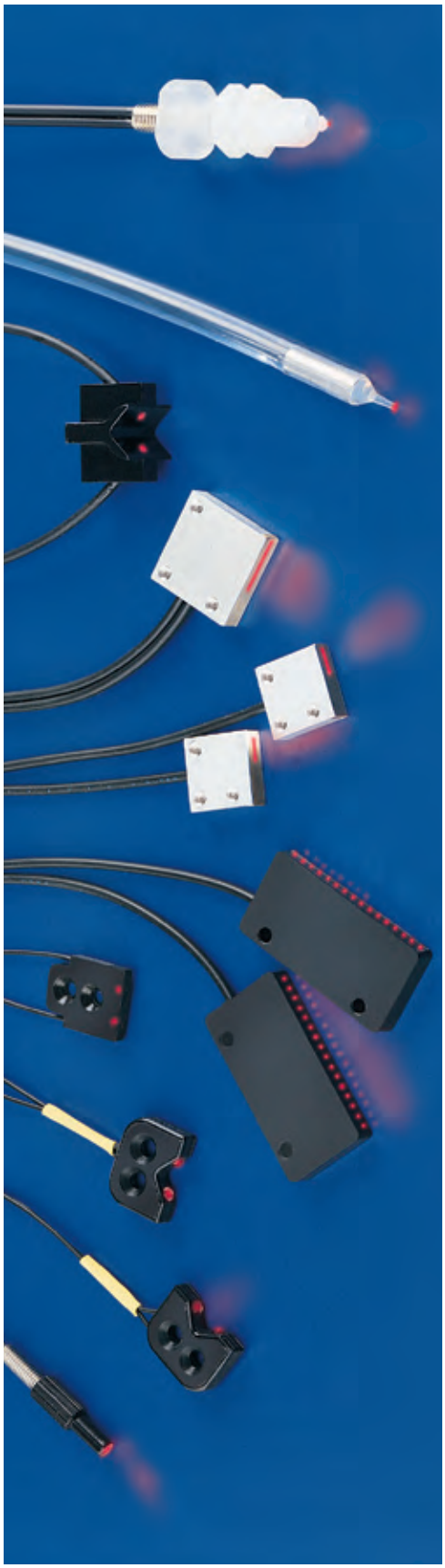
Fiber Optic Accessories

	Model Specific Features	General Features	Drawings	Model Number
Fiber Cutters	25 cutters(no bushings)	• These kits are used with unterminated plastic fiber cables • Each kit contains 40 bushings and 10 cutter assemblies (cutters can be purchased separately in packages of 25 - reference model PFC-2-25)	 NOTE: Bushings used with Q45, OMNI-BEAM, ECONO-BEAM, MAXI-BEAM and VALU-BEAM sensors only.	PFC-3-25
	For use with 0.25 and 0.5 mm diameter cables.			PFK20
	For use with 1 and 1.5 mm diameter cables.			PFK40
Plastic Fiber Field-Installable Sheathing	May be used with bifurcated fiber assemblies having M6 x 0.75 threaded end tips (e.g., PBCT46U, PBP46U, PBT46UHT1 and PBT66U).	• Stainless steel sheathing with stainless steel end fittings (one end internally threaded to capture fiber end tips, other end non-threaded) is used in applications where protection is required for plastic fiber optic cables • All models listed are 1.8 m in length • Other lengths are available by contacting Banner Applications Department		PFS69S6T
	May be used with individual or bifurcated fiber assemblies having M4 x 0.7 threaded end tips (e.g., PBCT26U, PBPF26U, PIP46U, PIT46U and PIT66U).			PFS53S6T
	May be used with individual fiber assemblies having M3 x 0.5 threaded end tips (e.g., PIP26U, PIT26U and PIT1X46U).			PFS44S6T
Plastic Fiber Adapters	Use to adapt plastic fiber optic cables with outside jacket diameter of 1.0 mm, such as PIT26U and PBP16U.	• Compression fitting adapters are used with small-diameter unterminated plastic fiber cables • Use when interfacing small-diameter plastic fibers to D10, D11, D12, QM42, QS18, R55F, FI22 and MINI-BEAM plastic fiber sensor families • Each kit contains 100 pairs of adapters. One pair will interface either one bifurcated fiber optic cable or a pair of individual cables to a fiber optic amplifier		UPFA-1-100
	Use to adapt plastic fiber optic cables with outside jacket diameter of 1.25 mm or 1.3 mm, such as PBCT26U and PBF46UM3MJ1.3.			UPFA-2-100

	Core	Length	Type	Drawing	Model Number
Unterminated Individual and Bifurcated Plastic Fibers	0.5 mm	9 m	Single		PIU230U
		18 m			PIU260U
	1.0 mm	9 m	Single		PIU430U
		18 m			PIU460U
	1.5 mm	9 m	Single		PIU630U
		18 m			PIU660U
	1.0 mm	9 m	Duplex		PBU430U
		18 m			PBU460U

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Specialty Fibers for Specific Sensing Applications





DURA-BEND™ for extremely tight radius bends



Fluoropolymer encapsulated fibers



Focused beam fibers



Convergent beam fibers



Linear array fibers



Liquid level detection fibers



High temperature fibers



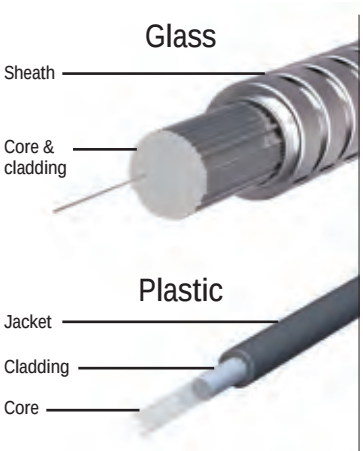
SteelSkin™ for impact and abrasion

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Glass Fiber Optics

- Solve numerous challenging sensing applications in the most hostile environments, including temperatures up to 480° C, corrosive materials and extreme moisture
- Withstand severe shock and vibration
- Ignore extreme electrical noise
- Constructed of a combination of optical glass fiber, stainless steel, PVC, brass, molded thermoplastics and optical-grade epoxy



Fiber Construction

Core:	Thin glass or plastic center of the fiber through which light travels
Cladding:	Outer optical material surrounding the core that reflects light back into the core
Jacket/ Sheath:	Protective layer to protect fiber from damage and moisture

Choosing Glass or Plastic

Plastic fibers are for general purpose use. They tolerate severe flexing, can be cut to length in the field and cost less than glass fibers. Glass fibers are the best choice for challenging environments such as high temperatures, corrosive materials and moisture.



Glass fibers page 306

- Solve numerous challenging sensing requirements
- Ideal for hostile environments such as high temperatures to 480° C, corrosive materials and extreme moisture
- Withstand high levels of shock and vibration
- Inherently immune to extreme electrical noise
- Available with choice of sheathings: standard stainless-steel flexible conduit, PVC or other flexible tubing
- Can be quickly custom designed



Plastic fibers page 286

- Inexpensive and easily cut to length during installation
- Bend for a precise fit
- Available in high-flex models to withstand flexing
- Offered with special jackets that withstand corrosion, impact and abrasion
- Available in coiled versions for applications requiring articulated or reciprocating motion
- Available in diameters of 0.25, 0.5, 1.0 or 1.5 mm
- Can be quickly custom designed and built for your unique applications

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Model Key

I	A T	2	3	S	X X

ASSEMBLY STYLE designator

B = Bifurcated fiber
I = Individual fiber*

SENSING END TIP STYLE designator

A = 90° Angle
AM = Miniature 90° Angle
AT = 90° Angle/Thread
F = Ferrule
M = Miniature Tip
MP = Miniature Probe
MT = Miniature Thread
R = Rectangular Bundle Termination
T = Thread
TA = Thread/90° Angle
TETA = Thread and Extra Tight 90° Angle

FIBER BUNDLE DIAMETER designator

.44 = 0.027 in = 0.69 mm
.5 = 0.032 in = 0.81 mm
.75 = 0.046 in = 1.17 mm
1 = 0.062 in = 1.57 mm
1.5 = 0.09 in = 2.29 mm
2 = 0.125 in = 3.18 mm
2.5 = 0.156 in = 3.96 mm

OVERALL LENGTH designator (in feet)

2 = 2 ft. = 610 mm ±38 mm
3 = 3 ft. = 914 mm ±38 mm

SHEATHING MATERIAL designator

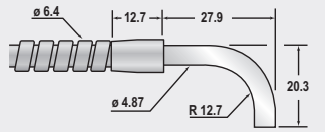
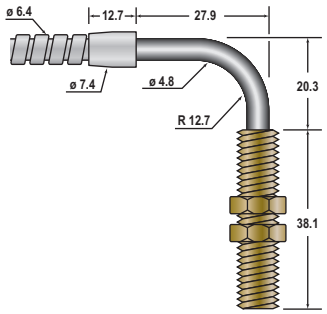
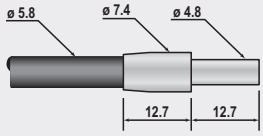
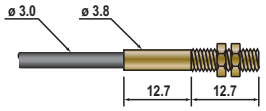
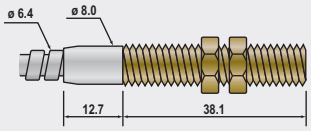
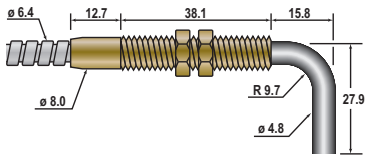
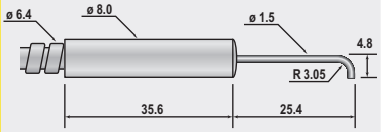
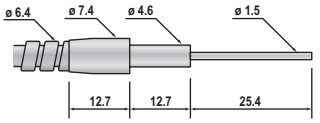
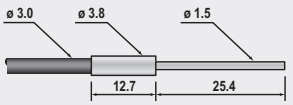
S = Stainless steel flexible conduit
P = PVC with galvanized monocoil reinforcing wire

MODIFICATIONS designator

"MXX" = Sensing end tip modification
"M600" = Sensing end withstands 315° C
"M900" = Sensing end withstands 480° C

* Individual glass fibers are packaged separately.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

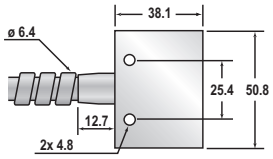
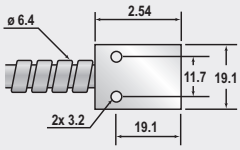
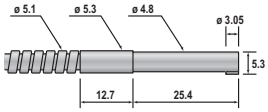
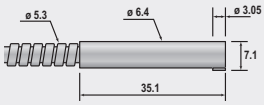
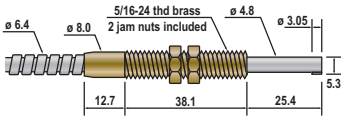
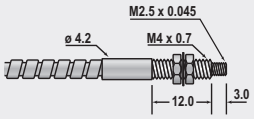
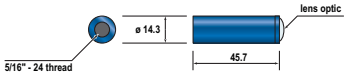
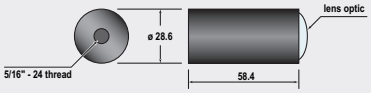
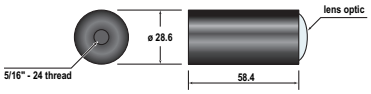
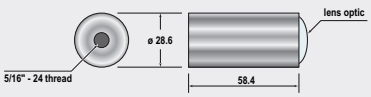
Fiber Mode	End Tip (mm)	Features	Typical Range (mm)	Model
Standard OPPOSED		• 3.18 mm core diameter • 19 mm bend radius • 90° angle M600 M900	QS18 715 R55F 1050 SME312 250 D12E 975 D12 550	IA23S
		• 3.18 mm core diameter • 19 mm bend radius • 90° angle/thread • Lenses available M600 M900	QS18 900 R55F 1050 SME312 250 D12E 975 D12 550	IAT23S
		• 3.18 mm core diameter • 19 mm bend radius • Smooth ferrule M600 M900	QS18 R55F 990 SME312 1050 D12E 975 D12 550	IF23P
		• 0.69 mm core diameter • 9.5 mm bend radius • Miniature thread	QS18 NA NA R55F 75 SME312 25 D12E 102 D12 70	IMT.442P
		• 3.18 mm core diameter • 19 mm bend radius • Thread • Lenses available M600 M900	QS18 900 R55F 1050 SME312 250 D12E 975 D12 550	IT23S
		• 3.18 mm core diameter • 19 mm bend radius • 90° angle/thread M600 M900	QS18 1100 R55F 1050 SME312 250 D12E 925 D12 550	ITA23S
Miniature Probe OPPOSED		• 1.17 mm core diameter • 19 mm bend radius • 90° angle M600	QS18 110 R55F 130 SME312 50 D12E 180 D12 170	IAM.752S
		• 1.17 mm core diameter • 19 mm bend radius • Non-bendable probe M600	QS18 NA NA R55F 130 SME312 50 D12E 180 D12 170	IM.752S
		• 1.17 mm core diameter • 9.5 mm bend radius	QS18 NA NA R55F 130 SME312 50 D12E 180 D12 170	IMP.753P

M600 Available 315° C models. Add M600 to end of model number (example, IA23SM600).

M900 Available 480° C models. Add M900 to end of model number (example, IA23SM900). Dimensions may vary for these models.

NA: Not recommended.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Fiber Mode	End Tip (mm)	Features	Typical Range (mm)	Model
Area Sensing (Array) OPPOSED		• 3.69 mm core diameter • 19 mm bend radius • Straight exit; 38 mm width M600	QS18 760 R55F 1175 SME312 350 D12E 975 D12 580	IR2.53S
		• 3.18 mm core diameter • 19 mm bend radius • Straight exit; 10 mm width M600	QS18 1045 R55F 1050 SME312 250 D12E 925 D12 550	IR23S
		• 2.29 mm core diameter • 19 mm bend radius • Ultra-compact head M600	QS18 250 R55F 600 SME312 180 D12E 500 D12 450	IA1.53SMETA
Side View OPPOSED		• 2.29 mm core diameter • 19 mm bend radius M600	QS18 340 R55F 600 SME312 180 D12E 500 D12 450	IA1.53SMTA
		• 2.29 mm core diameter • 19 mm bend radius M600	QS18 390 R55F 600 SME312 180 D12E 500 D12 450	ITETA1.53S
Vacuum OPPOSED		• 1.27 mm core diameter • 19 mm bend radius	QS18 R55F SME312 D12E D12	IMT.753SMVF
Extended Range Lens		• Glass lens withstands 315° C	Contact factory for sensing range	L9
		• Plastic housing withstands 105° C		L16F
		• Aluminum housing withstands 315° C		L16FAL
		• Stainless steel housing withstands 480° C		L16FSS

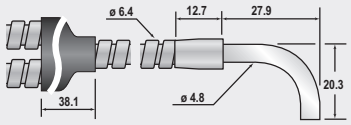
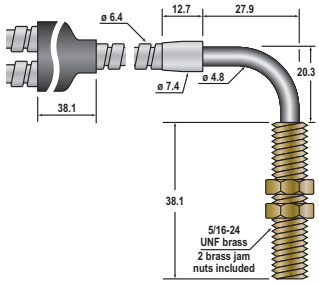
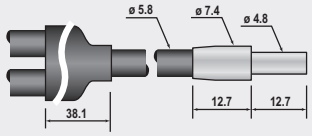
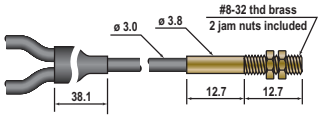
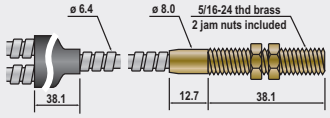
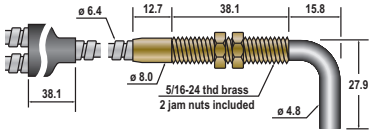
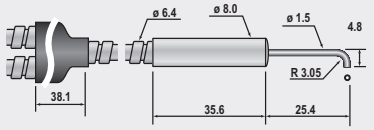
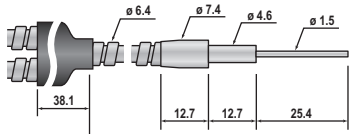
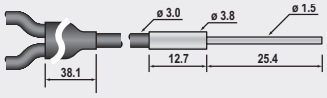








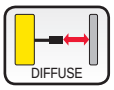
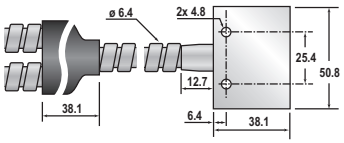
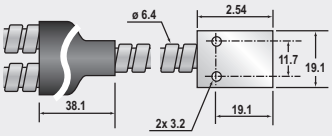
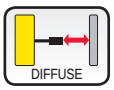
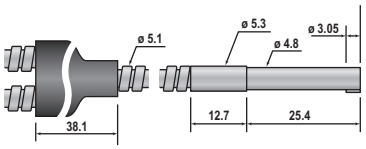
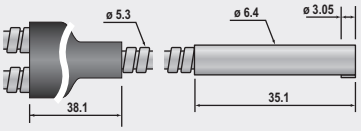
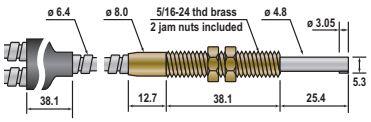
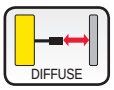
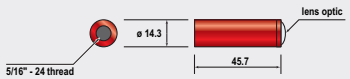
M600 Available 315° C models. Add M600 to end of model number (example, BA23SM600).

Fiber Mode	End Tip (mm)	Features	Typical Range (mm)	Model
Standard DIFFUSE		• 3.18 mm core diameter • 19 mm bend radius M600 M900	QS18 80 R55F 110 SME312 25 D12E 180 D12 150	BA23S
		• 3.18 mm core diameter • 19 mm bend radius M600 M900	QS18 90 R55F 110 SME312 25 D12E 180 D12 150	BAT23S
		• 3.18 mm core diameter • 19 mm bend radius	QS18 100 R55F 110 SME312 25 D12E 180 D12 150	BF23P
		• 0.69 mm core diameter • 9.5 mm bend radius	QS18 NA NA R55F NA NA SME312 1 D12E 10 D12 5	BMT.442P
		• 3.18 mm core diameter • 19 mm bend radius M600 M900	QS18 100 R55F 110 SME312 25 D12E 180 D12 150	BT23S
		• 3.18 mm core diameter • 19 mm bend radius M600 M900	QS18 85 R55F 110 SME312 25 D12E 180 D12 150	BTA23S
Miniature Probe DIFFUSE		• 1.17 mm core diameter • 19 mm bend radius M600	QS18 NA NA R55F 11 SME312 3 D12E 42 D12 25	BAM.752S
		• 1.17 mm core diameter • 19 mm bend radius M600	QS18 NA NA R55F 11 SME312 3 D12E 42 D12 25	BM.752S
		• 1.17 mm core diameter • 9.5 mm bend radius	QS18 NA NA R55F 11 SME312 3 D12E 42 D12 25	BMP.753P

M600 Available 315° C models. Add M600 to end of model number (example, BA23SM600).

M900 Available 480° C models. Add M900 to end of model number (example, BA23SM900). Dimensions may vary for these models.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Fiber Mode	End Tip (mm)	Features	Typical Range (mm)	Model
Area Sensing (Array) 		• 3.69 mm core diameter • 19 mm bend radius M600	QS18 75 R55F 120 SME312 30 D12E 180 D12 155	BR2.53S
		• 3.18 mm core diameter • 19 mm bend radius M600	QS18 110 R55F 110 SME312 25 D12E 180 D12 150	BR23S
Side-View 		• 2.29 mm core diameter • 19 mm bend radius M600	QS18 45 R55F 65 SME312 20 D12E 135 D12 125	BA1.53SMETA
		• 2.29 mm core diameter • 19 mm bend radius M600	QS18 50 R55F 60 SME312 20 D12E 135 D12 125	BA1.53SMTA
		• 2.29 mm core diameter • 19 mm bend radius M600	QS18 30 R55F 60 SME312 20 D12E 135 D12 125	BTETA1.53S
Convergent Beam Spot 		• Glass lens; withstands 315° C • Focuses light to .80 mm with ø 1.6 mm fiber	Contact factory for range information	L10

M600 Available 315° C models. Add M600 to end of model number (example, BA23SM600).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Glass Fiber Optics Specifications

Construction	Combination of optical glass fiber, stainless steel or PVC, brass, molded thermoplastics, and optical-grade epoxy. Optical fiber is F2 core, EN1 clad, approx. 50 µm diameter per strand. Flexible steel interlock sheathing is 302 stainless.
Sensing Range	Refer to the specific fiber optic to be used
Bend Radius	Inside bend radius must be 12 mm or greater for PVC covered fiber optic assemblies, and 25 mm or greater for stainless steel armored cable covered fibers
Length	Standard length for assemblies is 915 mm; see dimension diagrams Most models are available from the factory with shorter or longer cable lengths, up to 18 m max
Length Dimension Tolerance	Overall assembly length: ±12 mm per 300 mm of length Shrink junction dimensions: ±12 mm
Implied Dimensional Tolerances	All dimensions are in millimeters: x = ±2.5 mm, x.x = ±0.25 mm and x.xx = ±0.12 mm, unless specified.
Operating Conditions	Fiber assemblies with stainless-steel (SS) sheathing and metal end tips: -140° to +249° C Fiber assemblies with PVC sheathing and/or plastic end tips: -40° to +105° C Special order assemblies with SS sheathing and metal end tips and model suffix "M600": -140° to +315° C* Special order assemblies with SS sheathing and metal end tips and model suffix "M900": -140° to +480° C*; note dimensional changes from STD models * sensing end tip only

⚠ Application Notes and Warnings ⚠

1. The ends of glass fiber optic assemblies are optically ground and polished. Care taken in this manufacturing process accounts for the light coupling efficiency of the fiber optic assembly. As a result, glass fiber assemblies cannot be shortened, spliced or otherwise modified.
2. Use caution when applying fiber optics in hazardous locations. Although fiber optic assemblies are by themselves, intrinsically safe, the sensor and associated electronics must be LOCATED IN A SAFE ENVIRONMENT. Alternatively, fiber optics may be used with sensor model SMI912FQD. This sensor is approved for use inside hazardous areas when used with an appropriate intrinsic barrier. Also, see NAMUR sensor models Q45AD9F and MIAD9F. Fiber optics do not necessarily provide a hermetic seal between a hazardous environment and the safe environment.
3. In applications where glass fibers are used to insulate the control from high voltage, specify silicone rubber, Teflon®, or high-density polyethylene sheathing with no reinforcing wire in the cable. It is the responsibility of the user to test each fiber optic assembly for insulation capacity.
4. Do not subject the fibers to sharp bends, pinching, repeated flexing or high levels of radiation.
5. When ordering fiber lengths in excess of 1 m, take into account light signal reduction of 5 percent per 300 mm of additional length.

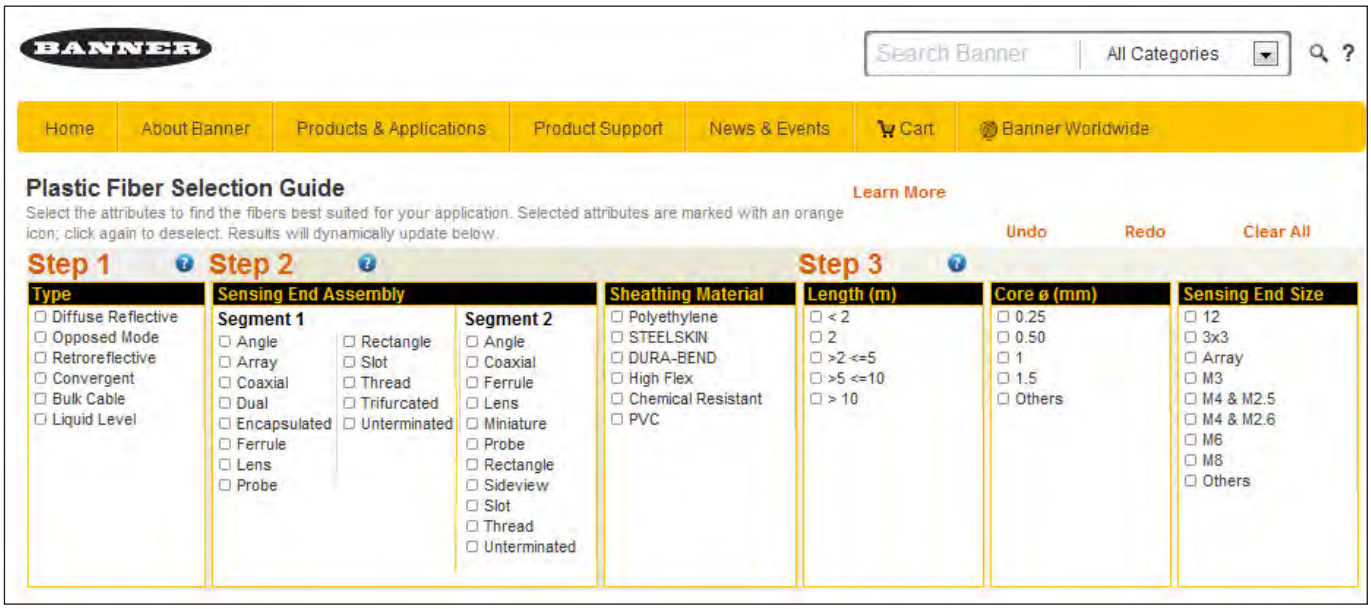
Teflon® is a registered trademark of Dupont™.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Additional Models Available

In addition to the configurations shown, Banner offers thousands of readily available alternative fiber models:

- Substitute PVC over monocoil sheathing for stainless steel
- Reduce or increase glass fiber optic bundle diameters
  Example: Change ø 3.18 mm bundle to ø 1.57 mm
- Substitute a rectangular-shaped fiber bundle (0.5 x 2.5 mm) for a circular bundle
- Change endtip material from brass to stainless steel
- Modify straight or angled probe tip dimensions
- Modify overall fiber length in intervals of 305 mm (standard lengths are 914 and 610 mm)



The Plastic Fiber Selection Guide at *Bannerengineering.com/selectionguide* is a tool that allows you to quickly and easily refine a search from hundreds of models by selecting key fiber criteria. Relevant model results will be displayed dynamically as you choose different criteria from the selection tool. The online Plastic Fiber Selection Guide is available in multiple languages for convenient use to help you find the right fiber that meets your needs. If you cannot find what you are looking for, contact a Banner Application Engineer at 1-888-3-SENSOR to find out more about our custom fibers.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Measurement

High-quality optical, ultrasonic, radar and measuring array sensors help to solve the most challenging measurement applications.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

MEASUREMENT

OPTICAL page 316

ULTRASONIC page 334

RADAR page 370

ARRAYS page 380

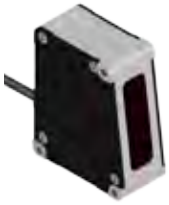
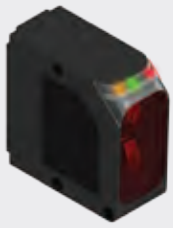
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Optical

Optical sensors provide accurate non-contact measuring and monitoring of targets with varying color, shape and temperature.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Max Sensing Range	Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	LE550 A laser sensor with a range of 100 to 1000 mm right out of the box with easy adjustment, setup and use. page 318	1 m	60 x 26 x 56 mm	IP67; NEMA 6	Die-cast zinc	12 to 30 V dc
	LH High-precision laser measurement page 320	200 mm	80 x 33 x 65 mm	IP67; NEMA 6	Aluminum	18 to 30 V dc
	LG High-precision short-range laser measurement page 322	125 mm	55.3 x 20.2 x 82.3 mm	IP67	Zinc alloy die-cast, plated and painted finish	12 to 30 V dc
	LT3 Time-of-flight laser distance-gauging page 326	50 m	68.5 x 35.3 x 87 mm	IP67; NEMA 6	ABS	12 to 24 V dc
	LT7 Time-of-flight laser distance-gauging page 330	250 m	93 x 42 x 95 mm	IP67	ABS	18 to 30 V dc

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



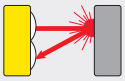
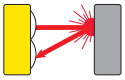
LE550
Laser Sensor

The LE550 laser sensor is ready to measure from 100 to 1000 mm right out of the box with easy adjustment, setup and use.

- Easy adjustment with a two-line, eight-character intuitive display
- Repeatability and accuracy for challenging targets, from metal to black rubber
- Visible class 2 laser for small spot size and simple alignment
- Ideal for applications such as loop control, thickness measurement, roll diameter and positioning

LE550 Class 2 Laser, 12-30 V DC

Visible Red Laser

Sensing Mode	Range	Output	Connection	Models
 DIFFUSE LASER	100-1000 mm	4-20 mA analog	Rotatable QD	LE550IQ NEW
		4-20 mA analog	Pigtail QD	LE550IQP NEW
		4-20 mA analog	2 m	LE550I NEW
 DIFFUSE LASER	100-1000 mm	0-10 V analog	Rotatable QD	LE550UQ NEW
		0-10 V analog	Pigtail QD	LE550UQP NEW
		0-10 V analog	2 m	LE550U NEW

Connection options: A model with a QD requires a mating cordset (see page 319).

For 9 m cable, add suffix W/30 to the 2 m model number (example, LE550I W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (With Shield)

See page 913

Length	Straight 5-Pin	Right-Angle 5-Pin
1.83 m	MQDEC2-506	MQDEC2-506RA
4.57 m	MQDEC2-515	MQDEC2-515RA
9.14 m	MQDEC2-530	MQDEC2-530RA

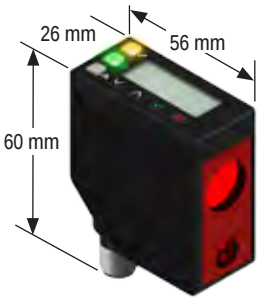
Additional cordset information available. See page 904.

Brackets

LE550

SMBLEU	SMBLEL	SMBLEFA
		

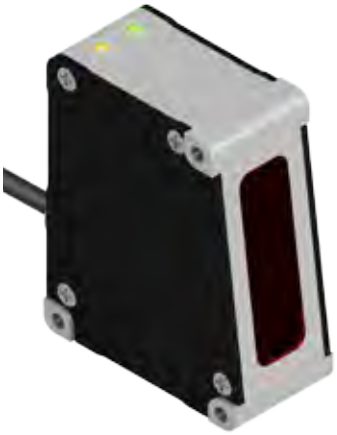
Additional bracket information available. See page 846.



LE550 Specifications

Sensing Beam	Visible red Class 2 laser, 650 nm
Supply Voltage and Current	12 to 30 V dc
Supply Protection Circuitry	Protected against reverse polarity and transient over voltages
Temperature Effect	±0.25 mm/°C @ <550 mm ±0.5 mm/°C @ >550 mm
Analog Linearity	Less than 0.5% full scale range (+/- 4.5 mm)
Analog Resolution	Less than 0.5 mm (100 – 550 mm) Less that 1 mm (550 – 1000 mm)
Construction	Housing: die-cast zinc Lens: polycarbonate
Vibration/Mechanical Shock	IEC 60947-5-2
Environmental Rating	IP67, NEMA 6
Certifications	CE
Hookup Diagrams	MI32 (p. 997)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



LH

High-Precision Laser Measurement

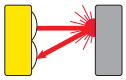
Highly precise laser technology of a 1024 pixel CMOS linear imager provides reliable and accurate measurement on virtually any material, including machined metal, wood, ceramic, paper and painted targets.

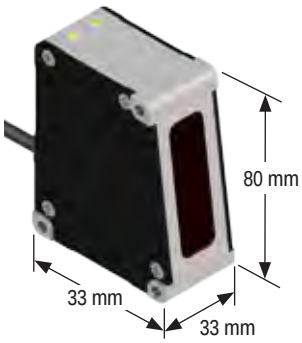
- Automatic laser power and measurement rate control for reliable measurement under changing or challenging conditions such as moving processes, hot parts, machined parts and a variety of colors and textures
- Robust, self-contained laser displacement sensor
- Free dedicated software for sensor setup and performance monitoring
- 4-20 mA or RS-485 serial communication outputs
- High-resolution thickness measurement or displacement*

*Two sensors required for thickness measurement

LH Class 2 Laser, 18-30 V DC

Visible Red Laser

Sensing Mode	Measurement: Span	Measurement: Start of Range	Measurement: End of Range	Measurement: Reference Distance	Connection	Output	Spot Size at Reference Distance	Models
 DIFFUSE LASER	10 mm	25 mm	35 mm	30 mm	8-pin Euro Pigtail QD	Analog 4-20 mA & RS-485	50 micron	LH30IX485QP
	40 mm	60 mm	100 mm	80 mm			125 micron	LH80IX485QP
	100 mm	100 mm	200 mm	150 mm			225 micron	LH150IX485QP



Connection options: A model with a QD requires a mating cordset (see page 321).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (With Shield)

See page 915

Length	Threaded 8-Pin Straight
2.00 m	MQLH-806-F
5.00 m	MQLH-815-F
9.00 m	MQLH-830-F

Euro QD—Double Ended (With Shield)

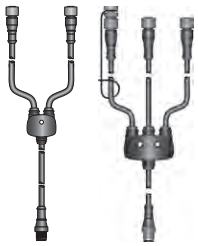
See page 917

Length	Threaded 8-Pin Straight Male to Straight Female	Threaded 8-Pin Straight Male to Straight Male
0.3 m	—	MQLH-801-MM
2.0 m	MQLH-806-MF	—
5.0 m	MQLH-815-MF	—
9.0 m	MQLH-830-MF	—

Euro QD—Splitter

See page 918

Length Branches	Length Trunk	Threaded 8-Pin
2 x 0 m	0.0 m	CSB-M1280M1280-LH
2 x 0.6 m	0.3 m	CSB-M1281M1282-LH
3 x 0.6 m	0.3 m	CSB3-M1281M1282-LH



Additional cordset information available. See page 904.

Brackets

LH

See page 875	See page 875	See page 875	See page 875
SMBLH1	SMBLH30	SMBLH80	SMBLH150



Additional brackets and information available. See page 846.

Serial Adapters

See page 969		Model
	• Easy configuration of a single sensor or network of sensors • USB to RS-485 serial adapter with integral communication cordset and USB cable	INTUSB485-LH
	• Converts an LH Network to the Modbus 485-RTU protocol • Supports baud rates up to 230,400 baud • Supports LH Networks with up to 32 sensors	INTMOD485-LH

LH Specifications

Sensing Beam	670 nm (1mW) visible red IEC and CDRH Class 2 laser
Supply Voltage and Current	18 to 30 V dc (10% max. ripple); 250 mA max. @ 24 V dc (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient over voltages
Delay at Power-up	1.25 seconds
Temperature Effect	0.01% of measurement range/°C
Linearity	0.1% of measurement range
Resolution	LH30: 1 µm LH80: 4 µm LH15: 10 µm Resolution obtained with an average of 64 readings on a white ceramic target
Ambient Light	≤ 3000 Lux
Measurement Frequency	Dynamically adjusted from 300 to 4000 Hz depending on target conditions, or locked via LH Series configurator square
Indicators	Green: Power ON; Flashing = target at reference distance Orange: Target inside measurement range
Construction	Housing: Aluminum Cover: Aluminum Lens: Glass Cable: PVC and nickel-plated brass
Environmental Rating	IP67
Output Configuration	Analog current output: 4 to 20 mA (current sourcing) Analog output rating: 1 kΩ max. @ 24 V dc, max. load resistance = [(Vcc-4.5)/0.02]Ω
Operating Conditions	Operating Temperature: –10° to +45° C Storage Temperature: 0° to +80° C Maximum relative humidity: 85% at +50° C, non-condensing
Vibration and Mechanical Shock	Vibration: 60 Hz, 30 minutes, 3 axes Shock: 30G for 11 milliseconds, half sine wave, 3 axes
Application Notes	Allow 30-minute warm-up for specified performance
Factory Default Settings	Mode: Displacement Mode Sensor Address: Unset (address 0) Baud Rate: 115200 Analog Output: 4-20 mA, positive slope, full range
Certifications	CE
Hookup Diagrams	MI06 (p. 990)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



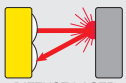
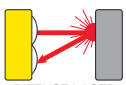
LG5
High-Precision Short-Range Laser Measurement

The LG5 uses an ultra-narrow beam for applications requiring precise measurement of distance, height or thickness as well as gauging applications.

- Replaces two-piece laser gauging sensors with completely self-contained, compact housing
- Houses discrete (switched) and analog outputs in the same unit, each independently programmable
- Features an outstanding maximum resolution of 3 µm
- Offers push-button programming for output response times or remote programming for added security and convenience
- Cordsets and brackets see page 324

LG5, 12-30 V DC

Visible Red Laser

Sensing Mode	Laser Class	Sensing Distance	Beam Size	Connection	Analog Output	Models NPN	Models PNP
 DIFFUSE LASER	Class 2	45-60 mm	At 53 mm: 0.4 mm x 0.6 mm Focus: 70 mm	2 m 8-pin Euro Pigtail QD 2 m 8-pin Euro Pigtail QD	0-10 V dc 4-20 mA	LG5A65NU LG5A65NUQ LG5A65NI LG5A65NIQ	LG5A65PU LG5A65PUQ LG5A65PI LG5A65PIQ
 DIFFUSE LASER	Class 2	45-60 mm	At 53 mm: 0.1 mm Focus: 53 mm	2 m 8-pin Euro Pigtail QD 2 m 8-pin Euro Pigtail QD	0-10 V dc 4-20 mA	LG5B65NU LG5B65NUQ LG5B65NI LG5B65NIQ	LG5B65PU LG5B65PUQ LG5B65PI LG5B65PIQ

For more specifications see page 324.

Connection options: A model with a QD requires a mating cordset (see page 324).

For 9 m cable, add suffix W/30 to the 2 m model number (example, LG10A65PU W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



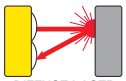
LG10
High-Precision Short-Range Laser Measurement

The LG10 uses a narrow beam for applications requiring precise measurement of a textured material's height or thickness as well as gauging applications.

- Replaces two-piece laser gauging sensors with completely self-contained, compact housing
- Houses discrete (switched) and analog outputs in the same unit, each independently programmable
- Features an outstanding maximum resolution of 10 µm
- Offers push-button programming for output response times or remote programming for added security and convenience
- Cordsets and brackets see page 324

LG10, 12-30 V DC

Visible Red Laser

Sensing Mode	Laser Class	Sensing Distance	Beam Size	Connection	Analog Output	Models NPN	Models PNP
 DIFFUSE LASER	Class 2	75-125 mm	At 125 mm: 0.6 mm x 0.8 mm	2 m 8-pin Euro Pigtail QD	0-10 V dc	LG10A65NU	LG10A65PU
						LG10A65NUQ	LG10A65PUQ
			Focus:180 mm	2 m 8-pin Euro Pigtail QD	4-20 mA	LG10A65NI	LG10A65PI
						LG10A65NIQ	LG10A65PIQ

For more specifications see page 324.

Connection options: A model with a QD requires a mating cordset (see page 324).

For 9 m cable, add suffix W/30 to the 2 m model number (example, LG10A65NU W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (With Shield)

See page 915

Length	Threaded 8-Pin Straight
2.00 m	MQDC-806
5.00 m	MQDC-815
9.00 m	MQDC-830

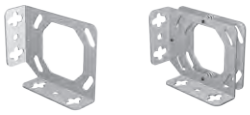


Additional cordset information available. See page 904.

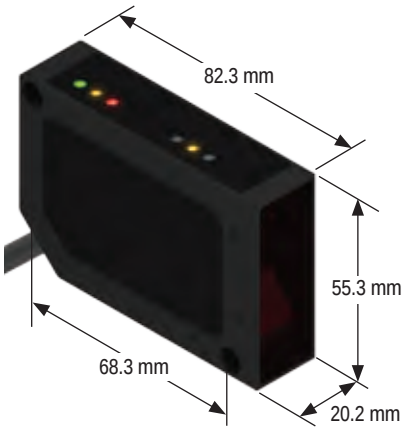
Brackets

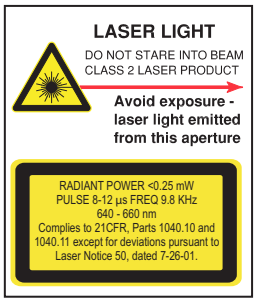
LG5/LG10

See page 875	See page 876
SMBLG	SMBLGA



Additional brackets and information available. See page 846.



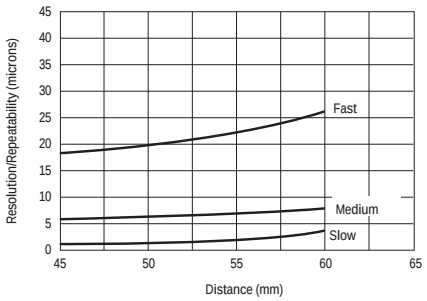


Repeatability/Resolution Curves

= Visible Red Laser

LG5

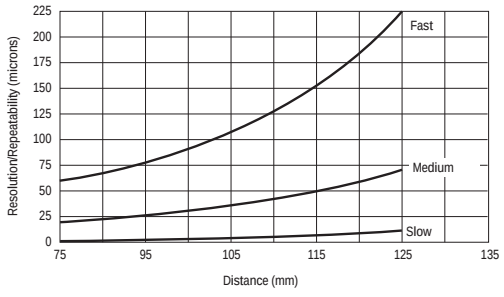




Range: 60 mm	Mode: Diffuse	LED:

LG10





Range: 125 mm	Mode: Diffuse	LED:

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

LG5 and LG10 Specifications

Sensing Beam	650 nm visible Red IEC and CDRH Class 2 laser; 0.20 mW max. radiant output power
Supply Voltage and Current	12 to 30 V dc (10% max. ripple); 50 mA max. @ 24 V dc (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient overvoltages
Delay at Power-up	1.25 second
Output Rating	**Discrete (switched) and Alarm outputs:** 100 mA max. **OFF-state leakage current:** less than 5 µA **Output saturation voltage** **PNP outputs:** less than 1.2 V at 10 mA and less than 1.6 V at 100 mA **NPN outputs:** less than 200 mV at 10 mA and less than 600 mV at 100 mA **Analog Current output:** 1 kΩ max. @ 24 V dc, max. load resistance = [(Vcc - 4.5)/0.02]Ω **Analog Voltage output:** 2.5 kΩ min. load impedance
Output Configuration	**Discrete (switched) & alarm outputs:** Solid-state switch; choose NPN (current sinking) or PNP (current sourcing) models **Analog output:** 4 to 20 mA (current sourcing) or 0 to 10 V dc (voltage sourcing), depending on model
Output Protection	Discrete and alarm outputs are protected against continuous overload and short circuit
Output Response Time	Discrete Outputs (ON/OFF) **Fast:** 2.0 milliseconds **Medium:** 10 milliseconds **Slow:** 100 milliseconds Analog Output (-3dB) **Fast:** 450 Hz (1 millisecond average/1 millisecond update rate) **Medium:** 45 Hz (10 millisecond average/2 millisecond update rate) **Slow:** 4.5 Hz (100 millisecond average/5 millisecond update rate)
Analog Resolution and Repeatability of Discrete Trip Point*	LG5: **Fast:** Less than 40 µm @ 50 mm **Medium:** Less than 12 µm @ 50 mm **Slow:** Less than 3 µm @ 50 mm See chart RRC-1 on page 324 LG10: **Fast:** Less than 150 µm @ 100 mm **Medium:** Less than 50 µm @ 100 mm **Slow:** Less than 10 µm @ 100 mm See chart RRC-2 on page 324
Analog Linearity* *Resolution and linearity specified @ 24 V dc, 22° C, using a white ceramic test surface (see Application Notes)	LG5: +/- 60 µm over 45 to 60 mm sensing window +/- 10 µm over 49 to 51 mm sensing window LG10: +/- 200 µm over 75 to 125 mm sensing window +/- 20 µm over 95 to 100 mm sensing window
Minimum Window Size (Analog or Discrete)	LG5: 1.5 mm LG10: 5 mm
Discrete Output Hysteresis	LG5: Less than 0.2 mm LG10: Less than 1.0 mm
Color Sensitivity (typical)	LG5: Less than 75 µm for white to dark gray ceramic target LG10: Less than 100 µm for white to dark gray ceramic target
Temperature Effect	LG5: +/- 7 µm/° C LG10: +/- 25 µm/° C
Remote TEACH and Laser Control Input Impedance	18 kΩ min. (65 kΩ min. at 5 V dc)
Remote TEACH	**To teach:** Connect yellow wire to +5 to 30 V dc **To disable:** Connect yellow wire to 0 to +2 V dc (or open connection)
Adjustments	**Response speed:** Push button toggles between Slow, Medium, and Fast (see Output Response Time) **Window limits (analog or discrete):** TEACH-mode programming of near and far window limits. Limits may also be taught remotely using TEACH wire **Analog output slope:** The first limit taught is assigned to the minimum analog output (0 V dc or 4 mA)
Laser Control	**To enable laser:** Connect green wire to +5 to 30 V dc **To disable laser:** Connect green wire to 0 to +2 V dc (or open connection) 250 millisecond delay upon enable/disable
Indicators	**Green Power ON LED:** Indicates when power is ON, overloaded output and laser status **Yellow Output LED:** Indicates when discrete load output is conducting **Red Signal LED:** Indicates when target is within sensing range and the condition of the received light signal **Tri-color Red/Green/Yellow TEACH LED:** Indicates sensor is ready for programming each limit (indicates Red for analog output, Green for discrete, and Yellow for simultaneous analog and discrete) **Yellow Fast/Slow LEDs:** Combination of 2 lights ON or OFF indicates 1 of 3 response speeds
Construction	**Housing:** Zinc alloy die-cast, plated and painted finish **Cover plate:** Aluminum with painted finish **Lens:** Acrylic
Environmental Rating	IP67; NEMA 6
Connections	2 m or 9 m 7-conductor shielded PVC-jacketed attached cable, or 150 mm 8-pin Euro-style pigtail quick-disconnect. Mating QD cordsets are purchased separately. See page 324.
Operating Conditions	**Temperature:** -10° to +50° C **Relative humidity:** 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	**Vibration:** 60 Hz, 30 minutes, 3 axes **Shock:** 30G for 11 milliseconds, half sine wave, 3 axes
Application Notes	For comparison, a white ceramic test surface has approximately 91% of the reflectivity of a white Kodak test card with a matte finish. A dark gray ceramic test surface has approximately 11% of the reflectivity of a white Kodak test card with a matte finish. (Allow 15-minute warm-up for maximum linearity.)
Certifications	CE c UL us
Hookup Diagrams	NPN Models: MI06 (p. 990) PNP Models: MI07 (p. 990)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



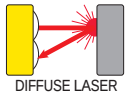
LT3
Time-of-Flight Laser Distance-Gauging Sensors

The LT3 uses advanced "time-of-flight" technology for precise, long-distance gauging.

- Reliably detects targets regardless of angles
- Visible red laser spot for easy alignment
- Offers push-button programming for other output response times or remote programming for added security and convenience

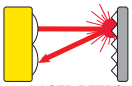
Diffuse LT3, 12-24 V DC

Visible Red Laser

Sensing Mode	Laser Class	Sensing Distance	Connection	Analog Output	Models NPN	Models PNP
 DIFFUSE LASER	Class 2	0.3 to 5 m for 90% reflectivity white card (Performance Curves on page 329 for more information)	2 m 8-pin Euro QD	None	LT3BD (Dual NPN or PNP selectable)	
					LT3BDQ (Dual NPN or PNP selectable)	
			2 m 8-pin Euro QD	0 to 10 V dc	LT3NU	LT3PU
					LT3NUQ	LT3PUQ
			2 m 8-pin Euro QD	4 to 20 mA	LT3NI	LT3PI
					LT3NIQ	LT3PIQ

Retro LT3, 12-24 V DC

Visible Red Laser

Sensing Mode	Laser Class	Sensing Distance	Connection	Analog Output	Models NPN	Models PNP
 LASER RETRO	Class 1	0.5 to 50 m† (Performance Curves on page 329 for more information)	2 m 8-pin Euro QD	None	LT3BDLV (Dual NPN or PNP selectable)	
					LT3BDLVQ (Dual NPN or PNP selectable)	
			2 m 8-pin Euro QD	0 to 10 V dc	LT3NULV	LT3PULV
					LT3NULVQ	LT3PULVQ
			2 m 8-pin Euro QD	4 to 20 mA	LT3NILV	LT3PILV
					LT3NILVQ	LT3PILVQ

For more specifications see page 328.

Connection options: A model with a QD requires a mating cordset (see page 327).

For 9 m cable, add suffix W/30 to the 2 m model number (example, LT3BD W/30).

† Retroreflective range is specified using a BRT-TVHG-8X10P high-grade target.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (With Shield)

See page 915

Length	Threaded 8-Pin Straight
2.00 m	MQDC-806
5.00 m	MQDC-815
9.00 m	MQDC-830



Additional cordset information available. See page 904.

Brackets

LT3

See page 876	See page 876	See page 876
SMBLT31	SMBLT32	SMBLT3IP

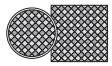


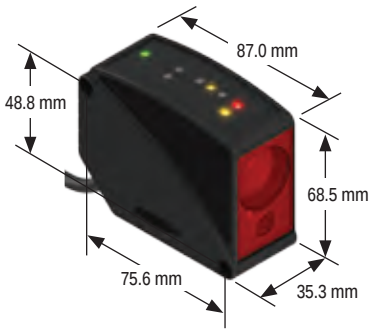
Additional brackets and information available. See page 846.

Other Accessories

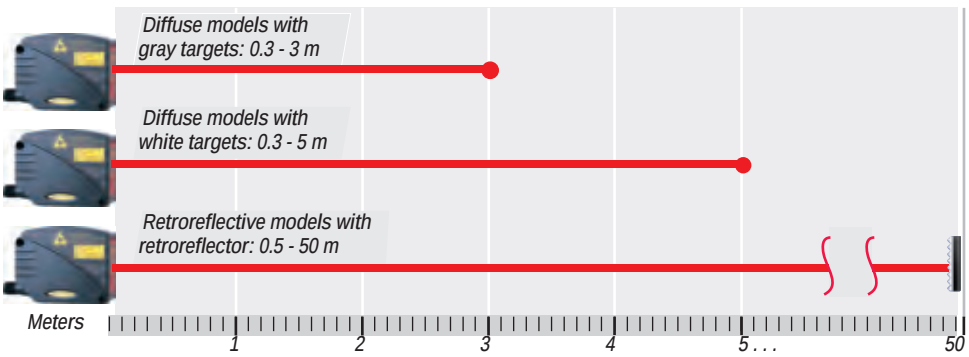
Reflectors

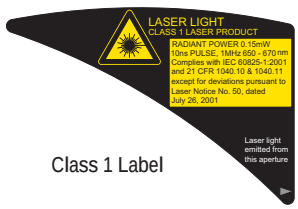
See page 940



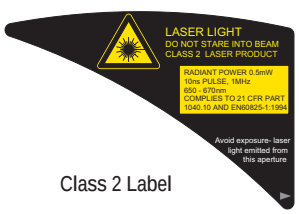


LT3 Sensing Ranges





Class 1 Label



Class 2 Label

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

L-GAGE® LT3 Specifications

Sensing Beam	**Typical beam diameter:** 6 mm @ 3 m **Typical laser lifetime:** 75,000 hours **Diffuse:** 658 nm visible red IEC and CDRH Class 2 laser; 0.5 mW max. radiant output power **Retroreflective:** 658 nm visible red IEC and CDRH Class 1 laser, 0.15 mW max. radiant output power	
Sensing Range	**Diffuse:** 90% white card: 0.3 to 5 m 18% gray card: 0.3 to 3 m 6% black card: 0.3 to 2 m	**Retroreflective:** 0.5 to 50 m (using supplied target)
Supply Voltage and Current	12 to 24 V dc (10% max. ripple); 108 mA max. @ 24 V dc or [2600/V dc] mA	
Supply Protection Circuitry	Protected against reverse polarity and transient voltages	
Delay at Power-up	1 second; outputs do not conduct during this time	
Output Rating	**Discrete (switched) output:** 100 mA max. **OFF-state leakage current:** less than 5 µA **Output saturation NPN:** less than 200 mV @ 10 mA; less than 600 mV @ 100 mA **Output saturation PNP:** less than 1.2 V at 10 mA; less than 1.6 V at 100 mA **Analog voltage output:** 2.5 kΩ min. load impedance (voltage sourcing) **Analog current output:** 1 kΩ max. @ 24V; max. load resistance = [Vcc-4.5/0.02 Ω] (current sourcing)	
Output Configuration	**Discrete (switched):** Solid-state switch; NPN (current sinking) or PNP (current sourcing), depending on model. Dual-discrete models feature selectable NPN or PNP, depending on wiring hookup. **Analog output:** 0 to 10 V dc or 4 to 20 mA	
Output Protection	Protected against short circuit conditions	
Output Response Time	**Discrete output** **Fast:** 1 millisecond ON/OFF **Medium:** 10 milliseconds ON/OFF **Slow:** 100 milliseconds ON/OFF **Diffuse Analog Voltage output (-3 dB)** **Fast:** 450 Hz (1 millisecond average/1 millisecond update rate) **Medium:** 45 Hz (10 milliseconds average/2 milliseconds update rate) **Slow:** 4.5 Hz (100 milliseconds average/4 milliseconds update rate) **Retroreflective Analog Voltage output (-3 dB)** **Fast:** 114 Hz (6 milliseconds average/ 1 millisecond update rate) **Medium:** 10 Hz (48 milliseconds average/ 1 millisecond update rate) **Slow:** 2.5 Hz (192 milliseconds average/ 1 millisecond update rate)	
Resolution/Repeatability	See charts RRC-1 and RRC-2 on page 329	
Color Sensitivity (typical)	**Diffuse:** 90% white to 18% gray: less than 10 mm; 90% white to 6% black: less than 20 mm. See chart CSC-1 on page 329.	
Analog Linearity	**Retroreflective:** ± 60 mm from 0.5 to 50 m (0.12% of full scale) (Specified @ 24 V dc, 22° C using supplied BRT-TVHG-8X10P retroreflector) **Diffuse:** ± 30 mm from 0.3 to 1.5 m; ± 20 mm from 1.5 to 5 m (Specified @ 24 V dc, 22° C using a 90% reflectance white card)	
Discrete Output Hysteresis	**Diffuse** **Fast:** 10 mm **Medium:** 5 mm **Slow:** 3 mm	**Retroreflective** **Fast:** 20 mm **Medium:** 10 mm **Slow:** 6 mm
Temperature Effect	**Diffuse:** less than 2 mm/ ° C	**Retroreflective:** less than 3 mm/° C
Minimum Window Size	**Diffuse:** 20 mm	**Retroreflective:** 40 mm
Remote TEACH Input	18 kΩ min. (65 kΩ at 5 V dc)	
Remote TEACH	**To teach:** Connect yellow wire to +5 to 24 V dc **To disable:** Connect yellow wire to 0 to +2 V dc (or open connection)	
Adjustments	**Response speed:** Push button toggles between fast, medium and slow (see Output Response Time) **Window limits (analog or discrete):** TEACH-mode programming of near and far window limits. Limits may also be taught remotely using TEACH input. **Analog output slope:** The first limit taught is assigned to minimum output current or voltage (4 mA or 0 V dc)	
Laser Control	Connect red wire to +5 to 24 V dc to enable laser beam; connect to 0 to +1.8 V dc (or open connection) to disable. See data sheet for delay time on enable.	
Indicators	**Green Power ON LED:** Indicates when power is ON, overloaded output and laser status **Yellow Output LED:** Indicates when discrete load output is conducting **Red Signal LED:** Indicates target is within sensing range and the condition of the received light signal **Yellow Speed LED:** Indicates the response speed setting **Red/Yellow TEACH LEDs:** In programming mode; indicate active output(s)	

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

L-GAGE® LT3 Specifications (cont'd)

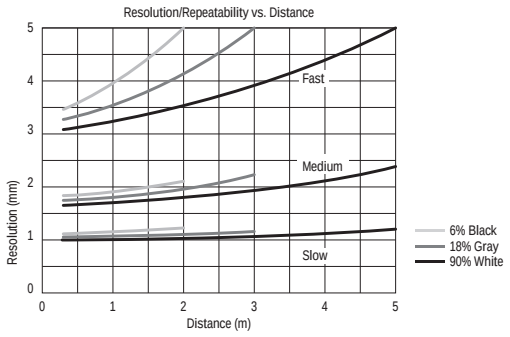
Construction	**Housing:** ABS/polycarbonate blend **Window:** Acrylic **Quick-disconnect:** ABS/polycarbonate blend
Environmental Rating	IP67; NEMA 6
Connections	2 m or 9 m shielded 7-conductor (with drain) PVC-jacketed attached cable, or 8-pin Euro-style quick-disconnect. QD cordsets are ordered separately. See page 327.
Operating Conditions	**Temperature:** 0° to +50° C **Relative humidity:** 90% at 50° C (non-condensing)
Application Notes	• For best accuracy, allow 30-minute warm-up before programming or operating • Retroreflective performance specifications are based on use with supplied BRT-TVHG-8X10P high-grade target. Results may vary with other retroreflective target materials.
Certifications	
Hookup Diagrams	**Discrete/Analog Models: NPN:** MI01 (p. 989) **PNP:** MI02 (p. 989) **Dual-Discrete Models: NPN:** MI03 (p. 989) **PNP:** MI04 (p. 989)

Repeatability/Resolution Curves

= Visible Red Laser

LT3

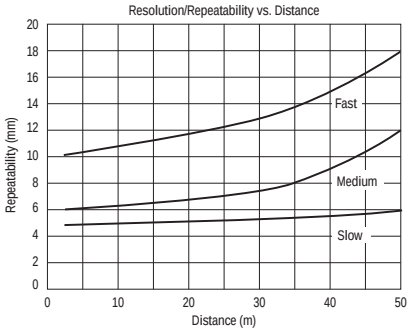




Range: 5 m	Mode: Diffuse	LED:

LT3





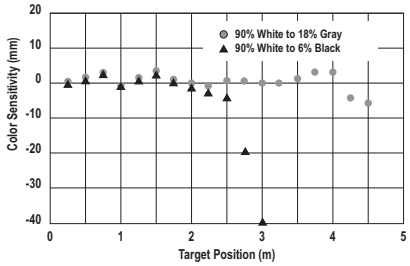
Range: 50 m	Mode: Retroreflective	LED:

Typical Color Sensitivity Curve

= Visible Red Laser

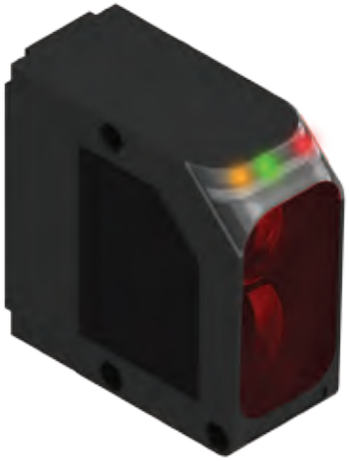
LT3





Range: 5 m	Mode: Diffuse	LED:

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



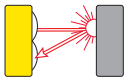
LT7
Time-of-Flight Laser Distance-Gauging Sensors

The LT7 uses advanced "time-of-flight" technology for precise, long-distance gauging with ranges up to 250 m.

- Visible red laser spot for easy alignment
- Features TEACH-mode programming using integrated push buttons or a serial interface
- Onboard LCD display for easy troubleshooting
- Long-range retroreflective models up to 250 m and diffuse models up to 10 m

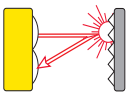
Diffuse L-GAGE® LT7, 18-30 V DC

Infrared Laser

Sensing Mode	Laser Class	Sensing Distance*	Connection	Discrete Output	Analog Output	Models	Serial
 DIFFUSE LASER	Class 1 Sensing Laser (Class 2 Alignment Laser)	0.5 to 10 m	12-pin M16 QD	2 PNP	4-20 mA	LT7PIDQ	RS-422 or SSI

Retro L-GAGE® LT7, 18-30 V DC

Infrared Laser

Sensing Mode	Laser Class	Sensing Distance*	Connection	Discrete Output	Analog Output	Models	Serial
 RETRO LASER	Class 1 Sensing Laser (Class 2 Alignment Laser)	0.5 to 250 m	12-pin M16 QD	2 PNP	—	LT7PLVQ	RS-422 or SSI

For more specifications see page 332.

Connection options: A model with a QD requires a mating cordset (see page 331).

* Diffuse-mode range specified using a 90% reflectance white card.
Retroreflective range is specified using a BRT-250, BRT-540 or BRT-700 retroreflective target (see page 940).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

See page 924

Length	Threaded 12-Pin Straight	Threaded 12-Pin Right-Angle
3.00 m	MQDC-1210ST	MQDC-1210RA
10.00 m	MQDC-1230ST	MQDC-1230RA

Additional cordset information available. See page 904.

Brackets

LT7

See page 877

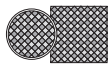
SMBLT7



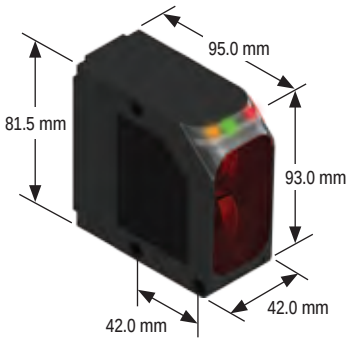
Additional brackets and information available. See page 846.

Other Accessories

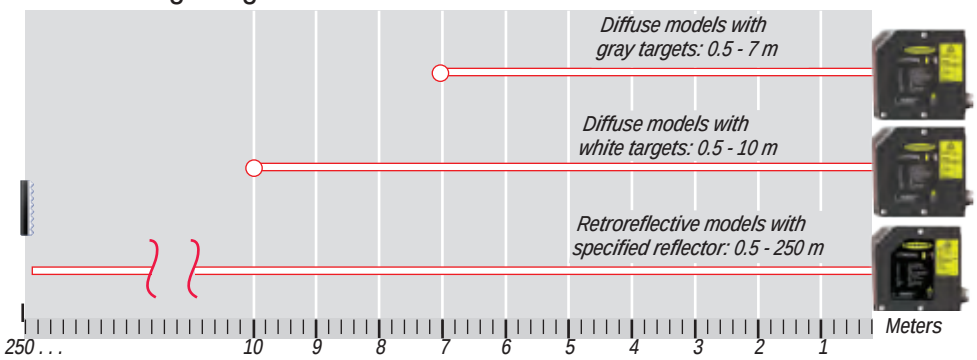
Reflectors	Apertures
See page 940	See page 966

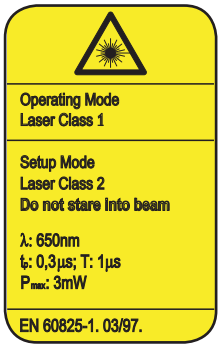






LT7 Sensing Ranges





Class 1 (Infrared Sensing Laser)

Lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing. Reference 60825-1 Amend. 2 © IEC:2001(E), section 8.2.

Class 2 (Visible Alignment Laser)

Lasers that emit visible radiation in the wavelength range from 400 to 700 nm where eye protection is normally afforded by aversion responses, including the blink reflex. This reaction may be expected to provide adequate protection under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing. Reference 60825-1 Amend. 2 © IEC:2001(E), section 8.2.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

L-GAGE® LT7 Specifications

Sensing Range	LT7PLVQ: 0.5 to 250 m (using specified reflector) LT7PIDQ: 6% Black card: 0.5 to 3 m 18% Gray card: 0.5 to 7 m 90% White card: 0.5 to 10 m
Supply Voltage and Current	18 to 30 V dc (10% max. ripple)
Power Consumption	Less than 4.5 W @ 25º C
Measuring Laser	Infrared, 900 nm, Class 1
Laser Control	Measurement laser is ON when sensor is ON. Pilot (visible) laser enabled during Programming mode; alternates with measurement laser.
Spot Size	LT7PLVQ: 10 m ø 20 mm; 50 m ø 100 mm; 100 m ø 200 mm; 250 m ø 500 mm LT7PIDQ: 4 m 3 x 10 mm; 6 m 4 x 12 mm; 10 m 10 x 20 mm
Pilot Laser (Alignment)	Visible red, 650 nm, Class 2
Discrete & Analog Output Protection	Protected against continuous overload and short circuit
Discrete Outputs	(2) 100 mA, PNP
Discrete Switch Points	Adjustable in 1 mm steps
Discrete Output Hysteresis	Adjustable, 10 mm min.
Alarm Outputs	50 mA, PNP (NO)
Analog Output	LT7PLVQ: None LT7PIDQ: 4-20 mA
Output Response Time	12 milliseconds
Linearity	±10 mm
Resolution/Repeatability	LT7PLVQ: ±2 mm LT7PIDQ: ±4 mm
Color Sensitivity	LT7PLVQ: Not Applicable LT7PIDQ: Contact Factory
Temperature Effect	Less than ± 5 mm over the total sensing range
Minimum Analog Window Size	LT7PLVQ: Not Applicable LT7PIDQ: 300 mm
Adjustments	Push-button-directed password enable/disable, measurement unit select, offset value select, output limits set, output mode select, analog output slope select (diffuse models only) and output limit manual adjust. See data sheet for information.
Serial Interface	RS-422 or SSI compatible
Serial Measurement Speed	SSI: 1.4 milliseconds (SSI cycle 80 microseconds) RS-422: 2.9 milliseconds @ 57.6 kBaud
Indicators	4 LEDs: Green: Power ON/OFF Red: Alarm (Error) LED Orange: Output 1 and Output 2 conducting LEDs 2-line digital LCD display. See data sheet for detailed information.
Construction	ABS shock-resistant housing; PMMA window; polycarbonate displays
Weight	Approximately 230 g
Environmental Rating	IEC IP67
Connections	12-pin M16 connector; 100 m max. cable length; use only cables listed on page 331
Operating Conditions	Temperature: -10° to +50° C in continuous operation
Storage Temperature	-30° to +75° C
Vibration/Shock	EN 60947-5-2
Application Notes	• All specifications are based on the specified surface at constant ambient conditions and following a minimum operating time of 15 minutes • For best accuracy, allow a 15 minute warm-up before programming or operating • Crosstalk avoidance: Light spots must be separated by at least 200 mm
Certifications	CE
Hookup Diagrams	MI05 (p. 990)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WEB ONLY



Q50

LED-based distance measurement sensor with analog or discrete output.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Ultrasonic

Ultrasonic sensors use sound waves rather than light, making them ideal for stable detection of uneven surfaces, liquids, clear objects, and objects in dirty environments. These sensors work well for applications that require precise measurements between stationary and moving objects.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Max Sensing Range	Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	QT50U The QT50U features a completely sealed, shock-resistant housing that is ideal for monitoring levels of liquids and solids with an extended sensing range up to 8 m. page 336	200 mm - 8 m	84.2 x 74.1 x 67.4 mm	IP67; NEMA 6P	ABS/ Polycarbonate	10 to 30 V dc, 48 to 250 V dc or 85 to 264 V ac
	S18U The S18U is ideal for material handling and packaged goods applications, such as bottling or liquid level detection and as a control for small containers with a sensing range up to 300 mm. page 342	30 - 300 mm	80.8 x ø18 mm	IP67; NEMA 6P	Thermoplastic polyester	10 to 30 V dc
	T30U/T30UX The T30UX features T-style, right-angle sensor package with a 30 mm threaded barrel and a wide variety of mounting brackets with sensing ranges up to 3 m. page 350	100 mm - 3 m	51.5 x 40 x 45 mm	IP67; NEMA 6	PTB polyester	10 to 30 V dc, 12 to 24 V dc, 15 to 24 V dc
	M25U The M25U Ultrasonic Sensor features a smooth 316 series stainless steel construction to withstand the toughest sanitary challenges. page 354	500 mm	103 x ø25 mm	IP67; NEMA 6, IP69K	316 Stainless Steel	10 to 30 V dc
	T18U The T18U is housed in a T-style right-angle sensor package with 18 mm threaded mounting hub, for versatile mounting. The T18U offers response time of 1 millisecond and ranges up to 600 mm depending on model. page 356	600 mm	51.5 x 40 x 30 mm	IP67; NEMA 6P	PTB polyester	12 to 30 V dc
	Q45U The Q45U accepts programming storage cards for fast, easy sensing parameter changes with ranges up to 3 m depending on model. page 358	100 mm - 3 m	87.6 x 44.5 x 60.5 mm	IP67; NEMA 6P	PTB polyester	12 to 24 V dc, 15 to 24 V dc
	Q45UR The Q45UR has sensing head choices of 18 mm diameter threaded barrel housing in plastic or stainless steel, or ultra-compact plastic Flat-Pak and has sensing ranges up to 250 mm. page 362	50 - 250 mm	87.6 x 44.5 x 60.5 mm (Remote sensors vary by model)	IP67; NEMA 6P	Thermoplastic polyester	12 to 24 V dc, 15 to 24 V dc
	QS18U The QS18U senses clear and transparent materials, as well as color variations, including clear web material, clear or shiny bottles, highly reflective surfaces and liquid or dry bulk materials inside cramped locations. The sensor has a sensing range of up to 500 mm. page 366	50 - 500 mm	41.5 x 15 x 33.5 mm	IP67 or IP68; NEMA 6P	ABS	12 to 30 V dc

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



QT50U
Long-Range Ultrasonic Sensors

The QT50U features a completely sealed, shock-resistant housing that is ideal for monitoring levels of liquids and solids with an extended sensing range up to 8 m.

- Features a small ultrasonic dead zone of 200 mm
- Available in a chemically resistant model with a Teflon® flange
- Detects targets at long ranges within confined areas, such as a storage tank, without interference from the tank walls
- Push-button and remote TEACH-mode programming with an external switch, computer or controller for added security and convenience

QT50U, 10-30 V DC

Range	Connection	Output	Models*
200 mm - 8 m	2 m 5-pin Mini QD 5-pin Euro QD	Selectable 0 to 10 V dc or 4 to 20 mA	QT50ULB QT50ULBQ QT50ULBQ6
200 mm - 8 m	2 m 5-pin Mini QD 5-pin Euro QD	Selectable Dual NPN or PNP	QT50UDB QT50UDBQ QT50UDBQ6

QT50U Universal Voltage, 85-264 V AC/48-250 V DC

Range	Connection	Output Operation Mode	Output	Models*
200 mm - 8 m	2 m 5-pin Micro QD 5-pin Mini QD	Window-limit (complementary outputs)	SPDT e/m relay	QT50UVR3W QT50UVR3WQ1 QT50UVR3WQ
200 mm - 8 m	2 m 5-pin Micro QD 5-pin Mini QD	Pump/level control (pump-in and pump-out logic)	SPDT e/m relay	QT50UVR3F QT50UVR3FQ1 QT50UVR3FQ

For more specifications see page 338-339.

Connection options: A model with a QD requires a mating cordset (see page 337).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QT50ULB W/30).
* For sensors with Teflon®-protected face and transducer, add suffix -CRFV to the model number (example, QT50ULB-CRFV).
Teflon® is a registered trademark of Dupont™.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (With Shield)

See page 913

Length	Threaded 5-Pin			
	Straight		Right-Angle	
1.83 m		MQDEC2-506		MQDEC2-506RA
4.57 m		MQDEC2-515		MQDEC2-515RA
9.14 m		MQDEC2-530		MQDEC2-530RA


Additional cordset information available.
See page 904.

Micro QD (With Shield)

See page 927

Length	Threaded 5-Pin			
	Straight		Right-Angle	
1.83 m		MQVR3S-506		MQVR3S-506RA
4.57 m		MQVR3S-515		MQVR3S-515RA
9.14 m		MQVR3S-530		MQVR3S-530RA

Mini QD (With Shield)

See page 929

Length	Threaded 5-Pin	
	Straight	
1.83 m		MBCC2-506
3.66 m		MBCC2-512
9.14 m		MBCC2-530

Brackets

QT50U

See page 869	See page 869	See page 870
SMB30A	SMB30MM	SMB30SC
		


Additional bracket information available.
See page 846



DC and Universal Voltage Models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

QT50U Universal Voltage Specifications

Effective Beam	See Charts on page 340.
Supply Voltage	85 to 264 V ac, 50/60 Hz / 48 to 250 V dc (1.5 watts max., exclusive of load)
Ultrasonic Frequency	75 kHz burst, rep. rate 96 milliseconds
Supply Protection Circuitry	Protected against transient over voltages. DC hookup is without regard to polarity.
Output Protection	Protected against short circuit conditions
Delay at Power-up	1.5 seconds
Output Configuration	SPDT (Single-Pole, Double-Throw) electromechanical relay output One normally open (NO) and one normally closed (NC)
Output Ratings	Max. switching power (resistive load): 2000 VA, 240 W (1000 VA, 120 W for sensors with Micro QD) Max. switching voltage (resistive load): 250 V ac, 125 V dc Max. switching current (resistive load): 8A @ 250 V ac, 8A @ 30 V dc derated to 200 mA @ 125 V dc (4A max. for sensors with Micro QD) Min. voltage and current: 5 V dc, 10 mA Mechanical life of relay: 50,000,000 operations Electrical life of relay at full resistive load: 100,000 operations NOTE: Transient suppression is recommended when switching inductive loads
Temperature Effect	Uncompensated: 0.2% of distance/° C Compensated: 0.02% of distance/° C
Repeatability	1.0 mm
Hysteresis	Window-limit sensor models: 5 mm Fill-level control sensor models: 0 mm
Output Response Time	Selectable 1600, 400 or 100 milliseconds
Minimum Window Size	20 mm
Adjustments	Sensing limits: TEACH-Mode programming of near and far limits may be set using the TEACH push button Sensor configuration: Output response time and temperature compensation mode may be set using the Speed push button Factory default settings: 400 milliseconds output response time; temperature compensation enabled
Indicators	Green Power ON LED: Indicates power is ON Red Signal LED: Indicates target is within sensing range, and the condition of the received signal Output indicator (bicolor Yellow/Red): Indicates output status or TEACH mode Response indicator (bicolor Yellow/Red): Indicates output response time selection
Construction	Transducer: Ceramic/Epoxy composite Housing: ABS Membrane Switch: Polyester
Environmental Rating	Leakproof design is rated IEC IP67; NEMA 6P
Connections	2 m or 9 m shielded 5-conductor (with drain) PVC jacketed attached cable, or 5-pin Micro-style quick-disconnect or 5-pin Mini-style quick-disconnect. QD cordsets are ordered separately. See page 337.
Operating Conditions	Temperature: -20° to +70° C Relative humidity: 100%
Vibration and Mechanical Shock	All models meet Mil Std. 202F requirements. Method 201A (vibration: 10 to 60Hz max., double amplitude 0.06", maximum acceleration 10G). Also meets IEC 947-5-2 requirements: 30G 11 milliseconds duration, half sine wave.
Temperature Warmup Drift	Less than 1.0% of sensing distance upon power-up with Temperature Compensation enabled
Application Notes	Objects passing inside the specified minimum sensing distance (200 mm) may produce a false response
Certifications	CE
Hookup Diagrams	UN09 (p. 986)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

QT50U Universal Voltage Specifications

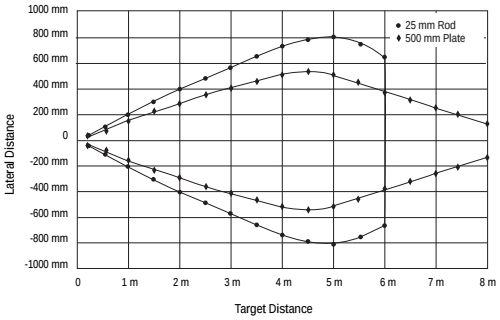
Effective Beam	See Charts on page 340.
Supply Voltage	85 to 264 V ac, 50/60 Hz / 24 to 250 V dc (1.5 watts max., exclusive of load)
Ultrasonic Frequency	75 kHz burst, rep. rate 96 milliseconds
Supply Protection Circuitry	Protected against transient over voltages. DC hookup is without regard to polarity.
Output Protection	Protected against short circuit conditions
Delay at Power-up	1.5 seconds
Output Configuration	SPDT (Single-Pole, Double-Throw) electromechanical relay output One normally open (NO) and one normally closed (NC)
Output Ratings	Max. switching power (resistive load): 2000 VA, 240 W (1000 VA, 120 W for sensors with Micro QD) Max. switching voltage (resistive load): 250 V ac, 125 V dc Max. switching current (resistive load): 8A @ 250 V ac, 8A @ 30 V dc derated to 200 mA @ 125 V dc (4A max. for sensors with Micro QD) Min. voltage and current: 5 V dc, 10 mA Mechanical life of relay: 50,000,000 operations Electrical life of relay at full resistive load: 100,000 operations NOTE: Transient suppression is recommended when switching inductive loads
Temperature Effect	Uncompensated: 0.2% of distance/° C Compensated: 0.02% of distance/° C
Repeatability	1.0 mm
Hysteresis	Window-limit sensor models: 5 mm Fill-level control sensor models: 0 mm
Output Response Time	Selectable 1600, 400 or 100 milliseconds
Minimum Window Size	20 mm
Adjustments	Sensing limits: TEACH-Mode programming of near and far limits may be set using the TEACH push button Sensor configuration: Output response time and temperature compensation mode may be set using the Speed push button Factory default settings: 400 milliseconds output response time; temperature compensation enabled
Indicators	Green Power ON LED: Indicates power is ON Red Signal LED: Indicates target is within sensing range, and the condition of the received signal Output indicator (bicolor Yellow/Red): Indicates output status or TEACH mode Response indicator (bicolor Yellow/Red): Indicates output response time selection
Construction	Transducer: Ceramic/Epoxy composite Housing: ABS Membrane Switch: Polyester
Environmental Rating	Leakproof design is rated IEC IP67; NEMA 6P
Connections	2 m or 9 m shielded 5-conductor (with drain) PVC jacketed attached cable, or 5-pin Micro-style quick-disconnect or 5-pin Mini-style quick-disconnect. QD cordsets are ordered separately. See page 337.
Operating Conditions	Temperature: -20° to +70° C Relative humidity: 100%
Vibration and Mechanical Shock	All models meet Mil Std. 202F requirements. Method 201A (vibration: 10 to 60Hz max., double amplitude 0.06", maximum acceleration 10G). Also meets IEC 947-5-2 requirements: 30G 11 milliseconds duration, half sine wave.
Temperature Warmup Drift	Less than 1.0% of sensing distance upon power-up with Temperature Compensation enabled
Application Notes	Objects passing inside the specified minimum sensing distance (200 mm) may produce a false response
Certifications	CE
Hookup Diagrams	UN09 (p. 986)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Effective Beam Patterns

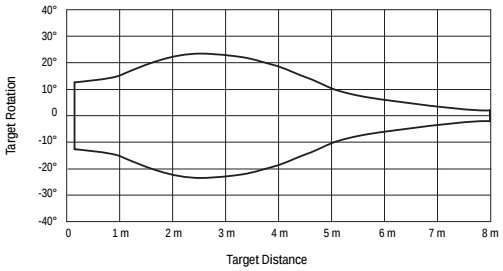
QT50U (Typical)





QT50U (with 500 mm Plate) Maximum Target Rotation Angle



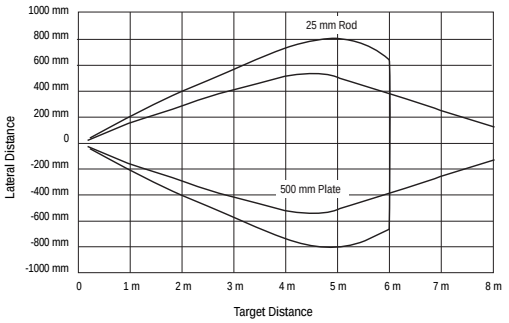


Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Effective Beam Patterns

QT50U Teflon®-Encapsulated (Typical)







S18U
Barrel Ultrasonic Sensors

The S18U is ideal for material handling and packaged goods applications, such as bottling or liquid level detection and as a control for small containers with a sensing range up to 300 mm.

- Features minimal dead zone and can eliminate dead zone if used in retrosonic mode
- Available in straight or right-angle versions with a wide variety of mounting hardware for enhanced sensing versatility
- Compensates for temperature to provide greatest sensing accuracy
- Push-button and remote TEACH-mode programming with an external switch, computer or controller for added security and convenience

S18U, 10-30 V DC

Range	Connections	Output	Housing Configuration	Models
30 - 300 mm	2 m 5-pin Euro QD	0 to 10 V dc	Straight	S18UUA S18UUAQ
	2 m 5-pin Euro QD	4 to 20 mA	Straight	S18UIA S18UIAQ
	2 m 5-pin Euro QD	Bipolar NPN/PNP	Straight	S18UBA S18UBAQ

S18U Right-Angle, 10-30 V DC

Range	Connections	Output	Housing Configuration	Models
30 - 300 mm	2 m 5-pin Euro QD	0 to 10 V dc	Right-Angle	S18UUAR S18UUARQ
	2 m 5-pin Euro QD	4 to 20 mA	Right-Angle	S18UIAR S18UIARQ
	2 m 5-pin Euro QD	Bipolar NPN/PNP	Right-Angle	S18UBAR S18UBARQ

For more specifications see page 344.

Connection options: A model with a QD requires a mating cable (see page 343).

For 9 m cable, add suffix W/30 to the 2 m model number (example, S18UUA W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (With Shield)

See page 913

Length	Threaded 5-Pin			
	Straight		Right-Angle	
1.83 m		MQDEC2-506		MQDEC2-506RA
4.57 m		MQDEC2-515		MQDEC2-515RA
9.14 m		MQDEC2-530		MQDEC2-530RA



Additional cordset information available.
See page 904.

Brackets

S18U

See page 859	See page 860	See page 861
SMB18A	SMB18FM	SMB18SF
		



Additional bracket information available.
See page 846.

Ultrasonic Wave Guides

Inside Diameter	Model	
5.0 mm	UWG18-5.0	
6.4 mm	UWG18-6.4	pg. 967



Straight Models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

S18U Specifications

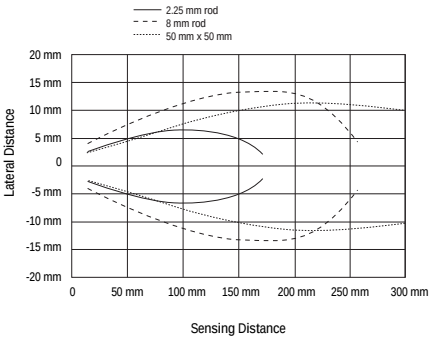
Effective Beam	See charts on page 345.
Supply Voltage and Current	10 to 30 V dc (10% max. ripple); 65 mA max. (exclusive of load), 40 mA typical @ 25 V input
Ultrasonic Frequency	300 kHz, rep. rate 2.5 milliseconds
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Protection	Protected against short circuit conditions
Output Ratings	Analog: Analog Voltage Output: 2.5 kΩ min. load resistance Minimum supply for a full 10 V output is 12 V dc (for supply voltages between 10 and 12, V out max is at least V supply -2) Analog Current Output: 1 kΩ max @ 24 V input Max load resistance = (Vcc-4)/0.02 Ω Discrete: 100 mA max. OFF-state leakage current: less than 5 µA NPN saturation: less than 200 mV @ 10 mA and less than 600 mV @ 100 mA PNP saturation: less than 1.2 V @ 10 mA and less than 1.6 V @ 100 mA
Output Configuration	Analog: 0 to 10 V dc or 4 to 20 mA, depending on model Discrete: Bipolar: One NPN (current sinking) and one PNP (current sourcing) output in each model. Solid-state switch conducts when target is sensed within sensing window.
Output Response Time	Analog: 30 milliseconds: Black wire at 0-2 V dc (or open) Discrete: 5 milliseconds 2.5 milliseconds: Black wire at 5-30 V dc
Delay at Power-up	300 milliseconds
Linearity* (Analog output models)	2.5 milliseconds response: ± 1 mm 30 milliseconds response: ± 0.5 mm
Resolution* (Analog output models)	2.5 milliseconds response: 1 mm 30 milliseconds response: 0.5 mm
Repeatability (Discrete models)	0.5 mm
Temperature Effect	0.02% of distance/ ° C
Temperature Warmup Drift	Less than 1.7% of sensing distance upon power-up
Minimum Window Size	5 mm
Switching Hysteresis (Discrete output models)	0.7 mm
Adjustments	Sensing window limits: TEACH-Mode programming of near and far window limits may be set using the push-button or remotely using TEACH input
Indicators	Power/Signal Strength (Red/Green): Green—Target is within sensing range Red—Target is outside sensing range OFF—Sensing power is OFF TEACH/Output Indicator (Yellow/Red): Yellow —Target is within taught limits OFF—Target is outside taught window limits Red—Sensor is in TEACH mode
Remote TEACH Input	Impedance: 12 kΩ
Construction	Threaded Barrel: Thermoplastic polyester Push-Button Housing: ABS/PC Push Button: Santoprene Lightpipes: Acrylic
Environmental Rating	Leakproof design is rated IEC IP67; NEMA 6P
Connections	2 m or 9 m shielded 5-conductor (with drain) PVC jacketed attached cable, or 5-pin Euro-style quick-disconnect. QD cordsets are ordered separately. See page 343.
Operating Conditions	Temperature: -20° to +60° C Relative humidity: 100%
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. method 201A (vibration: 10 to 60 Hz max., double amplitude 0.06", maximum acceleration 10G). Also meets IEC 947-5-2 requirements: 30G 11 milliseconds duration, half sine wave
Application Notes	Objects passing inside the specified near limit may produce a false response
Certifications	CE cULus
Hookup Diagrams	Analog Models: MI11 (p. 991) Discrete Models: MI10 (p. 991)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Effective Beam Patterns

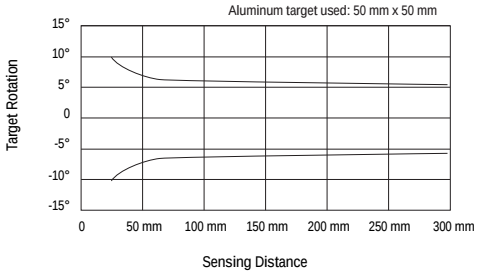
S18U (Typical)





S18U (with 500 mm Plate) Maximum Target Rotation Angle





Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



T30UX
Right-Angle, Long-Range Ultrasonic Sensors

The T30UX features T-style, right-angle sensor package with a 30 mm threaded barrel, a wide variety of mounting brackets and sensing ranges up to 3 m.

- Built-in temperature compensation for high-accuracy across a wide range of ambient temperatures
- Resists harsh environments with rugged IP67 (NEMA 6) housing and fully encapsulated electronics
- Push-button and remote TEACH-mode programming with an external switch, computer or controller for added security and convenience

T30UX, 10-30 V DC

Range	Frequency	Connection	Response Time	Output	Models*
100 mm to 1 m	224 kHz	2 m 4-Pin Euro QD	45 ms	Discrete: NPN, PNP, NO, NC, Selectable	T30UXDA T30UXDAQ8
200 mm to 2 m	174 kHz	2 m 4-Pin Euro QD	92 ms	Discrete: NPN, PNP, NO, NC, Selectable	T30UXDB T30UXDBQ8
300 mm to 3 m	114 kHz	2 m 4-Pin Euro QD	135 ms	Discrete: NPN, PNP, NO, NC, Selectable	T30UXDC T30UXDCQ8
100 mm to 1 m	224 kHz	2 m 4-Pin Euro QD	Selectable 45 or 105 ms	Analog: 0 to 10 V dc	T30UXUA T30UXUAQ8
100 mm to 1 m	224 kHz	2 m 4-Pin Euro QD	Selectable 45 or 105 ms	Analog: 4 to 20 mA	T30UXIA T30UXIAQ8
200 mm to 2 m	174 kHz	2 m 4-Pin Euro QD	Selectable 92 or 222 ms	Analog: 0 to 10 V dc	T30UXUB T30UXUBQ8
200 mm to 2 m	174 kHz	2 m 4-Pin Euro QD	Selectable 92 or 222 ms	Analog: 4 to 20 mA	T30UXIB T30UXIBQ8
300 mm to 3 m	114 kHz	2 m 4-Pin Euro QD	Selectable 135 or 318 ms	Analog: 0 to 10 V dc	T30UXUC T30UXUCQ8
300 mm to 3 m	114 kHz	2 m 4-Pin Euro QD	Selectable 135 or 318 ms	Analog: 4 to 20 mA	T30UXIC T30UXICQ8

For more specifications see page 348.

Connection options: A model with a QD requires a mating cordset (see page 347).

For 9 m cable, add suffix W/30 to the 2 m model number (example, T30UXDA W/30).
QD models: For a 4-pin 150 mm Euro-style PUR pigtail QD, add suffix QPMA the 2 m model number (example, T30UXDAQPMA).
* Contact factory to request chemically resistant flange or fill-level control models.

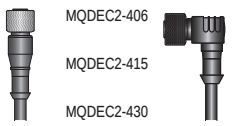
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (With Shield)

See page 909

Length	Straight 4-Pin	Right-Angle 4-Pin
1.83 m	MQDEC2-406	MQDEC2-406RA
4.57 m	MQDEC2-415	MQDEC2-415RA
9.14 m	MQDEC2-430	MQDEC2-430RA





Additional cordset information available.
See page 846.

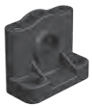
Brackets

T30UX/T30U

See page 869	See page 869	See page 866
SMB30A	SMB30FA..	SMB1815SF









Additional bracket information available.
See page 846.



T30UX (Long-range) Models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

T30UX Specifications

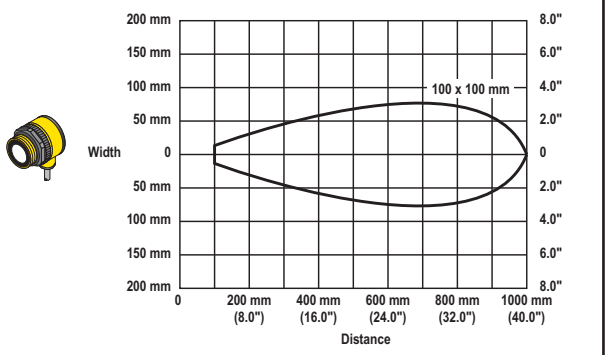
Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at 40 mA, exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Effective Beam	See Chart EPBC-1 to EPBC-6 on page 349.
Output Configuration	**Discrete (switched) output models:** SPST solid-state switch. Configurable as NPN (sinking) or PNP (sourcing) via Mode push button. Normally Open (NO) or Normally Closed (NC) operation is also selectable via Mode push button. The default setting is PNP/NO. **Analog output models:** 0 to 10 V dc or 4 to 20 mA, depending on model
Output Ratings	**Discrete output models:** 100 mA max. **OFF-state leakage current:** NPN: < 200 µA @ 30 V dc (see NOTE 1) PNP: < 10 µA @ 30 V dc **ON-state saturation voltage:** NPN: < 1.6 V @ 100 mA PNP: < 3 V @ 100 mA Analog output models **Analog Voltage Output:** 2.5 kΩ min. load resistance Minimum supply for a full 10 V output is 12 V dc (for supply voltages between 10 and 12, V out max. is at least V supply -2) **Analog Current Output:** 1 kΩ max. @ 24 V input; max. load resistance = (Vcc-4)/0.02Ω **For current output (4-20 mA) models,** ideal results are achieved when the total load resistance R = [(Vin – 4)/0.020]Ω. Example, at Vin = 24 V dc, R ≈ 1 kΩ (1 watt)
Output Protection Circuitry	Protected against short circuit conditions
Output Response Time	**"A" suffix models:** 45 milliseconds **"B" suffix models:** 92 milliseconds **"C" suffix models:** 135 milliseconds
Delay at Power-up	500 milliseconds
Temperature Effect	0.02% of distance/º C
Linearity (analog models)	0.25% of distance
Repeatability/Resolution	**"A" suffix models:** 0.1% of distance (0.5 mm min.) **"B" suffix models:** 0.1% of distance (1.0 mm min.) **"C" suffix models:** 0.1% of distance (1.5 mm min.)
Sensing Hysteresis (discrete models)	**"A" suffix models:** 2 mm **"B" suffix models:** 3 mm **"C" suffix models:** 4 mm
Minimum Window Size	10 mm
Adjustments	**Sensing window limits:** TEACH-Mode configuration of near and far window limits may be set using the push button or remotely viaTEACH input **Discrete output models:** **Output Configuration:** NPN, PNP, Normally Open (NO), Normally Closed (NC) select **Advanced configuration options:** Push button enabled/disabled, temperature compensation enabled/disabled **Analog output models:** **Response speed selection:** Fast or Slow **Advanced configuration options:** Analog output slope, push button enabled/disabled, temperature compensation enabled/disabled
Indicators	**Green Power LED ON:** Power ON, RUN mode **Red Signal LED:** Target signal strength **Amber Output LED:** Output enabled; sensor receiving a signal within the window limits **Amber Mode LED:** Currently selected mode
Loss of Signal Indication (analog models)	**0 to 10 V dc models:** Analog output goes to 0 V **4 to 20 mA models:** Analog output goes to 3.6 mA
Construction	**Housing:** PBT polyester **Push buttons:** Polyester **Transducer:** Epoxy /ceramic composite
Environmental Rating	Leakproof design, rated IEC IP67 (NEMA 6)
Connections	2 or 9 m shielded 4-conductor (with drain) PVC cable, 150 mm PUR Euro-style pigtail (QPMA), or 4-pin integral Euro-style connector (Q8). QD cordsets ordered separately. See page 347.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 95% at 50°C non-condensing
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration: 10 to 60Hz max., double amplitude 0.06", maximum acceleration 10G). Also meets IEC 947-5-2 requirements: 30G, 11 milliseconds duration, half sine wave.
Application Notes	The temperature warmup drift upon power-up is less than 1% of the sensing distance
Certifications	CE
Hookup Diagrams	**Discrete Models:** MI13 (p. 992) **Analog Models:** MI14 (p. 992)

NOTE: NPN < 200 µA for load impedance > 3 kΩ; for load current of 100 mA, leakage < 1% of load current

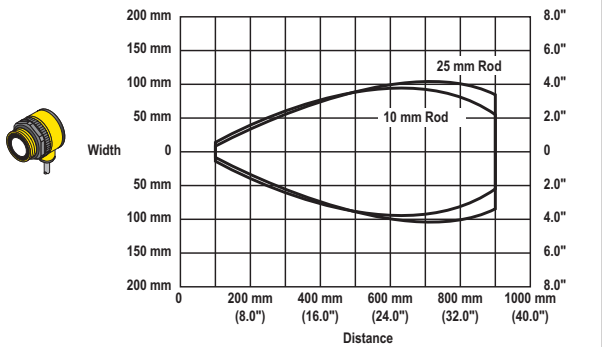
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Effective Beam Patterns

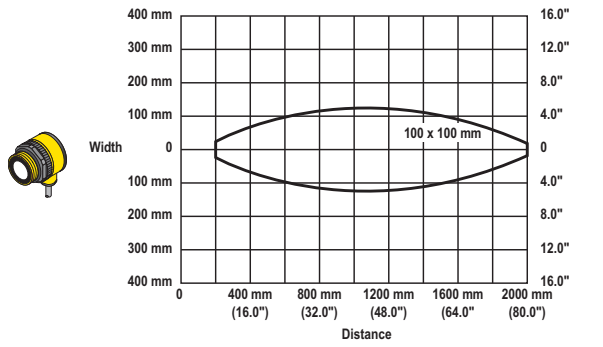
T30UX with Plate Target (Typical) 1-Meter Models



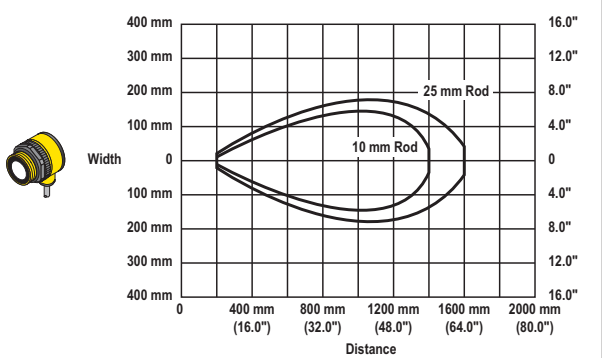
T30UX with Rod Target (Typical) 1-Meter Models



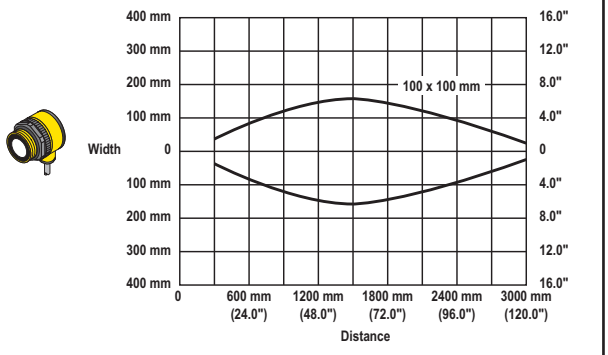
T30UX with Plate Target (Typical) 2-Meter Models



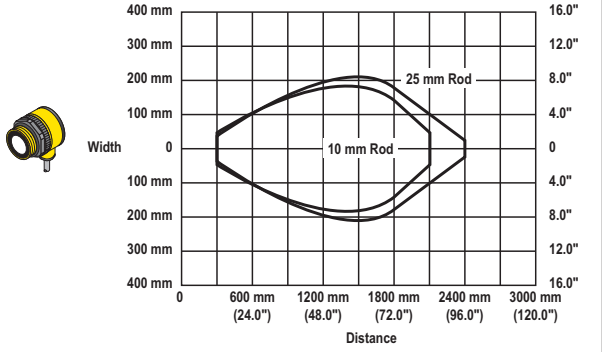
T30UX with Rod Target (Typical) 2-Meter Models



T30UX with Plate Target (Typical) 3-Meter Models



T30UX with Rod Target (Typical) 3-Meter Models



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



T30U
Right-Angle, Long-Range Ultrasonic Sensors

The T30U features T-style, right-angle sensor package with a 30 mm threaded barrel, a wide variety of mounting brackets and sensing ranges up to 2 m.

- Dual-discrete models for ON/OFF switching or pump-level control
- Resists harsh environments with rugged IP67 (NEMA 6) housing and fully encapsulated electronics
- Chemically resistant models with a Telfon® coating
- Push-button and remote TEACH-mode programming with an external switch, computer or controller for added security and convenience

T30U, 12-24 V DC

Range	Frequency	Connection	Response Time	Discrete Output(s)	Analog Output	Models*
150 mm - 1 m	228 kHz	2 m 5-pin Euro QD 2 m 5-pin Euro QD	48 ms	NPN PNP	4 to 20 mA	T30UINA T30UINAQ T30UIPA T30UIPAQ
300 mm - 2 m†	128 kHz	2 m 5-pin Euro QD 2 m 5-pin Euro QD	96 ms	NPN PNP	4 to 20 mA	T30UINB T30UINBQ T30UIPB T30UIPBQ
150 mm - 1 m	228 kHz	2 m 5-pin Euro QD 2 m 5-pin Euro QD	48 ms	Dual NPN Dual PNP	None	T30UDNA T30UDNAQ T30UDPA T30UDPAQ
300 mm - 2 m†	128 kHz	2 m 5-pin Euro QD 2 m 5-pin Euro QD	96 ms	Dual NPN Dual PNP	None	T30UDNB T30UDNBQ T30UDPB T30UDPBQ
150 mm - 1 m 300 mm - 2 m†	228 kHz 128 kHz	2 m 5-pin Euro QD 2 m 5-pin Euro QD	48 ms 96 ms	Pump/Level Control Dual NPN	None	T30UHNA T30UHNAQ T30UHNB T30UHNBQ
150 mm - 1 m 300 mm - 2 m†	228 kHz 128 kHz	2 m 5-pin Euro QD 2 m 5-pin Euro QD	48 ms 96 ms	Pump/Level Control Dual PNP	None	T30UHPA T30UHPAQ T30UHPB T30UHPBQ

For more specifications see page 352.

Connection options: A model with a QD requires a mating cordset (see page 351).

For 9 m cable, add suffix W/30 to the 2 m model number (example, T30UXDA W/30).
QD models: For a 4-pin 150 mm Euro-style PUR pigtail QD, add suffix QPMA the 2 m model number (example, T30UXDAQPMA).
* Contact factory to request chemically resistant flange or fill-level control models.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

T30U, 15-24 V DC

Range	Frequency	Connection	Response Time	Analog Output	Models* NPN	Models* PNP
150 mm - 1 m	228 kHz	2 m 5-pin Euro QD	48 ms	0 to 10 V dc	T30UUNA T30UUNAQ	T30UUPA T30UUPAQ
300 mm - 2 m†	128 kHz	2 m 5-pin Euro QD	96 ms	0 to 10 V dc	T30UUNB T30UUNBQ	T30UUPB T30UUPBQ

Connection options: A model with a QD requires a mating cordset

For 9 m cable, add suffix W/30 to the 2 m model number (example, T30UUNA W/30).

* For sensors with Teflon®-protected face and transducer (long-range models only), add suffix -CRFV to the model number (example, T30UUNB-CRFV).

† Teflon®-encapsulated models have a range of 300 mm - 1.5 m.

Teflon® is a registered trademark of Dupont™.

Cordsets

Euro QD (With Shield)

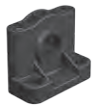
See page 913

Length	Threaded 5-Pin Straight	Threaded 5-Pin Right-Angle
1.83 m	MQDEC2-506	MQDEC2-506RA
4.57 m	MQDEC2-515	MQDEC2-515RA
9.14 m	MQDEC2-530	MQDEC2-530RA

Additional cordset information available. See page 904.

Brackets

T30U

See page 869	See page 869	See page 866
SMB30A	SMB30FA..	SMB1815SF
		

Additional bracket information available. See page 846.



T30U (Long-range) Models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

T30U Specifications

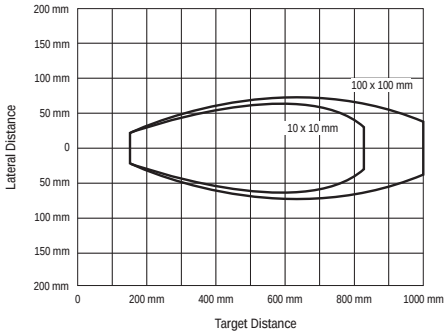
Supply Voltage and Current	**Current sourcing analog output models:** 12 to 24 V dc (10% max. ripple); 90 mA (exclusive of load) **Voltage sourcing analog output models:** 15 to 24 V dc (10% max. ripple); 90 mA (exclusive of load) **Dual-discrete output models:** 12 to 24 V dc (10% max. ripple); 90 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Effective Beam	See Chart EPBC-7 to EPBC-11 on page 353
Ultrasonic Frequency	**Short Range:** 228 kHz **Long Range:** 128 kHz
Output Protection	Protected against continuous overload and short-circuit; transient over-voltage; no false pulse on power-up
Output Configuration	**Discrete (switched) output:** Solid-state switch conducts when target is sensed within sensing window; choose NPN (current sinking) or PNP (current sourcing) models **Analog output:** Choose 0 to 10 V dc sourcing or 4 to 20 mA sourcing output models; output slope may be selected using TEACH sequence
Output Ratings	**Discrete (switched) output:** 100 mA max., total–both outputs **OFF-state leakage current:** less than 10 µA **ON-state saturation voltage:** less than 1 V at 10 mA and less than 1.5 V at 100 mA Analog Output: **Voltage sourcing:** 0 to 10 V dc (at 1 kΩ min. resistance) **Current sourcing:** 4 to 20 mA, 1 Ω to Rmax. $Rmax = \frac{V^{supply} - 7V}{20\ mA}$
Output Response Time	Discrete output: **"A" suffix models:** 48 milliseconds **"B" suffix models:** 96 milliseconds Analog output: **"A" suffix models:** 48 milliseconds average, 16-millisecond update **"B" suffix models:** 96 milliseconds average, 32-millisecond update
Sensing Performance (Specified using a 100 x 100 mm aluminum target at 25° C under fixed sensing conditions.)	**Analog sensing resolution or discrete output repeatability:** ±0.25% of measured distance **"A" suffix models:** .5 mm min **"B" suffix models:** 1 mm min **Analog linearity:** ±0.5% of full-scale span **Min. window size:** 10 mm **Hysteresis of discrete output:** 2.5 mm **Temperature effect:** 0.2% of sensing distance per ° C
Adjustments	**Sensing window limits (analog or discrete):** TEACH-mode programming of near and far window limits may be set using membrane push buttons on sensor or remotely using TEACH input. Window limits may be programmed separately, or together. **Analog output slope:** the first limit taught is assigned to the minimum output value (4 mA or 0V).
Indicators	**Four status LEDs: In RUN mode:** **Green ON Steady:** Power ON, RUN mode **Green Flashing:** Discrete output is overloaded **Red Flashing:** Relative received signal strength **Yellow analog ON Steady:** Target is inside window limits **Yellow discrete ON Steady:** Output conducting In Program mode: **Green OFF:** PROGRAM mode **Red Flashing:** Relative received signal strength **Yellow ON Steady:** Ready for first window limit **Yellow Flashing:** Ready for second limit **Yellow OFF:** Not teaching this output
Construction	Molded reinforced thermoplastic polyester housing
Environmental Rating	Leakproof design is rated IEC IP67; NEMA 6P
Connections	2 m or 9 m 5-conductor PVC-covered attached cable, or 5-pin Euro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 351.
Operating Conditions	**Temperature:** -20° to +70° C **Relative humidity:** 100%
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration: 10 to 60Hz max., double amplitude 0.06", maximum acceleration 10G). Also meets IEC 947-5-2 requirements: 30G, 11 milliseconds duration, half sine wave.
Application Notes	Objects passing inside the specified near limit will produce a false response NOTE: For more information about out-of-range and signal loss response of the analog output, see product literature
Certifications	CE
Hookup Diagrams	**Analog/Discrete Models:** MI16 (p. 992) **Dual-Discrete Models:** MI15 (p. 992)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Effective Beam Patterns

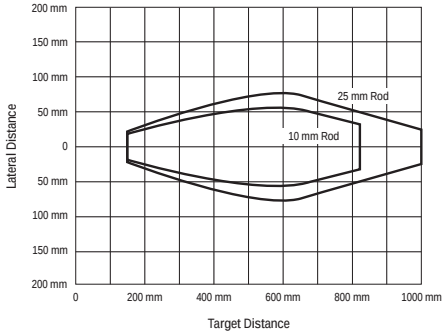
T30U with Plate Target (Typical)
1-Meter Models





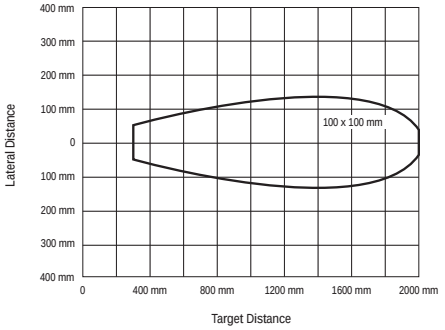
T30U with Rod Target (Typical)
1-Meter Models





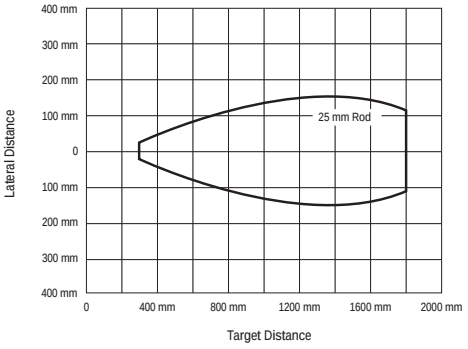
T30U with Plate Target (Typical)
2-Meter Models





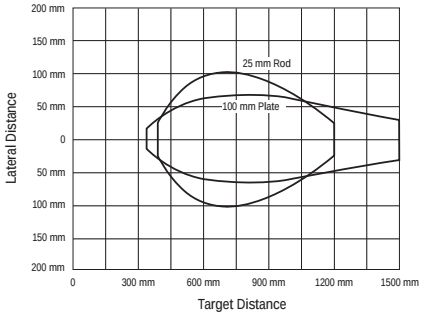
T30U with Rod Target (Typical)
2-Meter Models





T30U Teflon®-Encapsulated (Typical)





Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



M25U
Stainless Steel Opposed Ultrasonic Sensors

The M25U Ultrasonic Sensor features a smooth 316 series stainless steel construction to withstand the toughest sanitary challenges.

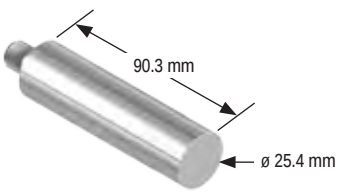
- Cleans easily with no thread, gaps or seams to trap debris
- Constructed with FDA approved materials and rated to IP69K, IEC IP67 (NEMA 6) with fully encapsulated electronics
- Withstands high-temperatures sprays of up to 80° C and 1500 psi occurring every few hours
- Features high-immunity to ambient electrical and sonic noise

M25U, 10 to 30 V DC

Range*	Frequency	Connection	Output	Response Time	Models
Normal Speed: 500 mm High Speed: 250 mm	140 kHz	4-pin Euro QD	—	—	M25UEQ8 Emitter
		5-pin Euro QD	Bipolar NPN/PNP	Normal Speed: 4.0 ms High Speed: 3.0 ms	M25URBQ8 Receiver

Connection options: A model with a QD requires a mating cordset (see page 355).

* M25U receivers may be wired for either of two speed modes: Normal or High, depending on hookup. The Normal-Speed mode offers a sensing range of 500 mm. The Normal-Speed mode maximizes sensing energy, as is required in demanding environments. The High-Speed mode offers a sensing range of 250 mm. The High-Speed mode maximizes sensing response, as is needed in high-speed counting applications.



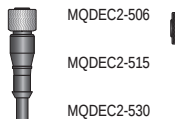
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (With Shield)

See page 913

Length	Straight 5-Pin	Right-Angle 5-Pin
1.83 m	MQDEC2-506	MQDEC2-506RA
4.57 m	MQDEC2-515	MQDEC2-515RA
9.14 m	MQDEC2-530	MQDEC2-530RA



Additional cordset information available. See page 904.

Washdown Euro QD

See page 912

Length	Straight 5-Pin
1.83 m	MQDCWD-506
9.14 m	MQDCWD-530



Brackets

M25U

See page 877 SMBM25A



See page 877 SMBM25B



Additional bracket information available. See page 846.

M25U Specifications

Sensing Range	Normal Speed: 500 mm High Speed: 250 mm 140KHz
Supply Voltage and Current	Emitter: 10 to 30 V dc (10% max. ripple) at less than 85 mA Receiver: 10 to 30 V dc (10% max. ripple) at less than 38 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Receiver Output Configuration	Bipolar (1 NPN & 1 PNP) solid-state output; Normally Open (output is activated when an object blocks the sensing beam)
Output Rating	100 mA (each output) with short circuit protection; see Note 1 OFF-state leakage current: NPN: < 200 µA sinking PNP: < 10 µA sourcing ON-state saturation voltage: NPN: < 1.6 V @ 100 mA PNP: < 3.0 V @ 100 mA
Output Protection Circuitry	Protected against short circuit conditions
Output Response Time	Normal Speed: 4.0 milliseconds High Speed: 3.0 milliseconds
Repeatability	1 millisecond
Delay at Power-up	< 250 milliseconds
Delay for Switching Between Normal and High Speed	20 milliseconds
Indicators	Green Power LED: indicates Power ON Amber Output LED: indicates output activated
Construction	Housing: 316 Stainless Steel LED window: Polysulphone
Connections	Emitter: 4-pin Euro-Style QD Receiver: 5-pin Euro-Style QD QD cordsets ordered separately. See page 355.
Environmental Rating	Leakproof design, rated IEC IP67 (NEMA 6), IP69K
Operating Conditions	Temperature: -20° to +70° C Max. Relative Humidity: 95% at 50° C non-condensing
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements method 201A (vibration: 10 to 60 Hz max. amplitude 0.06", max. acceleration 10G). Also meets IEC 947-5-2; 30G 11 ms duration.
Certifications	CE
Notes	1. NPN < 200 µA for load impedance > 3 KΩ; for load current of 100 mA, leakage < 1% of load current 2. When mounting the M25U, care should be taken to acoustically isolate the emitter and receiver to eliminate sound energy coupling between the sensor pair. This is best accomplished with elastomeric materials between the sensor and rigid mounting brackets.
Hookups Diagrams	Emitter Models: MI21 (p. 994) Receiver Models: MI17 (p. 993)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



T18U
Opposed Dual-Range Ultrasonic Sensors

The T18U is housed in a T-style right-angle sensor package with an 18 mm threaded mounting hub, for versatile mounting. The T18U offers a response time of 1 millisecond and ranges up to 600 mm.

- Features ultra-fast response time for high-speed applications such as counting
- Offers high immunity to electrical and acoustic noise
- Includes signal strength indicator to make alignment easy
- Ideal for small object and clear object detection

T18U, 12-30 V DC

Range†	Connection	Response Time	Models* NPN	Models* PNP
NORMAL resolution: 600 mm HIGH resolution: 300 mm	2 m	NORMAL resolution: 2 ms HIGH resolution: 1 ms	T186UE Emitter	
	4-pin Euro QD		T186UEQ Emitter	
	2 m		T18VN6UR	T18VP6UR
	4-pin Euro QD		T18VN6URQ	T18VP6URQ

Connection options: A model with a QD requires a mating cordset (see page 357).

For 9 m cable, add suffix W/30 to the 2 m model number (example, T18VN6UR W/30).

† Receivers may be wired for either resolutions: Normal or High.

* Sensor pair requires one emitter and one receiver.



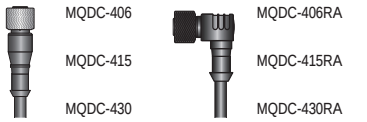
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA

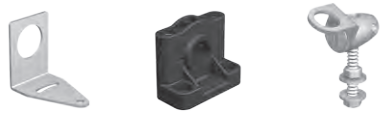


Additional cordset information available.
See page 904.

Brackets

T18U

See page 859	See page 866	See page 860
SMB18A	SMB18155F	SMB18FA..



Additional bracket information available.
See page 846.

T18U Specifications

Sensing Range (no minimum range)	NORMAL resolution mode: to 600 mm HIGH resolution mode: to 300 mm
Supply Voltage and Current	12 to 30 V dc, 10% max. ac ripple 50 mA (emitters); 35 mA (receivers), exclusive of output load
Ultrasonic Frequency	230 kHz
Minimum spacing (adjacent pairs)	50 mm for emitter-to-receiver separations of up to 150 mm Add 10 mm of adjacent-pair spacing for every 100 mm of emitter-to-receiver spacing beyond 150 mm
Receiver Output Configuration	T18VN models: NPN sinking, NO and NC (complementary) T18VP models: PNP sourcing, NO and NC (complementary)
Receiver Output Rating	150 mA max. each output at 25° C, derated to 100 mA at 70° C (derate ≈ 1 mA per ° C) Both outputs may be used simultaneously. ON-state saturation voltage: less than 1.5 V at 10 mA; less than 2.0 V at 150 mA OFF-state leakage current: less than 1 µA at 30 V dc Output protection: Overload and short-circuit protected. No false pulse upon receiver power-up: false pulse protection causes a 100 millisecond delay upon power-up.
Output Response Time	NORMAL resolution mode: 2 milliseconds ON/OFF HIGH resolution mode: 1 millisecond ON/OFF
Rep Rate	NORMAL resolution mode: 125 Hz max. HIGH resolution mode: 200 Hz max.
Mechanical Sensing Repeatability at 300 mm range	NORMAL resolution mode: less than 2 mm HIGH resolution mode: less than 1 mm
Beam Angle (-3dB full angle)	15 ± 2°
Indicators	Emitters have a green LED for dc power ON. Receivers have two LEDs, one yellow and one green Green: power ON Yellow: sonic signal received (flash rate is proportional to received signal strength; flash is from full to half intensity) See data sheet for detailed information
Construction	T-style yellow PBT polyester housing with black PBT polyester back cover. Transducer housing is threaded M18 x 1. Mating jam nut is supplied for mounting. Acoustic face is epoxy reinforced. Circuitry is epoxy-encapsulated.
Environmental Rating	IEC IP67; NEMA 6P
Connections	Emitters: 2 m long attached PVC- covered 2-wire cable or 4-pin Euro-style quick-disconnect fitting. Receivers: 2 m long attached PVC-covered 4-wire cable or 4-pin Euro-style quick-disconnect fitting. 9 m long cables are available by request. Mating Euro-style quick-disconnect cordsets are also available. See page 357.
Operating Temperature	-40° to +70° C
Vibration and Mechanical Shock	All models meet Mil.Std 202F requirements method 201A (Vibration: frequency 10 to 60 Hz, max., and double amplitude 0.06", maximum acceleration 10G) and method 213B conditions H&I (Shock: 75G with unit operation; 100G for non-operation). Also meets IEC 947-5-2 requirements: 30G, 11 milliseconds duration, half sine wave.
Certifications	CE
Hookup Diagrams	Emitter Models: MI21 (p. 994) NPN Models: MI19 (p. 993) PNP Models: MI20 (p. 993)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Q45U
Versatile Ultrasonic Sensors

The Q45U accepts programming storage cards for fast, easy sensing parameter changes with ranges up to 3 m.

- Bipolar discrete models have switches for ON/OFF presence detection and HIGH/LOW level control
- In ON/OFF mode, bipolar discrete models detect when the target is within the set range or when it is outside the range
- In HIGH/LOW mode, bipolar discrete models detect when the target is outside the configured range, for fill level control, web tensioning control and similar applications
- Response time is programmed with switches in discrete models and with a potentiometer in analog models
- Push-button and remote TEACH-mode programming with an external switch, computer or controller for added security and convenience

Q45U Discrete Output, 12-24 V DC

Range	Temperature Compensation	Connection *	Output Type	Response Time	Models
100 mm - 1.4 m	No	2 m 5-pin Mini QD 5-pin Euro QD	Bipolar NPN/PNP	Programmable for 20, 40, 160 or 640 ms	Q45UBB63DA Q45UBB63DAQ Q45UBB63DAQ6
100 mm - 1.4 m	Yes	2 m 5-pin Mini QD 5-pin Euro QD	Bipolar NPN/PNP	Programmable for 20, 40, 160 or 640 ms	Q45UBB63DAC Q45UBB63DACQ Q45UBB63DACQ6
250 mm - 3 m†	Yes	2 m 5-pin Mini QD 5-pin Euro QD	Bipolar NPN/PNP	Programmable for 40, 80, 320 or 1280 ms	Q45UBB63BC Q45UBB63BCQ Q45UBB63BCQ6

For more specifications see page 360.

Connection options: A model with a QD requires a mating cordset (see page 359).

* For 9 m cable, add suffix W/30 to the 2 m model number (example, Q45UBB63DA W/30).

† The far limit may be extended as far as 3.9 m for good acoustical targets–hard surfaces with area greater than 100 cm^2.

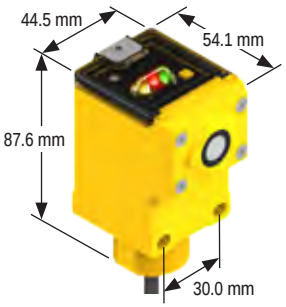
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

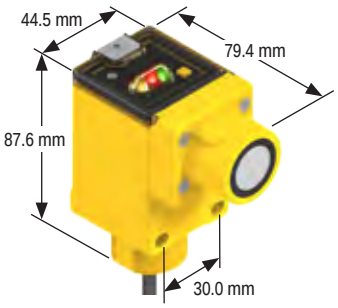
Q45U Analog Output, 15-24 V DC

Range	Temperature Compensation	Connection *	Output Type	Response Time	Models
100 mm - 1.4 m	Yes	2 m 5-pin Mini QD 5-pin Euro QD	Selectable 0 to 10 V dc or 4 to 20 mA	Adjustable from 40 to 1280 ms	Q45ULIU64ACR Q45ULIU64ACRQ Q45ULIU64ACRQ6
250 mm - 3 m†	Yes	2 m 5-pin Mini QD 5-pin Euro QD		Adjustable from 80 to 2560 ms	Q45ULIU64BCR Q45ULIU64BCRQ Q45ULIU64BCRQ6

Connection options: A model with a QD requires a mating cordset (see page 359).

* For 9 m cable, add suffix W/30 to the 2 m model number (example, Q45UBB63DA W/30).
† The far limit may be extended as far as 3.9 m for good acoustical targets–hard surfaces with area greater than 100 cm².





Cordsets

Euro QD (With Shield)

See page 913

Length	Straight 5-Pin		Right-Angle 5-Pin	
1.83 m	MQDEC2-506		MQDEC2-506RA	
4.57 m	MQDEC2-515		MQDEC2-515RA	
9.14 m	MQDEC2-530		MQDEC2-530RA	

Additional cordset information available. See page 904.

Mini QD (With Shield)

See page 929

Length	Threaded 5-Pin Straight	
1.83 m	MBCC2-506	
3.66 m	MBCC2-512	
9.14 m	MBCC2-530	

Brackets

Q45U

See page 869	See page 869	See page 870
SMB30A	SMB30MM	SMB30SC
		

Additional bracket information available. See page 846.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q45U Specifications

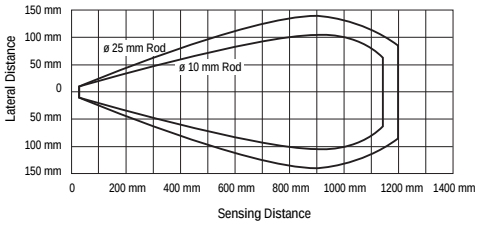
Sensing Range	**Short Range: Near limit:** 100 mm min. (239 kHz) **Long Range:** Near limit: 250 mm min. (128 kHz) **Short Range: Far limit:** 1.4 m max. (239 kHz) **Long Range:** Far limit: 3.0 m max. (128 kHz) NOTE: The far limit may be extended on long range units, as far as 3.9 m for good acoustical targets (hard surfaces with area greater than 100 cm^2)
Supply Voltage and Current	**Discrete:** 12 to 24 V dc (10% max. ripple); 100 mA (exclusive of load) **Analog:** 15 to 24 V dc (10% max. ripple); 100 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs
Output Configuration	**Discrete: Bipolar:** One current sourcing (PNP) and one current sinking (NPN) open collector transistor **Analog:** One voltage sourcing and one current sourcing; one or the other output is enabled by internal programming switch #2
Output Ratings	**Discrete:** 150 mA max. (each) **OFF-state leakage current:** less than 25 µA at 24 V dc **ON-state saturation voltage**: less than 1.5 V at 10 mA; less than 2.0 V at 150 mA Analog: **Voltage sourcing:** 0 to 10 V dc, 10 mA max. **Current sourcing:** 4 to 20 mA, 1 to 500 Ω impedance
Performance Specifications	Short Range / Long Range **Analog resolution or discrete repeatability:** ± 0.1% of sensing distance (± 0.25 mm min.) / ± 0.1% of sensing distance (± 0.5 mm min.) **Analog Linearity:** 1% of full scale / 1% of full scale **Temperature effect:** 0.05% of sensing distance/ ° C with temp. comp. / 0.05% of sensing distance/° C 0.2% of sensing distance/ ° C without temp. comp. **Min. window size:** 10 mm / 25 mm **Hysteresis (discrete output):** 5 mm / 10 mm
Adjustments	The following may be selected by a 4-position DIP switch. Discrete: **Switch 1:** Output normally open/normally closed (pump in/pump out) **Switch 2:** High/Low level control mode or ON/OFF presence sensing mode **Switch 3 & 4:** Response speed selection (digital filter) Analog: **Switch 1:** Output slope positive or output slope negative **Switch 2:** Current output mode or voltage output mode **Switch 3:** Loss of echo min/max mode or loss of echo Hold Mode **Switch 4:** Loss of echo min/max default output value
Indicators	**Discrete: Three status LEDs:** **Green:** power ON **Yellow:** outputs are conducting (Yellow LED also indicates programming status during setup mode) **Red:** indicates relative strength of received echo **Analog: Three status LEDs:** **Green:** power ON **Yellow:** target is sensed within the window limits (Yellow LED also indicates programming status during setup mode) **Red flashing:** indicates relative strength of received echo 5-segment moving dot LED indicates the position of the target within the sensing window. See data sheet for detailed information.
Construction	Molded PBT polyester thermoplastic polyester housing, o-ring sealed transparent acrylic top cover, and stainless steel hardware. Q45U sensors are designed to withstand 1200 psi washdown. The base of cabled models has a ½"-14NPS internal conduit thread.
Environmental Rating	Leakproof design is rated IEC IP67; NEMA 6P
Connections	2 m or 9 m attached cable, or 5-pin Mini-style or 5-pin Euro-style QD fitting. QD cordsets are ordered separately. See pages 359.
Operating Conditions	**Temperature:** -25° to +70° C **Relative humidity:** 100%
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration: 10 to 60Hz max., double amplitude 0.06", maximum acceleration 10G). Method 213B conditions H & I (Shock: 75G with unit operating; 100G for non-operation). Also meets IEC 947-5-2 requirements: 30G, 11 milliseconds duration, half sine wave.
Application Notes	**Short Range: Min. target size:** 10 x 10 mm aluminum plate at 500 mm 35 x 35 mm aluminum plate at 1.4 m **Long Range: Min. target size:** 50 x 50 mm aluminum plate at 3 m **Discrete:** Enable/Disable; Connect yellow wire to +5 to 24 V dc to enable sensor and 0 to +2 V dc to disable sensor. When the sensor is disabled, the last output state is held until the sensor is re-enabled. The wire must be held to the appropriate voltage for at least 40 milliseconds for the sensor to enable or disable.
Certifications	CE
Hookup Diagrams	MI18 (p. 993)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Effective Beam Patterns

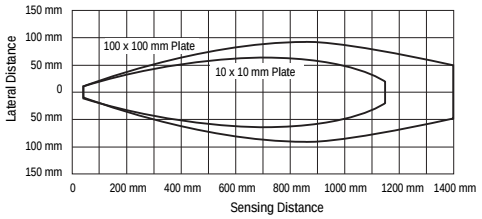
Q45U Short Range with Rod Target (Typical)





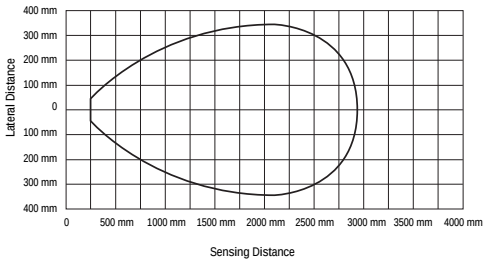
Q45U Short Range with Plate Target (Typical)





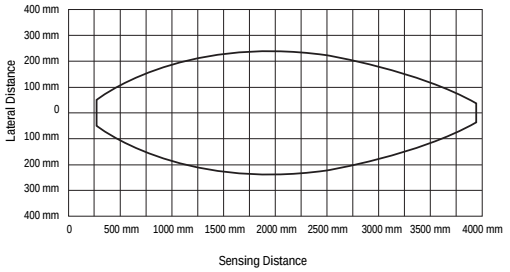
Q45U Long Range with 25 mm Rod Target (Typical)





Q45U Long Range with 100 x 100 mm Plate Target (Typical)





Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Q45UR
Remote Transducer Ultrasonic Sensors

The Q45UR offers a Q45 housing with an available plastic or a stainless steel 18 mm threaded barrel sensing head or an ultra-compact plastic Flat-Pak sensing head. The Q45UR has sensing ranges up to 250 mm.

- Resolution/repeatability +/- 0.2% of sensing distance
- Analog models feature a selectable positive or negative output slope
- Environmental rating is IEC IP65 and NEMA 4
- Push-button and remote TEACH-mode programming with an external switch, computer or controller for added security and convenience

Q45UR Discrete Output, 12-24 V DC

Sensor Range	Controller Connection	Controller Output	Kit Models	Kit Includes Controller & Sensor		
50 - 250 mm	2 m 5-pin Mini QD 5-pin Euro QD	Bipolar NPN/PNP	Q45UR3BA63CK Q45UR3BA63CQK Q45UR3BA63CQ6K	Q45UR3BA63C Q45UR3BA63CQ Q45UR3BA63CQ6		M18C2.0 Stainless Steel Barrel
50 - 250 mm	2 m 5-pin Mini QD 5-pin Euro QD	Bipolar NPN/PNP	Q45UR3BA63CKQ Q45UR3BA63CQKQ Q45UR3BA63CQ6KQ	Q45UR3BA63C Q45UR3BA63CQ Q45UR3BA63CQ6		Q13C2.0 Flat-Pak
50 - 250 mm	2 m 5-pin Mini QD 5-pin Euro QD	Bipolar NPN/PNP	Q45UR3BA63CKS Q45UR3BA63CQKS Q45UR3BA63CQ6KS	Q45UR3BA63C Q45UR3BA63CQ Q45UR3BA63CQ6		S18C2.0 Molded Barrel

For more specifications see page 364.

Connection options: A model with a QD requires a mating cordset (see page 363).

For 9 m cable, add suffix W/30 to the 2 m model number (example, Q45UR3BA63CK W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q45UR Analog Output, 15-24 V DC

Sensor Range	Controller Cable	Controller Output	Kit Models	Kit Includes Controller & Sensor		
50 - 250 mm	2 m 5-pin Mini QD 5-pin Euro QD	Selectable 0 to 10 V dc or 4 to 20 mA	Q45UR3LIU64CK Q45UR3LIU64CQK Q45UR3LIU64CQ6K	Q45UR3LIU64C Q45UR3LIU64CQ Q45UR3LIU64CQ6		M18C2.0 Stainless Steel Barrel
50 - 250 mm	2 m 5-pin Mini QD 5-pin Euro QD		Q45UR3LIU64CKQ Q45UR3LIU64CQKQ Q45UR3LIU64CQ6KQ	Q45UR3LIU64C Q45UR3LIU64CQ Q45UR3LIU64CQ6		Q13C2.0 Flat-Pak
50 - 250 mm	2 m 5-pin Mini QD 5-pin Euro QD		Q45UR3LIU64CKS Q45UR3LIU64CQKS Q45UR3LIU64CQ6KS	Q45UR3LIU64C Q45UR3LIU64CQ Q45UR3LIU64CQ6		S18C2.0 Molded Barrel

For more specifications see page 364.

Connection options: A model with a QD requires a mating cordset

For 9 m cable, add suffix W/30 to the 2 m model number (example, Q45UR3BA63CK W/30).

Cordsets

Euro QD (With Shield)

See page 913

Length	Threaded 5-Pin Straight		Threaded 5-Pin Right-Angle	
1.83 m		MQDEC2-506		MQDEC2-506RA
4.57 m		MQDEC2-515		MQDEC2-515RA
9.14 m		MQDEC2-530		MQDEC2-530RA

Additional cordset information available. See page 904.

Mini QD (With Shield)

See page 929

Length	Threaded 5-Pin Straight	
1.83 m		MBCC2-506
3.66 m		MBCC2-512
9.14 m		MBCC2-530

Brackets

Q45UR

See page 869	See page 869	See page 870
SMB30A	SMB30MM	SMB30SC
		

Additional bracket information available. See page 846.

Q45UR High-Gain Controllers

Product P/N	Version	
63060	Q45UR3BA63CQ6-63060	Discrete
63667	Q45UR3LIU64CQ6-63667	Analog

NOTE: Special High-Gain controllers are available for small object detection. Contact factory for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q45UR Remote Sensors Specifications

Supply Voltage and Current	Discrete: 12 to 24 V dc (10% max. ripple); 100 mA (exclusive of load) Analog: 15 to 24 V dc (10% max. ripple); 100 mA (exclusive of load)
Ultrasonic Frequency	400 kHz
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Protection Circuitry	Both outputs are protected against continuous overload and short circuit
Output Rating	Discrete: 150 mA max. (each output) OFF-state leakage current: less than 25 µA at 24 V dc ON-state saturation voltage: less than 1.5 V at 10 mA; less than 2.0 V at 150 mA Analog: Voltage sourcing: 0 to 10 V dc, 10 mA max. Current sourcing: 4 to 20 mA, 1 to 500 Ω impedance
Output Configuration	Discrete: Bipolar: One current sourcing (PNP) and one current sinking (NPN) open collector transistor Analog: One voltage sourcing and one current sourcing; one or the other output is enabled by internal programming switch #2
Performance Specifications	Discrete: Response Speed: 40 or 160 milliseconds (switch selectable) Repeatability*: ±0.2% of measured distance Temperature stability: ±0.03% of the window limit positions per ° C from 0° to 50° C, (±0.05% per ° C over remainder of operating temperature range) Sensing window width: 5 to 200 mm, when independent near and far limits are taught; 1, 2, 3, or 4 mm (switch selectable), when a sensing distance set point is taught Hysteresis: 0.5 mm Ultrasonic beam angle: ±3.5° Analog: Response Speed: 10 to 320 milliseconds (2 to 64 cycles) selectable Resolution*: 0.2% of sensing distance at 320 milliseconds response, 0.4% of sensing distance at 10 milliseconds response Linearity*: 1% of full scale Temperature stability: ±0.03% of sensing distance per ° C from 0° to 50° C, (±0.05% per ° C over remainder of operating temperature) Ultrasonic beam angle: ±3.5° * Repeatability and analog resolution and linearity are specified using a 50 x 50 mm aluminum plate at 22° C under fixed sensing conditions (Analog: using the 4 to 20 mA output @ 15 V dc)
Effective Beam	See page 365.
Adjustments	Discrete: The following may be selected by a 4-position DIP switch Switch 1: Output normally open (output is energized when target is within sensing window limits), or normally closed (output is energized when target is outside sensing window limits) Switches 2 & 3: Sensing window size (1, 2, 3 or 4 mm) Switch 4: Response speed selection (40 or 160 milliseconds) Analog: Push-button TEACH-mode programming of window limits. The following may be selected by a 4-position DIP switch located on top of the controller, beneath a transparent o-ring sealed acrylic cover and beneath the black inner cover. Switch 1: Output slope: output value increases or decreases with distance Switch 2: Output mode: current output or voltage output Switches 3 & 4: Response to loss of echo Response Speed Adjustment: Single-turn potentiometer selects six response values from 10 to 320 milliseconds
Indicators	Discrete: Three status LEDs: Green: Power ON Yellow: Output are conducting (Yellow also indicates programming status during setup) Red: Relative strength of received echo 5-segment moving dot LED indicates the position of the target within the sensing window Analog: Three status LEDs: Green: Power ON Yellow: Target is sensed within the window limits (Yellow LED also indicates programming status during setup mode) Red: Relative strength of received echo 5-segment moving dot LED indicates the position of the target within the sensing window See data sheet for detailed information
Construction	Controller: Molded thermoplastic polyester housing, o-ring sealed transparent acrylic top cover, and stainless steel hardware Sensors: M18C2.0: Stainless steel M18 threaded barrel housing and jam nuts, polyetherimide front cover, ceramic transducer, polyurethane rear cover S18C2.0: Thermoplastic polyester S18 threaded barrel housing and jam nuts, polyetherimide front cover, ceramic transducer, polyurethane rear cover Q13C2.0: Molded 30% glass reinforced thermoplastic polyester housing, ceramic transducer, fully epoxy-encapsulated

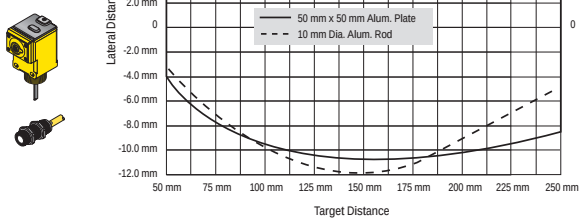
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q45UR Remote Sensors Specifications

Environmental Rating	Controller: IEC IP67; NEMA 6P Sensor: IEC IP65; NEMA 4
Connections	Controller: 2 m or 9 m attached cable, or 5-pin Mini-style or Euro-style quick-disconnect fitting. See page 363. Sensor: 2 m attached PVC cable terminated with 4-pin Euro-style quick-disconnect fitting for connection to controller.
Operating Conditions	Controller and sensor: -25° to +70° C Relative humidity: 85% (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A Vibration: 10 to 60Hz max., double amplitude 0.06" (maximum acceleration 10G). Method 213B conditions H & I (Shock: 75G with unit operating; 100G for non-operation). Also meets IEC 947-5-2 requirements: 30G, 11 milliseconds duration, half sine wave.
Application Notes	Discrete: The TEACH-mode function of the controller is used to set the sensing distance set point. The sensing window size is set using DIP switches #2 and #3. The sensing distance set point is centered within the sensing widow. The size of the sensing window may be adjusted at any time, with or without power applied, and without re-teaching the sensing distance set point. The controller has non-volatile memory which remembers the last sensing distance set point setting if power is removed and later reapplied. The sensing distance set point may be programmed using the Remote TEACH input (see hookup diagrams). Acceptable target angle is within ±5° of normal for a smooth, flat target; target rotation does affect the apparent target location with respect to the sensor. Analog: The controller has non-volatile memory which remembers the last sensing distance set point setting if power is removed and later reapplied. The sensing distance set point may be programmed using the Remote TEACH input (see hookup diagrams). Acceptable target angle is within ±5° of normal for a smooth, flat target; target rotation does affect the apparent target location with respect to the sensor.
Certifications	CE
Hookup Diagrams	MI18 (p. 993)

Effective Beam Patterns

Q45UR





Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



QS18U
Right-Angle Ultrasonic Sensors

The QS18U senses clear and transparent materials, as well as color variations, including clear web material, clear or shiny bottles, highly reflective surfaces and liquid or dry bulk materials inside cramped locations with a sensing range up to 500 mm.

- Features a universal housing with an 18 mm threaded lens or side mount
- Available in encapsulated IP68 models rated for a range of harsh conditions
- Push-button and remote TEACH-mode programming with an external switch, computer or controller for added security and convenience

QS18U, 12-30 V DC

Range	Connection	TEACH Options	Models NPN	Models PNP
50 - 500 mm	2 m	Integral push button and remote TEACH (IP67; NEMA 6P)	QS18UNA	QS18UPA
	4-pin Euro QD		QS18UNAQ8	QS18UPAQ8
50 - 500 mm	2 m	Remote TEACH (epoxy-encapsulated, IP68; NEMA 6P)	QS18UNAE†	QS18UPAE†
	4-pin Euro QD		QS18UNAEQ8†	QS18UPAEQ8†

For more specifications see page 368.

Connection options: A model with a QD requires a mating cordset (see page 367).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS18UNA W/30).
QD models:
- For 4-pin integral Euro-style QD, add suffix Q8 (example, QS18UNAQ8).
- For 4-pin integral Pico-style QD, add suffix Q7 (example, QS18UNAQ7).
- For 4-pin 150 mm Euro-style pigtail, add suffix Q5 (example, QS18UNAQ5).
- For 4-pin 150 mm Pico-style pigtail, add suffix Q (example, QS18UNAFQ).

† Models are epoxy-encapsulated, IP68; NEMA 6P with remote TEACH programming

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (With Shield)

See page 909

Length	Straight 4-Pin	Right-Angle 4-Pin
1.83 m	MQDEC2-406	MQDEC2-406RA
4.57 m	MQDEC2-415	MQDEC2-415RA
9.14 m	MQDEC2-430	MQDEC2-430RA



Additional cordset information available.
See page 904.

Pico QD (With Shield)

See page 906

Length	Straight 4-Pin	Right-Angle 4-Pin
1.83 m	PKG4S-2	PKW4ZS-2



Brackets

QS18U

See page 859	See page 860	See page 861
SMB18A	SMB18FA..	SMB18SF



Additional bracket information available.
See page 846.

Ultrasonic Wave Guides

Inside Diameter	Model	
5.0 mm	UWG18-5.0	
6.4 mm	UWG18-6.4	pg. 967



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

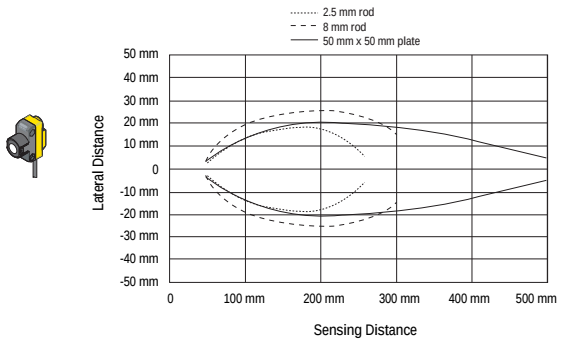
QS18U Specifications

Effective Beam	See charts on page 369.	
Sensing Range	50 to 500 mm	
Supply Voltage and Current	12 to 30 V dc (10% max. ripple); 25 mA max. (exclusive of load)	
Ultrasonic Frequency	300 kHz, rep. rate 7.5 milliseconds	
Supply Protection Circuitry	Protected against reverse polarity and transient voltages	
Output Protection	Protected against short circuit conditions	
Delay at Power-Up	300 milliseconds	
Output Configurations	Solid-state switch conducts when target is sensed within sensing window; one NPN (current sinking) or one PNP (current sourcing), depending on model	
Temperature Effect	Non-encapsulated models: ± 0.05% per ° C from -20° to +50° C, ± 0.1% per ° C from +50° to +60° C Encapsulated models: ± 0.05% per ° C from 0° to +60° C, ± 0.1% per ° C from -20° to 0° C	
Repeatability	0.7 mm	
Hysteresis	1.4 mm	
Output Ratings	100 mA max. (see Application Note 1) OFF-state leakage current: less than 10 µA (sourcing); less than 200 µA (sinking); See Application Note 2 NPN ON-state saturation voltage: less than 1.6 V @ 100 mA PNP ON-state saturation voltage: less than 3.0 V @ 100 mA	
Output Response Time	15 milliseconds	
Minimum Window Size	5 mm	
Adjustments	Sensing window limits: TEACH-Mode programming of near and far window limits may be set using the push button or remotely using TEACH input	
Indicators	Range Indicator (Red/Green) Green: Target is within sensing range Red: Target is outside sensing range OFF: Sensing power is OFF	TEACH/Output Indicator (Yellow/Red) Yellow: Target is within taught limits OFF: Target is outside taught window limits Red: Sensor is in TEACH mode
Construction	Housing: ABS Push Button: TPE	Push-Button Housing: ABS Lightpipes: Polycarbonate
Environmental Rating	Leakproof design, rated IEC IP67 or IP68; NEMA 6P, depending on model; UL type 1	
Connections	2 m or 9 m 4-conductor PVC jacketed attached cable, or 4-pin Euro-style integral QD (Q8), or 4-pin Pico-style integral QD (Q7), or 4-pin Euro-style 150 mm pigtail QD (Q5), or 4-pin Pico-style 150 mm pigtail QD (Q), depending on model. See page 367.	
Operating Conditions	Temperature: -20° to +60° C	Relative humidity: 100% (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements method 201A (vibration: 10 to 60 Hz max., double amplitude 0.06", maximum acceleration 10G). Also meets IEC 947-5-2 requirements: 30G 11 milliseconds duration, half sine wave.	
Temperature Warmup Drift	See data sheet	
Application Notes	1. If supply voltage is > 24 V dc, derate maximum output current 5 mA/°C above 50°C. 2. NPN OFF-state leakage current is < 200 µA for load resistances > 3 kΩ or optically isolated loads. For load current of 100 mA, leakage is < 1% of load current. 3. Objects passing inside the specified near limit may produce a false response.	
Certifications	CE	
Hookup Diagrams	MI13 (p. 992)	

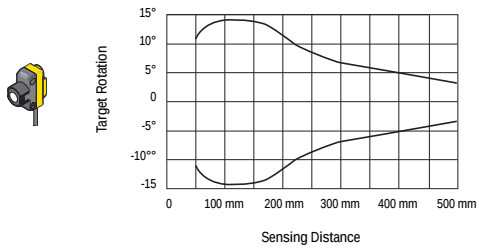
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Effective Beam Pattern

QS18U (Typical)



QS18U Maximum Target Rotation Angle



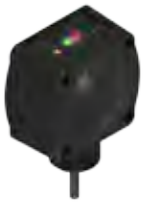
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Radar

Radar sensors use Frequency Modulated Continuous Wave (FMCW) radar to reliably detect moving or stationary targets, including cars, trains, trucks and cargo in rain, snow, high and low temperatures and wind.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Max Sensing Range	Dimensions H x W x D	Protection Rating	Power Supply
	Q120RA Radar-Based narrow-beam sensors for detection of moving and stationary targets that are unaffected by wind, falling rain or snow, fog, humidity, air temperatures or light. page 372	40 m	159.5 x 90.8 x 62 mm	IP67	12 to 30 V dc
	QT50R Radar sensor's functions are unaffected by wind, rain, fog, light, humidity and temperature, making it ideal for outdoor environments. page 373	24 m	100.2 x 74.1 x 46.1 mm	IP67	12 to 30 V dc
	QT50R-AF2W Radar-based, dual-zone sensors detect moving and stationary targets, ideal for collision avoidance and outdoor crane-to-crane proximity detection. page 374	24 m	89 x 120 x 259 mm	IP67	12 to 30 V dc

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

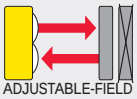
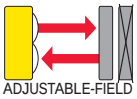


Q120RA
Radar-Based Adjustable-Field Sensor

Radar-Based narrow-beam sensors for detection of moving and stationary targets that are unaffected by wind, falling rain or snow, fog, humidity, air temperatures or light.

- Fourth generation FMCW (true-presence) radar detects moving and stationary objects
- Narrow beam pattern and high sensitivity
- Easy setup and configuration of range, sensitivity and output with simple DIP switches
- Sensor operates in Industrial, Scientific and Medical (ISM) telecommunication band; no special license required
- Cordsets and brackets see page 375

R-GAGE Q120RA Narrow Beam, High Sensitivity, Single & Dual Zone, 12-30 V DC

Sensing Mode	Max Range†	Connection	Telecom Approval*	Output	Model
	Single sensing zone: 12 m	2 m	(Pending) US (Pending) Europe (except UK) and China (Pending) UK	Bipolar NPN/PNP Selectable NO or NC	Q120RA-US-AF Q120RA-EU-AF Q120RA-UK-AF
	Two independent sensing zones: 40+ m	2 m	(Pending) US (Pending) Europe (except UK) and China (Pending) UK	Selectable Dual NPN/PNP Selectable NO or NC	Q120RA-US-AF2 Q120RA-EU-AF2 Q120RA-UK-AF2

For more specifications see page 376.

QD models: A model with a QD requires a mating cordset (see page 375).

QD models: For 5-pin Euro-style QD, add Q to the 2 m model (example, Q120RA-US-AF2Q).

† Range is dependent on target object.

* Contact factory at 1-888-373-6767 for additional information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

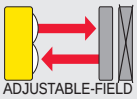
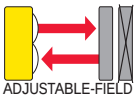
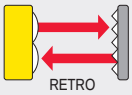


QT50R
Radar-Based Sensors

The QT50R radar sensor's functions are unaffected by wind, rain, fog, light, humidity and temperature, making it ideal for outdoor environments.

- High sensitivity and long range
- Uses Frequency Modulated Continuous Wave (FMCW) to detect moving and stationary objects
- Easy setup and configuration of range, sensitivity and output with simple DIP switches
- Retroreflective models use a reference target, enabling reliable detection of weak targets in the foreground
- Adjustable-field models ignore objects beyond the set point
- Cordsets and brackets see page 375

R-GAGE QT50R Wide Beam, 12-30 V DC

Sensing Mode	Max Range†	Connection	Telecom Approval*	Output	Model
 ADJUSTABLE-FIELD	24 m	2 m	US, Canada and Brazil Europe (except UK), Australia, New Zealand, Japan and China UK	Bipolar NPN/PNP Selectable NO or NC	QT50R-US-AFH QT50R-EU-AFH QT50R-UK-AFH
 ADJUSTABLE-FIELD	3.75 m	2 m	Europe (except UK), Australia, New Zealand, Japan and China	Bipolar NPN/PNP Selectable NO or NC	QT50R-EU-AFS
 RETRO	12 m	2 m	US, Canada and Brazil Europe (except UK), Australia, New Zealand, Japan and China UK	Bipolar NPN/PNP Selectable NO or NC	QT50R-US-RH QT50R-EU-RH QT50R-UK-RH

For more specifications see page 376.

QD models: A model with a QD requires a mating cordset (see page 375).

QD models: For 5-pin Euro-style QD, add Q to the 2 m model (example, QT50R-US-AFHQ).

† Range is dependent on target object.
* Contact factory at 1-888-373-6767 for additional information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

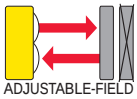


QT50RAF
Radar-Based Sensor

Radar-based, dual-zone sensors detect moving and stationary targets, ideal for collision avoidance and outdoor crane-to-crane proximity detection.

- Narrow beam pattern
- Two independent, adjustable sensing zones
- Easy setup and configuration of range, sensitivity and output with simple DIP switches
- Sensing functions are unaffected by wind, rain, fog, light, humidity and temperature
- Rugged IP67 housing withstands harsh environments

R-GAGE QT50R-AF2W Narrow Beam Dual Zone, 12-30 V DC

Sensing Mode	Max Range†	Connection	Telecom Approval*	Output	Model
 ADJUSTABLE-FIELD	24 m	2 m	US, Canada and Brazil	Selectable dual NPN or PNP	QT50R-US-AF2W
			Europe (except UK), Australia, New Zealand, Japan and China	Selectable dual NO or NC	QT50R-EU-AF2W
			UK		QT50R-UK-AF2W

For more specifications see page 376.

QD models: A model with a QD requires a mating cordset (see page 375).

QD models: For 5-pin Euro-style QD, add Q to the 2 m model (example, QT50R-US-AF2WQ).

† Range is dependent on target object.

* Contact factory at 1-888-373-6767 for additional information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD with Shield

See page 913

Length	Threaded 5-Pin	
	Straight	Right-Angle
1.83 m	MQDEC2-506	MQDEC2-506RA
4.57 m	MQDEC2-515	MQDEC2-515RA
9.14 m	MQDEC2-530	MQDEC2-530RA



Additional cordset information available.
See page 904.

Brackets

QT50R

See page 869	See page 870	See page 869
SMB30A	SMB30SC	SMB30MM



Additional brackets and information available.
See page 846.

QT50R Weather Deflector Kit



QT50RCK
- Required if R-GAGE is exposed to rain and snow
- Prevents buildup of water or ice on sensor face

Q120RA Weather Deflector Hood



SMBWSQ120
- Rear-Mount Protective Metal Enclosure
- Supports both horizontal and vertical sensor mounting

Radar Target



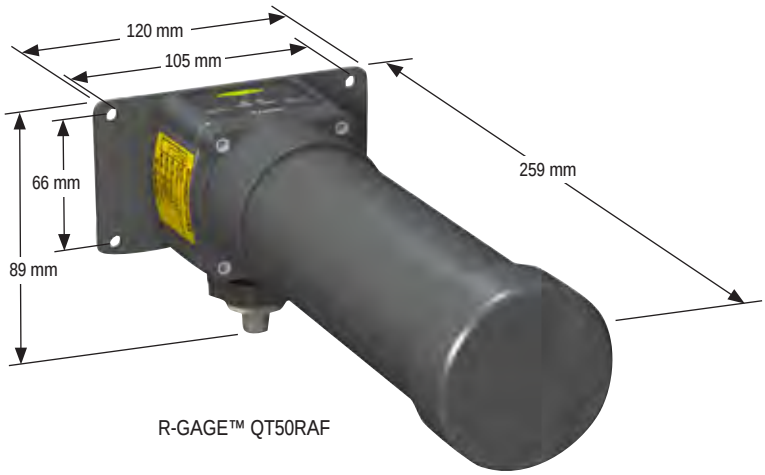
BRTR-CC20E
- Large corner-cube reflector in protective plastic enclosure
- 7x excess gain at 6 m distance



R-GAGE™ Q120RA



R-GAGE™ QT50R



R-GAGE™ QT50RAF

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

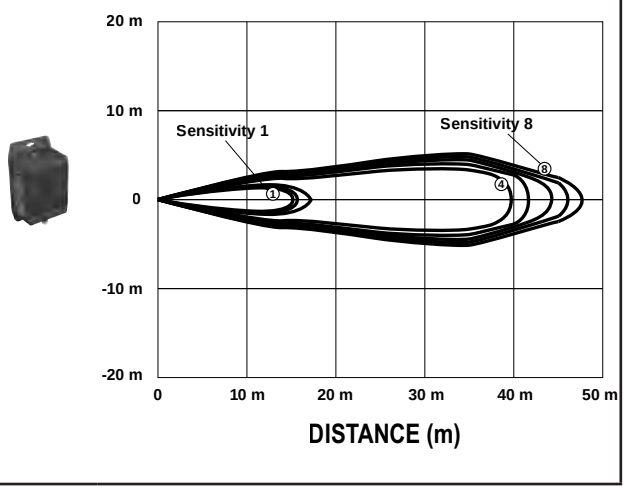
R-GAGE™ Specifications

Range	The sensor is able to detect a proper object (see Detectable Objects) from 0 to 40+ m
Effective Beam	See charts EBPC-1 and EBPC-2 on page 377-378
Detectable Objects	Objects containing metal, water or similar high-dielectric material
Operating Principle	Frequency Modulated Continuous Wave (FMCW) radar
Operating Frequency	24.00-24.25 GHz, ISM Band (varies slightly by model and national telecom regulations)
Supply Voltage	12 to 30 V dc, less than 100 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient overvoltages
Delay at Power-up	Less than 2 seconds
Output Configuration	NPN and PNP, N.O. and N.C., 150 mA each
Output Protection	Protected against short circuit conditions
Indicators	Power LED: Green (Power ON) Signal Strength LED: Red, flashes in proportion to signal strength Output LEDs: Yellow (output energized)/Red (configuration) See data sheets for more detailed information
Response Time	DIP-switch configurable ON/OFF response time
Adjustments	DIP-Switch configurable sensing distance, sensitivity, response time, and output configuration. Remote line TEACH for retroreflective models.
Construction	Housing: ABS/polycarbonate Lightpipes: Acrylic Access Cap: Polyester
Operating Temperature	-40° to +65° C
Environmental Rating	IP67
Connections	2 m, 5-wire, shielded, cordset or 5-pin Euro-style QD. Mating QD cordsets are ordered separately. See page 375.
Certifications	CE and ETSI/EN 300 400, FCC part 15; RSS-210; ANATEL Category II; CMII Category G; ARIB STD T-73. For more information consult factory
Hookup Diagram	MI22 (p. 994)

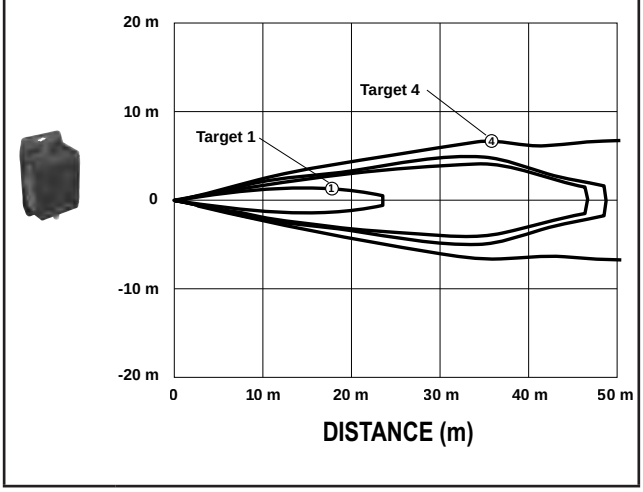
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Effective Beam Patterns

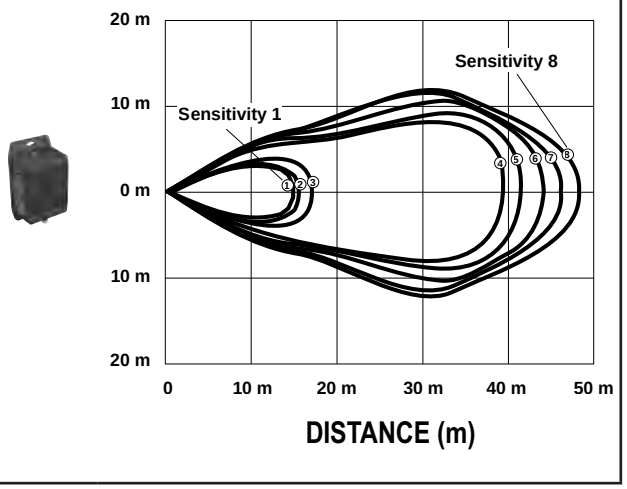
Q120RA Left-Right



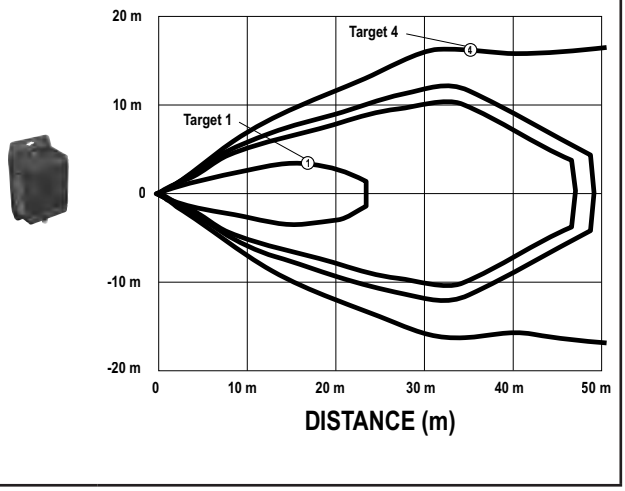
Q120RA Left-Right



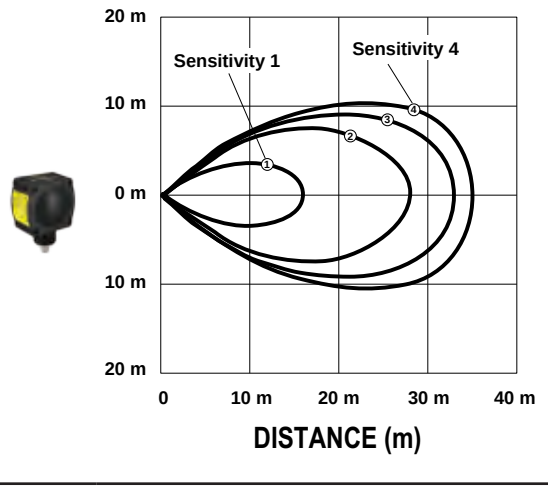
Q120RA Up-Down



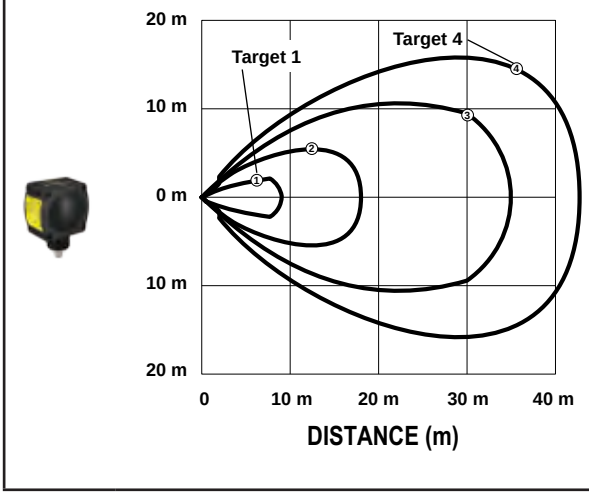
Q120RA Up-Down



QT50R-AFH & QT50R-RH Adjustable Field



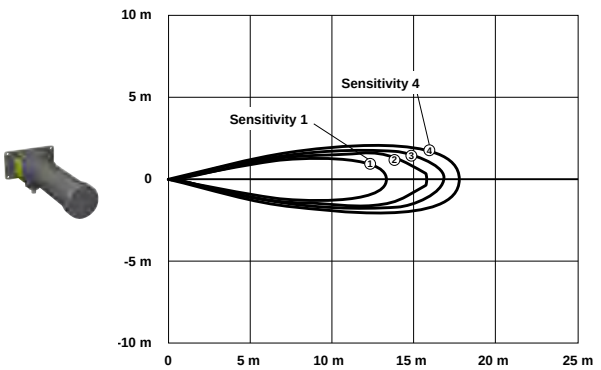
QT50R-AFH & QT50R-RH Adjustable Field



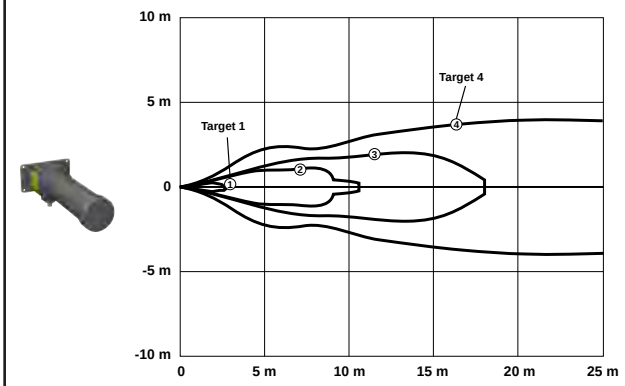
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Effective Beam Patterns

QT50R-AF2W Adjustable Field



QT50R-AF2W Adjustable Field



Example Targets

1: Weak Object (Radar cross section = 0.25 m^2)

2: Car (Radar cross section = 3 m^2)

3: Large Truck (Radar cross section = 50 m^2)

4: Passenger Train (Radar cross section = 300 m^2)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

PORT & MOBILE EQUIPMENT SOLUTIONS















Arrays

Using an array of closely spaced light beams, measuring light screens are designed for profiling, inspections and process monitoring.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Minimum Object Detection Range	Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	EZ-ARRAY Two piece measuring array page 382	5 mm	H (varies by model) 36 x 45.2 mm	IP65	Aluminum with clear anodized finish	12 to 30 V dc
	Mini Array For inspections and profiling with a long range page 386	2.5 mm	H (varies by model) 38.1 x 38.1 mm	IP65	Aluminum with black anodized finish	Controller: 16 to 30 V dc
	High Res Mini Array Excels at high-speed, precise monitoring and inspection applications page 392	Beam Spacing	H (varies by model) 38.1 x 38.1 mm	IP65	Aluminum with black anodized finish	Controller: 16 to 30 V dc

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



EZ-ARRAY™
Two-Piece Measuring Light Screens

The two-piece light-screen design eliminates the need for a separate controller and is ideal for applications such as edge and center guarding, loop tension control, hole sizing, part counting, and on-the-fly product sizing and profiling.

- 5 mm beam spacing provides edge resolution of 2.5 mm
- High excess gain option for detecting opaque objects in single and double edge scan mode
- Seven zone LEDs provide instant alignment and beam blockage information
- Remote TEACH capable
- Rugged aluminum housing
- Cordsets and brackets see page 384

EZ-ARRAY™, 12-30 V DC–5 mm Beam Spacing

Housing Length (L)	Array Length	Total Beams	Range*	Analog Output	Emitter Model	Receiver Model NPN Outputs	Receiver Model PNP Outputs
227 mm	150 mm	30	0.4 – 4 m	Current (4–20 mA)	EA5E150Q	EA5R150NIXMODQ	EA5R150PIXMODQ
				Voltage (0–10V)		EA5R150NUXMODQ	EA5R150PUXMODQ
379 mm	300 mm	60		Current (4–20 mA)	EA5E300Q	EA5R300NIXMODQ	EA5R300PIXMODQ
				Voltage (0–10V)		EA5R300NUXMODQ	EA5R300PUXMODQ
529 mm	450 mm	90		Current (4–20 mA)	EA5E450Q	EA5R450NIXMODQ	EA5R450PIXMODQ
				Voltage (0–10V)		EA5R450NUXMODQ	EA5R450PUXMODQ
678 mm	600 mm	120		Current (4–20 mA)	EA5E600Q	EA5R600NIXMODQ	EA5R600PIXMODQ
				Voltage (0–10V)		EA5R600NUXMODQ	EA5R600PUXMODQ
828 mm	750 mm	150		Current (4–20 mA)	EA5E750Q	EA5R750NIXMODQ	EA5R750PIXMODQ
				Voltage (0–10V)		EA5R750NUXMODQ	EA5R750PUXMODQ
978 mm	900 mm	180		Current (4–20 mA)	EA5E900Q	EA5R900NIXMODQ	EA5R900PIXMODQ
				Voltage (0–10V)		EA5R900NUXMODQ	EA5R900PUXMODQ
1128 mm	1050 mm**	210		Current (4–20 mA)	EA5E1050Q	EA5R1050NIXMODQ	EA5R1050PIXMODQ
				Voltage (0–10V)		EA5R1050NUXMODQ	EA5R1050PUXMODQ
1278 mm	1200 mm**	240		Current (4–20 mA)	EA5E1200Q	EA5R1200NIXMODQ	EA5R1200PIXMODQ
				Voltage (0–10V)		EA5R1200NUXMODQ	EA5R1200PUXMODQ
1578 mm	1500 mm**	300		Current (4–20 mA)	EA5E1500Q	EA5R1500NIXMODQ	EA5R1500PIXMODQ
				Voltage (0–10V)		EA5R1500NUXMODQ	EA5R1500PUXMODQ
1878 mm	1800 mm**	360		Current (4–20 mA)	EA5E1800Q	EA5R1800NIXMODQ	EA5R1800PIXMODQ
				Voltage (0–10V)		EA5R1800NUXMODQ	EA5R1800PUXMODQ
2178 mm	2100 mm**	420		Current (4–20 mA)	EA5E2100Q	EA5R2100NIXMODQ	EA5R2100PIXMODQ
				Voltage (0–10V)		EA5R2100NUXMODQ	EA5R2100PUXMODQ
2478 mm	2400 mm**	480		Current (4–20 mA)	EA5E2400Q	EA5R2400NIXMODQ	EA5R2400PIXMODQ
				Voltage (0–10V)		EA5R2400NUXMODQ	EA5R2400PUXMODQ

For more specifications see page 385.

QD models: A model with a QD requires a mating cordset (see page 384).

* Models with a range of 300 mm to 1500 mm models are available upon request. Contact factory at 1-888-373-6767 for more information.

** Models with array lengths 1050 mm and longer ship with a center bracket and two end-cap brackets.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-ARRAY™ IO-Link, 0-10 V DC–5 mm Beam Spacing

Housing Length (L)	Array Length	Total Beams	Range*	Emitter Model	Receiver Model PNP Outputs
227 mm	150 mm	30	0.4 – 4 m	EA5E150Q NEW	EA5R150XKQ NEW
379 mm	300 mm	60		EA5E300Q NEW	EA5R300XKQ NEW
529 mm	450 mm	90		EA5E450Q NEW	EA5R450XKQ NEW
678 mm	600 mm	120		EA5E600Q NEW	EA5R600XKQ NEW
828 mm	750 mm	150		EA5E750Q NEW	EA5R750XKQ NEW
978 mm	900 mm	180		EA5E900Q NEW	EA5R900XKQ NEW
1128 mm	1050 mm**	210		EA5E1050Q NEW	EA5R1050XKQ NEW
1278 mm	1200 mm**	240		EA5E1200Q NEW	EA5R1200XKQ NEW
1578 mm	1500 mm**	300		EA5E1500Q NEW	EA5R1500XKQ NEW
1878 mm	1800 mm**	360		EA5E1800Q NEW	EA5R1800XKQ NEW
2178 mm	2100 mm**	420		EA5E2100Q NEW	EA5R2100XKQ NEW
2478 mm	2400 mm**	480		EA5E2400Q NEW	EA5R2400XKQ NEW

For more specifications see page 385.

QD models: A model with a QD requires a mating cordset (see page 384).

* Models with a range of 300 mm to 1500 mm models are available upon request. Contact factory at 1-888-373-6767 for more information.

** Models with array lengths 1050 mm and longer ship with a center bracket and two end-cap brackets.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (With Shield)

See page 915

Length	Threaded 8-Pin Straight
4.57 m	MAQDC-815
9.14 m	MAQDC-830
15.2 m	MAQDC-850



Communication Cordsets

See page 931

Length	Threaded 5-Pin Straight	Threaded 5-Pin Right-Angle
1.83 m	MQDMC-506	MQDMC-506RA
4.57 m	MQDMC-515	MQDMC-515RA
9.14 m	MQDMC-530	MQDMC-530RA







Additional cordset information available. See page 904.

Brackets

EZ-ARRAY™

See page 895	See page 878
EZA-MBK-20	SMBLBCZB







Additional bracket information available. See page 846.

Serial Adapters

See page 969		Model
	USB to RS-485 serial adapter with integral communication cordset and USB cable for advanced configuration with a PC.	EZA-USB485-01
	USB to RS-485 serial adapter for advanced configuration with a PC. NOTE: Communication cordset ordered separately.	INTUSB485-1

Other Accessories

Reflectors	Apertures	Stands	Enclosures	Lens Shields
See page 940	See page 966	See page 952	See page 960	See page 962













EZ-ARRAY Light Screen

W = 36.0 mm D = 45.2 mm

L = Length (see model chart page 382)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-ARRAY™ Specification

Supply Voltage (Limit Values)	Emitter: 12 to 30 V dc Receiver Analog Current Models: 12 to 30 V dc Receiver Analog Voltage Models: 15 to 30 V dc
Supply Power Requirements	Emitter/Receiver Pair (Exclusive of discrete load): Less than 9 watts Power-up delay: 2 seconds
Emitter/Receiver Range	400 mm to 4 m
Field of View	Nominally ± 3°
Beam Spacing	5 mm
Light Source	Infrared LED
Minimum Object Detection Size	Straight Scan, Low-Contrast: 5 mm Straight Scan, High-Excess-Gain: 10 mm
Sensor Positional Resolution	Straight Scan: 5 mm Double-Edge Scan: 2.5 mm Single-Edge Scan: 2.5 mm
Teach Input (Receiver Gray Wire)	Low: 0 to 2 volts High: 6 to 30 volts or open (input impedance 22 kΩ)
Two Discrete Outputs	Solid-State NPN or PNP (current sinking or sourcing) Rating: 100 mA max. each output OFF-State Leakage Current: NPN: less than 200 uA @ 30 V dc PNP: less than 10 uA @ 30 V dc ON-State Saturation Voltage: NPN: less than 1.6 V @ 100 mA PNP: less than 2.0 V @ 100 mA Protected against false pulse on power-up and continuous overload or short circuit.
Two Analog Outputs	Voltage Sourcing: 0 to 10 V (maximum current load of 5 mA) Current Sourcing: 4 to 20 mA (maximum resistance load = $(V_{supply}-3)/0.020$)
Serial Communication Interface	EIA-485 Modbus RTU (up to 15 nodes per communication ring) RTU binary format Baud Rate: 9600, 19.2K or 38.4K 8 Data Bits, 1 Stop Bit, and Even, Odd, or 2 Stop Bits and No Parity
Scan Time	Scan times depend on scan mode and sensor length. Straight scan times range from 2.8 to 26.5 milliseconds.
Status Indicators	Emitter: Red Status LED ON Steady—Status Flashing at 1 hz—Error Receiver: 7 Zone Indicators Red—Blocked channels within zone Green—All channels clear within zone 3-digit 7-segment indicators for measurement mode / diagnostic information Sensor Status Bicolor Indicator LED Red—Hardware Error or Marginal Alignment Green—OK Modbus Activity Indicator LED: Yellow Modbus Error Indicator LED: Red
System Configuration (Receiver Interface)	6-position DIP switch: Used to set scanning type, measurement modes, analog slope and discrete output 2 function. Alternate software GUI interface provides additional options; see full manual. Push Buttons Two momentary push buttons for alignment and gain level selection.
Connections	Serial communication: The receiver uses a PVC-jacketed, 5-conductor 22-gauge quick-disconnect cable, 5.4 mm diameter. QD cordsets are ordered separately. See page 384. Other Sensor connections: 8-conductor quick-disconnect cordsets (one each for emitter and receiver), ordered separately (may not exceed 75 m long), PVC-jacketed cordsets measure 5.8 mm diameter, have shield wire; 22-gauge conductors. QD cordsets are ordered separately. See page 384.
Construction	Aluminum housing with clear-anodized finish; acrylic lens cover
Environmental Rating	IEC IP65
Operating Conditions	Temperature: –40° to +70° C Relative humidity: 95% at 50° C (non-condensing)
Certification	CE
Hookup Diagrams	NPN models: MI23 (p. 994) PNP models: MI24 (p. 994)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



MINI-ARRAY®
Measuring Light Screens

The MINI-ARRAY® is a programmable measuring light screen for inspections and profiling with a long range up to 17 m.

- Offers programmable controller with a selection of measurement modes, scan modes and output configurations
- Available with 9.5 or 19 mm beam spacing for detecting objects as small as 12.7 mm
- Advanced software GUI
- DeviceNet™ compatible modes
- Highly visible indicators for status monitoring
- Cordsets and brackets see page 388

MINI-ARRAY®–19.1 mm Beam Spacing

Housing Length (L)	Array Length	Total Beams	Range	Connection	Minimum Object Size	Models* Emitter	Models* Receiver
201 mm	133 mm	8	0.9 - 17 m	5-pin Mini QD	38.1 mm Interlaced Mode: 25.4 mm	BMEL616A	BMRL616A
356 mm	286 mm	16	0.9 - 17 m			BMEL1216A	BMRL1216A
505 mm	438 mm	24	0.9 - 17 m			BMEL1816A	BMRL1816A
659 mm	591 mm	32	0.9 - 17 m			BMEL2416A	BMRL2416A
810 mm	743 mm	40	0.9 - 17 m			BMEL3016A	BMRL3016A
963 mm	895 mm	48	0.9 - 17 m			BMEL3616A	BMRL3616A
1115 mm	1048 mm	56	0.9 - 17 m			BMEL4216A	BMRL4216A
1267 mm	1200 mm	64	0.9 - 14 m			BMEL4816A	BMRL4816A
1572 mm	1505 mm	80	0.9 - 14 m			BMEL6016A	BMRL6016A
1877 mm	1810 mm	96	0.9 - 14 m			BMEL7216A	BMRL7216A

For more specifications see page 389.

QD models: A model with a QD requires a mating cordset (see page 388).

* "E" and "R" in models numbers denotes "Emitter" and "Receiver" respectively. Sold separately.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

MINI-ARRAY®–9.5 mm Beam Spacing

Housing Length (L)	Total Beams	Array Length	Range	Connection	Minimum Object Size	Models* Emitter	Models* Receiver
201 mm	16	143 mm	0.6 - 6.1 m	5-pin Mini QD	19.1 mm Interlaced Mode: 12.7 mm	BMEL632A	BMRL632A
356 mm	32	295 mm	0.6 - 6.1 m			BMEL1232A	BMRL1232A
505 mm	48	448 mm	0.6 - 6.1 m			BMEL1832A	BMRL1832A
659 mm	64	600 mm	0.6 - 6.1 m			BMEL2432A	BMRL2432A
810 mm	80	752 mm	0.6 - 6.1 m			BMEL3032A	BMRL3032A
963 mm	96	905 mm	0.6 - 6.1 m			BMEL3632A	BMRL3632A
1115 mm	112	1057 mm	0.6 - 6.1 m			BMEL4232A	BMRL4232A
1267 mm	128	1210 mm	0.6 - 4.6 m			BMEL4832A	BMRL4832A
1572 mm	160	1514 mm	0.6 - 4.6 m			BMEL6032A	BMRL6032A
1877 mm	192	1819 mm	0.6 - 4.6 m			BMEL7232A	BMRL7232A

MINI-ARRAY® Controllers†, 16-30 V DC

Inputs	Solid-State Discrete Outputs	Analog Outputs	Serial Output	Controller Models
1 Sensor pair & Trigger (Gate)	1 Reed & 1 NPN	–	RS-232 & RS-485	MAC-1
	2 NPN	–		MACN-1
	2 PNP	–		MACP-1
	1 NPN	(2) 0-10 V Sourcing	RS-232	MACV-1
	1 NPN	(2) 4-20 mA Sinking		MACI-1
1 Sensor pair & Trigger (Gate)	16 NPN	–	RS-232	MAC16N-1
	16 PNP	–		MAC16P-1

For more specifications see page 389.

QD models: A model with a QD requires a mating cordset (see page 388).

* "E" and "R" in models numbers denotes "Emitter" and "Receiver" respectively. Sold separately.

† One controller and an emitter/receiver pair (of matching length and resolution) required per system.

DeviceNet™ is a trademark of the Open DeviceNet Vendor Association, Inc.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Mini QD (Shielded with Twisted Pair)

See page 930

Length	Threaded 5-Pin Straight
4.57 m	QDC-515C
7.62 m	QDC-525C
15.2 m	QDC-550C
22.9 m	MAQDC-575C
30.5 m	MAQDC-5100C
38.1 m	MAQDC-5125C
45.7 m	MAQDC-5150C





Additional cordset information available. See page 904.

DB9 Communication

See page 932

Length	9-Pin Straight
2.00 m	MASC



Brackets

MINI-ARRAY®

See page 854 | See page 878

DIN-35-.. | MSMB-3







Additional bracket information available. See page 846.

Other Accessories

Stands	Enclosures	Lens Shields
See page 952	See page 960	See page 962







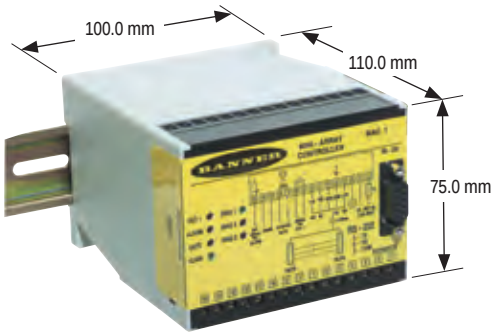
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



MINI-ARRAY Sensors

W = 38.1 mm D = 38.1 mm

L = Length (see model chart page 386)



MINI-ARRAY Controller

MINI-ARRAY® Emitter/Receiver Specifications

Emitter/Receiver Range Max range is specified at the point where 3x excess gain remains	9.5 mm beam spacing Array Length 143 to 1057 mm: 0.6 to 6.1 m Array Length 1210 to 1819 mm: 0.6 to 4.6 m	19.1 mm beam spacing Array Length 133 to 1057 mm: 0.9 to 17 m Array Length 1200 to 1810 mm: 0.9 to 14 m
Minimum Object Sensitivity	9.5 mm Beam Spacing Straight, Edge Modes: 19.1 mm Interlaced Mode: 12.7 mm* With DeviceNet Controller: Straight, Edge Modes: 19.1 mm Skip Mode: Multiply the above by the number of skipped beams, plus 1 Interlaced Mode: 12.7 mm* *Assumes sensing is in the middle 1/3 of sensing range	19.1 mm Beam Spacing Straight, Edge Modes: 38.1 mm Interlaced Mode: 25.4 mm* With DeviceNet Controller: Straight, Edge Modes: 38.1 mm Skip Mode: Multiply the above by the number of skipped beams, plus 1 Interlaced Mode: 25.4 mm*
Sensor Scan Time	55 microseconds per beam, plus 1 millisecond post process time per scan DeviceNet: Post process time will vary, based on the number of channels interrogated during each scan	
Power Requirements †Maximum current is for a 6' sensor	9.5 mm beam spacing 12 V dc ±2%, supplied by controller Emitter: 0.10 A @ 12 V dc Receiver: 0.75 A @ 12 V dc†	19.1 mm beam spacing 12 V dc ±2%, supplied by controller Emitter: 0.10 A @ 12 V dc Receiver: 0.50 A @ 12 V dc†
Connections	Sensors connect to controller using 5-conductor Mini-style quick-disconnect cordsets (one each for emitter and receiver), ordered separately. Use only Banner cordsets, which incorporate a "twisted pair" for noise immunity. Cordsets measure 8.1 mm dia. and are shielded and PVC-jacketed. Conductors are 20 gauge. Emitter and receiver cordsets may not exceed 75 m long, each. See page 388.	
Status Indicators	Emitter: Red LED lights to indicate proper emitter operation Receiver: Green indicates sensors aligned (> 3x excess gain) Yellow indicates marginal alignment of one or more beams (1x -3x excess gain) Red indicates sensors misaligned or one or more beam(s) blocked	
Construction	Aluminum, with black anodized finish; acrylic lens cover	
Environmental Rating	NEMA 4, 13; IP65	
Certification	CE	
Operating Conditions	Temperature: -20° to +70° C Relative humidity: 95% at 50° C (non-condensing)	

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

MINI-ARRAY® Controller Specifications

Power Requirements	16 to 30 V dc @ 1.25 amps max. (see current requirements for sensors); controller alone, (without sensors connected) requires 0.1 amp.
Inputs	Sensor input (5 connections): Emitter and receiver wire in parallel to five terminals Trigger (Gate) input: Optically isolated, requires 10 to 30 V dc (7.5K input impedance) for gate signal
Discrete Outputs	MAC-1: Output 1 (OUT 1) - Reed relay contact rated 125 V ac/dc max., 10 VA max. resistive load (non-inductive). Output 2 (ALARM) - Open collector NPN transistor rated 30 V dc max., 150 mA max, short-circuit protected; may be configured as a second data analysis output, a system alarm output, or a scan trigger output for a parallel array OFF-state leakage current: less than 10 µA @ 30 V dc ON-state saturation voltage: less than 1 V @ 10 mA; less than 1.5 V @ 150 mA MACN-1: (2) Open collector NPN transistor outputs MACP-1: (2) Open collector PNP transistor outputs; transistor rated 30 V dc max. 150 mA max, short circuit protected; may be configured as a second data analysis output, a system alarm output, or a scan trigger output for a parallel array OFF-state leakage current: less than 10 µA @ 30 V dc ON-state saturation voltage: less than 1 V @ 10 mA; less than 1.5 V @ 150 mA MACV-1/MACI-1: Alarm - Open collector NPN transistor rated 30 V dc max. 150 mA max, short circuit protected; may be configured as a data analysis output, a system alarm output, or a scan trigger output for a parallel array OFF-state leakage current: less than 10 µA @ 30 V dc ON-state saturation voltage: less than 1 V @ 10 mA; less than 1.5 V @ 150 mA MAC16P-1: Sixteen open collector PNP transistor outputs MAC16N-1: Sixteen open collector NPN transistor outputs 30 V dc max, 150 mA max., short circuit protected OFF-state leakage current: less than 10 µA ON-state saturation voltage: less than 1 V @ 10 mA; less than 1.9 V @ 150 mA
Serial Data Outputs	RS-232, ASCII or binary data format Baud Rate: 9600, 19.2K, or 38.4K, 8 data bits, 1 start bit, 1 stop bit, even parity Clear data may be suppressed Header string may be suppressed in binary format MAC-1: Up to 15 controllers may be given unique address for RS-485 party line
Analog Outputs	MACV-1: 0-10 Volts sourcing adjustable Null and Span (20 mA current limit) MACI-1: 4-20 mA current sinking adjustable Null and Span (16 to 30 V input) Resolution: Span/(Number of sensor channels) Linearity: 0.1% of Full Scale Temperature variation: 0.01% of Full Scale/° C
Controller Programming	All models: Via RS-232 PC-compatible computer running Windows XP, 2000, Vista or Windows 7 and using Banner supplied software
Sensor Scan Time	All models: 55 microseconds per beam plus processing time The processing time is dependent on the scan analysis and the number of active outputs1 This timing assumes a straight scan, continuous, and TBB mode MAC-1, MACN-1 & MACP-1: 1 millisecond processing time MACV-1 & MACI-1: 1.5 milliseconds processing time MAC16N-1 & MAC16P-1: 2.3 to 7 milliseconds processing time
System Response Time	Outputs are not active for 5 seconds after system power up. Maximum response time for the system is two sensor scan cycles. A scan cycle includes a sensor scan plus any serial data transmission. Serial transmission (if activated) follows every sensor scan.
Status Indicators	The following status LEDs are located on the top surface of the module: MACV-1 & MACI-1: V OUT (Red) - (also called I OUT) Indicates that the analog outputs are active MAC-1, MACN-1 & MACP-1: OUT 1 (Red) - Indicates that output 1 is energized MAC16N-1 & MAC16P-1: OUT (Red) - Indicates that at least one output is active ALARM (Red) - Indicates that Output 2 is active/MAC16N-1 & MAC16P-1: Indicates output 16 is active GATE (Red) - Indicates voltage is applied to Trigger (Gate) input ALIGN (Green) - Indicates sensor aligned (excess gain > 1x) DIAG1 (Green) - Indicates power is applied to the module DIAG2 (Red) - Indicates receiver failure DIAG3 (Red) - Indicates emitter failure

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

MINI-ARRAY® Controller Specifications

Construction	Polycarbonate	
Environmental Rating	NEMA 1; IP20	
Operating Conditions	Temperature: -20° to +70° C	Relative humidity: 95% (non-condensing)
Certifications		
Hookup Diagram	MAC-1: MI27 (p. 995) MACV-1/MACI-1: MI29 (p. 996)	MACN-1/MACP-1: MI28 (p. 995) MAC16N-1/MAC16P-1: MI31 (p. 996)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



High-Resolution MINI-ARRAY®

High-Resolution Measuring Light Screens

The MINI-ARRAY® excels at high-speed, precise monitoring and inspection applications, including on-the-fly sizing, profiling, precision edge guiding, center guiding and hole detection.

- Offers programmable controller with a selection of measurement modes, scan modes and output configurations
- 120 sensing beams per foot provides reliable detection of objects as small as 2.5 mm
- Features a 1.8 m range and easy alignment
- Advanced software GUI
- Highly visible indicators for status monitoring
- Cordsets and brackets see page 394

High-Resolution MINI-ARRAY®–2.5 mm Beam Spacing

Housing Length (L)	Array Length	Total Beams	Connection	Range	Minimum Object Size	Models* Emitters	Models* Receivers
236 mm	163 mm	64	5-pin Mini QD	0.4 - 1.8 m	2.5 mm	MAHE6A	MAHR6A
399 mm	325 mm	128				MAHE13A	MAHR13A
561 mm	488 mm	192				MAHE19A	MAHR19A
724 mm	650 mm	256				MAHE26A	MAHR26A
887 mm	813 mm	320				MAHE32A	MAHR32A
1049 mm	975 mm	384				MAHE38A	MAHR38A
1215 mm	1138 mm	448				MAHE45A	MAHR45A
1377 mm	1300 mm	512				MAHE51A	MAHR51A
1540 mm	1463 mm	576				MAHE58A	MAHR58A
1703 mm	1626 mm	640				MAHE64A	MAHR64A
1865 mm	1788 mm	704				MAHE70A	MAHR70A
2028 mm	1951 mm	768				MAHE77A	MAHR77A

For more specifications see page 395.

QD models: A model with a QD requires a mating cordset (see page 394).

* "E" and "R" in model numbers denotes "Emitter" and "Receiver" respectively. Sold separately.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

High-Resolution MINI-ARRAY® Controllers†, 16-30 V DC

Inputs	Solid-State Discrete Outputs	Analog Outputs	Serial Output	Controller Models
1 Sensor pair & Trigger (Gate)	2 PNP	(2) 0-10 V Sourcing	RS-232 & RS-485	MAHCVP-1
	2 NPN	(2) 0-10 V Sourcing		MAHCVN-1
	2 PNP	(2) 4-20 mA Sinking		MAHCIP-1
	2 NPN	(2) 4-20 mA Sinking		MAHCIN-1

† One controller and an emitter/receiver pair (of matching length) required per system.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Mini QD (Shielded with Twisted Pair)

See page 930

Length	Threaded 5-Pin Straight
4.57 m	QDC-515C
7.62 m	QDC-525C
15.2 m	QDC-550C
22.9 m	MAQDC-575C
30.5 m	MAQDC-5100C
38.1 m	MAQDC-5125C
45.7 m	MAQDC-5150C



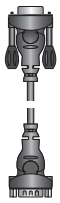


Additional cordset information available. See page 904.

DB9 Communication

See page 932

Length	9-Pin Straight
2.00 m	MASC



Brackets

MINI-ARRAY®

See page 854 | See page 878

DIN-35-.. | MSMB-3







Additional bracket information available. See page 846.

Other Accessories

Stands	Enclosures	Lens Shields
See page 952	See page 960	See page 962





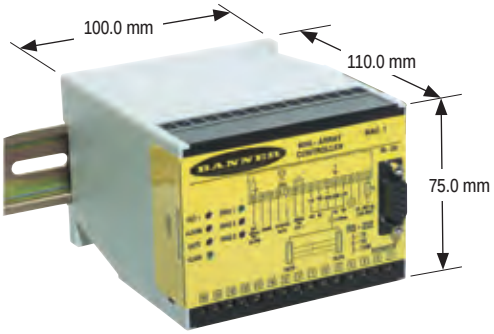




MINI-ARRAY Sensors

W = 38.1 mm D = 38.1 mm

L = Length (see model chart page 392)



MINI-ARRAY Controller

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

High-Resolution MINI-ARRAY® Emitter/Receiver Specifications

Emitter/Receiver Range	380 mm to 1.8 m
Minimum Object Sensitivity	2.5 mm
Sensor Scan Time	1.8 to 58.4 milliseconds, depending on scanning method and sensor length plus 1 millisecond post processing time for controller
Power Requirements	12 V dc ±2%, supplied by controller
Connections	Sensors connect to controller using two 5-conductor quick-disconnect cordset (one each for emitter and receiver), ordered separately. Use only Banner cordset, which incorporate a "twisted pair" for noise immunity. Cordsets measure 8.1 mm in diameter and are shielded and PVC-jacketed. Conductors are 20 gauge (0.9 mm). Emitter and receiver cordset may not exceed 75 m long, each. See page 394.
Status Indicators	Emitter: Red LED lights to indicate proper emitter operation Receiver: Green indicates sensors aligned Yellow indicates marginal alignment of one or more beams Red indicates sensors misaligned or one or more beam(s) blocked
Construction	Aluminum, with black anodized finish; acrylic lens cover
Environmental Rating	NEMA 4, 13; IP65
Operating Conditions	Temperature: 0° to +50° C Relative humidity: 95% at 50° C (non-condensing)
Certifications	CE

High-Resolution MINI-ARRAY® Controller Specifications

Power Requirements	16 to 30 V dc @ 1.0 A (typical: 0.5 A @ 16 V dc)
Inputs	Sensor input: Emitter and receiver wire in parallel to five terminals Trigger (Gate) input: Optically isolated, requires 10 to 30 V dc (7.5 kΩ impedance) for gate signal Remote alignment input: Optically isolated, requires 10 to 30 V dc (7.5 kΩ impedance) for alignment sequence signal
Discrete (Switched) Outputs	NPN outputs: Open collector NPN transistor rated at 30 V dc max., 150 mA max. PNP outputs: Open collector PNP transistor rated at 30 V dc max., 150 mA max. All discrete outputs: OFF-state leakage current: less than 10 µA @ 30 V dc ON-state saturation voltage: less than 1 V @ 10 mA; less than 1.5 V @ 150 mA
Serial Data Outputs	RS-232 or RS-485 interface. (Up to 15 control modules may be given unique addresses on one RS-485 party line.) ASCII or binary data format 9600, 19.2K or 39.4K baud rate 8 data bits, stop bit, and even, odd or no parity
Analog Outputs	Voltage-sourcing outputs: 0 to 10 V dc (25 mA current limit) Current-sinking outputs: 4 to 20 mA (16 to 30 V dc input) Resolution: Span / Number of sensing channels Linearity: 0.1% of full scale Temperature variation: 0.01% of full scale per ° C
Output Configuration	MAHCVP-1: Two PNP discrete (switched), two 0-10 V voltage sourcing MAHCVN-1: Two NPN discrete (switched), two 0-10 V voltage sourcing MAHCIP-1: Two PNP discrete (switched), two 4-20 mA current sinking MAHCIN-1: Two NPN discrete (switched), two 4-20 mA current sinking
System Programming	Via RS-232 interface to PC-compatible computer running Windows® 95, 98, NT, ME, XP or 2000 and using software supplied with each control module
Status Indicators	Output 1 (Red): Lights to indicate Discrete Output #1 is active Alarm (Red): Lights to indicate Discrete Output #2 is active Gate (Red): Lights to indicate Trigger (Gate) is active Align (Green): Lights to indicate emitter and receiver are aligned Diagnostics indicator: (Key on controller side label) Identifies System errors and status
Construction	Polycarbonate housing; mounts to flat surface or directly onto 35-mm DIN rail
Environmental Rating	NEMA 1; IP20
Operating Conditions	Temperature: 0° to +50° C Relative humidity: 95% @ 50° C (non-condensing)
Certifications	CE c UL US
Hookup Diagrams	0-10 V sourcing: MI25 (p. 995) 4 to 20 mA voltage: MI26 (p. 995)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Special Purpose

Special purpose sensors provide a variety of choices for challenging environments and applications where standard sensors don't make the cut. From hazardous areas and heavy duty washdown environments to sensing specific colors and temperatures for maximum accuracy, special purpose sensors meet specific application needs.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SPECIAL PURPOSE

BARCODE READERS page 398

REGISTRATION, COLOR & LUMINESCENCE page 414

STAINLESS STEEL page 428

CLEAR OBJECT page 454

TEMPERATURE page 468

HAZARDOUS AREA page 474

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Barcode Readers

Able to decode over a dozen commonly used 1D and 2D barcode symbols, provides fast read rates, wide depth of field, and high resolution.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Max Sensing Range	Dimensions H x W x D	Housing Material	Power Supply
	iVu BCR Easy to set up, powerful, affordable inspection solution solves a wide variety of simple and complex applications. page 400	Varies by selected lens	95.3 x 81.2 x 53.2 mm	Black Valox™	10-30 V dc
	P4 BCR Find and decode 2D and 1D linear bar codes. page 408	Varies by selected lens	124.5 x 66.8 x 34.3 mm	Black anodized aluminum	10-30 V dc
	Laser Barcode Scanner Can detect over a dozen of the most commonly used linear barcode symbols with a fast reading rate. page 410	600 mm	68 x 83.4 x 32.8 mm	Black anodized aluminum	10-30 V dc

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



iVu BCR
Bar Code Reader (BCR)

Bar code readers solve a variety of linear and 2D bar code applications.

- Powerful, affordable inspection solution solves a wide variety of simple and complex applications
- First-time users can have it up and running in minutes
- Optional remote touch screen for programming
- Ability to change parameters on the fly
- Cordsets and brackets see page 403

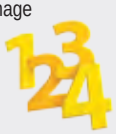
No PC required to configure, change or monitor

- Built-in or remote touch screen
- Self-contained sensor with easy configuration and convenient monitoring right on the sensor



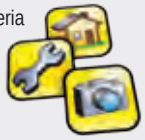
Installation and configuration in four easy steps

1. Install and connect the sensor
2. Select the sensor or bar code type, depending on model
3. Acquire a good image
4. Set inspection parameters



Intuitive operation with menu driven tools to guide you through setup

- Define region of interest
- Adjust intensity/contrast
- Define the pass criteria



iVu BCR Applications

Bar Code Type

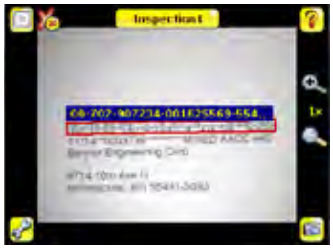


Reading a 1D barcode

Screen Interface Pass



Screen Interface Fail





Reading a 2D barcode





Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



iVu Plus BCR
Bar Code Reader (BCR)

Bar code readers solve a variety of linear and 2D bar code applications.

- Ethernet communication available
- Ability to change parameters on the fly
- Provides the capability of storing and controlling up to 30 inspections for fast product change over
- All-inclusive image sensor with lens, light, IO and touch screen programming
- Cordsets and brackets see page 403

Additional iVu Plus BCR Functions



Store up to 30 inspections for fast product turnover

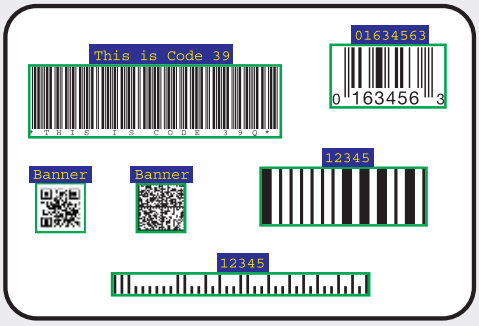
Ethernet provides simplified communications and enhanced control of the sensor

Conducts high-performance reading of industry standard barcodes.

Reads up to ten 1D and 2D bar codes at one time.

2D Bar Codes
Data Matrix (ECC200)
QR & Micro QR

1D Bar Codes
Code 128
Code 39
Codabar
Interleaved 2 of 5
EAN-13 (UPC-A)
EAN-8
UPC-E
IMB
Postnet
Pharmacode



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Choosing a BCR model

Example Model Number IVUPTBR04

Platform — Step One

IVUP

- IVU = Reads 1D or 2D barcodes
- IVUP = Reads 1D or 2D barcode, stores up to 30 inspections and has Ethernet connection

Model — Step Two

TB

- TB  Integrated touch screen
- RB*  Remote touch screen (sold separately see page 405)

I/O — Step Three

- N = NPN output (current sinking)
- P = PNP output (current sourcing)
- Blank = Plus models are NPN/PNP selectable

Ring Light — Step Four

R

R = Red	I = Infrared
B = Blue	6 = UV365 nm
G = Green	9 = UV395 nm
W = White	XC = C-mount†
X = No Ring Light	

Lens — Step Five

04

- 04 = 4.3 mm
- 06 = 6 mm
- 08 = 8 mm
- 12 = 12 mm
- 16 = 16 mm
- 25 = 25 mm
- Blank = No lens (only C-mount)

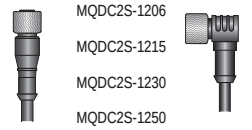
For more specifications see page 404.
Display and cordsets ordered separately.
* Remote display is required for set up and viewing of sensors with a remote touch screen.
† Requires C-mount lens. See page 407.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Euro QD

See page 922

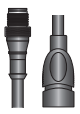
Length	Threaded 12-Pin (Open Shield)	
	Straight	Right-Angle
1.83 m	MQDC2S-1206	MQDC2S-1206RA
4.57 m	MQDC2S-1215	MQDC2S-1215RA
9.14 m	MQDC2S-1230	MQDC2S-1230RA
15.2 m	MQDC2S-1250	MQDC2S-1250RA



USB (BCR models)

See page 919

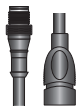
Length	8-Pin Euro QD to USB		4-Pin Pico QD to USB
	Used with Integrated Touch Screen Models		Remote Touch Screen
	Straight	Right-Angle	Straight
0.15 m	MQDEC-8005-USB	MQDEC-8005RA-USB	PSG-4M-4005-USB
0.30 m	MQDEC-801-USB	MQDEC-801RA-USB	PSG-4M-401-USB
0.90 m	MQDEC-803-USB	MQDEC-803RA-USB	PSG-4M-403-USB
3.00 m	MQDEC-810-USB	MQDEC-810RA-USB	PSG-4M-410-USB



USB (BCR Plus models)

See page 907

Length	4-Pin Pico QD to USB
	Straight
0.15 m	PSG-4M-4005-USB
0.30 m	PSG-4M-401-USB
0.90 m	PSG-4M-403-USB
3.00 m	PSG-4M-410-USB



Ethernet Communication (Plus only)

See page 933

Length	RJ45 to 4-Pin Pico QD
	Straight
2.00 m	IVUC-E-406
5.00 m	IVUC-E-415
9.00 m	IVUC-E-430
16.00 m	IVUC-E-450
23.00m	IVUC-E-475



iVu BCR &iVu Plus BCR

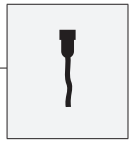
See page 880	See page 880	See page 879	See page 880
SMBIVURAL*	SMBIVURAR*	SMBIVUB	SMBIVUU



* For orientation see page 880.

Power

Select one



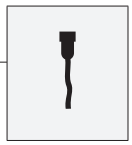
USB

Select one



Ethernet

Plus only



Mounting

Select one



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

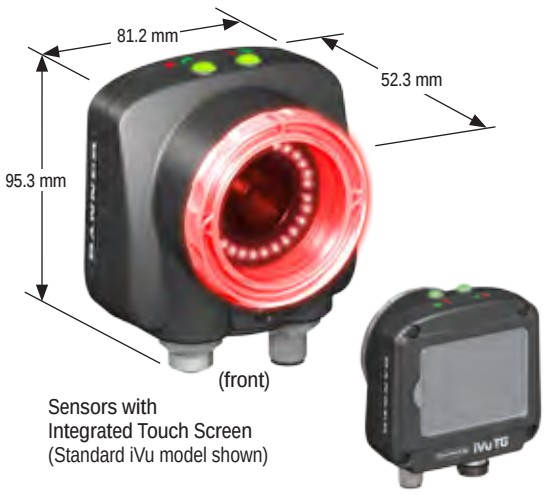
iVu BCR & iVu Plus BCR Specifications

General	
Supply Voltage	10-30 V dc
Demo Mode	Full tool functionality on canned images
Sensor Lock	Optional password protection
Integrated Ring Light	Red, IR, Green, Blue, White or no integrated ring light
Imager	1/3 inch CMOS 752 x 480 pixels; adjustable Field-of-View (FOV)
Lens Mount	M12 X 1 mm thread(c-mount lens); microvideo lens 4.3, 6, 8, 12, 16, 25 mm
Output Rating	150 mA
Exposure Time	0.1 milliseconds to 1.049 seconds
Construction	Black Valox™ sensor housing; acrylic window iVu Plus Integrated: Die cast zinc and Black Valox™
External Strobe Output	+ 5 V dc
Environmental Rating	IP67
Model Specific	
Power Connection	iVu BCR (integrated and remote touch screen): 12-pin Euro-style (M12) male connector iVu Plus BCR (integrated and remote touch screen): 12-pin Euro-style (M12) male connector Accessory cordset required for operation; QD cordsets are ordered separately. See page 403.
Supply Current	iVu BCR: 800 mA max. (exclusive of I/O load) iVu Plus BCR: 850 mA max. (exclusive of I/O load)
USB 2.0 Host	iVu BCR (integrated touch screen): 8-pin Euro-style (M12) female connector iVu BCR (remote touch screen): 4-pin Pico-style (M8) female connector iVu Plus BCR (integrated and remote touch screen): 4-pin Pico-style (M8) female connector Optional USB cordset required for operation of USB Thumb Drive. QD cordsets are ordered separately. See page 406.
Ethernet Connection	iVu Plus BCR: 4-pin Pico-style (M8) male connector. Ethernet cordsets are ordered separately. See page 406
Output Configuration	iVu BCR: NPN or PNP determined by model iVu Plus BCR: NPN or PNP, software selectable
Display	Integrated touch screen: 68.5 mm (2.7") LCD Color Integrated Display 320 x 240 pixels Remote touch screen: See RD35 Remote Display specifications (page 405).
Acquisition	iVu BCR (integrated touch screen): 50 fps (frames per second) max. iVu BCR (remote touch screen): 50 fps (frames per second) max. iVu Plus BCR (integrated and remote touch screen): 100 fps (frames per second) max.
Operating conditions	Stable Ambient Temperature: BCR: 0° to + 50° C iVu Plus BCR (integrated touch screen): 0° to +50º C iVu Plus BCR (remote touch screen): 0° to +40º C
Remote Display connection (Remote Touch Screen Models Only)	8-pin Euro-style (M12) female connector Accessory cordset required for remote display; QD cordsets are ordered separately. See page 406.
Certifications	CE NOTE: iVu Plus remote must use Euro QD power cordset for CE compliance. See page 406.
Hookup Diagrams	iVu Plus: NPN: VS01 (p. 998) PNP: VS02 (p. 998) iVu (Integrated Touch Screen): NPN: VS05 (p. 999) PNP: VS06 (p. 999) All others: NPN: VS03 (p. 998) PNP: VS04 (p. 998)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

iVu Remote Display Specifications

Screen Size	3.5" diagonal
LCD Aspect Ratio	4:3
Display Resolution	320 x 240 RGB
Viewing Angle	60 degrees left, and 60 degrees right, 50 degrees up, and 55 degrees down
Housing Material	Zinc Zamac #3
Bracket Material	Delrin
Stylus	Delrin
Display Weight	4.8 oz
Bracket & Stylus Weight	1.1 oz
Connection	Molex HandyLink connector
Operating Temperature	0° to + 50° C



Sensors with
Integrated Touch Screen
(Standard iVu model shown)

RD35 Remote Touch Screen
(sold separately)



Sensors with
Remote Touch Screen



RDM35

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



RDM35
Machine-mountable Remote Display
Used for- programming & monitoring

Remote Display Touch Screen

Description	Model
3.5" diagonal remote touch screen - Handheld	RD35
3.5" diagonal remote touch screen - Machine-mountable	RDM35

RDM35 Accessory Kits

Description	Straight	Right-Angle
1 m cordset, bracket/docking station, stylus and hardware	IVURDM-QDK-803	IVURDM-QDK-803RA
2 m cordset, bracket/docking station, stylus and hardware	IVURDM-QDK-806	IVURDM-QDK-806RA
5 m cordset, bracket/docking station, stylus and hardware	IVURDM-QDK-815	IVURDM-QDK-815RA
9 m cordset, bracket/docking station, stylus and hardware	IVURDM-QDK-830	IVURDM-QDK-830RA
16 m cordset, bracket/docking station, stylus and hardware	IVURDM-QDK-850	IVURDM-QDK-850RA



RD35
Handheld Remote Display
Used for- programming

RD35 Accessory Kits

Description	Straight	Right-Angle
1 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-803	IVURD-MXK-803RA
2 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-806	IVURD-MXK-806RA
5 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-815	IVURD-MXK-815RA
9 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-830	IVURD-MXK-830RA
16 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-850	IVURD-MXK-850RA

Cordsets for remote display

Hand Held Remote Display

See page 920

Length	8-Pin Euro QD to Molex		
	Straight		Right-Angle
0.91 m	IVURD-MX-803		IVURD-MX-803RA
1.83 m	IVURD-MX-806		IVURD-MX-806RA
4.57 m	IVURD-MX-815		IVURD-MX-815RA
9.14 m	IVURD-MX-830		IVURD-MX-830RA
15.2 m	IVURD-MX-850		IVURD-MX-850RA

Additional cordset information available. See page 904.

Machine Mountable Remote Display

See page 920

Length	8-Pin Euro QD		
	Straight		Right-Angle
0.91 m	IVURDM-QD-803		IVURDM-QD-803RA
1.83 m	IVURDM-QD-806		IVURDM-QD-806RA
4.57 m	IVURDM-QD-815		IVURDM-QD-815RA
9.14 m	IVURDM-QD-830		IVURDM-QD-830RA
15.2 m	IVURDM-QD-850		IVURDM-QD-850RA

Brackets for remote display

Remote Display

SMBRD35	SMBKS	SMBRDM35
		

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Lenses

iVu & iVu Plus



4.3 mm Lens	LMF04
6 mm Lens	LMF06
8 mm Lens	LMF08
12 mm Lens	LMF12
16 mm Lens	LMF16
25 mm Lens	LMF25*

* 25 mm filter holder is purchased separately.

Filter Kits†

iVu & iVu Plus



Red	FLTMR
Dark Red	FLTMRDR
Blue	FLTMB
Green	FLTMG
Infrared	FLTMI*

* Infrared pass filters are preinstalled on infrared ring light models.
† Filter kits include 1 color and two sizes of filter holders.

Replacement Windows

iVu & iVu Plus

Focusing ring with optically clear glass	IVUW-G
Focusing ring with plastic window	IVUW
Replacement cover for touch screen	IVUBC

Sensor Interface Module

See page 970



- Sensor interface module for simplified wiring of iVu sensors in an electrical box

USB Drive

2 Gb USB Drive



IVU-USBFD2

Stylus

Stylus



STYLUS-1 (Qty 1)

STYLUS-10 (Qty 10)

C-mount Lens Covers*

iVu & iVu Plus



Lens cover 50 mm - plastic window — IVUSLC50-P



Lens cover 75 mm - plastic window — IVUSLC75-P

Accessories for C-Mount Lenses*

	Description	Format Size	Model	Used With
	Extension Kit (0.5, 1.0 , 5.0, 10, 20 and 40 mm)	—	LEK	All Lenses
	Extension Kit (0.25 and 0.5 mm)		LEKS	
	Lens Extender (increases focal length 2X)		LCF2X	
	UV Lens Filter, Clear Glass	2/3"	FLTUV	Tamron Megapixel Lenses

Description	Model	Used With
Polarizing filter 25.5 mm	FLTPR032-25.5	iVu & *Presence*PLUS
Polarizing filter 27 mm	FLTPR032-27	
Polarizing filter 30.5 mm	FLTPR032-30.5	

C-Mount Color Filters*

Color	Description	Plastic Models	Glass Models
Infrared	High-pass filter blocks visible light and passes infrared light. Included with all Banner Infrared light sources.	FLTI (≥ 760 nm)	FLTI850 (810-990 nm)
Blue	Band-pass filter improves quality by helping to reduce ambient light; it passes blue and infrared light.	FLTB (400-525 nm)	FLTB470 (435-490 nm)
Green	Band-pass filter improves quality by helping to reduce ambient light; it passes green and infrared light.	FLTG (400-575 nm)	FLTG525 (495-565 nm)
Red	High-pass filter improves quality by helping to reduce ambient light; it passes red and infrared light.	FLTR (≥ 600 nm)	FLTR635 (600-660 nm)
Dark Red	High-pass filter improves quality by helping to reduce ambient light; it passes red and infrared light.	—	FLTR660 (650-680 nm)

* For C-Mount lenses see page 511

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



P4 BCR
Bar Code Reader

P4 Bar Code Readers find and decode 2D and 1D linear bar codes.

- Industry-standard bar code metrics and grading
- Economical one-piece solution
- Available in high-resolution models
- High performance vision inspections in self-contained in-line or right-angle housing styles that fit in the palm of your hand
- Provides direct connectivity to EtherNet/IP and Modbus/TCP industrial networks
- For vision lighting products with UV: (Ring lights, area lights, linear array lights available with UV LEDs)

Choosing a P4 BCR Example Model Number P4BCR-OC

	Resolution	Housing
P4BC		R
P4BC = BCR - Bar Code Reader	Blank = 640 x 480 1.3 = 1280 x 1024	R = Right-Angle I = In-Line

For more specifications see page 411.
* To add the OCR/OCV premium tool add suffix -OC to the model number. (example P4BCR-OC)

Conducts high-performance reading of industry standard barcodes.

2D Bar Codes
Data Matrix (ECC200)
QR & Micro QR

1D Bar Codes

Code 128	EAN-13 (UPC-A)	Postnet
Code 39	EAN-8	Pharmacode
Codabar	UPC-E	
Interleaved 2 of 5	IMB	

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Power

See page 924

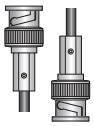
Length	12-Pin QD Straight
1.83 m	P4C06
7.01 m	P4C23
9.75 m	P4C32
15.2 m	P4C50
22.9 m	P4C75
34.0 m	P4C110



Video

See page 930

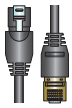
Length	BNC to BNC Straight
1.83 m	BNC06
5.57 m	BNC15
9.14 m	BNC30
14.6 m	BNC48



Ethernet Communication

See page 933

Length	RJ45 to RJ45 Shielded	Shielded Crossover
2.13 m	STP07	STPX07
7.62 m	STP25	STPX25
15.2 m	STP50	STPX50
22.9 m	STP75	STPX75





Additional cordset information available.
See page 904.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Right-Angle Sensor Models
(shown with lens—sold separately)



In-line Sensor Models
(shown with lens—sold separately)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

*Presence*PLUS® *P4* Dedicated-Function Specifications

Supply Voltage and Current	10 to 30 V dc (24 V dc ±10% if the sensor powers a light source) Less than 650 mA (exclusive of lights and I/O load) Less than 550 mA (exclusive of lights and I/O load)
Memory	Storage: BCR—8 MB Inspection (jobs): 999 max. BCR 1.3—32 MB Inspection (jobs): 999 max.
Input/Output Configuration	NPN (sinking) or PNP (sourcing) software selectable
Output Rating	150 mA max. each output OFF-state leakage current: less than 100 µA ON-state saturation voltage: NPN—less than 1 V @ 150 mA max. PNP—greater than V+ -2 V
Bicolor Status Indicators	PASS/FAIL: Green ON steady—PASS Red ON steady—FAIL POWER/ERROR: Green ON steady—POWER Red ON steady—ERROR READY/TRIGGER: Green ON steady—READY Yellow ON steady—TRIGGER
Display Options	PC or NTSC video (uses 9 m max. BNC cordset)
Discrete I/O	1 Trigger IN 1 Strobe OUT 4 Programmable I/O 1 Product Change IN 1 Remote TEACH IN
Communications	RJ-45 10/100 Ethernet connection for running *Presence*PLUS *P4* software and/or output inspection results RS-232 connection for output of inspection results
Imager Resolution	BCR: 640 x 480 pixels BCR 1.3: 1280 x 1024 pixels
Pixel Size	BCR: 7.4 x 7.4 µm BCR 1.3: 6.7 x 6.7 µm
Imager Size	BCR: 4.8 x 3.6 mm, 6 mm diagonal (1/3 inch CCD) BCR 1.3: 8.6 x 6.9 mm, 11 mm diagonal (2/3 inch CMOS)
Levels of Gray	256 Gray Scale
Exposure Time	BCR: 0.1 to 2830 milliseconds BCR 1.3: 0.1 to 1670 milliseconds
Full Image Acquisition	BCR: 48 frames per second max.* BCR 1.3: 27 frames per second max.*
Lens Mount	Standard C-mount (1 inch—32 UN)
Construction	Black anodized aluminum housing, glass lens
Weight	In-line: 293 g Right-angle: 385 g
Environmental Rating	IEC IP20; NEMA 1
Operating Temperature	Stable ambient temperature: 0° to +50° C Stable ambient lighting: No large, quick changes in light level; no direct or reflected sunlight Relative humidity: 90% (non-condensing)
Certifications	CE
Hookup Diagrams	NPN: VS09 (p. 1000) NPN: VS10 (p. 1000)

* A reduced Field-of-View (FOV) dramatically increases acquisition rates.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Barcode Scanner

Laser Barcode Scanner

The TCNM can detect over a dozen of the most commonly used linear barcode symbols with a fast reading rate.

- Advanced algorithm and multiple scans can reconstruct damaged codes
- Has a barcode reading range of up to 600 mm
- Rugged, IP65-rated industrial housing
- SMART TEACH push button programming
- 500 to 1000 scans per second



Correct Label Verification
Lot control and traceability for a pharmaceutical manufacturer

Barcode Scanner, 10-30 V DC

Visible Red Laser

Sensing Mode	Range	Resolution	Laser Output	Models	
Class 2 laser	40-300 mm	Standard resolution: 8-20 mils	Single line scan	TCNM-AD-1200	NEW
	50-310 mm	High performance: 6-20 mils		TCNM-AD-1204	NEW
	30-90 mm	High resolution: 6-12 mils		TCNM-AD-2200	NEW
	45-100 mm	High resolution, High performance 5-8 mils		TCNM-AD-2204	NEW
Class 2 laser	40-300 mm	Standard resolution: 8-20 mils	Ten line raster scan	TCNM-AD-1210	NEW
	50-310 mm	High performance: 6-20 mils		TCNM-AD-1214	NEW
	30-90 mm	High resolution: 6-12 mils		TCNM-AD-2210	NEW
	45-100 mm	High resolution, High performance 5-8 mils		TCNM-AD-2214	NEW
Class 2 laser	75-340 mm	Short range: 8-14 mils	Single line scan	TCNM-EX-0200	NEW
	100-440 mm	Medium range: 10-20 mils		TCNM-EX-1200	NEW
	190-600 mm	Long range: 14-20 mils		TCNM-EX-2200	NEW
Class 2 laser	75-340 mm	Short range: 8-14 mils	Ten line raster scan	TCNM-EX-0210	NEW
	100-440 mm	Medium range: 10-20 mils		TCNM-EX-1210	NEW
	190-600 mm	Long range: 14-20 mils		TCNM-EX-2210	NEW

Conducts high-performance reading of industry standard barcodes.

- Code 128
- Code 39
- Codabar
- Interleaved 2 of 5
- EAN-13 (UPC-A)
- EAN-8
- UPC-E
- IMB
- Postnet
- Pharmacode
- GS1 DataBar
- GS1 DataBar Expanded
- GS1 DataBar Limited

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Accessories



TCNM-AD-CAB
25-pin Connector



TCNM-ACBB1
Connection box



Barcode Scanner Specifications

Supply Voltage and Current	10 to 30 V dc Maximum 0.5 to 0.17 A; 5 W
Input/Output Configuration	Input 1 (External Trigger), Input 2: Optocoupled, polarity insensitive
Reading Features	Scan Rate (software): (600 to 1000 scans/sec) Aperture Angle: 50°
Construction	Black anodized aluminum housing, glass lens
Weight	In-line: 293 g Right-angle: 385 g
Environmental Rating	IP65
Operating Temperature	Operating temperature: 0° to +45° C Storage temperature: -20° to +70° C Relative humidity: 90% (non-condensing)
Hookup Diagrams	See data sheet for more information

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Registration, Color & Luminescence

Registration mark sensors reliably detect registration marks in low contrast applications. True color sensors analyze colors and reliably detect registration marks in extremely low contrast applications. These sensors can detect changes in color and intensity of targets of the same color. Luminescence sensors detect luminescent marks even on irregular or reflective backgrounds.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Max Sensing Range	Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	R58 Registration mark sensors that detect contrasts as low as 2% over a wide range of colors. page 416	Convergent: 10 mm	62.1 x 30 x 83.3 mm	IEC IP67	Zinc alloy	10 to 30 V dc
	R55 Delivers outstanding color contrast sensitivity and features an innovative TEACH function for setting the sensing threshold. page 422	Varies depending on fiber	85.4 x 30 x 25 mm	IEC IP67; NEMA 6	ABS/polycarbonate blend	10 to 30 V dc
	QC50/QCX50 Accurately analyze and compare colors or varying intensities of color. page 424	Diffuse: 20 mm	50 x 25 x 50 mm	IEC IP62	ABS	10 to 30 V dc
	QL56 Detects luminescent marks, even on luminescent backgrounds, and reflective surfaces such as ceramic, metal or mirrored glass. page 426	Diffuse: 50 mm	96.5 x 31.9 x 65.5 mm	IP67	Aluminum	15 to 30 V dc

OTHER AVAILABLE MODELS



iVu 490

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



R58 Series
Registration Mark Sensors

Three color LEDs provide outstanding color contrast sensitivity in low-contrast or high-gloss applications. Registration mark sensors detect contrasts as low as 2% over a wide range of colors.

- 10,000 actuations per second and 15 microsecond repeatability
- Rugged mechanical housing rated to IP67
- Fast warm-up and excellent temperature stability
- Models with OFF-delay for applications requiring a delay for reliable detection
- Highly visible indicators for status monitoring



R58E Expert page 418

The R58E sensors offer maintenance-free, solid-state reliability for color contrast applications. With a fast, 50-microsecond sensing response time, the R58E provides excellent registration repeatability, even in speedy applications.



R58B *Expert*™ page 419

The R58B automatically selects the correct LED to optimize contrast for each application.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



R58A page 420

The R58A provides outstanding color contrast sensitivity in low-contrast or high-gloss applications and detects contrasts as low as 2% over a wide range of colors.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



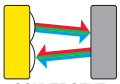
R58E *Expert*™
Registration Mark Sensors

The R58E sensors offer maintenance-free, solid-state reliability for color contrast applications. With a fast, 50-microsecond sensing response time, the R58E provides excellent registration repeatability, even in speedy applications.

- Bipolar outputs
- 10,000 actuations per second and 15 microsecond repeatability
- Rugged mechanical housing rated to IP67
- Fast warm-up and excellent temperature stability
- Highly visible indicators for status monitoring
- Cordsets and brackets see page 420

R58E *Expert*™, 10-30 V DC

Visible Red, Green or Blue LED, depending on registration mark

Sensing Mode/LED	Focus	Connection	Output Type	Models: Parallel	Models: Perpendicular
 CONVERGENT	10 mm	2 m	Bipolar NPN/PNP	R58ECRGB1	R58ECRGB2
		5-pin Euro Pigtail QD		R58ECRGB1Q	R58ECRGB2Q

For more specifications see page 421.

Connection options: A model with a QD requires a mating cordset (see page 420)

For 9 m cable, add suffix W/30 to the 2 m model number (example, R58ECRGB1 W/30).
QD models: For integral 5-pin Euro-style QD, add suffix Q8 to the 2 m model number (example R58ECRGB1Q8).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



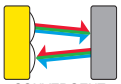
R58B *Expert*™
Registration Mark Sensors

The R58B automatically selects the correct LED to optimize contrast for each application.

- Detects contrast as low as 2% over a wide range of colors
- 10,000 actuations per second and 15 microsecond repeatability
- Rugged mechanical housing rated to IP67
- Fast warm-up and excellent temperature stability
- Highly visible indicators for status monitoring
- Cordsets and brackets see page 420

R58B *Expert*™, 10-30 V DC

Visible Red, Green or Blue LED, depending on registration mark

Sensing Mode/LED	Focus	Connection	Output Type	Models: Parallel	Models: Perpendicular
 CONVERGENT	10 mm	2 m	PNP	R58BPCRGB1	R58BPCRGB2
		5-pin Euro Pigtail QD		R58BPCRGB1Q	R58BPCRGB2Q
	10 mm	2 m	NPN	R58BNCRGB1	R58BNCRGB1
		5-pin Euro Pigtail QD		R58BNCRGB1Q	R58BNCRGB2Q

For more specifications see page 421.

Connection options: A model with a QD requires a mating cordset (see page 420)

For 9 m cable, add suffix W/30 to the 2 m model number (example, R58BPCRGB1 W/30).
QD models: For integral 5-pin Euro-style QD, add suffix Q8 to the 2 m model number (example R58BPCRGB1Q8).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



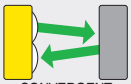
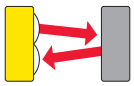
R58A
Registration Mark Sensors

The R58A provides outstanding color contrast sensitivity in low-contrast or high-gloss applications and detects contrasts as low as 2% over a wide range of colors.

- Bipolar outputs
- Provides a single emitter color of red or green, depending on model
- Rugged mechanical housing rated to IP67
- Fast warm-up and excellent temperature stability
- Highly visible indicators for status monitoring

R58A *Expert*™, 10-30 V DC

Visible Red LED Visible Green LED

Sensing Mode/LED	Focus	Connection	Output Type	OFF-Delay	Models: Parallel	Models: Perpendicular
 CONVERGENT	10 mm	2 m 4-pin Euro Pigtail QD	Bipolar NPN/ PNP	0 ms 20 ms	R58ACG1 R58ACG1Q R58ACG1D R58ACG1DQ	R58ACG2 R58ACG2Q R58ACG2D R58ACG2DQ
 CONVERGENT	10 mm	2 m 4-pin Euro Pigtail QD	Bipolar NPN/ PNP	0 ms 20 ms	R58ACR1 R58ACR1Q R58ACR1D R58ACR1DQ	R58ACR2 R58ACR2Q R58ACR2D R58ACR2DQ

For more specifications see page 421.

Connection options: A model with a QD requires a mating cordset (see page 420)

For 9 m cable, add suffix W/30 to the 2 m model number (example, R58ACG1 W/30).
QD models: For integral 4-pin Euro-style QD, add suffix Q8 to the 2 m model number (example, R58ACG1Q8).

Cordsets

Euro QD (for Q or Q8 models)

See page 908

Length	Threaded 4-Pin: Straight	Threaded 4-Pin: Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA




Additional cordset information available. See page 904.

Brackets

R58E/R58A

See page 878	See page 879	See page 878	See page 879
SMB55A	SMB55RA	SMB55F	SMB55S
			

Additional bracket information available. See page 846.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



R58 Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	R58 Expert & R58A: Bipolar: One current sourcing (PNP) and one current sinking (NPN) R58B: Single output: One current sourcing (PNP) or one current sinking (NPN)
Output Rating	R58 Expert & R58B: 100 mA max. (each output) OFF-state leakage current: NPN less than 200 µA; PNP less than 10 µA NPN saturation: less than 1.6 V @ 100 mA PNP saturation: less than 3 V @ 100 mA R58A: 150 mA max. (each output) OFF-state leakage current: less than 10 µA NPN saturation: less than 200 mV @ 10 mA and less than 1 V @ 150 mA PNP saturation: less than 1 V @ 10 mA and less than 2 V @ 150 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs
Output Response Time	50 microseconds
Delay at Power-up	100 milliseconds; outputs do not conduct during this time
Repeatability	15 microseconds
Sensing Image	Rectangular: 1.2 x 3.8 mm at 10 mm from face of lens; image oriented either parallel or perpendicular to sensor length, depending on model
Adjustments	R58 Expert & R58B: 2 push buttons and remote wire for sensor TEACH programming and configuration. See data sheet for detailed information. R58A: Light/Dark Operate (LO/DO) select switch, and 15-turn switchpoint adjustment potentiometer
Indicators	R58 Expert: 8-segment Bargraph display: Green: Power ON Yellow: Outputs ON 2-position Green: LED ON next to DO for Dark Operate LED ON next to LO for Light Operate 2-position Green: LED ON next to ON for ON-delay LED ON next to OFF for OFF-delay R58B: Green: Power ON Amber: Output active R58A: Amber: Output active Green: Switchpoint threshold adjustment indicators See data sheet for detailed information.
Construction	Zinc alloy die-cast housing with black painted finish and o-ring sealed lens port cap Lens: Acrylic Lens port cap and lens holder: ABS Sensitivity and LO/DO adjusters: Acetal QD: Anodized aluminum
Environmental Rating	IEC IP67
Connections	PVC-jacketed 4-conductor 2 m or 9 m attached cable with internal strain relief, integrated 4-pin Euro-style QD fitting or 150 mm pigtail with 4-pin Euro-style quick-disconnect. QD cordsets are ordered separately. See page 420.
Operating Conditions	Temperature: -10° to +50° C Relative humidity: 90% at 50° C (non-condensing) Storage temperature: -20° to +80° C
Shock and Vibration	All models meet IEC 68-2-6 and IEC 68-2-27 testing criteria
Certification	CE
Hookup Diagrams	DC04 (p. 974)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



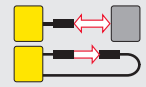
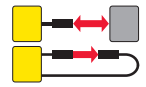
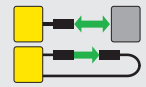
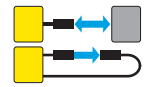
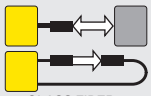
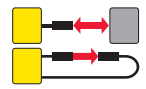
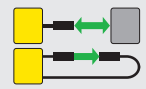
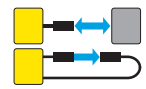
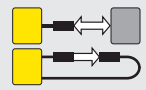
R55F
Fiber Optic Sensors

The R55F delivers outstanding color contrast sensitivity and features an innovative TEACH function for setting the sensing threshold.

- Reliably detects 16 levels of grayscale at up to 10,000 actuations per second
- Clearly displays relative received signal strength with 10-element indicator bargraph
- Economical plastic fibers for repeated flexing and glass fibers for harsh conditions
- Bipolar outputs

R55F Fiber Optic, 10-30 V DC

Visible Green LED | Visible Blue LED | Visible White LED | Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m	Bipolar NPN/PNP	R55F
		5-pin Euro QD		R55FQ
 GLASS FIBER		2 m		R55FV
		5-pin Euro QD		R55FVQ
 GLASS FIBER		2 m		R55FVG
		5-pin Euro QD		R55FVGQ
 GLASS FIBER		2 m		R55FVB
		5-pin Euro QD		R55FVBQ
 GLASS FIBER		2 m		R55FVW
		5-pin Euro QD		R55FVWQ
 PLASTIC FIBER		2 m		R55FP
		5-pin Euro QD		R55FPQ
 PLASTIC FIBER		2 m		R55FPG
		5-pin Euro QD		R55FPGQ
 PLASTIC FIBER		2 m		R55FPB
		5-pin Euro QD		R55FPBQ
 PLASTIC FIBER		2 m		R55FPW
		5-pin Euro QD		R55FPWQ

Connection options: A model with a QD requires a mating cordset (see page 423).

For 9 m cable, add suffix W/30 to the 2 m model number (example, R55F W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q or Q8 models)

See page 912

Length	Threaded 5-Pin	
	Straight	Right-Angle
1.83 m	MQDC1-506	MQDC1-506RA
4.57 m	MQD1C-515	MQDC1-515RA
9.14 m	MQD1C-530	MQDC1-530RA





Additional cordset information available. See page 904.

Brackets

R55F

See page 854	See page 855	See page 855
DIN-35...	SMBR55F01	SMBR55FRA







Additional bracket information available. See page 846.



R55F Fiber Optic Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at less than 70 mA, exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Bipolar:** One current sourcing (PNP) and one current sinking (NPN) open-collector transistor
Output Rating	150 mA max each output @ 25° C (derate ≈ 1 mA per ° C increase) **OFF-state leakage current:** less than 5 µA @ 30 V dc **ON-state saturation voltage:** PNP: less than 1 V @ 10 mA; 1.5 V @ 150 mA NPN: less than 200 mV @ 10 mA; 1 V @ 150 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs
Output Response Time	50 microseconds
Delay at Power-up	100 milliseconds; outputs do not conduct during this time
Adjustments	**Using push buttons ("+" Dynamic and "-" Static):** Manually adjust Switch Point using "+" or "-" buttons Dynamic TEACH (teach on-the-fly) sensitivity adjustment Static TEACH sensitivity adjustment Static Single-Point TEACH Light Operate/Dark Operate OFF-Delay select: 0 milliseconds, 20 milliseconds or 40 milliseconds **Using Remote TEACH input (gray wire):** Dynamic TEACH (teach on-the-fly) sensitivity adjustment Static TEACH sensitivity adjustment Static Single-Point TEACH Light Operate/Dark Operate OFF-Delay select: 0 milliseconds, 20 milliseconds or 40 milliseconds Push button lockout for security
Indicators	**10-segment light bar indicates signal strength** **Light Operate:** Green **Dark Operate:** Green **Outputs Conducting:** Yellow **OFF-Delay (Green): SETUP Mode:** OFF–no delay; Flashing–20 milliseconds delay; ON–40 milliseconds delay **RUN Mode:** OFF–no delay; ON–20 or 40 milliseconds delay
Construction	Black ABS/polycarbonate blend; nylon fiber clip mounts to standard 35 mm DIN rail. 1 stainless steel right angle bracket and 1 PBT polyester bracket for mounting to flat surfaces also included with sensor.
Environmental Rating	IEC IP67; NEMA 6
Connections	2 m or 9 m PVC-jacketed 5-conductor cable, or 5-pin Euro-style quick-disconnect (QD) fitting. QD cordsets are ordered separately. See page 423. **Fibers:** Fiber clip (no tool required)
Operating Conditions	**Temperature:** -10° to +55° C **Relative humidity:** 90% at 50° C (non-condensing)
Application Notes	• Do not mount the fiber tip directly perpendicular to shiny surfaces; position it at approximately a 15° angle in relation to the sensing target • Minimize web or product "flutter" whenever possible to maximize sensing reliability
Certifications	CE
Hookup Diagrams	DC08 (p. 975)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



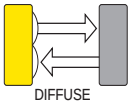
QC50/QCX50
True Color Sensors

The QC50 and QCX50 accurately analyze and compare colors or varying intensities of color.

- Offers easy-to-set push-button programming options for up to three colors
- Compact, self-contained design
- Offers fast response time of 335 microseconds, depending on model
- Three independently programmable PNP or NPN outputs
- Highly visible indicators for status monitoring

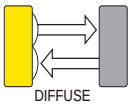
QC50, 10-30 V DC

⇨ Visible White LED

Sensing Mode	Range	Connection	Response Time	Output Type	Models
 DIFFUSE	20 mm typical; varies according to sensor configuration	8-pin Euro QD	335 µs	NPN, 3 channels	QC50A3N6XDWQ
				PNP, 3 channels	QC50A3P6XDWQ

QCX50, 10-30 V DC

⇨ Visible White LED

Sensing Mode	Range	Connection	Response Time	Output Type	Models
 DIFFUSE	20 mm typical; varies according to sensor configuration	8-pin Euro QD	Selectable 5 ms or 1 ms	NPN, 3 channels	QCX50A3N6XDWQ
				PNP, 3 channels	QCX50A3P6XDWQ

Connection options: A model with a QD requires a mating cordset (see page 425).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q or Q8 models)

See page 916

Length	Threaded 8-Pin Straight		Threaded 8-Pin Right-Angle	
1.83 m		MQDC2S-806		MQDC2S-806RA
4.57 m		MQDC2S-815		MQDC2S-815RA
9.14 m		MQDC2S-830		MQDC2S-830RA



Additional cordset information available. See page 846.

Brackets

QC50/QCX50

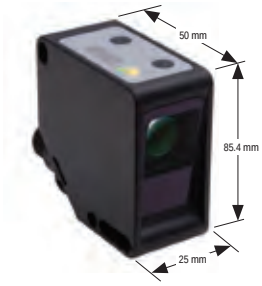
See page 879

SMBQC50





Additional bracket information available. See page 846.



QC50/QCX50 Specifications

Sensing Receiver	Solid-state photodiode device with R, G, B filters
Minimum Spot Diameter	4 mm
Supply Voltage and Current	10 to 30 V dc, 2 V pp max ripple 40 mA max @ 24 V dc (excluding output current)
Supply Protection Circuitry	Protected against reverse polarity, over-voltage, and transient voltage
Output Configuration	3 PNP or 3 NPN outputs, depending on model 30 V dc max. Saturation voltage: less than 2 V
Output Rating	100 mA max. load per output channel
Output Protection Circuitry	Protected against output short-circuit, continuous overload, transient over-voltages, and false pulse on power-up
Output Response Time	QC50 models: 335 microseconds QCX50 models: Selectable 5 milliseconds (normal) or 1 millisecond QC50 models / QCX50 models Gate ON-time: 335 microseconds / 700 microseconds Gate OFF-time: 170 microseconds / 400 microseconds
Delay at Power-up	500 milliseconds; outputs do not conduct during this time
Data Retention	EEPROM nonvolatile memory
Ambient Light Rejection	According to EN 609475-2
Adjustments	2 push buttons (Set and Select) • Color, scanning, color modes, delay and tolerance • Manual adjustment of color channels, sensing mode and tolerance level
Indicators	4-Digit LCD Display: indicates sensing mode, run status, tolerance level, output status Yellow Output LED: ON when any output is conducting 3 Green Channel Output Status LEDs: ON when its corresponding output is conducting
Construction	ABS shock-resistant housing; glass window and lens
Environmental Rating	IEC IP62
Connections	8-pin Euro-style swivel quick-disconnect fitting. QD cordsets are ordered separately. See page 425.
Operating Conditions	Temperature: -10° to +55° C Relative humidity: 90% at 50° C (non-condensing)
Shock Resistance	Approx. 30 G; 3 shocks per axis; 11 milliseconds duration
Vibration	0.5 mm amplitude; 10 to 60 Hz frequency; 30 minutes for each X, Y, Z axis
Certifications	CE
Hookup Diagrams	NPN Models: SP05 (p. 988) PNP Models: SP06 (p. 988)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



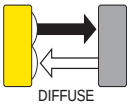
QL56
Luminescence Sensors

The QL56 detects luminescent marks, even on luminescent backgrounds, and reflective surfaces such as ceramic, metal or mirrored glass.

- Compact, self-contained design
- Includes easy-to-set programming options
- High-speed response of 250 microseconds
- Bipolar outputs

QL56, 15-30 V DC

Black Ultraviolet LED Returned Luminescence

Sensing Beam/LED	Range	Connection	Output Type	Models
 DIFFUSE	10-20 mm	5-pin Euro QD	Bipolar NPN/PNP plus one 0.75-5.5 V dc analog	QL56M6XD15BQ
	20-40 mm	5-pin Euro QD		QL56M6XD30BQ
	30-50 mm	5-pin Euro QD		QL56M6XD40BQ

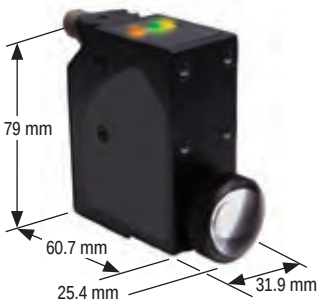
Connection options: A model with a QD requires a mating cordset (see page 427).



QL56M6XD30BQ8 Models



QL56M6XD10BQ8 Models



QL56M6XD40BQ8 Models

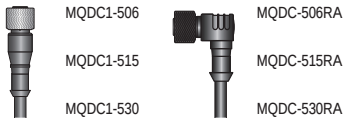
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q or Q8 models)

See page 912

Length	Threaded 5-Pin Straight	Threaded 5-Pin Right-Angle
1.83 m	MQDC1-506	MQDC-506RA
4.57 m	MQDC1-515	MQDC-515RA
9.14 m	MQDC1-530	MQDC-530RA



Additional cordset information available.
See page 904.

Brackets

QL50

See page 878	See page 879	See page 878	See page 879
SMB55A	SMB55RA	SMB55F	SMB55S



Additional bracket information available.
See page 846.

QL56 Specifications

Sensing Beam	LED UV, 375 nm; class 1
Supply Voltage and Current	15 to 30 V dc, (2 V pp max ripple); 50 mA max @ 24 V dc (excluding output current)
Supply Protection Circuitry	Protected against reverse polarity
Output Configuration	Bipolar (1 NPN & 1 PNP), plus 0.75 to 5.5 V dc analog output
Analog Output	0.75 to 5.5 V dc max
Analog Output Impedance	2.2 kΩ (short-circuit protection)
Output Rating	100 mA max.
Output Saturation Voltage	≤ 2 V
Output Protection Circuitry	Overload and short circuit protection
Output Response Time	250 microseconds
Ambient Light Rejection	According to EN 60947-5-2
Adjustments	"+" and "–" push buttons determine sensitivity "Set" push button activates delay and keylock function
Switching Frequency	2 kHz
Delay at Power-up	0 milliseconds (default) or 20 milliseconds user selectable
Indicators	Green Ready LED: ON indicates power ON Yellow Output LED: ON indicates output conducting Green Ready LED: ON indicates power on; Flashing indicates output overload Orange Delay LED: ON indicates 20 milliseconds delay activated Orange Keylock LED: ON indicates push buttons are unlocked 5-segment bar graph: Indicates sensitivity
Construction	Aluminum housing, glass lens; mass 180 g. max.
Environmental Rating	IP67
Connections	5-pin Euro-style (M12). QD cordsets are ordered separately.
Operating Conditions	Temperature: -10° to +55° C Storage Temperature: -20° to 70° C
Minimum Spot Dimensions	2 x 8 mm @ 10 mm (QL56M6XD15BQ) 3 x 11 mm @ 24 mm (QL56M6XD30BQ) 4 x 15 mm @ 50 mm (QL56M6XD40BQ)
Shock Resistance	30 G; 6 shocks per axis; 11 milliseconds duration (EN60068-2-27)
Vibration	0.5 mm amplitude; 10 to 55 Hz frequency; per axis (EN60068-2-6)
Application Notes	The lens must be used in the lower position, and the cap must remain in place on the end position
Certifications	CE
Hookup Diagrams	SP07 (p. 988)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



STAINLESS STEEL

Stainless steel sensors hold up well in extremely abusive environments and can handle a wide variety of chemicals. This makes them ideal for hygienic applications, such as food and beverage applications.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Max Sensing Range	Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	QM26 The QM26 withstands high-pressure washdown environments and is easy to mount for a hassle-free setup. Page 430	Opposed: 8.5 m Polor Retro: 3 m Coaxial Polor Retro: 2.6 m Background Suppression: 200 mm	48.5 x 14 x 25 mm	IP69K	316L Stainless Steel	10-30 V dc
	QMH26 The QMH26 is designed with minimal grooves and crevices, making it easy to clean and ideal for clean-in-place (CIP) applications. Page 434	Polor Retro: 3 m Coaxial Polor Retro: 2.6 m Background Suppression: 400 mm Foreground Suppression: 200 mm	53.7 x 14 x 20.3 mm	IP69K	316L Stainless Steel	10-30 V dc
	M25U Universal housing design with 18 mm threaded lens; an ideal replacement for hundreds of other sensor styles. Available in eight modes with a compact housing for limited space setups. Page 438	Ultrasonic: 500 mm	103 x ø 25 mm	IP67; NEMA 6, IP69K	316 Stainless Steel	10-30 V dc
	SM30 Powerful sensor with a long range and the stainless steel model can be used in abusive environments. Page 440	Opposed: 150 m	30 ø x 102 mm	IEC IP67; NEMA 6	Thermoplastic Polyester or Stainless steel	10-30 V dc, 2-240 V ac
	VSM Series Heavy-duty metal sensors that are compact and ideal for use in confined areas. Page 444	Opposed: 250 mm Diffuse: 200 mm	Varies by model	IP67; NEMA 6P	Stainless steel	10-30 V dc
	M18 Epoxy-encapsulated metal barrel sensors provide reliable sensing without adjustments. Page 450	Opposed: 20 m Retro: 2 m Polarized Retro: 2 m Diffuse 300 mm Fixed-Field: 100 mm	18 ø x 59.2 mm	QD models: IP69K Other models: IEC IP67; NEMA 6	Stainless steel	10-30 V dc

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



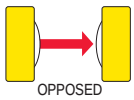
QM26
Washdown Sensors

The QM26 withstands high-pressure washdown environments and is easy to mount for a hassle-free setup.

- Rugged, chemically resistant and food safe 316L stainless steel housing
- IP69K rated for use in harsh 1500 psi and 80° C washdown
- Withstands environmental temperature cycling from -30° C to 60° C
- Compatible with food products for reliable sensing in food and beverage applications

Opposed QM26, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 OPPOSED	8.5 m	4-pin Euro QD	QM26EQ5 Emitter	
			QM26VNRQ5	QM26VPRQ5

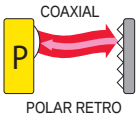
Polar Retro QM26, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 POLAR RETRO	3 m	4-pin Euro QD	QM26VNLPQ5	QM26VPLPQ5

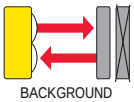
Coaxial Polar Retro QM26, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 COAXIAL POLAR RETRO	2.6 m	4-pin Euro QD	QM26ENXLPCQ5	QM26EPXLPCQ5

Background Suppression QM26, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 BACKGROUND SUPPRESSION	5-400 mm Cutoff	4-pin Euro QD	QM26VNAF400Q5	QM26VPAF400Q5
	5-200 mm Cutoff (small light spot)	4-pin Euro QD	QM26VNAF200Q5	QM26VPAF200Q5

For more specifications see page 432.

Connection options: A model with a QD requires a mating cordset (see page 431).

For a 5 m cable, replace Q5 with -5M to the 2 m model number (example, QM26E-5M)

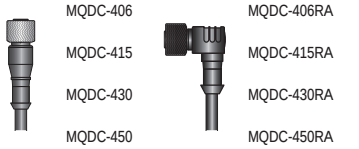
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for ..Q8 or ..Q5 models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA
15.2 m	MQDC-450	MQDC-450RA

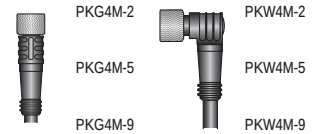


Additional cordset information available. See page 904.

Pico QD (for Q and Q3 models)

See page 906

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
2.00 m	PKG4M-2	PKW4M-2
5.00 m	PKG4M-5	PKW4M-5
9.00 m	PKG4M-9	PKW4M-9



Brackets

QM26

See page 868	See page 868
SMBLSTDLQ26	SMBLSTQ26



Additional brackets and information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966





Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

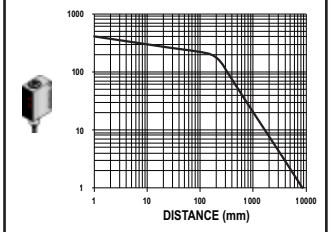
QM26 Specifications

Supply Voltage and Current	10 to 30 V dc (10% maximum ripple within specified limits); supply current (exclusive of load current) less than 20mA
Supply Protection Circuity	Protected against reverse polarity and transient voltages
Output Configuration	**Most Models:** Complementary PNP or NPN by model number
Output Rating	100 mA max **OFF-state leakage current for load:** NPN less than 200 µA; PNP less than 500 µA **ON-state saturation voltage:** less than 2 V @ 100 mA
Output Protection Circuitry	Protected against false pulse at power-up and continuous overload or short circuit of outputs
Output Response Time	500 microseconds ON and OFF
Repeatability	**Opposed mode:** 110 microseconds **All other mode:** 150 microseconds
Indicators	**Green steady:** Power ON **Yellow steady:** Light sensed **Yellow flashing:** Light sensed but marginal signal
Construction	316L stainless steel housing; acrylic window
Operating Conditions	**Temperature:** -30º to +70º C **Relative Humidity:** Periodic exposure to 100% humidity and washdown cleaning
Environmental Rating	IP67 & IP69K, Ecolab® compatible
Connection	4-pin Threaded/Snap M8/Pico-Style QD connector or 4-pin 150 mm (6") Euro-style pigtail QD with PVC cable jacket depending on model. QD cordsets are ordered separately. See page 431.
Vibration and Shock	IEC60947-5-2
Certifications	With Class 2 power
Hookup Diagrams	NPN: DC07 (p. 975) PNP: DC03 (p. 974)

Excess Gain Curves (Diffuse and Fixed-Field mode performance based on 90% reflectance white test card)

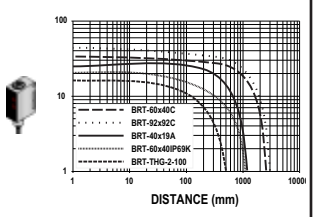
● = Visible Red LED P = Visible Red LED Polarized

Opposed Mode QM26



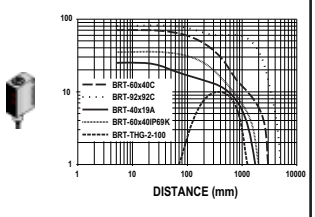
Range: 8.5 m | LED: ●

Expert™ Coaxial Polarized Retroreflective Mode QM26



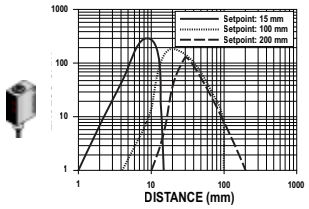
Range: 2.6 m | LED: P

Polarized Retroreflective Mode QM26



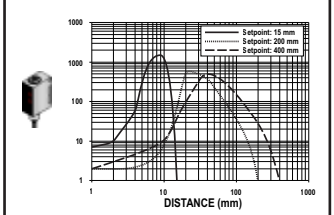
Range: 3 m | LED: P

Adjustable-Field Mode QM26



Range: 5-200 mm | LED: ●

Adjustable-Field Mode QM26



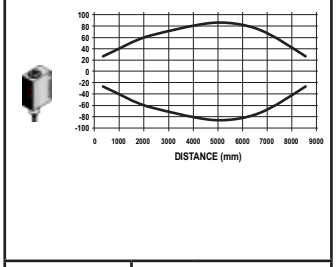
Range: 5-400 m | LED: ●

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Beam Patterns (Diffuse mode performance based on 90% reflectance white test card)

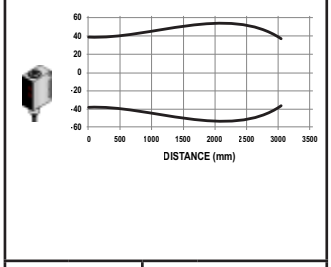
● = Visible Red LED P = Visible Red LED Polarized

Opposed Mode QM26



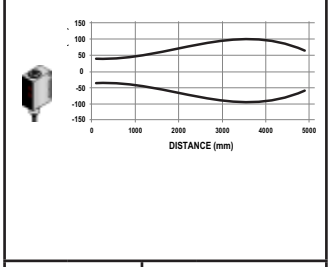
Range: 8.5 m | LED: ●

Expert™ Coaxial Polarized Retroreflective Mode QM26



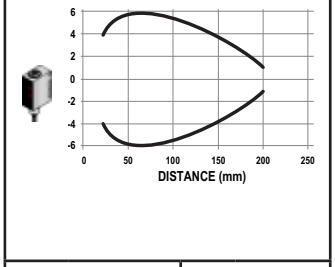
Range: 2.6 m | LED: P

Polarized Retroreflective Mode QM26



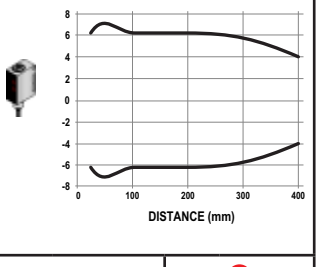
Range: 3 m | LED: P

Adjustable-Field Mode QM26



Range: 5-200 mm | LED: ●

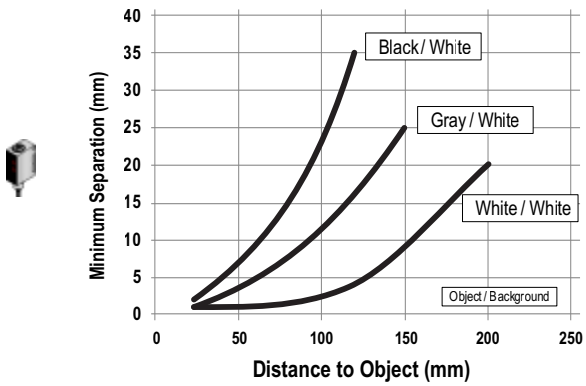
Adjustable-Field Mode QM26



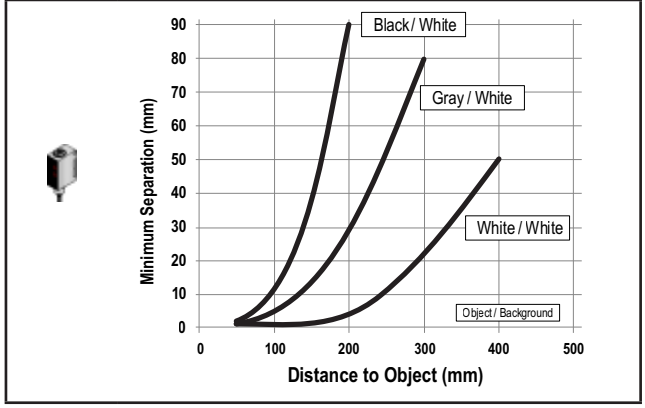
Range: 5-400 mm | LED: ●

Minimum Separation Distance

QM26 Adjustable-Field Foreground Suppression LED (5-200 mm)



QM26 Adjustable-Field Background Suppression LED (5-400 mm)



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



QMH26
Hygienic Sensors

The QMH26 is designed with minimal grooves and crevices, making it easy to clean and ideal for clean-in-place (CIP) applications.

- Rugged, chemically resistant and food safe 316L stainless steel housing
- Hygienic mounting shape minimizes contamination risk and is self draining for clean-in-place (CIP) applications
- IP69K rated for use in harsh 1500 psi and 80° C washdown
- High chemical resistance for the most demanding photoelectric sensing environments

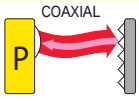
Polar Retro QMH26, 10-30 V DC

→ Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 POLAR RETRO	3 m	4-pin Pico QD	QMH26VNLPQ7	QMH26VPLPQ7

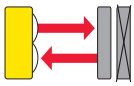
Coaxial Porla Retro QMH26, 10-30 V DC

→ Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 POLAR RETRO	2.6 m	4-pin Pico QD	QMH26ENXLPCQ7	QMH26EPXLPCQ7

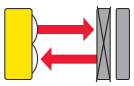
Background Suppression QMH26, 10-30 V DC

→ Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 BACKGROUND SUPPRESSION	Adjustable between 5-400 mm	4-pin Pico QD	QMH26VNAF400Q7	QMH26VPAF400Q7

Foreground Supression QMH26, 10-30 V DC

→ Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 FOREGROUND SUPPRESSION	Adjustable between 5-200 mm	4-pin Pico QD	QMH26VNAF200Q7	QMH26VPAF200Q7

For more specifications see page 436.

Connection options: A model with a QD requires a mating cordset (see page 435).

For a 5 m cable, replace Q7 with -5M in the model number (example, QMH26VNLP-5M)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q5 models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA
15.2 m	MQDC-450	MQDC-450RA



Additional cordset information available. See page 904.

Pico QD (for Q7 models)

See page 906

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
2.00 m	PKG4M-2	PKW4M-2
5.00 m	PKG4M-5	PKW4M-5
9.00 m	PKG4M-9	PKW4M-9





Brackets

QMH26

See page 868	See page 868	See page 868
SMBLSTDLQ26	SMBLSTQ26	SMBQMH26-SS-150



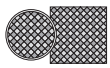




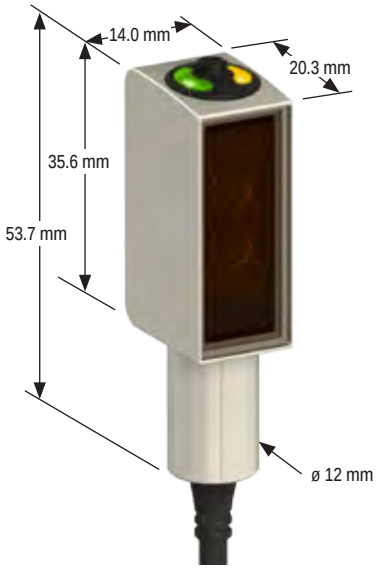
Additional brackets and information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966







Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

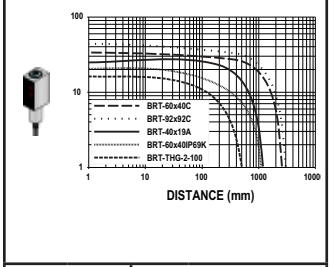
QMH26 Specifications

Supply Voltage and Current	10 to 30 V dc (10% maximum ripple within specified limits); supply current (exclusive of load current) less than 20mA
Supply Protection Circuity	Protected against reverse polarity and transient voltages
Output Configuration	**Most Models:** Complementary PNP or NPN by model number **QMH26E...XLPC models:** Single PNP or NPN on pin 4 (black wire) with remote teach input on pin 2 (white wire)
Output Rating	100 mA max **OFF-state leakage current for load:** NPN less than 200 µA; PNP less than 500 µA **ON-state saturation voltage:** less than 2 V @ 100 mA
Output Protection Circuitry	Protected against false pulse at power-up and continuous overload or short circuit of outputs
Output Response Time	500 microseconds ON and OFF
Repeatability	**Opposed mode:** 110 microseconds **All other mode:** 150 microseconds
Indicators	**Green steady:** Power ON **Yellow steady:** Light sensed **Yellow flashing:** Light sense but marginal signal
Construction	316L stainless steel housing; acrylic window
Operating Conditions	**Temperature:** -30º to +70º C **Relative Humidity:** Periodic exposure to 100% humidity and washdown cleaning
Environmental Rating	IP67 & IP69K, Ecolab® compatible
Connection	4-pin Threaded/Snap M8/Pico-Style QD connector or 4-pin 150 mm (6") Euro-style pigtail QD with PVC cable jacket depending on model. QD cordsets are ordered separately. See page 435.
Vibration and Shock	IEC60947-5-2
Certifications	With Class 2 power
Hookup Diagrams	NPN: DC07 (p. 975) PNP: DC03 (p. 974)

Excess Gain Curves (Diffuse and Fixed-Field mode performance based on 90% reflectance white test card)

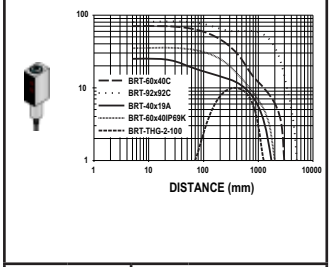
● = Visible Red LED P = Visible Red LED Polarized

Expert™ Coaxial Polarized Retroreflective Mode QMH26



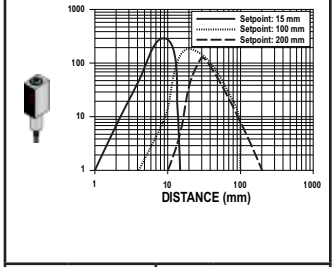
Range: 2.6 m | LED: P

Polarized Retroreflective Mode QMH26



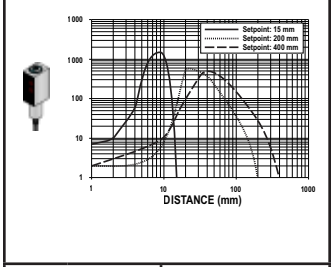
Range: 3 m | LED: P

Adjustable-Field Mode QMH26



Range:5-200 mm | LED: ●

Adjustable-Field Mode QMH26



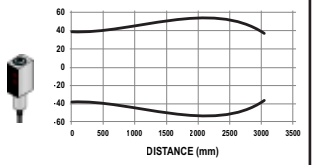
Range: 5-400 m | LED: ●

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Beam Patterns (Diffuse mode performance based on 90% reflectance white test card)

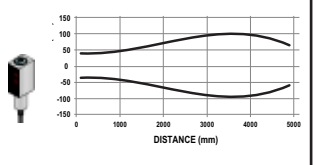
● = Visible Red LED P = Visible Red LED Polarized

Expert™ Coaxial Polarized Retroreflective ModeQMH26



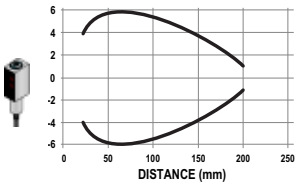
Range: 2.6 m | LED: P

Polarized Retroreflective Mode QMH26



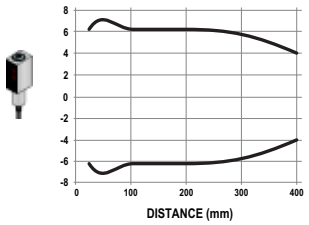
Range: 3 m | LED: P

Adjustable-Field Mode QMH26



Range: 5-200 mm | LED: ●

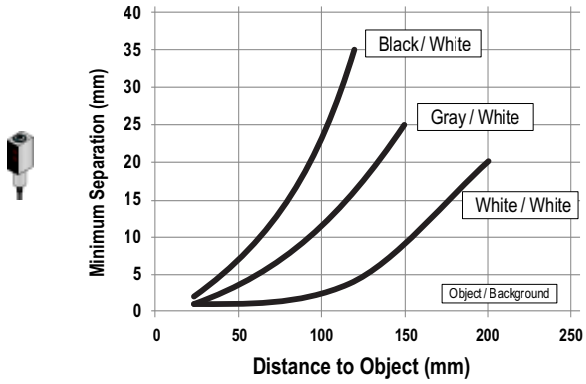
Adjustable-Field Mode QMH26



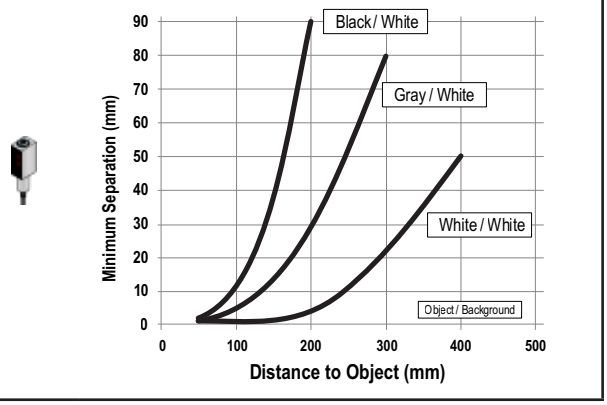
Range: 5-400 mm | LED: ●

Minimum Separation Distance

QMH26 Adjustable-Field Foreground Suppression LED (5-200 mm)



QMH26 Adjustable-Field Background Suppression LED (5-400 mm)



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



M25U
Stainless Steel Ultrasonic Sensors

The M25U Ultrasonic Sensor features a smooth 316 series stainless steel construction to withstand the toughest sanitary challenges.

- Cleans easily with no thread, gaps or seams to trap debris
- Constructed with FDA approved materials and rated to IP69K, IEC IP67 (NEMA 6) with fully encapsulated electronics
- Withstands high-temperatures sprays of up to 80° C and 1500 psi occurring every few hours
- Features high-immunity to ambient electrical and sonic noise

M25U, 10 to 30 V DC

Range*	Frequency	Connection	Output	Response Time	Models
Normal Speed: 500 mm High Speed: 250 mm	140 kHz	4-pin Euro QD	—	—	M25UEQ8 Emitter
		5-pin Euro QD	Bipolar NPN/PNP	Normal Speed: 4.0 ms High Speed: 3.0 ms	M25URBQ8 Receiver

Connection options: A model with a QD requires a mating cordset

* M25U receivers may be wired for either of two speed modes: Normal or High, depending on hookup. The Normal-Speed mode offers a sensing range of 500 mm. The Normal-Speed mode maximizes sensing energy, as is required in demanding environments. The High-Speed mode offers a sensing range of 250 mm. The High-Speed mode maximizes sensing response, as is needed in high-speed counting applications.

Cordsets

Euro QD (With Shield)

See page 913

Length	Straight 5-Pin	Right-Angle 5-Pin
1.83 m	MQDEC2-506	MQDEC2-506RA
4.57 m	MQDEC2-515	MQDEC2-515RA
9.14 m	MQDEC2-530	MQDEC2-530RA





Additional cordset information available. See page 904.

Washdown Euro QD

See page 912

Length	Straight 5-Pin
1.83 m	MQDCWD-506
9.14 m	MQDCWD-530



Brackets

M25U

See page 877	See page 877
SMBM25A	SMBM25B



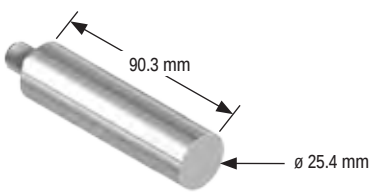


Additional bracket information available. See page 846.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

M25U Specifications

Sensing Range	Normal Speed: 500 mm High Speed: 250 mm 140KHz
Supply Voltage and Current	Emitter: 10 to 30 V dc (10% max. ripple) at less than 85 mA Receiver: 10 to 30 V dc (10% max. ripple) at less than 38 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Receiver Output Configuration	Bipolar (1 NPN & 1 PNP) solid-state output; Normally Open (output is activated when an object blocks the sensing beam)
Output Rating	100 mA (each output) with short circuit protection; see Note 1 OFF-state leakage current: NPN: < 200 µA sinking PNP: < 10 µA sourcing ON-state saturation voltage: NPN: < 1.6 V @ 100 mA PNP: < 3.0 V @ 100 mA
Output Protection Circuitry	Protected against short circuit conditions
Output Response Time	Normal Speed: 4.0 milliseconds High Speed: 3.0 milliseconds
Repeatability	1 millisecond
Delay at Power-up	< 250 milliseconds
Delay for Switching Between Normal and High Speed	20 milliseconds
Indicators	Green Power LED: indicates Power ON Amber Output LED: indicates output activated
Construction	Housing: 316 Stainless Steel LED window: Polysulfone
Connections	Emitter: 4-pin Euro-Style QD Receiver: 5-pin Euro-Style QD QD cordsets ordered separately. See page 438.
Environmental Rating	Leakproof design, rated IEC IP67 (NEMA 6), IP69K
Operating Conditions	Temperature: -20° to +70° C Max. Relative Humidity: 95% at 50° C non-condensing
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements method 201A (vibration: 10 to 60 Hz max. amplitude 0.06", max. acceleration 10G). Also meets IEC 947-5-2; 30G 11 ms duration.
Certifications	CE
Notes	1. NPN < 200 µA for load impedance > 3 KΩ; for load current of 100 mA, leakage < 1% of load current 2. When mounting the M25U, care should be taken to acoustically isolate the emitter and receiver to eliminate sound energy coupling between the sensor pair. This is best accomplished with elastomeric materials between the sensor and rigid mounting brackets.
Hookups Diagrams	Emitter Models: MI21 (p. 994) Receiver Models: MI17 (p. 993)



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



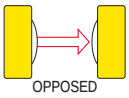
SM30
High-Power, Long-Range, Opposed-Mode Barrel Sensors

The SM30 is a powerful sensor with a long range for different frequencies and the stainless steel model can be used in abusive environments.

- Available with ac or dc supply voltages
- Ideal in equipment washdown environments
- Stainless steel model available
- Sensing range up to 200 m
- Cordsets and brackets see page 442

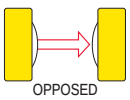
SM30 Emitters, 10-30 V DC or 12-240 V AC, Frequency A†

⇨ Infrared LED

Sensing Mode	Housing	Range	Connection	Output Type	Models
 OPPOSED	Plastic	150 m	2 m 3-Pin Mini QD	N/A	SMA30PEL SMA30PELQD
	Stainless Steel	150 m	2 m 3-Pin Mini QD	N/A	SMA30SEL SMA30SELQD

SM30 Receivers, 10-30 V DC Frequency A†

⇨ Infrared LED

Sensing Mode	Housing	Range	Connection	Output Type	Models
 OPPOSED	Plastic	150 m	2 m 4-Pin Mini QD	Bi-Modal™ NPN or PNP	SM30PRL SM30PRLQD
	Stainless Steel	150 m	2 m 4-Pin Mini QD	Bi-Modal™ NPN or PNP	SM30SRL SM30SRLQD

For more specifications see page 443.

Connection options: A model with a QD requires a mating cordset (see page 442).

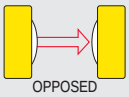
For 9 m cable, add suffix W/30 to the 2 m model number (example, SM30PR W/30).

† Modulation frequency "A" is standard; frequencies "B" and "C" are also available to minimize optical crosstalk potential between adjacent pairs and are specified by adding "B" or "C" at the end of the standard model number (example, SM30PRLB or SM30PRLC).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SM30 Receivers, 24-240 V AC, Frequency A†

⇨ Infrared LED

Sensing Mode	Housing	Range	Connection	Output Type	Models
 OPPOSED	Plastic	150 m	2 m	LO	SM2A30PRL
			3-Pin Mini QD		SM2A30PRLQD
	Stainless Steel	150 m	2 m	LO	SM2A30SRL
			3-Pin Mini QD		SM2A30SRLQD
	Plastic	150 m	2 m	DO	SM2A30PRLNC
			3-Pin Mini QD		SM2A30PRLNCQD
	Stainless Steel	150 m	2 m	DO	SM2A30SRLNC
			3-Pin Mini QD		SM2A30SRLNCQD

For more specifications see page 443.

Connection options: A model with a QD requires a mating cordset (see page 442).

For 9 m cable, add suffix W/30 to the 2 m model number (example, SM2A30PRL W/30).

† Modulation frequency "A" is standard; frequencies "B" and "C" are also available to minimize optical crosstalk potential between adjacent pairs and are specified by adding "B" or "C" at the end of the standard model number (example, SM30PRLB or SM30PRLC).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Mini QD

See page 928

Length	3-Pin Threaded Straight
1.83 m	SM30CC-306
3.66 m	SM30CC-312



Additional cordset information available. See page 904.

Brackets

SM30

See page 869	See page 869	See page 870	See page 870
SMB30A	SMB30FA..	SMB30SC	SMBAMS30P



Additional brackets and information available. See page 846.

Other Accessories

Apertures

See page 966





Opposed Models—All Frequencies
Suffix E and R
(Metal Housing Shown)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

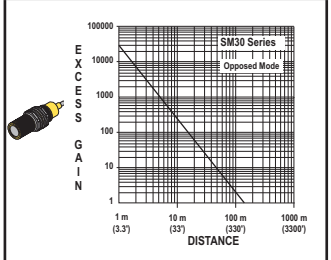
SM30 Specifications

Supply Voltage and Current	**Emitters:** 12 to 240 V ac (50/60 Hz) or 10 to 30 V dc (10% max. ripple) at 20 mA **DC Receivers:** 10 to 30 V dc (10% max. ripple) at 10 mA max, exclusive of load **AC Receivers:** 24 to 240 V ac (50/60 Hz)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**DC Receivers:** Bi-Modal™ output (PNP sourcing or NPN sinking). Selection of sourcing or sinking configuration depends upon receiver's power supply hookup polarity. Once wired, the unit performs as a solid-state switch. **AC Receivers:** Solid-state switch offer Light Operate (LO) or Dark Operate (DO) by model
Output Rating	**DC Receivers:** 250 mA continuous **Output saturation voltage:** (PNP & NPN configuration) less than 1 volt at 10 mA; less than 2 volts at 250 mA **OFF-state leakage current:** less than 10 µA **AC Receivers:** Max. steady-state load capability is 500 mA **Inrush capability:** 10 amps for 1 second (non-repeating) **OFF-state leakage:** current less than 1.7 mA rms **ON-state voltage drop:** less than 3.5 volts rms across a 500 mA load; less than 5 volts rms across a 15 mA load
Output Protection Circuitry	Outputs of dc receivers are short circuit protected
Output Response Time	10 milliseconds ON/OFF
Repeatability	**"A" frequency units:** 1 millisecond **"B" frequency units:** 1.5 milliseconds **"C" frequency units:** 2.3 milliseconds
Indicators	Internal Red LED, visible through the lens or from side of the sensor. **Emitters:** Red "Power ON" indicator LED **DC Receivers:** Lights whenever receiver sees its modulated light source **AC Receivers:** Lights whenever receiver's output is conducting
Construction	Fully epoxy-encapsulated tubular threaded housing, positive sealed at both ends, quad-ring sealed acrylic lens **Plastic models:** 30 mm diameter thermoplastic polyester housing and jam nuts **Stainless Steel models:** 30 mm diameter 303 stainless steel housing and jam nuts
Environmental Rating	Exceeds NEMA 6P; IEC IP67 standards
Connections	PVC-jacketed 2 m or 9 m cables or Mini-style quick-disconnect (QD) fitting are available. QD cordsets are ordered separately. See page 442.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Certifications	
Hookup Diagrams	**Cabled Emitters:** UN10 (p. 986) **AC Cabled Receivers:** AC10 (p.983) **DC Receivers:** DC20 & DC21 (pp. 978 & 979) **QD Emitters:** AC04 (p. 981) **AC QD Receivers:** AC11 (p.983)

Excess Gain Curves

○ = Infrared LED

Opposed Mode SM30



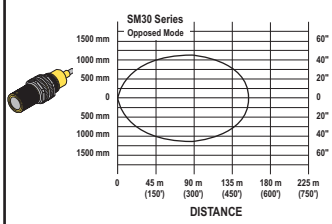
Range: 150 m | LED: ○

Beam Patterns

○ = Infrared LED

Opposed Mode SM30

Effective Beam: 19 mm



Range: 150 m | LED: ○

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



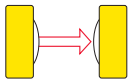
VSM
Self-Contained, High Performance Metal Sensors

The VSM sensors are heavy-duty, compact, metal sensors that are ideal for use in confined areas.

- Sapphire lens
- Tough 300 series stainless steel body withstands a wide variety of chemicals and cutting fluids
- Smooth barrel models are ideal for hygienic applications that require frequent cleaning
- Advanced optical design provides high performance with repeatable sensing
- Cordsets and brackets see page 446

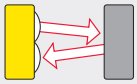
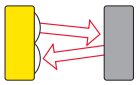
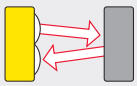
Opposed VSM (4 mm Smooth Barrel), 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 OPPOSED	250 mm	2 m 3-Pin Pico QD	—	VSM46E Emitter	
				VSM46EQ7 Emitter	
		2 m 3-Pin Pico QD	DO	VSM4RN6R	VSM4RP6R
				VSM4RN6RQ7	VSM4RP6RQ7

Diffuse VSM (4 mm Smooth Barrel), 10-30 V DC

Infrared LED

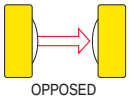
Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 DIFFUSE	10-30 mm	2 m 3-Pin Pico QD	LO	VSM4AN6CV10	VSM4AP6CV10
				VSM4AN6CV10Q7	VSM4AP6CV10Q7
 DIFFUSE	20-50 mm	2 m 3-Pin Pico QD		VSM4AN6CV20	VSM4AP6CV20
				VSM4AN6CV20Q7	VSM4AP6CV20Q7
 DIFFUSE	50-140 mm	2 m 3-Pin Pico QD		VSM4AN6CV50	VSM4AP6CV50
				VSM4AN6CV50Q7	VSM4AP6CV50Q7

For more specifications see page 447.

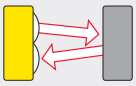
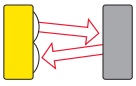
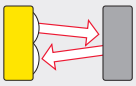
Connection options: A model with a QD requires a mating cordset (see page 446).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

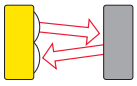
Opposed VSM (5 mm Threaded Barrel), 10-30 V DC

Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 OPPOSED	250 mm	2 m	—	VSM56E Emitter	
		3-Pin Pico QD		VSM56EQ7 Emitter	
		2 m	DO	VSM5RN6R	VSM5RP6R
		3-Pin Pico QD		VSM5RN6RQ7	VSM5RP6RQ7

Diffuse VSM (5 mm Threaded Barrel), 10-30 V DC

Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 DIFFUSE	10-30 mm	2 m	LO	VSM5AN6CV10	VSM5AP6CV10
		3-Pin Pico QD		VSM5AN6CV10Q7	VSM5AP6CV10Q7
 DIFFUSE	20-50 mm	2 m	LO	VSM5AN6CV20	VSM5AP6CV20
		3-Pin Pico QD		VSM5AN6CV20Q7	VSM5AP6CV20Q7
 DIFFUSE	50-140 mm	2 m	LO	VSM5AN6CV50	VSM5AP6CV50
		3-Pin Pico QD		VSM5AN6CV50Q7	VSM5AP6CV50Q7

VSM (Flat-Pack, Side-Looker), 10-30 V DC

Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 DIFFUSE	20-50 mm	2 m	LO	VSMQAN6CV20	VSMQAP6CV20
	50-140 mm			VSMQAN6CV50	VSMQAP6CV50
	90-200 mm			VSMQAN6CV90	VSMQAP6CV90

Cordsets

Pico QD

See page 904

Length	Threaded 3-Pin			
	Straight		Right-Angle	
2.00 m		PKG3M-2		PKW3M-2
5.00 m		PKG3M-5		PKW3M-5
9.00 m		PKG3M-9		PKW3M-9



Additional cordset information available. See page 904.

Brackets

VSM

SMBVSM4

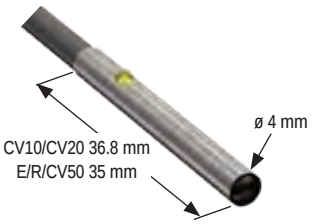




Additional brackets and information available. See page 846.



VSMQ
Diffuse Models



VSM4
Opposed and
Diffuse Models



VSM5
Opposed and
Diffuse Models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

VSM Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Single-output: 1 NPN or 1 PNP, Light Operate (LO) or Dark Operate (DO), depending on model
Output Rating	100 mA max. **OFF-state leakage current:** less than 1 µA **ON-state saturation voltage:** less than 2 V @ 100 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs Overload trip point ≥ 100 mA
Response Time	2.5 milliseconds
Delay at Power-up	20 milliseconds
Repeatability	1 millisecond
Indicators	**Yellow LED:** light sensed
Construction	300 series stainless steel with sapphire lens and PVC cable
Environmental Rating	IP67
Connections	2 m PVC-jacketed cable or 3-pin Pico-style integral QD (Q7), depending on model. QD cordsets ordered separately. See page 446.
Operating Conditions	**Operating temperature:** 0° to +55° C
Hookup Diagram	**Emitters:** DC02 (p. 974) **Receivers:** DC01 (p. 974)
Certification	CE UL LISTED

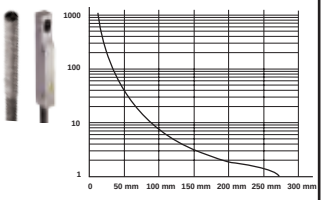
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

(Convergent performance based on 90% reflectance white test card)

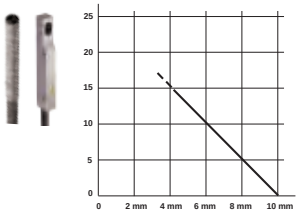
○ = Infrared LED

Opposed Mode VSM4 & VSM5



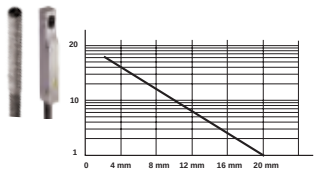
Range: 250 mm | LED: ○

Diffuse Mode VSM4 & VSM5



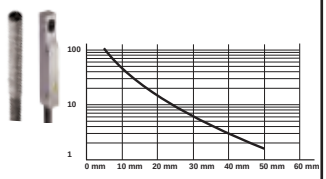
Range: 10 mm | LED: ○

Diffuse Mode VSM4 & VSM5



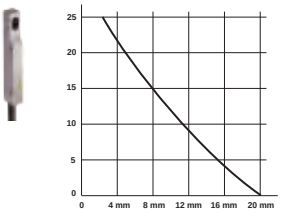
Range: 20 mm | LED: ○

Diffuse Mode VSM4 & VSM5



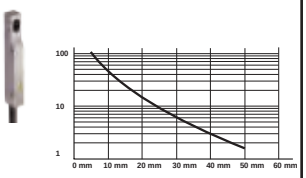
Range: 50 mm | LED: ○

Diffuse Mode VSMQ



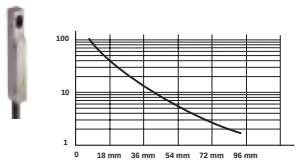
Range: 20 mm | LED: ○

Diffuse Mode VSMQ



Range: 50 mm | LED: ○

Diffuse Mode VSMQ



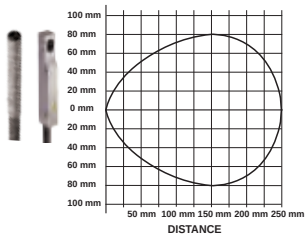
Range: 90 mm | LED: ○

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Beam Patterns (Convergent performance based on 90% reflectance white test card)

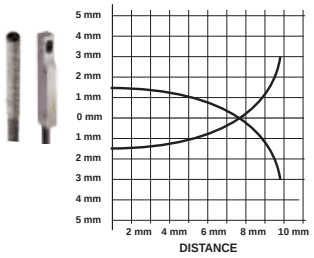
○ = Infrared LED

Opposed Mode VSM4 & VSM5



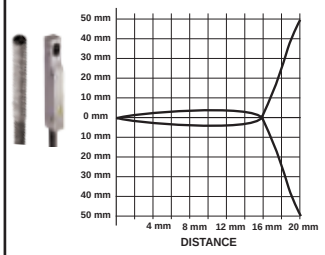
Range: 250 mm | LED: ○

Diffuse Mode VSM4 & VSM5



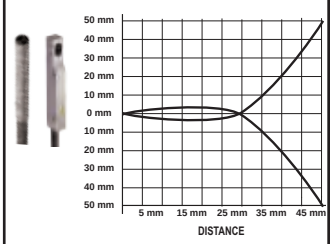
Range: 10 mm | LED: ○

Diffuse Mode VSM4 & VSM5



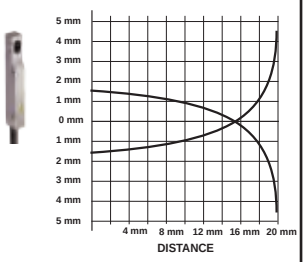
Range: 20 mm | LED: ○

Diffuse Mode VSM4 & VSM5



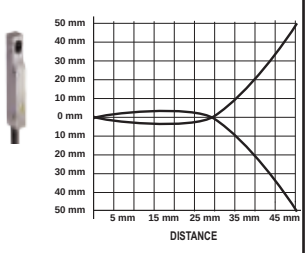
Range: 50 mm | LED: ○

Diffuse Mode VSMQ



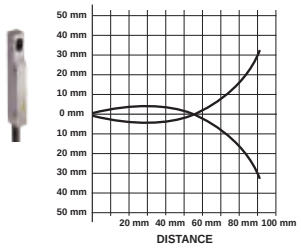
Range: 20 mm | LED: ○

Diffuse Mode VSMQ



Range: 50 mm | LED: ○

Diffuse Mode VSMQ



Range: 90 mm | LED: ○

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

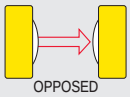
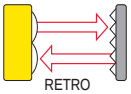
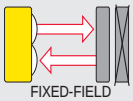
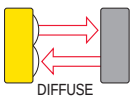


M18
18 mm Metal Barrel-Mount

Epoxy-encapsulated metal barrel sensors provide reliable sensing without adjustments.

- Available in multiple operating modes
- Meets IP69K standards
- Wide operating range from -40°C to +70°C
- High performance sensing

M18, 10-30 V DC

Sensing Mode	Range	Connection	Models NPN	Models PNP
 OPPOSED	20 m	2 m	M186E Emitter	
		4-pin Euro QD	M186EQ Emitter	
		2 m	M18SN6R	M18SP6R
		4-pin Euro QD	M18SN6RQ	M18SP6RQ
 RETRO	2 m†	2 m	M18SN6L	M18SP6L
		4-pin Euro QD	M18SN6LQ	M18SP6LQ
 POLAR RETRO	2 m†	2 m	M18SN6LP	M18SP6LP
		4-pin Euro QD	M18SN6LPQ	M18SP6LPQ
 FIXED-FIELD	0 - 25 mm Cutoff	2 m	M18SN6FF25	M18SP6FF25
		4-pin Euro QD	M18SN6FF25Q	M18SP6FF25Q
	0 - 50 mm Cutoff	2 m	M18SN6FF50	M18SP6FF50
		4-pin Euro QD	M18SN6FF50Q	M18SP6FF50Q
	0 - 100 mm Cutoff	2 m	M18SN6FF100	M18SP6FF100
		4-pin Euro QD	M18SN6FF100Q	M18SP6FF100Q
 DIFFUSE	100 mm	2 m	M18SN6D	M18SP6D
		4-pin Euro QD	M18SN6DQ	M18SP6DQ
	300 mm	2 m	M18SN6DL	M18SP6DL
		4-pin Euro QD	M18SN6DLQ	M18SP6DLQ

For more specifications see page 452.

Connection options: A model with a QD requires a mating cordset (see page 451).

For 9 m cable, add suffix W/30 to the 2 m model number (example, M18SP6R W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector, unless otherwise noted.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories section for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin			
	Straight		Right-Angle	
1.83 m	MQDC-406		MQDC-406RA	
4.57 m	MQDC-415		MQDC-415RA	
9.14 m	MQDC-430		MQDC-430RA	
15.2 m	MQDC-450		MQDC-450RA	

Additional cordset information available. See page 904.

Brackets

M18

See page 860	See page 859	See page 861	See page 864
SMB18FA..	SMB18A	SMB3018SC	SMBAMS18P
			


Additional brackets and information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966
	



M18 Opposed, Non-polarized
Retroreflective and Diffuse Models
Suffix E, R, L, D and DL

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

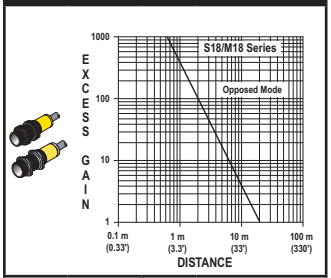
M18 DC Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple); Supply current (exclusive of load current): Opposed Emitters: 25 mA Opposed Receivers: 20 mA Polarized Retroreflective: 30 mA Non-polarized Retroreflective: 25 mA Fixed-field: 35 mA Diffuse: 25 mA
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state complementary dc switch; NPN (current sinking) or PNP (current sourcing), depending on model The Dark Operate (DO) output may be wired as a normally open marginal signal alarm output, depending upon hookup to the power supply
Output Rating	150 mA max. (each) in standard hookup. When wired for alarm output, the total load may not exceed 150 mA OFF-state leakage current: less than 1 µA at 30 V dc ON-state saturation voltage: less than 1 V at 10 mA dc; less than1.5 V at 150 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time	Opposed: 3 milliseconds ON, 1.5 milliseconds OFF Polarized Retroreflective, Non-polarized Retroreflective, Fixed-field and Diffuse: 3 milliseconds ON/OFF
Delay at Power-up	100 milliseconds; outputs are non-conducting during this time
Repeatability	Opposed: 375 microseconds Polarized Retroreflective, Non-polarized Retroreflective, Fixed-field and Diffuse: 750 microseconds. Repeatability and response are independent of signal strength.
Indicators	Two LEDs: Green: Power is ON Yellow: Light Operate (LO) output is energized
Construction	M18 models: stainless steel housing S18 models: thermoplastic polyester housing Lenses are polycarbonate or acrylic; S18 and M18 models come with two jam nuts
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9.
Connections	2 m or 9 m attached cable, or 4-pin Euro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 451.
Operating Conditions	Temperature: -40° to +70° C Relative humidity: 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max., double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	S18 and M18 models: CE S18 models: CSA, UL LISTED
Hookup Diagrams	Emitters: DC02 (p. 974) NPN Models: DC05 (p. 975) PNP Models: DC06 (p. 975)

Excess Gain Curves (Diffuse and Fixed-Field mode performance based on 90% reflectance white test card†)

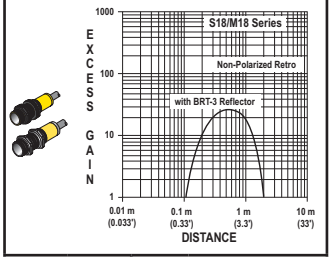
○ = Infrared LED P = Visible Red LED Polarized

Opposed Mode S18/M18



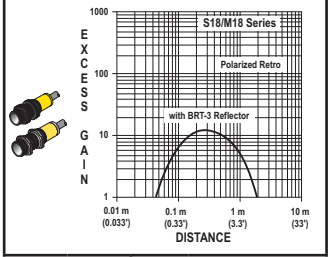
Range: 20 m | LED: ○

Retroreflective Mode S18/M18



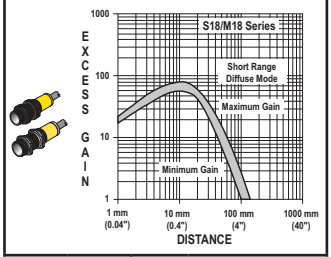
Range: 2 m | LED: ○

Polarized Retroreflective Mode S18/M18



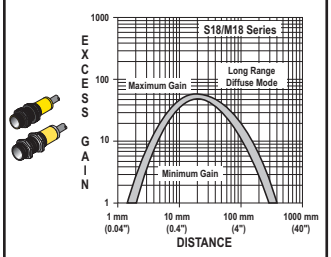
Range: 2 m | LED: P

Diffuse Mode S18/M18



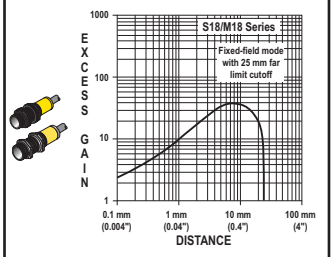
Range: 100 mm | LED: ○

Diffuse Mode S18/M18



Range: 300 mm | LED: ○

Fixed-Field Mode S18/M18



Cutoff: 25 mm | LED: ○

Ø 10 mm spot size @ 8 mm focus
Ø 10 mm spot size @ 25 mm cutoff

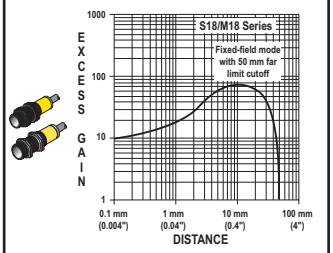
† Using 18% gray test card: Cutoff distance will be 95% of value shown.
† Using 6% black test card: Cutoff distance will be 90% of value shown.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves (Diffuse and Fixed-Field mode performance based on 90% reflectance white test card†)

○ = Infrared LED P = Visible Red LED Polarized

Fixed-Field Mode S18/M18

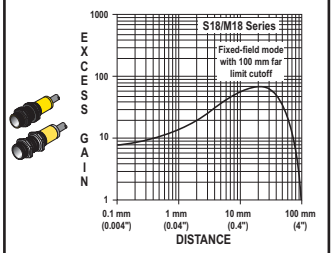


Ø 10 mm spot size @ 10 mm focus
Ø 10 mm spot size @ 50 mm cutoff

† Using 18% gray test card: Cutoff distance will be 90% of value shown.
† Using 6% black test card: Cutoff distance will be 85% of value shown.

Cutoff: 50 mm | LED: ○

Fixed-Field Mode S18/M18



Ø 10 mm spot size @ 20 mm focus
Ø 10 mm spot size @ 100 mm cutoff

† Using 18% gray test card: Cutoff distance will be 85% of value shown.
† Using 6% black test card: Cutoff distance will be 75% of value shown.

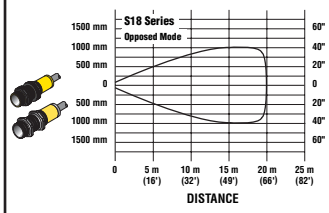
Cutoff: 100 mm | LED: ○

Beam Patterns (Diffuse mode performance based on 90% reflectance white test card)

○ = Infrared LED P = Visible Red LED Polarized

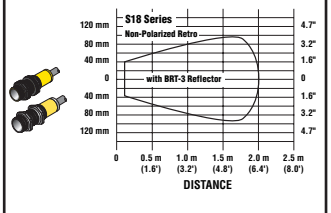
Opposed Mode S18/M18

Effective Beam: 13 mm



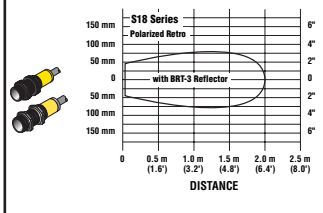
Range: 20 m | LED: ○

Retroreflective Mode S18/M18



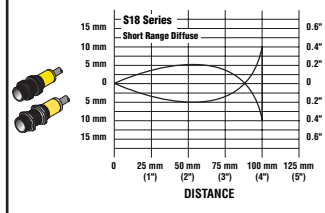
Range: 2 m | LED: ○

Polarized Retroreflective Mode S18/M18



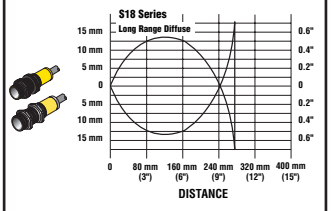
Range: 2 m | LED: P

Diffuse Mode S18/M18



Range: 100 mm | LED: ○

Diffuse Mode S18/M18



Range: 300 mm | LED: ○

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Clear Object

Clear object detection sensors reliably and quickly detect clear, transparent and mirror-like surfaces with various visible red laser or ultrasonic sensor models for high precision detection.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Max Sensing Range	Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	QS30 The QS30 reliably detects clear, translucent and opaque objects faster than other clear object detection sensor options. page 456	Retro: 2 m	44 x 22 x 33 mm	IP67	ABS	10 to 30 V dc
	Q26 Coaxial optics enable reliable detection of clear, translucent or opaque objects including mirror-like surfaces. page 458	Coaxial Polar Retro: 800 mm	52.3 x 45 x 25 mm	IP67	ABS	12 to 30 V dc
	OMNI-BEAM Modular self-contained photoelectric sensors can be customized for specific applications and offer reliable clear object detection. page 460	Polar Retro: 4 m	H (varies by model) 44.5 x 54.6 mm	IP66	Thermoplastic polyester	10 to 30 V dc
	MINI-BEM Universal housing design with 18 mm threaded lens; an ideal replacement for other sensor styles. page 464	Polar Retro: 1 m	33.3 x 12 53.1 mm	IP67	Thermoplastic polyester	10 to 30 V dc

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



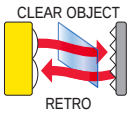
QS30
Right-Angle Clear Object Detection Sensors

The QS30 reliably detects clear, translucent and opaque objects faster than other clear object detection sensor options.

- Three selectable thresholds based on type of target being detected
- Easy configuration of sensor via push buttons or remote wire
- Rugged housing rated to IP67 NEMA 6
- Compact housing with mounting versatility

QS30 *Expert*™, 10-30 V DC

Visible Red LED

Sensing Mode	Laser Class	Range	Connection	Model Bipolar NPN/PNP
	—	100 mm to 2 m†	2 m	QS30ELVC
			5-pin Euro QD	QS30ELVCQ

Connection options: A model with a QD requires a mating cordset (see page 457).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS30ELVC W/30).

† BRT-2X2LVC and BRT40X19A retroreflectors are included with sensor.

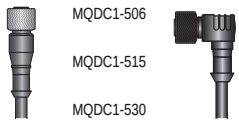
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 912

Length	Threaded 5-Pin Straight	Threaded 5-Pin Right-Angle
1.83 m	MQDC1-506	MQDC1-506RA
4.57 m	MQDC1-515	MQDC1-515RA
9.14 m	MQDC1-530	MQDC1-530RA



Additional cordset information available. See page 904.

Brackets

QS30

See page 869	See page 871	See page 872	See page 871
SMB30A	SMBQS30L	SMBQS30YL	SMBQS30Y



Additional brackets and information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966







Retroreflective Expert Models
Suffix ELVC

QS30 *Expert*™ Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at less than 25 mA, exclusive of load
Output Protection Circuitry	Protected against output short-circuit, continuous overload, transient over-voltages and false pulse on power-up
Sensing Beam	660 nm visible Red
Supply Protection Circuitry	Protected against reverse polarity; over voltage and transient voltages
Output Configuration	**Bipolar:** One NPN (current sinking) and one PNP (current sourcing); Light Operate (LO) or Dark Operate (DO) configurable
Output Response Time	500 microseconds
Delay at Power-up	250 milliseconds; outputs do not conduct during this time
Repeatability	150 microseconds
Adjustments	2 push buttons and remote wire for TEACH programming and configuration See data sheet for detailed information
Indicators	2 LEDs: **Green:** Power ON **Yellow:** Output conducting See data sheet for more detailed information
Construction	PC/ABS housing with acrylic lens cover
Environmental Rating	IEC IP67 (NEMA 6); PW12 1200 PSI washdown
Connections	5-conductor 2 m or 9 m attached PVC cable, or 5-pin Euro-style quick-disconnect fitting. QD cordset are ordered separately. See page 457.
Operating Conditions	**Temperature:** -10° to +55° C **Relative humidity:** 95% @ 55° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz max., double amplitude 0.06-inch acceleration 10G). Also meets IEC 947-5-2 requirements: 30G, 11 milliseconds duration, half-sine wave.
Application Note	If supply voltage is > 24 V dc, derate maximum output current 1 mA/°C above 25° C
Certification	CE
Hookup Diagrams	DC08: (p. 975)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

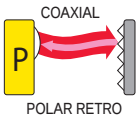


Q26
Clear Object Sensors

Coaxial optics enable reliable detection of clear, translucent or opaque objects including mirror-like surfaces.

- Simple setup with a single turn sensitivity adjustment potentiometer
- Compact design ideal when space is limited
- Rugged ABS housing with glass window

Q26, 12-30 V DC

Sensing Mode	Range	Connection	Models NPN	Models PNP
	5-800 mm sensor to reflector distance with no detection	4-pin Pico QD	Q26NXLPQ7	Q26PXLPQ7
		4-pin Euro Pigtail QD	Q26NXLPQ5	Q26PXLPQ5



Connection options: A model with a QD requires a mating cordset (see page 459).

For a 9 m cable, add suffix W/30 to the 2 m model number (example, Q26NXLPQ7 W/30)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA

Pico QD

See page 906

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
2.00 m	PKG4M-2	PKW4M-2
5.00 m	PKG4M-5	PKW4M-5
9.00 m	PKG4M-9	PKW4M-9

Additional cordset information available. See page 904.

Brackets

Q26

See page 868	See page 868
SMBLSTDLQ26	SMBLSTQ26




Additional brackets and information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966



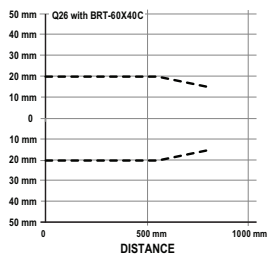

Q26 Specifications

Supply Voltage and Current	12 to 30 V dc (10% maximum ripple within specified limits); supply current (exclusive of load current): 15mA
Supply Protection Circuity	Protected against reverse polarity and transient voltages
Output Configuration	Primary output (pin 2) NPN or PNP (current sinking or sourcing), depending on model; second output (pin 4) is a Health mode output
Output Rating	100 mA max OFF-state leakage current: less than 1 microamp @ 30 V dc ON-state saturation voltage: less than 1 V @ 10 mA dc; less than 1.5 V @ 150 mA dc
Output Protection Circuitry	Protected against false power-up and continuous overload or short circuit of outputs
Output Response Time	250 µS ON and OFF
Repeatability	50 microseconds
Indicators	Green steady: Power ON Yellow steady: Output conducting
Construction	ABS plastic housing; glass window
Operating Conditions	Temperature: -10º to +55º C Relative Humidity: 90% at 50º; non-condensing
Environmental Rating	Leakproof design rated IP67
Connection	4-pin Threaded/Snap M8/Pico-Style QD connector or 4-pin 150 mm (6") Euro-style pigtail QD with PVC cable jacket depending on model. QD cordsets are ordered separately. See page 459.
Vibration and Shock	EN60068-2-6 and EN60068-2-27
Certifications	CE cULus LISTED
Hookup Diagrams	DC23 (p. 979)

Beam Patterns

P = Visible Red LED Polarized

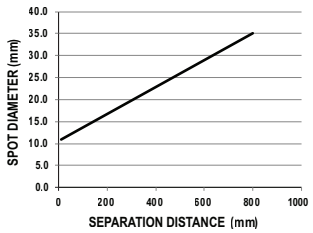
Polarized Retroreflective Mode Q26



Range: 800 mm | LED: P

Spot Diameter

Polarized Retroreflective Mode Q26



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



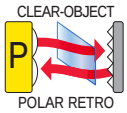
OMNI-BEAM™
Rectangular Modular Sensors

Modular self-contained photoelectric sensors can be customized for specific applications and offer reliable clear object detection.

- Includes a sensor head and power block with optional timing logic module
- Offers interchangeable AC or DC power blocks
- Features exclusive multiple-LED system that display received signal strength, sensing contrast and seven different warnings
- Cordsets and brackets see page 462

OMNI-BEAM™ Sensor Heads

Visible Red LED

Sensing Mode	Range	Supply Voltage	Response & Repeatability	Models
	4 m†	Provided by Power Block	Response: 4 ms Repeatability: 0.2 ms	OSBLVAGC

For more specifications see page 463.

† Retroreflective range is specified using one model BRT-3 retroreflector. Actual sensing range may differ, depending on efficiency and reflective area of the retroreflector in use. See Accessories for more information.
NOTE: Sensor heads require a power block.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

OMNI-BEAM™ Power Blocks, DC

Connection	Supply Voltage	Output Type	Models
2 m 4-Pin Mini QD 4-Pin Euro QD	10-30 V dc	Bi-Modal™ NPN or PNP Two outputs: Load and Alarm	OPBT2 OPBT2QD OPBT2QDH
2 m 4-Pin Mini QD 4-Pin Euro QD	10-30 V dc	No output: for powering emitter-only sensor heads	OPBTE OPBTEQD OPBTEQDH

OMNI-BEAM™ Power Blocks, AC

Connection	Supply Voltage	Output Type	Models
2 m 5-Pin Mini QD	105-130 V ac	SPST solid-state ac relay Two outputs: Load and Alarm	OPBA2 OPBA2QD
2 m 5-Pin Mini QD	210-250 V ac		OPBB2 OPBB2QD
2 m 5-Pin Mini QD	105-130 V ac	No output: for powering emitter only sensor heads	OPBAE OPBAEQD
2 m 5-Pin Mini QD	210-250 V ac		OPBBE OPBBEQD



STEP 1: Choose a power block for the required sensor power (ac or dc) and interface.

STEP 3: Choose an timing logic module (Optional)

STEP 4: Plug and bolt components together without interwiring.

OMNI-BEAM modular components are sold separately. The three modular components, and the lenses, can be replaced in the field.

OMNI-BEAM™ Timing Logic Modules

Type	Logic Function	Timing Ranges	Models
Delay Timer Logic Module	ON-DELAY or OFF-DELAY or ON/OFF DELAY	ON-Delay: 0.01-1 sec., 0.15-15 sec., or none OFF-Delay: 0.01-1 sec., 0.15-15 sec., or none	OLM5
Pulse Timer Logic Module	ONE-SHOT pulse timer or DELAYED ONE-SHOT logic timer	Delay: 0.01-1 sec., 0.15-15 sec., or none Pulse: 0.01-1 sec., 0.15-15 sec.	OLM8
Pulse Timer Logic Module	ONE-SHOT pulse timer or DELAYED ONE-SHOT logic timer	Delay: 0.002-0.1 sec., 0.03-1.5 sec., or none Pulse: 0.002-0.1 sec., 0.03-1.5 sec.	OLM8M1

For information on Timing Diagrams, see data sheet

For more specifications see page 463.

Connection options: A model with a QD requires a mating cordset (see page 462).

For 9 m cable, add suffix W/30 to the 2 m model number (example, OPBT2 W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA



Pico QD

See page 928

Length	Threaded 4-Pin Straight	Threaded 5-Pin Straight
1.83 m	MBCC-406	MBCC-506
3.66 m	MBCC-412	MBCC-512
9.14 m	MBCC-430	MBCC-530



Additional cordset information available. See page 904.

Brackets

OMNI-BEAM

See page 869	See page 869	See page 870
SMB30A	SMB30FA..	SMB30SC

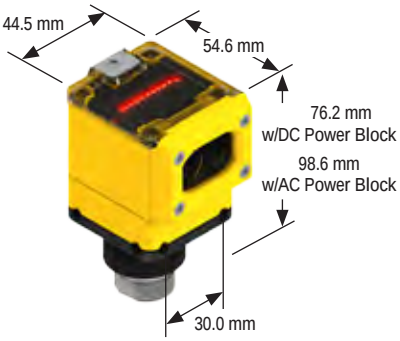


Additional brackets and information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966





Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

OMNI-BEAM™ Sensor Head Specifications

Supply Voltage and Current	Supplied by OMNI-BEAM power block. See data sheet.
Output Response Time	See individual sensing heads for response times. See page 463.
Delay at Power-up	200 milliseconds; outputs are non-conducting during this time
Adjustments	Four programming DIP switches SWITCH #1 selects the amount of sensing hysteresis SWITCH #2 selects the alarm output configuration SWITCH #3 selects Light Operate (switch #3 OFF) or Dark Operate (switch #3 ON) SWITCH #4 selects the STANDARD (switch #4 OFF) or Fine (switch #4 ON) scale factor for the D.A.T.A. light signal strength indicator array Sensitivity: 15-turn slotted brass screw Gain (sensitivity) adjustment potentiometer
Indicators	Sense and Load indicator LEDs are located on the top of the sensor head on either side of the D.A.T.A. array Sense LED indicates when a target has been sensed Load LED lights whenever the load (sensor output) is energized Also, Banner's exclusive, D.A.T.A. sensor self-diagnostic system located on the top of the sensor head warns of marginal sensing conditions usually before a sensing failure occurs (except on model OSBFAC)
Construction	Sensor heads are molded of rugged thermoplastic polyester; top view window is polycarbonate; acrylic lenses; stainless steel hardware
Environmental Rating	Meets NEMA standards 1, 2, 3, 3S, 4, 12, and 13; IEC IP66 when assembled to power block
Operating Conditions	Temperature: -40° to +70° C Relative humidity: 90% at 50° C (non-condensing)
Certifications	

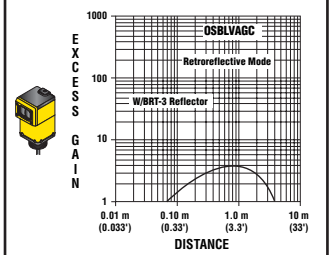
OMNI-BEAM™ Timing Logic Module Specifications

Response Time	A disabled timing function adds no measurable sensing response time
Timing Adjustments	All logic modules feature 15-turn clutched potentiometers for accurate timing adjustments. The logic module slides into the sensor head housing and interconnects without wires. Timing adjustments are easily accessible at the top of the sensor head and are protected by the sensor's transparent cover.
Timing Repeatability	± 2% of timing range (max.); assumes conditions of constant temperature and power supply
Time Range	Useful range is from maximum time down to 10% of maximum (all models); when timing potentiometer is set fully counterclockwise, time will be approximately 1% of maximum for models OLM5 and OLM8, and 2% of maximum for model OLM8M1
Operating Conditions	Temperature: -40° to +70° C Relative humidity: 90% at 50° C (non-condensing)
Certifications	

Excess Gain Curves

■ = Visible Red Clear Object Detection Polarized

Polarized Retroreflective Mode OMNI-BEAM™



Range: 4 m	LED: ■

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



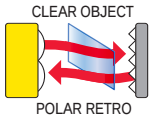
MINI-BEAM
Clear Object Sensor with Mounting Versatility

Universal housing design with 18 mm threaded lens; an ideal replacement for hundreds of other sensor styles. Available in eight modes with a compact housing for limited space setups.

- Versatile sensor with several mounting options
- Meets IP67 and NEMA 6 standards for harsh environment
- Universal housing design
- All-purpose, go-to sensor for many application needs

MINI-BEAM® *Expert*, 10-30 V DC

Visible Red LED

Sensing Mode/LED	Range	Connection	Output	Models
	1 m	2 m	Bipolar NPN/PNP	SME312LPC*
		5-Pin Euro QD		SME312LPCQD*

For more specifications see page 466.

Connection options: A model with a QD requires a mating cordset (see page 465).

For 9 m cable, add suffix W/30 to the 2 m model number (example, SME312D W/30).

* NOTE: For clear object detection, sensing range varies, according to the efficiency and reflective area of the retroreflector(s) used.
For these low-contrast applications, the model BRT-2X2 reflector is recommended and is included with each SME312LPC(QD) sensor.
- For applications with high vibration, the model BRT-51X51BM, with its micro-prism geometry, is recommended.
- For long-range applications, the BRT-77X77C reflector provides a range up to 2 m.
- SME312LPC(QD) are for use with corner cube type reflectors only; reflective tape is not recommended.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD for DC and *Expert* models

See page 908

Length	Straight 4-Pin	Straight 5-Pin	Right-Angle 4-Pin	Right-Angle 5-Pin
1.83 m	MQDC-406	MQDC1-506	MQDC-406RA	MQDC1-506RA
4.57 m	MQDC-415	MQDC1-515	MQDC-415RA	MQDC1-515RA
9.14 m	MQDC-430	MQDC1-530	MQDC-430RA	MQDC1-530RA





Additional cordset information available. See page 904.

Brackets

MINI-BEAM

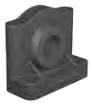
See page 859	See page 860	See page 866	See page 862	See page 861
SMB18A	SMB18FA..	SMB18SF	SMB312B	SMB3018SC









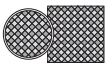




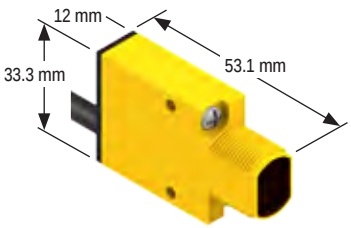
Additional brackets and information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966







MINI-BEAM dc
Suffix EPD and RPD

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

MINI-BEAM® *Expert*™ Specifications

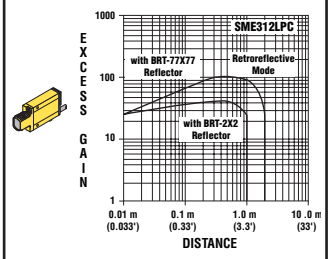
Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at less than 45 mA, exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Bipolar:** One current sourcing (PNP) and one current sinking (NPN) open-collector transistor Configuration in TEACH sequence for Light Operate (LO) or Dark Operate (DO)
Output Rating	150 mA max. each output at 25° C, derated to 100 mA at 70° C (derate ≈ 1 mA per ° C) **OFF-state leakage current:** less than 5 µA @ 30 V dc **Output saturation voltage (PNP output):** less than 1 V at 10 mA and less than 2 V at 150 mA **Output saturation voltage (NPN output):** less than 200 mV at 10 mA and less than 1 V at 150 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs
Output Response Time	Sensors will respond to either a “light” or a “dark” signal of 500 microseconds or longer duration, 1 kHz max.
Delay at Power-up	1 second; outputs do not conduct during this time
Repeatability	100 microseconds (all models)
Adjustments	Push-button TEACH mode sensitivity setting; remote TEACH mode input is provided (gray wire)
Indicators	**Two LEDs:** Yellow and Bicolor Green/Red **Green:** power ON **Red:** OFF when no signal is received **Yellow (TEACH Mode):** ON to indicate sensor is ready to learn output ON condition OFF to indicate sensor is ready to learn output OFF condition **Yellow (RUN Mode):** ON when outputs are conducting See data sheet for more detailed information
Construction	Reinforced thermoplastic polyester housing, totally encapsulated, o-ring seal, acrylic lenses, and stainless steel screws
Environmental Rating	Meets NEMA standards 1, 2, 3, 3S, 4, 4X, 6, 12, and 13; IEC IP67
Connections	PVC-jacketed 5-conductor 2 m or 9 m unterminated cable, or 5-pin Euro-style quick-disconnect (QD) fitting are available. QD cordsets are ordered separately. See page 465.
Operating Conditions	**Temperature:** -20° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Application Notes	The first condition presented during TEACH mode becomes the output ON condition
Certifications	CE c UL US
Hookup Diagrams	DC08 (p. 975)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

■ = Visible Red Clear Object Detection Polarized

Retroreflective Mode MINI-BEAM® *Expert*™

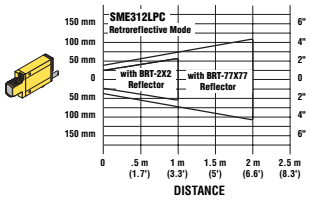


Range: 1 m	LED: ■

Beam Patterns

■ = Visible Red Clear Object Detection Polarized

Polarized Retroreflective Mode MINI-BEAM® *Expert*™



Range: 1 m	LED: ■



Temperature

Temperature sensors are passive, non-contact sensors that are able to detect a change as small as 3° C.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Temperature Measurement Range	Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	M18T A small, self-contained design with easy to use TEACH mode programming. page 470	0 to 300° C	H (varies by model) ø18 mm	IP67	304 Stainless Steel	10 to 30 V dc

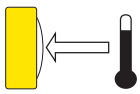


M18T
Rugged Temperature Sensors

The M18T has a small, self-contained design and has easy-to-use TEACH mode programming.

- Rugged, encapsulated design for harsh environments
- Remote Teach available in both Static and Dynamic modes
- Fast 25 ms response time (up to 20Hz switching speed)
- Product motion not required for sensing
- Cordsets and brackets see page 472

Discrete M18T, 10-30 V DC

Sensing Mode	D:S Ratio*	Sensing Face	Connection	Output	Models
 TEMPERATURE	8:1	Integrated lens	2 m 5-Pin Euro QD	Bipolar (NPN and PNP)	M18TB8 M18TB8Q
	6:1	Enclosed plastic face (for food industry use)	2 m 5-Pin Euro QD		M18TB6E M18TB6EQ
	14:1	Germanium lens	2 m 5-Pin Euro QD		M18TB14 M18TB14Q

For more specifications see page 473.

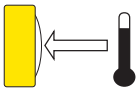
Connection options: A model with a QD requires a mating cordset (see page 472).

For 9 m cable, add suffix W/30 to the 2 m model number (example, M18TB8 W/30).

* For D:S ratio information see page 473

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Analog M18T, 12-30 V DC

Sensing Mode	D:S Ratio*	Sensing Face	Connection	Output	Models
 TEMPERATURE	8:1	Integrated lens	2 m 5-Pin Euro QD	0 to 10 V dc analog, plus PNP Alarm	M18TUP8 M18TUP8Q
	6:1	Enclosed plastic face (for food industry use)	2 m 5-Pin Euro QD		M18TUP6E M18TUP6EQ
	14:1	Germanium lens	2 m 5-Pin Euro QD		M18TUP14 M18TUP14Q
	8:1	Integrated lens	2 m 5-Pin Euro QD	4 to 20 mA analog, plus PNP Alarm	M18TIP8 M18TIP8Q
	6:1	Enclosed plastic face (for food industry use)	2 m 5-Pin Euro QD		M18TIP6E M18TIP6EQ
	14:1	Germanium lens	2 m 5-Pin Euro QD		M18TIP14 M18TIP14Q

For more specifications see page 473.

Connection options: A model with a QD requires a mating cordset (see page 472).

For 9 m cable, add suffix W/30 to the 2 m model number (example, M18TTUP8 W/30).

* For D:S ratio information see page 473

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD with Shield (for Q models)

See page 913

Length	Threaded 5-Pin			
	Straight		Right-Angle	
1.83 m		MQDEC2-506		MQDEC2-506RA
4.57 m		MQDEC2-515		MQDEC2-515RA
9.14 m		MQDEC2-530		MQDEC2-530RA

Additional cordset information available.
See page 904.

Brackets

M18T

See page 859	See page 861
SMB18A	SMB18SF
	

Additional bracket information available.
See page 846.



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

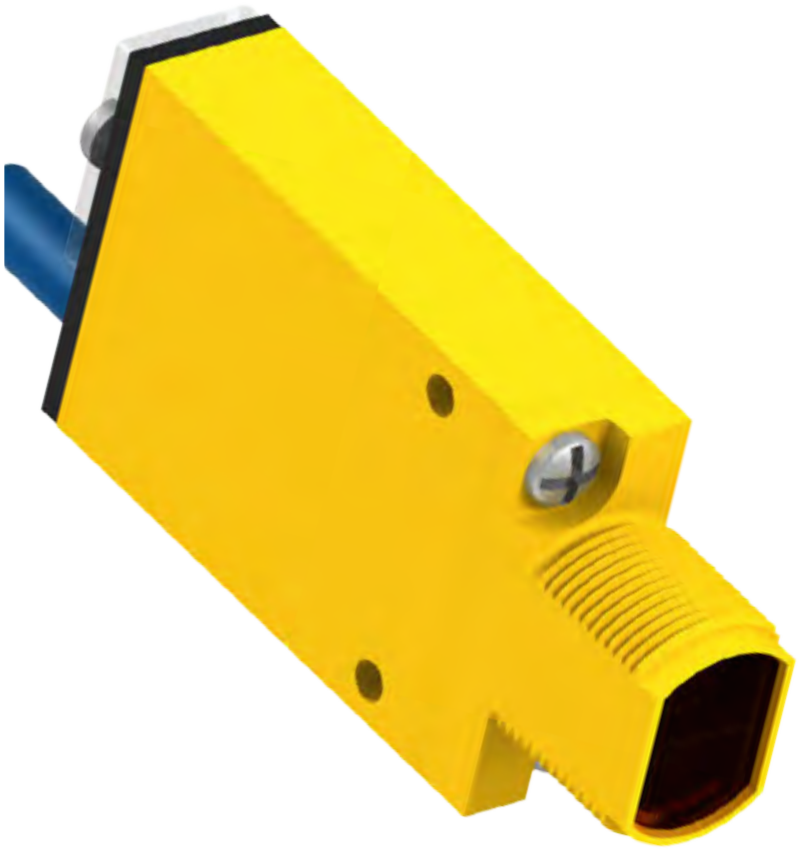
M18T Specifications

Supply Voltage and Current	**Discrete models**: 10 to 30 V dc (10% max. ripple) **Analog models**: 12 to 30 V dc (10% max. ripple)
Supply Protection Circuitry	Protected against short circuit conditions
Output Rating	**Analog Voltage:** 2.5 kΩ minimum load resistance **Analog Current:** 1 kΩ max. @ 24 V input; max. load resistance = [(Vcc -4)/0.02]Ω **For current output (4-20mA models):** Ideal results are achieved when the total load resistance R = [(Vin - 4)/0.02] Ω **Example**, at Vin = 24 V dc, R ~= 1kΩ (1 watt) **Alarm: Off-state leakage:** < 10 microamps; **Saturation**: < 1.2 V @ 10 mA and < 1.6 V @ 100 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs
Sensing Field of View	Distance from Sensor Face Versus Sport Size

D:S ratio	100	200	300	400	500	600	700	800	900	1000	Distance (mm)
6:1	17	33	50	67	83	100	117	133	150	167	Spot size (mm)
8:1	13	25	38	50	63	75	88	100	113	125	
14:1	7	14	21	39	36	43	50	57	64	71	

Construction	**Threaded Barrel:** 304 stainless steel **Push Button Housing:** ABS/PC **Push Button:** Santoprene
Environmental Rating	IEC IP67; NEMA 6
Operating Conditions	**Temperature:** -20° to +70° C
Certification	CE (some models pending. Contact factory for additional information)
Hookup Diagrams	See data sheet

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Hazardous Area

Sensors for hazardous areas are ideal for environments or locations with possibility of fire or explosion. Extensive approvals ensure sensors are safe to use in classified areas or zones.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Max Sensing Range	Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	MINI-BEAM Ideal for hazardous environments with approved switching amplifiers that have intrinsically safe input circuits. page 476	Opposed: 6 m Retro: 5 m Retro Polarized: 2 m Convergent: 43 mm Diffuse: 380 mm Glass/Plastic Fiber: Varies	30.7 x 12.2 x 66 mm	IP67	Thermoplastic Polyester	5 to 15 V dc
	Q45 NAMUR A specialized sensor for explosive environments meeting intrinsically safe standards to ensure it is safe for use in hazardous areas. page 480	Opposed: 6 m Retro: 9 m Retro Polarized: 6 m Convergent: 100 mm Diffuse: 1 m Glass/Plastic Fiber: Varies	87.6 x 44.5 (D varies by model)	IP67	Thermoplastic Polyester	5 to 15 V dc
	SMI30 An extremely rugged and powerful intrinsically safe barrel sensor designed for the most demanding hazardous area sensing applications. page 484	Opposed:140 m	ø30 x 102 mm	IP67	Thermoplastic Polyester	10 to 30 V dc

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



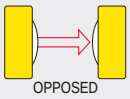
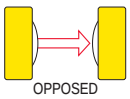
MINI-BEAM® NAMUR
Compact Sensors for Hazardous Areas

The MIAD9 series NAMUR models are ideal for hazardous environments with approved switching amplifiers that have intrinsically safe input circuits.

- Available in opposed, retroreflective, convergent, diffuse and fiber optic modes
- Infrared or visible red sensing beam
- Industry standard mounting holes
- Cordsets and brackets see page 478

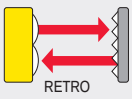
Opposed MINI-BEAM®, 5-15 V DC

Infrared LED

Sensing Mode	Range	Connection	Output	Models
 OPPOSED	6 m	2 m 4-Pin Euro QD	—	MI9E Emitter MI9EQ Emitter
 OPPOSED	6 m	2 m 4-Pin Euro QD	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9R MIAD9RQ

Retro & Polar Retro MINI-BEAM®, 5-15 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 RETRO	5 m†	2 m 4-Pin Euro QD	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9LV MIAD9LVQ
 POLAR RETRO	50 mm - 2 m†	2 m 4-Pin Euro QD	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9LVAG MIAD9LVAGQ

For more specifications see page 479.

Connection options: A model with a QD requires a mating cordset (see page 478).

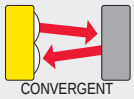
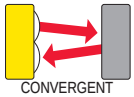
For 9 m cable, add suffix W/30 to the 2 m model number (example, MIAD9LV W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector. Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories section for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

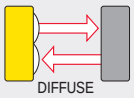
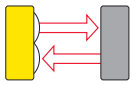
Convergent MINI-BEAM®, 5-15 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 CONVERGENT	16 mm	2 m	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9CV
		4-Pin Euro QD		MIAD9CVQ
 CONVERGENT	43 mm	2 m	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9CV2
		4-Pin Euro QD		MIAD9CV2Q

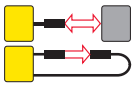
Diffuse MINI-BEAM®, 5-15 V DC

Infrared LED

Sensing Mode	Range	Connection	Output	Models
 DIFFUSE	380 mm	2 m	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9D
		4-Pin Euro QD		MIAD9DQ
 DIVERGENT DIFFUSE	75 mm	2 m	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9W
		4-Pin Euro QD		MIAD9WQ

MINI-BEAM® NAMUR Sensors, 5-15 V DC

Infrared LED

Sensing Mode	Range	Connection	Output	Models
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9F
		4-Pin Euro QD		MIAD9FQ

For more specifications see page 479.

Connection options: A model with a QD requires a mating cordset (see page 478).

For 9 m cable, add suffix W/30 to the 2 m model number (example, MIAD9LV W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

NAMUR Euro QD (for Q models)

See page 909

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQD9-406	MQD9-406RA
4.57 m	MQD9-415	MQD9-415RA

Additional cordset information available. See page 904.

Brackets

MINI-BEAM

See page 862	See page 860	See page 862
SMB312PD	SMB18FA..	SMB312B



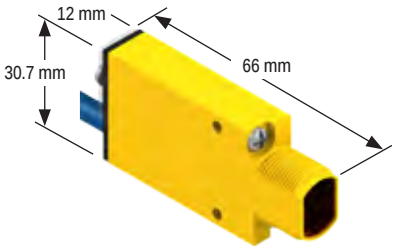


Additional brackets and information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966



MINI-BEAM NAMUR
Retroreflective, Diffuse and
Convergent Models
Suffix E, R, LV, D and CV

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

MINI-BEAM® NAMUR Specifications

Supply Voltage	5 to 15 V dc (provided by the amplifier to which the sensor is connected)
Output	**Constant current output:** ≤ 1.2 mA in the "dark" condition and ≥ 2.1 mA in the "light" condition
Output Response Time	**Opposed receiver:** 2 milliseconds ON/400 microseconds OFF **All others:** 5 milliseconds ON/OFF (does not include amplifier response)
Adjustments	GAIN (sensitivity) adjustment potentiometer
Indicators	Red LED Alignment Indicator Device (AID) located on rear panel lights when the sensor sees a "light" condition; pulse rate is proportional to signal strength (the stronger the signal, the faster the pulse rate).
Construction	Reinforced thermoplastic polyester housing, totally encapsulated, o-ring sealing, acrylic lenses and stainless steel screws
Environmental Rating	Meets NEMA standards 1, 2, 3, 3S, 4, 4X, 6, 12 and 13; IEC IP67
Connections	PVC-jacketed 2-conductor 2 m or 9 m cables, or special 4-pin Euro-style quick-disconnect (QD) fitting are available; QD cordsets are ordered separately. See page 478.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Design Standards	MIAD9 Series sensors comply with the following standards: DIN 19 234, EN 50 014 Part 1. 1977, EN50 020 Part 7. 1977, Factory Mutual #3610 and 3611, CSA 22.2 #157-92 and 22.2 #213-M1987
Certifications	CE KEMA FM APPROVED ETL LISTED CSA
Hookup Diagrams	SP01 (p. 987)

APPROVALS

CSA:	#LR 41887	Instrinsically Safe, with Entity for: Class I, Groups A-D Class I, Div. 2, Groups A-D	FM:	#J.I. 5Y3A4.AX	Intrinsically Safe, with Entity for: Class I, II, III, Div. 1, Groups A-G Class I, II, III, Div. 2, Groups A-D and G
KEMA:	#03ATEX1441X	II IG EEx ia IIC T6	ETL:	#553868	

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



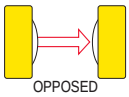
Q45 NAMUR
Rectangular Sensors for Hazardous Areas

The Q45 NAMUR is a specialized sensor for explosive environments meeting intrinsically safe standards to ensure it is safe for use in hazardous areas.

- Intrinsically safe dc models for potentially explosive environments
- For use with approved DIN 19 234 switching amplifiers
- 1.2 mA output or less in dark condition and 2.1 mA or more in light condition
- Cordsets and brackets see page 482

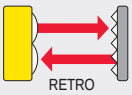
Opposed Q45, 5-15 V DC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Models
 OPPOSED	6 m	2 m 4-Pin Euro QD 2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q459E Emitter Q459EQ Emitter Q45AD9R Q45AD9RQ

Retro & Polar Retro Q45, 5-15 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
 RETRO	9 m†	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9LV Q45AD9LVQ
 POLAR RETRO	6 m†	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9LP Q45AD9LPQ

For more specifications see page 483.

Connection options: A model with a QD requires a mating cordset (see page 482).

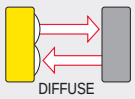
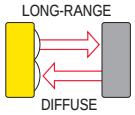
For 9 m cable, add suffix W/30 to the 2 m model number (example, Q459E W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector.
Actual sensing range may differ, depending on efficiency and reflective area of the retroreflector in use. See Accessories for more information.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

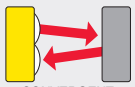
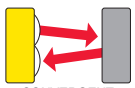
Diffuse Q45, 5-15 V DC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Models
 DIFFUSE	300 mm	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9D Q45AD9DQ
LONG-RANGE  DIFFUSE	1 m	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9DL Q45AD9DLQ

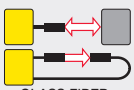
Convergent Q45, 5-15 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
 CONVERGENT	38 mm	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9CV Q45AD9CVQ
 CONVERGENT	100 mm	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9CV4 Q45AD9CV4Q

Glass & Plastic Fiber Q45, 5-15 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9F Q45AD9FQ
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9FV Q45AD9FVQ
 PLASTIC FIBER	Range varies by sensing mode and fiber optics used	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9FP Q45AD9FPQ

For more specifications see page 483.

Connection options: A model with a QD requires a mating cordset (see page 482).

For 9 m cable, add suffix W/30 to the 2 m model number (example, Q45AD9D W/30).

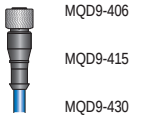
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

NAMUR Euro QD (for Q models)

See page 909

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQD9-406	MQD9-406RA
4.57 m	MQD9-415	MQD9-415RA
9.14 m	MQD9-430	MQD9-430RA





Additional cordset information available. See page 904.

Brackets

Q45

See page 869	See page 870
SMB30MM	SMB30SC

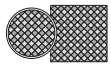




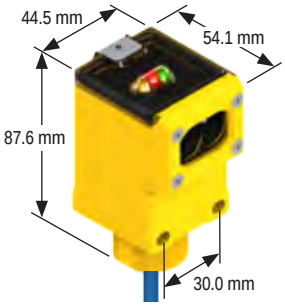
Additional bracket information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966



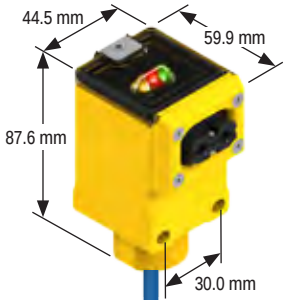




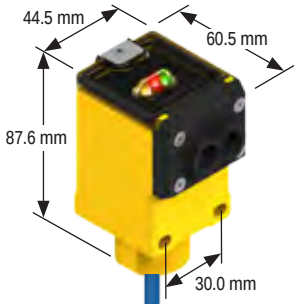
Opposed, Retroreflective and Diffuse Models
Suffix E, R, D, DL, LV and LP



Convergent Models
Suffix CV and CV4



Plastic Fiber Model
Suffix FP



Glass Fiber Models
Suffix F and FV

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q45 NAMUR Specifications

Supply Voltage and Current	5 to 15 V dc. Supply voltage is provided by the amplifier to which the sensor is connected.
Output	Constant current output: ≤ 1.2 mA in the dark condition and ≥ 2.1 mA in the light condition
Output Response Time	Opposed receiver: 2 milliseconds ON/0.4 milliseconds OFF All others: 5 milliseconds ON/OFF (does not include amplifier response)
Adjustments	Multi-turn sensitivity control on top of sensor
Indicators	Power (Red): LED (emitters only) lights whenever 5 - 15 V dc power is applied Signal (Red): LED lights whenever the sensor sees its modulated light source
Construction	Molded thermoplastic polyester housing, o-ring sealed transparent Lexan® top cover, molded acrylic lenses, and stainless steel hardware. Q45s are designed to withstand 1200 psi washdown. The base of cabled models has a ½" NPS integral internal conduit thread.
Environmental Rating	IP67; NEMA 6P
Connections	PVC-jacketed 2 m or 9 m cables, or 4-pin Euro-style quick-disconnect (QD) fitting are available. QD cordsets are ordered separately. See page 482.
Operating Conditions	Temperature: -40° to +70° C Relative humidity: 90% at 50° C (non-condensing)
Design Standards	Q45AD9 Series sensors comply with the following standards: DIN 19234, EN 50 014: 1977, EN 50 020: 2002
Certifications	CE, CSA Exia NRTL/C, KEMA, ETL, FM APPROVED
Hookup Diagrams	SP01 (p. 987)

Lexan® is a registered trademark of General Electric Co.

APPROVALS

CSA: #LR 41887	Intrinsically Safe, with Entity for Class I, Groups A-D Class I, Div. 2, Groups A-D	KEMA: #03 ATEX 1441x	II IG EEx ia IICTC
FM: #J.I. 5Y3A4.AX	Intrinsically Safe, with Entity for Class I, II, III, Div. 1, Groups A-G Class I, II, III, Div. 2, Groups A-D and G	ETL: #558044	Tested per FM and CSA as shown above

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



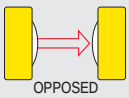
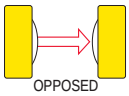
SMI30
Long-Range Barrel Sensors for Hazardous Areas

The SMI30 is an extremely rugged and powerful intrinsically safe barrel sensor designed for the most demanding hazardous area sensing applications.

- Certified as intrinsically safe for use in hazardous atmospheres as defined by Article 500 of the National Electrical Code, when used with approved "positive input" intrinsic safety barriers
- Certified by Factory Mutual and CSA as non-incendive devices when used in Division 2 locations (except Groups E and F) without intrinsic safety barriers

SMI30, 10-30 V DC, Frequency A†

⇨ Infrared LED

Sensing Mode	Range	Connection	Output Type	Response Time	Models
 OPPOSED	140 m	3-Pin Mini QD	—	10 ms	SMI306EQ
			NPN/LO		SMI30AN6RQ
			NPN/DO		SMI30RN6RQ
 OPPOSED	60 m	3-Pin Mini QD	—	1 ms	SMI306EYQ
			NPN/LO		SMI30AN6RYQ
			NPN/DO		SMI30RN6RYQ

Intrinsic Safety Kits for Use with SMI30 Intrinsically Safe Sensors

Model	Description
CI2BK-1	Includes a CI3RC2 current amplifier, one RS-11 socket, one DIN-rail mount and one single-channel intrinsically safe barrier
CI2BK-2	Includes a CI3RC2 current amplifier, one RS-11 socket, one DIN-rail mount and one dual-channel intrinsically safe barrier
CI3RC2	Current trip point amplifier
CIB-1	Single channel intrinsic safety barrier
CI2B-1	Dual channel intrinsic safety barrier

For more specifications see page 486.

Connection options: A model with a QD requires a special Mini-style mating cordset (see page 485).

† Modulation frequency "A" is standard; frequencies "B" and "C" are also available to minimize optical crosstalk potential between adjacent pairs and are specified by adding "B" or "C" at the end of the standard model number (example, SMI306EBQ or SMI306ECQ).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Mini QD

See page 928

Length		3-Pin	4-Pin
1.83 m		SMICC-306	MBCC-406
3.66 m		SMICC-312	MBCC-412
9.14 m		SMICC-330	MBCC-430



Additional cordset information available. See page 904.

Brackets

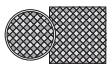
SMI30

See page 869	See page 869	See page 870
SMB30A	SMB30FA..	SMBAMS30P
		



Additional bracket information available. See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966
	



SMI30 Specifications

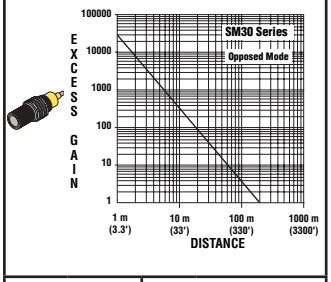
Supply Voltage and Current	**Emitters:** 10 to 30 V dc at 25 mA **Receivers:** 10 to 30 V dc at 15 mA max. Division 1 use, with barriers, requires minimum system supply voltage of 10 V.
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Receivers:** Current sinking NPN open-collector transistor
Output Rating	Three-wire hookup sinks 15 mA max. continuous, 10 to 30 V dc. Two-wire hookup sinks ≤10 mA
Output Protection Circuitry	Outputs are short circuit protected
Output Response Time	10 milliseconds or 1 millisecond ON/OFF, depending on models; independent of signal strength
Repeatability	**"A" frequency units:** 10 millisecond receiver is 1 milliseconds and 1 millisecond receiver is 360 microseconds **"B" frequency units:** 1.6 milliseconds **"C" frequency units:** 10 millisecond receiver is 2.3 milliseconds and 1 millisecond receiver is 210 microseconds Repeatability is independent of signal strength
Indicators	Internal Red LED lights whenever the receiver sees the emitter's modulated light source. Emitters have Red "power on" indicator LED. All indicators are visible through the lens or from side of the sensor.
Construction	30 mm diameter tubular threaded thermoplastic polyester housing, fully epoxy-encapsulated, positive sealing at both ends, quad-ring sealed acrylic lens. Two thermoplastic polyester jam nuts provided.
Environmental Rating	IP67; NEMA 6P
Connections	3-wire Mini-style quick-disconnect (QD) fitting. Use cordset models SMICC-3xx (p. 485). Cable electric properties: 40 pf/ft; 20 µH/ft. Order cable separately from sensor.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Certifications	CE CSA Exia ® NRTL/C KEMA FM APPROVED
Hookup Diagrams	See data sheet for detailed Hookup Diagrams.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Excess Gain Curves

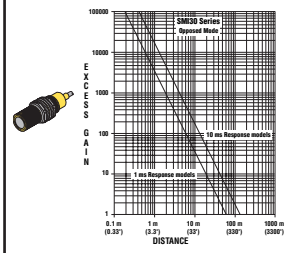
○ = Infrared LED

Opposed Mode SM30



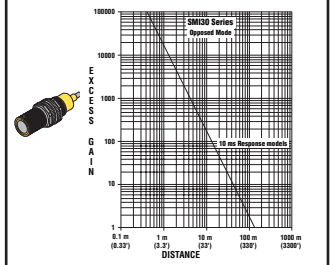
Range: 200 m | LED: ○

Opposed Mode SMI30 - Frequency A



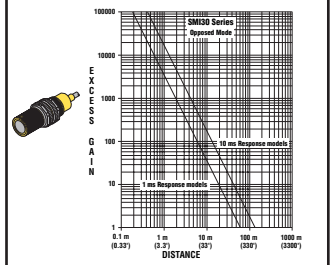
Range: 140 m | LED: ○

Opposed Mode SMI30 - Frequency B



Range: 140 m | LED: ○

Opposed Mode SMI30 - Frequency C



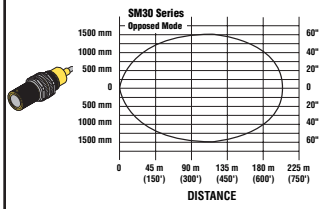
Range: 140 m | LED: ○

Beam Patterns

○ = Infrared LED

Opposed Mode SM30

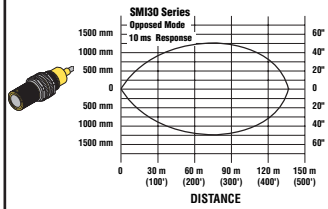
Effective Beam: 19 mm



Range: 200 m | LED: ○

Opposed Mode SMI30

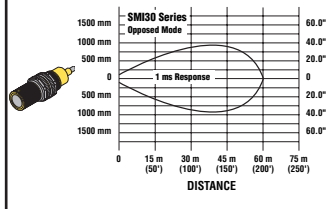
Effective Beam: 19 mm



Range: 140 m | LED: ○

Opposed Mode SMI30

Effective Beam: 22 mm



Range: 60 m | LED: ○



Vision

Banner's extensive line of vision sensors helps you find defects earlier in the manufacturing process. Banner offers standard and high-resolution gray scale, color and single and multi-purpose vision sensors. Add inspection capabilities where you need them.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

VISION

iVu page 490

*Presence*PLUS® page 499

VISION LIGHTING page 512

OTHER AVAILABLE MODELS



iVu BCR 400

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



iVu TG
Image Sensor

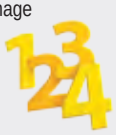
The first touch screen image sensor combines the simplicity of a photoelectric sensor and the intelligence of a vision sensor, providing high-performance inspection capabilities at your fingertips.

- Powerful, affordable inspection solution solves a wide variety of simple and complex applications
- First-time users can have it up and running in minutes
- Optional remote touch screen for programming
- Ability to change parameters on the fly
- Barcode reader options available see page 400
- Cordsets and brackets see page 493

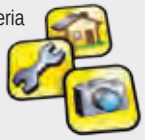
No PC required to configure, change or monitor
- Built-in or remote touch screen
- Self-contained sensor with easy configuration and convenient monitoring right on the sensor



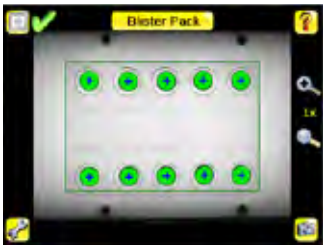
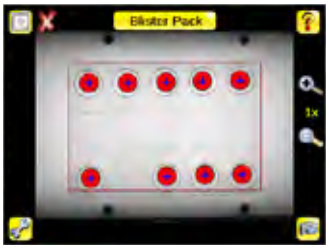
Installation and configuration in four easy steps
1. Install and connect the sensor
2. Select the sensor or bar code type, depending on model
3. Acquire a good image
4. Set inspection parameters



Intuitive operation with menu driven tools to guide you through setup
- Define region of interest
- Adjust intensity/contrast
- Define the pass criteria



iVu TG Sensor Types

Sensor Type	*Screen Interface Pass*	*Screen Interface Fail*
		
Match Sensor Compares a part to a reference to determine if there is a match		
		
Area Sensor Detects whether a particular feature (features) are present		
		
Blemish Sensor Finds flaws on parts		

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

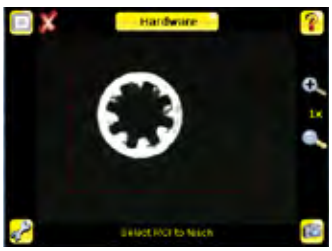


iVu Plus TG
Image Sensor

The first touch screen image sensor combines the simplicity of a photoelectric sensor and the intelligence of a vision sensor, providing high-performance inspection capabilities at your fingertips.

- Powerful, affordable inspection solution solves a wide variety of simple and complex applications
- Ability to change parameters on the fly
- Supports the ability to obtain results and command rapid product changeovers over TCP/IP, EtherNet/IP or Modbus/TCP protocols
- Provides the capability of storing and controlling up to 30 inspections for fast product change over
- All-inclusive image sensor with lens, light, IO and touch screen programming
- Barcode reader options available see page 400
- Cordsets and brackets see page 493

Additional iVu Plus TG (in addition to Standard TG Sensor Types)

Sensor Type	*Screen Interface Pass*	*Screen Interface Fail*
		
Multi-Point Inspection (Plus only) Use five to seven sensors in the same inspection		
		
Sort Sensor (Plus only) Recognize and sort up to ten different patterns in the same inspection		



Store up to 30 inspections for fast product turnover

Ethernet provides simplified communications and enhanced control of the sensor

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Choosing a TG model

Example Model Number IVUPTGR04

Platform

IVUP

Step One

IVU = Allows you to use the Match, Area or Blemish sensors

IVUP = Allows the three standard sensors plus Multi-Tool and Sort
Store up to 30 inspections
Ethernet connection

Model†

TG

Step Two

TG  Integrated touch screen

RG*  Remote touch screen. Choose between machine mount or handheld (sold separately see page 496).

I/O

Step Three

N = NPN output (current sinking)
P = PNP output (current sourcing)
Blank = Plus models are NPN/PNP selectable

Ring Light

R

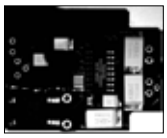
Step Four

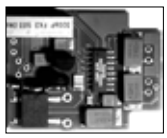
R = Red
B = Blue
G = Green
W = White
X = No Ring Light

I = Infrared
6 = UV365 nm
9 = UV395 nm
XC = C-mount**

Sample application


Original


Red Light


Blue Light

Lens

04

Step Five

04 = 4.3 mm
06 = 6 mm
08 = 8 mm
12 = 12 mm
16 = 16 mm
25 = 25 mm
Blank = No lens (only C-mount)

For more specifications see page 494.

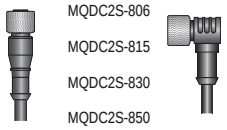
Display and cordsets ordered separately.
* Remote display is required for set up and viewing of sensors with a remote touch screen.
** Requires C-mount lens. See page 497.
† Barcode models available. See page 400

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Euro QD (TG models)

See page 916

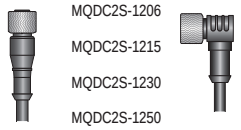
Length	Threaded 8-Pin (Open Shield) Straight	Right-Angle
1.83 m	MQDC2S-806	MQDC2S-806RA
4.57 m	MQDC2S-815	MQDC2S-815RA
9.14 m	MQDC2S-830	MQDC2S-830RA
15.2 m	MQDC2S-850	MQDC2S-850RA



Euro QD (Plus models)

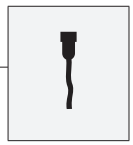
See page 922

Length	Threaded 12-Pin (Open Shield) Straight	Right-Angle
1.83 m	MQDC2S-1206	MQDC2S-1206RA
4.57 m	MQDC2S-1215	MQDC2S-1215RA
9.14 m	MQDC2S-1230	MQDC2S-1230RA
15.2 m	MQDC2S-1250	MQDC2S-1250RA



Power

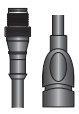
Select one



USB (TG models)

See page 919

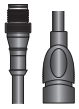
Length	8-Pin Euro QD to USB Used with Integrated Touch Screen Models Straight	Right-Angle	4-Pin Pico QD to USB Remote Touch Screen Straight
0.15 m	MQDEC-8005-USB	MQDEC-8005RA-USB	PSG-4M-4005-USB
0.30 m	MQDEC-801-USB	MQDEC-801RA-USB	PSG-4M-401-USB
0.90 m	MQDEC-803-USB	MQDEC-803RA-USB	PSG-4M-403-USB
3.00 m	MQDEC-810-USB	MQDEC-810RA-USB	PSG-4M-410-USB



USB (TG Plus models)

See page 907

Length	4-Pin Pico QD to USB Straight
0.15 m	PSG-4M-4005-USB
0.30 m	PSG-4M-401-USB
0.90 m	PSG-4M-403-USB
3.00 m	PSG-4M-410-USB



USB

Select one



Ethernet Communication (Plus only)

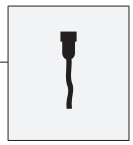
See page 933

Length	RJ45 to 4-Pin Pico QD Straight
2.00 m	IVUC-E-406
5.00 m	IVUC-E-415
9.00 m	IVUC-E-430
16.00 m	IVUC-E-450
23.00m	IVUC-E-475



Ethernet

Plus only



TG & Plus TG

See page 880	See page 880	See page 879	See page 880
SMBIVURAL*	SMBIVURAR*	SMBIVUB	SMBIVUU



* For orientation see page 880.

Mounting

Select one



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

iVu & iVu Plus Specifications

General	
Supply Voltage	10-30 V dc
Demo Mode	Full tool functionality on canned images
Sensor Lock	Optional password protection
Integrated Ring Light	Red, IR, Green, Blue, White, UV or no integrated ring light
Imager	1/3 inch CMOS 752 x 480 pixels; adjustable Field-of-View (FOV)
Lens Mount	M12 X 1 mm thread(c-mount lens); microvideo lens 4.3, 6, 8, 12, 16, 25 mm
Output Rating	150 mA
Exposure Time	0.1 milliseconds to 1.049 seconds
Construction	Black Valox™ sensor housing; acrylic window **iVu Plus Integrated:** Die cast zinc and Black Valox™
External Strobe Output	+ 5 V dc
Environmental Rating	IP67
Model Specific	
Power Connection	**iVu TG (integrated touch screen):** 8-pin Euro-style (M12) male connector **iVu TG (remote touch screen):** 12-pin Euro-style (M12) male connector **iVu Plus TG (integrated and remote touch screen):** 12-pin Euro-style (M12) male connector Accessory cordset required for operation; QD cordsets are ordered separately. See page 493.
Supply Current	**iVu TG:** 800 mA max. (exclusive of I/O load) **iVu Plus TG:** 850 mA max. (exclusive of I/O load)
USB 2.0 Host	**iVu TG (integrated touch screen):** 8-pin Euro-style (M12) female connector **iVu TG (remote touch screen):** 4-pin Pico-style (M8) female connector **iVu Plus TG (integrated and remote touch screen):** 4-pin Pico-style (M8) female connector Optional USB cordset required for operation of USB Thumb Drive. QD cordsets are ordered separately. See page 493.
Ethernet Connection	**iVu Plus TG:** 4-pin Pico-style (M8) male connector. Ethernet cordsets are ordered separately. See page 493.
Output Configuration	**iVu TG:** NPN or PNP determined by model **iVu Plus TG:** NPN or PNP, software selectable
Tools	**iVu TG:** Area, Blemish and Match **iVu Plus TG:** Area, Blemish, Match and Sort
Display	**Integrated touch screen:** 68.5 mm (2.7") LCD Color Integrated Display 320 x 240 pixels **Remote touch screen:** See RD35 Remote Display specifications (page 501).
Acquisition	**iVu TG (integrated and remote touch screen):** 100 fps (frames per second) max. **iVu Plus TG (integrated and remote touch screen):** 100 fps (frames per second) max.
Operating conditions	Stable Ambient Temperature: **iVu TG:** 0° to + 50° C **iVu Plus TG (integrated touch screen):** 0° to +50° C **iVu Plus TG (remote touch screen):** 0° to +40° C
Remote Display connection (Remote touch screen only)	8-pin Euro-style (M12) female connector Accessory cordset required for remote display; QD cordsets are ordered separately. See page 493.
Certifications	CE NOTE: iVu Plus remote must use Euro QD power cordset for CE compliance. See page 493.
Hookup Diagrams	**iVu Plus:** NPN: VS01 (p. 998) PNP: VS02 (p. 998) **iVu (Integrated Touch Screen):** NPN: VS05 (p. 999) PNP: VS06 (p. 999) **All others:** NPN: VS03 (p. 998) PNP: VS04 (p. 998)

iVu & iVu Plus BCR Specifications

See page 404

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

iVu Remote Display Specifications

Screen Size	3.5" diagonal
LCD Aspect Ratio	4:3
Display Resolution	320 x 240 RGB
Viewing Angle	60 degrees left, and 60 degrees right, 50 degrees up, and 55 degrees down
Housing Material	Zinc Zamac #3
Bracket Material	Delrin
Stylus	Delrin
Display Weight	4.8 oz
Bracket & Stylus Weight	1.1 oz
Connection	Molex HandyLink connector
Operating Temperature	0° to + 50° C



Sensors with
Integrated Touch Screen
(Standard iVu model shown)

RD35 Remote Touch Screen
(sold separately)



Sensors with
Remote Touch Screen



RDM35

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



RDM35
Machine-mountable Remote Display
Used for- programming & monitoring



RD35
Handheld Remote Display
Used for- programming

Remote Display Touch Screen

Description	Model
3.5" diagonal remote touch screen - Handheld	RD35
3.5" diagonal remote touch screen - Machine-mountable	RDM35

RDM35 Accessory Kits*

Description	Straight	Right-Angle
1 m cordset, bracket/docking station, stylus and hardware	IVURDM-QDK-803	IVURDM-QDK-803RA
2 m cordset, bracket/docking station, stylus and hardware	IVURDM-QDK-806	IVURDM-QDK-806RA
5 m cordset, bracket/docking station, stylus and hardware	IVURDM-QDK-815	IVURDM-QDK-815RA
9 m cordset, bracket/docking station, stylus and hardware	IVURDM-QDK-830	IVURDM-QDK-830RA
16 m cordset, bracket/docking station, stylus and hardware	IVURDM-QDK-850	IVURDM-QDK-850RA

* Bracket and cordsets are sold individually (see below)

RD35 Accessory Kits*

Description	Straight	Right-Angle
1 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-803	IVURD-MXK-803RA
2 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-806	IVURD-MXK-806RA
5 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-815	IVURD-MXK-815RA
9 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-830	IVURD-MXK-830RA
16 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-850	IVURD-MXK-850RA

* Bracket and cordsets are sold individually (see below)

Cordsets for remote display

Hand Held Remote Display

See page 920

Length	8-Pin Euro QD to Molex	
	Straight	Right-Angle
0.91 m	IVURD-MX-803	IVURD-MX-803RA
1.83 m	IVURD-MX-806	IVURD-MX-806RA
4.57 m	IVURD-MX-815	IVURD-MX-815RA
9.14 m	IVURD-MX-830	IVURD-MX-830RA
15.2 m	IVURD-MX-850	IVURD-MX-850RA

Additional cordset information available. See page 904.

Machine Mountable Remote Display

See page 920

Length	8-Pin Euro QD to Molex	
	Straight	Right-Angle
0.91 m	IVURDM-QD-803	IVURDM-QD-803RA
1.83 m	IVURDM-QD-806	IVURDM-QD-806RA
4.57 m	IVURDM-QD-815	IVURDM-QD-815RA
9.14 m	IVURDM-QD-830	IVURDM-QD-830RA
15.2 m	IVURDM-QD-850	IVURDM-QD-850RA

Brackets for remote display

Remote Display

SMBRD35	SMBKS	SMBRDM35

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Lenses

iVu & iVu Plus



4.3 mm Lens	LMF04
6 mm Lens	LMF06
8 mm Lens	LMF08
12 mm Lens	LMF12
16 mm Lens	LMF16
25 mm Lens	LMF25*

* 25 mm filter holder is purchased separately.

Filter Kits†

iVu & iVu Plus



Red	FLTMR
Dark Red	FLTMRDR
Blue	FLTMB
Green	FLTMG
Infrared	FLTMI*

* Infrared pass filters are preinstalled on infrared ring light models.
† Filter kits include 1 color and two sizes of filter holders.

Replacement Windows

iVu & iVu Plus

Focusing ring with optically clear glass	IVUW-G
Focusing ring with plastic window	IVUW
Replacement cover for touch screen	IVUBC

Sensor Interface Module

See page 970



• Sensor interface module for simplified wiring of iVu sensors in an electrical box

USB Drive

2 Gb USB Drive



IVU-USBFD2

Stylus

Stylus



STYLUS-1 (Qty 1)

STYLUS-10 (Qty 10)

C-mount Lens Covers*

iVu & iVu Plus



Lens cover 50 mm - plastic window — IVUSLC50-P



Lens cover 75 mm - plastic window — IVUSLC75-P

Accessories for C-Mount Lenses*



Description	Format Size	Model	Used With
Extension Kit (0.5, 1.0 , 5.0, 10, 20 and 40 mm)	—	LEK	All Lenses
Extension Kit (0.25 and 0.5 mm)		LEKS	
Lens Extender (increases focal length 2X)		LCF2X	
UV Lens Filter, Clear Glass	2/3"	FLTUV	Tamron Megapixel Lenses

Description	Model	Used With
Polarizing filter 25.5 mm	FLTPR032-25.5	iVu & *Presence*PLUS
Polarizing filter 27 mm	FLTPR032-27	
Polarizing filter 30.5 mm	FLTPR032-30.5	
Polarizing filter kits available		

C-Mount Color Filters*

Color	Description	Plastic Models	Glass Models
Infrared	High-pass filter blocks visible light and passes infrared light. Included with all Banner Infrared light sources.	FLTI (≥ 760 nm)	FLTI850 (810-990 nm)
Blue	Band-pass filter improves quality by helping to reduce ambient light; it passes blue and infrared light.	FLTB (400-525 nm)	FLTB470 (435-490 nm)
Green	Band-pass filter improves quality by helping to reduce ambient light; it passes green and infrared light.	FLTG (400-575 nm)	FLTG525 (495-565 nm)
Red	High-pass filter improves quality by helping to reduce ambient light; it passes red and infrared light.	FLTR (≥ 600 nm)	FLTR635 (600-660 nm)
Dark Red	High-pass filter improves quality by helping to reduce ambient light; it passes red and infrared light.	—	FLTR660 (650-680 nm)

* For C-Mount lenses see page 511

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



*Presence*PLUS®

Presence PLUS is a comprehensive family of vision systems that addresses a wide range of application needs, including high resolution and high speed inspections. One- or two-piece systems are available with a complete suite of location, inspection and analysis tools that can be used simultaneously for inspecting multiple features and solving complex applications.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Integrated I/O	Memory	Protection Rating	Housing Material	Power Supply
	***Presence*PLUS *Pro*II** Two piece system with a complete suite of location, inspection and analysis tools can be used simultaneously for inspecting multiple features and solving complex applications. page 502	14	64 MB	Camera: IP20 or IP68 Controller: IP20	Camera: Black anodized aluminum, Nickel-plated aluminum, 316 stainless Controller: Steel with zinc plating	10 to 30 V dc
	***Presence*PLUS P4 OMNI** One piece sensor with a complete suite of location, inspection and analysis tools can be used simultaneously for inspecting multiple features and solving complex applications. page 506	7	32 MB	IP20 or IP68	Black anodized aluminum or Nickel-plated aluminum,	10 to 30 V dc

WEB ONLY



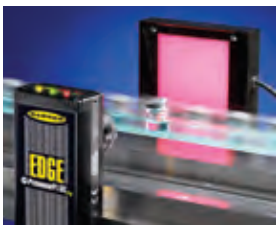
*Presence*PLUS® *P4* AREA

- Uses Blob and Gray Scale tools for basic inspections of defined areas
- High-speed analysis up to 10,000 parts per minute
- Standard resolution: 128 X 100
- High-resolution: 1280 X 1024



*Presence*PLUS® *P4* GEO

- Uses GEO Count tool to detect presence, location and rotation of a target pattern (360°)
- Standard resolution: 128 X 100
- High-resolution: 1280 X 1024



*Presence*PLUS® *P4* EDGE

- Uses Edge and Object tools to validate height, width, location and edges
- High-speed analysis faster than 10,000 parts per minute
- Standard resolution: 128 X 100
- High-resolution: 1280 X 1024

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Vision Software Tools
Comprehensive Software Platform

The vision software tools offer seamless functionality across the entire Pro and P4 vision sensor series with easy, menu-driven, point-and-click interface on a PC.

- Direct connectivity to EtherNet/IP and Modbus TCP industrial networks
- In nine languages, including English, Simplified Chinese, Traditional Chinese, French, German, Italian, Japanese, Portuguese and Spanish with translated text, buttons, commands and icons in the respective languages
- Free Active X utilities for linking and embedding images and results
- Free web download or disc, including all Banner vision sensor manuals, troubleshooting guides, and lens and lighting guides
- Free firmware and software upgrades

VISION TOOLS analyze the image

Average Color: Tests or communicates color content values sensed in a selected area

Color Blob: Determines the presence, connectivity, size and location of selected features with one or more colors

Color Match: Inspects for matching hue and intensity

Average Gray Scale: Determines the gray scale value of an area

Bar Code: Finds, decodes and grades 2D and 1D linear bar codes

Bead Tool: Monitors a track of material for width, consistency and location

Blob Detect: Determines the presence, connectivity, size and location of selected features

Edge: Determines the presence, number, classification and location of edges

GEO Count: Detects the presence and location of a target pattern in any orientation

Object: Determines the presence, number, classification, size and location of objects

OCR/OCV: Reads and verifies optical characters

Pattern Count: Determines the presence, number and location of pattern(s)

Circle Detect: Determines radius, center point and other characteristics of a circle or arc

Line Detect: Determines length, end points and other characteristics of a line segment

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

LOCATION TOOLS compensate for translational and rotational movement



GEO Find: Determines translation and rotation movement of a part up to 360° by detecting relative movement of a pattern



Locate: Determines translation and rotation by detecting relative movement of edges



Pattern Find: Determines translation and rotation by detecting relative movement of a pattern



Blob Find: Determines translation and rotation by detecting the presence, connectivity, size, shape and location of selected features

ANALYSIS TOOLS measure and evaluate the results of the vision tools



Communication: Sends images or results of selected location, vision and analysis tools over the Ethernet or RS-232 serial communication ports to industrial Ethernet or PC networks



Math: Performs arithmetic functions on any tool or constant



Measure: Measures distance and angles between two prescribed points, lines or curves



Test: Evaluates results of selected vision and analysis tools to determine whether an inspection passes or fails and activates outputs



String: Performs string comparison and substring search operations on string constants and tools that produce string results

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



*Presence*PLUS® *Pro*II
Full-Featured Vision System

- Compact camera with separate DIN-mountable controller
- Ethernet, serial and flexible discrete I/O
- A choice of standard or mini anodized aluminum camera, or washdown, IP68-rated nickel-plated aluminum or stainless steel cameras
- VGA, color and high-resolution models available
- Six bright bicolor LED indicators
- Premium tools for enhanced inspection capabilities
- Cordsets and brackets see page 504

Choosing a *Pro*II Controller

Example Model Number PPROCTL-BC

Controller		Premium Tools (optional)
PPROCTL	—	BD

PPROCTL = 640 x 480 Gray Scale
PPROCTL1.3 = 180 x 1024 Gray Scale
PPROCTLC = 752 x 480 Color & Gray Scale

BC = Bar Code Reader
BD = Bead Tool
OC = OCR/OCV
BCBD = Bar Code Reader & Bead Tool
BCOC = Bead Tool & OCR/OCV
BDOC = Bead Tool & OCR/OCV
BCBDOC = Bar Code Reader, Bead Tool & OCR/OCV

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Choosing a *Pro*II Camera

Standard Camera



PPROCAMQ = Gray Scale
PPROCAMQ1.3 = Gray Scale 1.3
PPROCAMCQ = Color

Mini Camera



PPROMCAMQ = Gray Scale
PPROMCAM1.3Q = Gray Scale 1.3
PPROMCAMCQ = Color

Choosing an IP68 *Pro*II Camera Example Model Number PPROCAMSC-G

PPROCAMQ = Gray Scale
PPROCAM1.3 = Gray Scale 1.3
PPROCAMCQ = Color*

Step One → Camera: PPROCAM

S = Nickel-Plated Aluminium
SS = Stainless Steel

Step Two → Housing: S

C = 50 mm long lens cover (no light)*
R = Red
I = Infrared
B = Blue
G = Green
W = White*

Step Three → Ring Light Color: C

—

G = Glass
P = Plastic

Step Four → Window: G

* Color models only available with no light or white ring light

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Camera-to-Controller

See page 923

Length	12-Pin Euro QD to DB15	
	Straight	Right-Angle
1.83 m	PPC06SHF	PPC06SRAHF
3.96 m	PPC13SHF	PPC13SRAHF
7.01 m	PPC23SHF	PPC23SRAHF
9.75 m	PPC32SHF	PPC32SRAHF

Video

See page 930

Length	BNC to BNC
	Straight
1.83 m	BNC06
5.57 m	BNC15
9.14 m	BNC30
14.6 m	BNC48

Serial Communication

See page 932

Length	DB9 to DB9
	Straight
1.83 m	DB9P06
4.57 m	DB9P15
9.14 m	DB9P30

Ethernet Communication

See page 933

Length	RJ45 to RJ45	
	Shielded	Shielded Crossover
2.13 m	STP07	STPX07
7.62 m	STP25	STPX25
15.2 m	STP50	STPX50
22.9 m	STP75	STPX75

Additional cordset information available. See page 904.

*Presence*PLUS® *Pro*II Series



Controller Models



Standard Camera Models
(shown with lens—sold separately)



Mini Camera Models
(shown with lens—sold separately)



IP68-Rated Camera Models
(shown with cover)



IP68 Rated Camera Models
(shown with ring light)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

*Presence*PLUS® *Pro*II Controller Specifications

Supply Voltage and Current	PPROCTL: 10 to 30 V dc @ less than 1.5 A (exclusive of load) PPROCTL1.3 & PPROCTLC: 10 to 30 V dc @ less than 1.2 A (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Memory	Storage: 64 MB Inspections (jobs): 999 max.
Input/Output Configuration	NPN (sinking) or PNP (sourcing) software selectable
Output Rating	150 mA max. each output OFF-state leakage current: less than 100 µA ON-state saturation voltage: NPN—less than 1 V @ 150 mA PNP—greater than V+ -2 V
Input Specifications	NPN: ON—less than 3 V OFF-state voltage—greater than 10 V @ 4 mA max PNP: ON—greater than (+V -2)V @ 1 mA max. OFF-state voltage—less than 3 V @ 6 mA max.
Indicators	6 LED indicators: Trigger, Ready, Power, Pass, Fail, Error
Display Options	PC or NTSC video (uses 9 m max. BNC cordset)
Discrete I/O	1 Trigger IN (pin 3), 1 Strobe OUT (pin 4), 1 Remote TEACH IN (pin 6), 6 Programmable I/O (pins 9-14), 1 Product Change IN (pin 15), 4 Product Select IN (pins 16-19)
Communications	1 RJ-45 10/100 Ethernet connection for running *Presence*PLUS *Pro* software and/or output inspection results 1 RS-232 DB-9 port for output of inspection results
Construction	Steel with black zinc plating
Weight	Approx. 0.55 kg
Environmental Rating	IEC IP20; NEMA 1
Operating Conditions	Stable Ambient Temperature: 0° to +50° C Relative Humidity: 90% (non-condensing) Stable Ambient Lighting: No large, quick changes in light level; no direct or reflected sunlight
Certifications	CE

*Presence*PLUS® *Pro*II Camera Specifications

Image Resolution	PPROCAMQ & PPROCAMS(S): 640 x 480 pixels PPROMCAMQ, PPROMCAMCQ, PPROCAMCQ & PPROCAMCS(S): 752 x 480 pixels PPROMCAM1.3Q, PPROCAM1.3Q & PPROCAM1.3S(S): 1280 x 1024 pixels
Pixel Size	PPROCAMQ & PPROCAMS(S): 7.4 x 7.4 µm PPROMCAMQ, PPROMCAMCQ, PPROCAMCQ & PPROCAMCS(S): 6.0 x 6.0 µm PPROMCAM1.3Q, PPROCAM1.3Q & PPROCAM1.3S(S): 6.7 x 6.7 µm
Imager Size	PPROCAMQ & PPROCAMS(S): 4.8 x 3.6 mm, 6 mm diagonal (1/3 inch CCD) PPROMCAMQ, PPROMCAMCQ, PPROCAMCQ & PPROCAMCS(S): 4.5 x 2.9 mm, 5.4 mm diagonal (1/3 inch CMOS) PPROMCAM1.3Q, PPROCAM1.3Q & PPROCAM1.3S(S): 8.6 x 6.9 mm. 11 mm diagonal (2/3 inch CMOS)
Levels of Gray Scale or Color	PPROMCAMQ, PPROCAMQ, PPROMCAM1.3Q, PPROCAM1.3Q, PPROCAMS(S) & PPROCAM1.3S(S): 256 Gray Scale PPROMCAMCQ, PPROCAMCQ & PPROCAMCS(S): 256 Red, Green and Blue
Exposure Time	PPROCAMQ & PPROCAMS(S): 0.10 to 2830 milliseconds PPROMCAMQ, PPROMCAMCQ, PPROCAMCQ & PPROCAMCS(S): 0.10 to 1040 milliseconds PPROMCAM1.3Q, PPROCAM1.3Q & PPROCAM1.3S(S): 0.10 to 1670 milliseconds
Full Image Acquisition*	PPROMCAMQ, PPROCAMQ & PPROCAMS(S): 48 frames per second PPROMCAMCQ: 55 frames per second max. PPROCAMCQ & PPROCAMCS(S): 17 frames per second max. PPROMCAM1.3Q, PPROCAM1.3Q & PPROCAM1.3S(S): 18 frames per second max.
Interface	LVDS
Construction	PPROMCAMQ, PPROCAMQ, PPROMCAM1.3Q, PPROCAM1.3Q, PPROMCAMCQ & PPROCAMCQ: black anodized aluminum and black painted die cast zinc PPROCAMS, PPROCAM1.3S & PPROCAMCS: nickel-plated aluminum (Lens covers and ring lights are nickel-plated aluminum with glass or polycarbonate window) PPROCAMSS, PPROCAM1.3SS & PPROCAMCSS: 316 stainless steel (Lens covers and ring lights are stainless steel with glass or polycarbonate window)
Environmental Rating	PPROMCAMQ, PPROCAMQ, PPROMCAM1.3Q, PPROCAM1.3Q, PPROMCAMCQ & PPROCAMCQ: IEC IP20; NEMA 1 PPROCAMS, PPROCAM1.3S & PPROCAMCS: IEC IP68; NEMA 6P PPROCAMSS, PPROCAM1.3SS & PPROCAMCSS: IEC IP68; NEMA 6P and NEMA 4X
Outside Temperature	0° to +50° C
Relative Humidity	PPROMCAMQ, PPROCAMQ, PPROMCAM1.3Q, PPROCAM1.3Q, PPROMCAMCQ & PPROCAMCQ: 90% (non-condensing)
Certifications	CE
Hookup Diagrams	NPN: VS07 (p. 999) PNP: VS08 (p. 999)

* A reduced Field-of-View (FOV) dramatically increases acquisition rates.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



*Presence*PLUS® P4 OMNI
Full-Featured Vision System

Full-featured sensor with a complete suite of location, inspection and analysis tools can be used simultaneously for inspecting multiple features and solving complex applications.

- Economical one-piece design
- Premium tools for enhanced inspection capabilities
- VGA, color and high-resolution models available
- Three bright bicolor LED indicators
- Seven configurable discrete I/O (NPN/PNP)
- Cordsets and brackets see page 508

Choosing a P4 OMNI

Example Model Number P4OR-BC

Controller	Housing		Premium Tools
P4O	R	—	BD

Controller
- P4O = 640 x 480 Gray Scale
- P4O1.3 = 180 x 1024 Gray Scale
- P4CO = 752 x 480 Color & Gray Scale

Housing
- R = Right-Angle
- I = In-Line

Premium Tools
- BC = Bar Code Reader
- BD = Bead Tool
- OC = OCR/OCV
- BCBD = Bar Code Reader & Bead Tool
- BCOC = Bead Tool & OCR/OCV
- BDOC = Bead Tool & OCR/OCV
- BCBDOC = Bar Code Reader, Bead Tool & OCR/OCV

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



*Presence*PLUS® P4 OMNI Sealed

Full-Featured Vision System

The P4 OMNI Sealed has a sealed camera and is a full-featured sensor with a complete suite of location, inspection and analysis tools that can be used simultaneously for inspecting multiple features and solving complex applications.

- Economical one-piece design
- A choice of anodized aluminum or washdown, IP68-rated nickel-plated aluminum housing
- Premium tools for enhanced inspection capabilities
- VGA, color and high-resolution models available
- Three bright bicolor LED indicators
- Seven configurable discrete I/O (NPN/PNP)
- Cordsets and brackets see page 508

Choosing an IP68 P4 OMNI

Example Model Number P4ORS-BC

Controller	Housing	Sealed		Premium Tools
P4O	R	S	—	BD
P4O = 640 x 480 Gray Scale P4O1.3 = 180 x 1024 Gray Scale P4CO = 752 x 480 Color & Gray Scale	R = Right-Angle	S =Sealed IP68		BC = Bar Code Reader BD = Bead Tool OC = OCR/OCV BCBD = Bar Code Reader & Bead Tool BCOC = Bead Tool & OCR/OCV BDOC = Bead Tool & OCR/OCV BCBDOC = Bar Code Reader, Bead Tool & OCR/OCV

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Power

See page 924

Length	12-Pin QD Straight
1.83 m	P4C06
7.01 m	P4C23
9.75 m	P4C32
15.2 m	P4C50
22.9 m	P4C75
34.0 m	P4C110



Sealed Power

See page 922

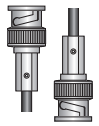
Length	12-Pin Euro QD Straight
1.83 m	MQDC2S-1206
5.57 m	MQDC2S-1215
9.14 m	MQDC2S-1230
15.2 m	MQDC2S-1250
22.9 m	MQDC2S-1275



Video

See page 930

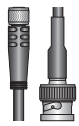
Length	BNC to BNC Straight
1.83 m	BNC06
5.57 m	BNC15
9.14 m	BNC30
14.6 m	BNC48



Sealed Video

See page 931

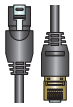
Length	Pico QD to BNC Straight
2.00 m	PKG4M-2/CS
5.00 m	PKG4M-5/CS
9.00 m	PKG4M-9/CS



Ethernet Communication

See page 933

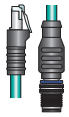
Length	RJ45 to RJ45 Shielded	Shielded Crossover
2.13 m	STP07	STPX07
7.62 m	STP25	STPX25
15.2 m	STP50	STPX50
22.9 m	STP75	STPX75



Sealed *P4* Ethernet Communication

See page 933

Length	RJ45 to 8-Pin Euro QD Straight
1.83 m	STP-MAQDC-806
4.57 m	STP-MAQDC-815
9.14 m	STP-MAQDC-830



Additional cordset information available. See page 904.



IP68-Rated
Right-Angle Models
(shown with cover and lens—sold separately)



Right-Angle Sensor Models
(shown with lens—sold separately)



In-line Sensor Models
(shown with lens—sold separately)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

*Presence*PLUS® *P4* OMNI Specifications

Supply Voltage and Current	10 to 30 V dc (24 V dc ±10% if the sensor powers a light source) P4OR, P4OI & P4ORS: less than 650 mA (exclusive of lights and I/O load) P4O1.3R, P4O1.3I, P4COR, P4COI, P4CORS & P4O1.3RS: less than 550 mA (exclusive of lights and I/O load)
Memory	32 MB Inspection (jobs): 999 max.
Input/Output Configuration	NPN (sinking) or PNP (sourcing) software selectable
Output Rating	150 mA max. each output OFF-state leakage current: less than 100 µA ON-state saturation voltage: NPN—less than 1 V @ 150 mA max. PNP—greater than V+ -2 V
Bicolor Status Indicators	PASS/FAIL: Green ON steady—PASS / Red ON steady—FAIL POWER/ERROR: Green ON steady—POWER / Red ON steady—ERROR READY/TRIGGER: Green ON steady—READY / Yellow ON steady—TRIGGER
Display Options	PC or NTSC video (uses 9 m max. BNC cordset)
Discrete I/O	1 Trigger IN 1 Strobe OUT 4 Programmable I/O 1 Product Change IN 1 Remote TEACH IN
Communications	10/100 Ethernet connection for running *Presence*PLUS *P4* software and/or output inspection results P4OR, P4OI, P401.3R, P401.3I, P4COR & P4COI: RJ-45 connector P4ORS, P401.3RS & P4CORS: 8-pin M12/Euro-style (female) connector RS-232 connection for output of inspection results
Imager Resolution	P4OR, P4OI & P4ORS: 640 x 480 pixels P4O1.3R, P4O1.3I & P4O1.3RS: 1280 x 1024 pixels P4COR, P4COI & P4CORS: 752 x 480 pixels
Pixel Size	P4OR, P4OI, P4COR, P4COI & P4ORS: 7.4 x 7.4 µm P4O1.3R, P4O1.3I & P4O1.3RS: 6.7 x 6.7 µm P4CORS: 6.0 X 6.0 µm
Imager Size	P4OR, P4OI & P4ORS: 4.8 x 3.6 mm, 5.9 mm diagonal (1/3 inch CCD) P4O1.3R, P4O1.3I & P4O1.3RS: 8.6 x 6.9 mm, 11 mm diagonal (2/3 inch CMOS) P4COR, P4COI & P4CORS: 4.5 x 2.9 mm, 5.4 mm diagonal (1/3 inch CMOS)
Levels of Gray Scale or Color	P4OR, P4OI, P4O1.3R, P4O1.3I, P4ORS & P4O1.3RS: 256 Gray Scale P4COR, P4COI & P4CORS:256 Red, Green and Blue
Exposure Time	P4OR, P4OI & P4ORS: 0.1 to 2830 milliseconds P4O1.3R, P4O1.3I & P4O1.3RS: 0.1 to 1670 milliseconds P4COR, P4COI & P4CORS: 0.1 to 1000 milliseconds
Full Image Acquisition	P4OR, P4OI & P4ORS: 48 frames per second max.* P4O1.3R, P4O1.3I & P4O1.3RS: 26.8 frames per second max.* P4COR, P4COI & P4CORS: 17 frames per second max.*
Lens Mount	Standard C-mount (1 inch—32 UN)
Construction	P4OR, P4OI, P4O1.3R, P4O1.3I, P4COR & P4COI: Black anodized aluminum housing, glass lens P4ORS, P4O1.3RS & P4CORS: Die-cast nickel-plated aluminum housing, glass or acrylic window
Weight	P4OI, P4O1.3I & P4COI: 293 g P4OR, P4O1.3R & P4COR: 385 g P4ORS, P4O1.3RS & P4CORS: 430 g
Environmental Rating	P4OR, P4OI, P4O1.3R, P4O1.3I, P4COR & P4COI: IEC IP20; NEMA 1 P4ORS, P4O1.3RS & P4CORS: IEC IP68
Operating Conditions	Stable ambient temperature: 0° to +50° C Stable ambient lighting: No large, quick changes in light level; no direct or reflected sunlight Relative humidity: P4OR, P4OI, P4O1.3R, P4O1.3I, P4COR & P4COI: 35-90% (non-condensing)
Certifications	CE
Hookup Diagrams	NPN: VS09 (p. 1000) PNP: VS10 (p. 1000)

* A reduced Field-of-View (FOV) dramatically increases acquisition rates.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Brackets

*Pro*II Controller		*Pro*II Cameras			*Pro*II Mini Camera	Sealed *Pro*II Camera	*P4*		Sealed *P4*
See page 883	See page 882	See page 881	See page 881	See page 882	See page 882	See page 882	See page 880	See page 881	See page 881
SMBPPDH	SMBPPDE	SMBPPLU	SMBPPRA	SMBPPU	SMBPPROMRA	SMBPPSU	SMBP4RAB	SMBP4RAS	SMBP4SRAF
									

Additional brackets and information available. See page 846.

Adjustable Mounting System

See page 954



- 3" and 6" column, base and knuckle kits for positioning of sensor and lights
- Bogen arm with clamp for added flexibility in mounting
- 2" pivoting knuckle assembly for positioning spot light

Sensor Interface Modules and Power Supplies

See page 970



- Sensor interface modules for simplified wiring of *P4* sensors in an electrical box
- Lighting interface for strobe operation of Banner lighting with any vision sensor
- Strobe control module for control of specialty strobe lights

Accessories for C-Mount Lenses

	Description	Format Size	Model	Used With
	Extension Kit (0.5, 1.0 , 5.0, 10, 20 and 40 mm)	—	LEK	All Lenses
	Extension Kit (0.25 and 0.5 mm)		LEKS	
	Lens Extender (increases focal length 2X)		LCF2X	
	UV Lens Filter, Clear Glass	2/3"	FLTUV	Tamron Megapixel Lenses

Description	Model	Used With
Polarizing filter 25.5 mm	FLTPR032-25.5	iVu & *Presence*PLUS
Polarizing filter 27 mm	FLTPR032-27	
Polarizing filter 30.5 mm	FLTPR032-30.5	
Polarizing filter kits available		

C-Mount Color Filters

Color	Description	Plastic Models	Glass Models
Infrared	High-pass filter blocks visible light and passes infrared light. Included with all Banner Infrared light sources.	FLTI (≥ 760 nm)	FLTI850 (810-990 nm)
Blue	Band-pass filter improves quality by helping to reduce ambient light; it passes blue and infrared light.	FLTB (400-525 nm)	FLTB470 (435-490 nm)
Green	Band-pass filter improves quality by helping to reduce ambient light; it passes green and infrared light.	FLTG (400-575 nm)	FLTG525 (495-565 nm)
Red	High-pass filter improves quality by helping to reduce ambient light; it passes red and infrared light.	FLTR (≥ 600 nm)	FLTR635 (600-660 nm)
Dark Red	High-pass filter improves quality by helping to reduce ambient light; it passes red and infrared light.	—	FLTR660 (650-680 nm)

Lens Covers

Sealed *Pro*II & *P4* Lens Covers

	Length		Works with	Model
	50 mm	Nickel-plated aluminum	*P4*	P4SLC50-G
				P4SLC50-P
			Pro	PPSLC50-G
				PPSLC50-P
	75 mm	Nickel-plated aluminum	*Pro* & *P4*	PPSLC75-G
				PPSLC75-P
	50 mm	Stainless Steel	*Pro*	PPSSLC50-G
				PPSSLC50-P

Monitors

	Description	Model*
	8" Flat Panel NTSC Video Monitor	PPM8

* Monitors require a BNC cordset for connection to a *Presence*PLUS Sensor (see page 498).

Enclosures

See page 960



- Offers models for sensors and lights
- Provides protection in rugged or harsh environments
- Prevents tampering

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

C-Mount Standard Lenses



Description	Format Size	Model	Used With
4 mm	1/3"	LCF04	All (except 1.3 megapixel models)
8 mm		LCF08	
12 mm with Focus Locking		LCF12	
16 mm with Focus Locking		LCF16	
25 mm with Focus Locking (Goyo)	1"	LCF25R	
25 mm with Focus and Aperture Locking, Metal Housing (Goyo)		LCF25LR	
50 mm with Focus and Aperture Locking (Goyo)	2/3"	LCF50L1R*	
50 mm with Focus Locking, Metal Housing (Goyo)	1"	LCF50L2R*	
75 mm with Focus and Aperture Locking, Metal Housing (Goyo)		LCF75LR*	

C-Mount Specialty Lenses



Description	Format Size	Model	Used With
3.5 mm with Focus and Aperture Locking (Kowa)	1/2"	LCF03LT	All (except 1.3 megapixel models)
6 mm with Focus and Aperture Locking (Kowa)		LCF06LK	
10 – 40 mm with Zoom, and Focus and Aperture Locking (Tamron)		LCF1040LT*	
50 mm Telecentric (Navitar)	2/3"	LCF50TELN	

C-Mount Megapixel Lenses with Focus and Aperture Locking



Description	Format Size	Model	Used With
8 mm (Tamron)	2/3"	LCF08LTMP	All
16 mm (Tamron)		LCF16LTMP	
25 mm (Tamron)		LCF25LTMP	
50 mm (Tamron)		LCF50LTMP†	
16 mm (Pentax)	2/3"	LCF16LMP	
25 mm (Pentax)		LCF25LMP	
35 mm (Pentax)		LCF35LMP	
50 mm (Pentax)		LCF50LMP	
5 mm (Computar)	1/2"	LCF05LCMP	
8 mm (Computar)	2/3"	LCF08LMP	
12 mm (Computar)		LCF12LMP	
16 mm (Computar)		LCF16LCMP	
25 mm (Computar)		LCF25LCMP	
35 mm (Computar)		LCF35LCMP†	
50 mm (Computar)		LCF50LCMP†	
75 mm (Computar)		LCF75LCMP†	
8.5 mm (Edmund Optics)	2/3"	LCF08LEMP	
12 mm (Edmund Optics)		LCF12LEMP	
16 mm (Edmund Optics)		LCF16LEMP	
25 mm (Edmund Optics)		LCF25LEMP	
35 mm (Edmund Optics)		LCF35LEMP†	

* Lens models will not fit in opening of Banner Ring Lights.
† Lenses require a 75 mm cover when used with a Sealed *Pro* or *P4* Camera (see page 498)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Vision Lighting

Vision lighting is the key to creating all-important contrast between the feature of interest and its background.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Ring Lights page 514
Mounts directly to the sensor for easy setup and illuminates any object directly in front of the sensor



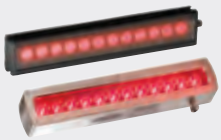
Area Lights page 516
Provides even illumination in a concentrated area



Backlights page 518
Installs behind the target, directly facing the sensor; has a highly diffused surface and uniform brightness



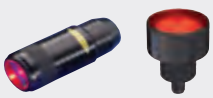
Linear Array Backlights page 519
Diffused backlights that can be used for any vision system or as a highly diffused area light



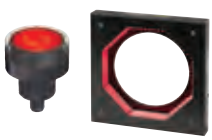
Linear Array Lights page 520
Provides high-intensity illumination of large areas, at long distances



On-Axis Lights page 521
Provides collimated illumination along the same optical path as the camera



Spot Lights page 522
Provides even illumination in a small concentrated spot



Low-Angle Ring Lights page 524
Illuminates nearly perpendicular to the direction of an inspection



Laser Line Generator page 524
Laser Line Generators have dynamic line balancing for repeatable performance



Tubular Fluorescent Lights page 525
Features flicker-free high-intensity illumination of large areas

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Ring Lights

A ring light provides direct illumination over a small area. With the lens axis through the center opening of the ring light assembly, the ring light illuminates the area directly in front of the camera.

- Connects directly to PresencePLUS vision sensors or an external power supply
- Brightly illuminates small objects
- Mounts directly to the camera and centers the light on the image
- Includes models to withstand washdown environments (IP68 rated)
- Cordsets and brackets see page 526

IP50 High-Intensity LED Ring Light Model Key, 24 V DC Example Model Number LEDRR70XD5-XM

Light	Color	Type of Light	Size	Housing Construction	Window	Relative Intensity		Intensity Adjustment	Connector Type
LED	R	R	70	X	D	5	–	X	M
	B = Blue G = Green I = Infrared R = Red W = White UV395 = UV 395 nm	R = Ring Light	70 mm	X = Not sealed	D = Diffused clear plastic			X = Fixed P = Potentiometer	Q = 0.15 m 5-pin Euro Pigtail QD† M = 0.3 m 3-pin Pico Pigtail QD*

Connection options:

* Pico QD model required for *P4* sensors.
Pico QD models include a built-in mounting bracket for use with *P4* sensors.
† Models require a mating cordset (see page 526).
Optional bracket SMBPPRHI required for use with *Pro* cameras (see page 526).
Optional bracket SMBPMPRHI required for use with *Pro* Mini cameras (see page 526).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

IP20 LED Ring Lights, 24 V DC Example Model Number LEDRR80X80W

Light	Color	Type of Light	Camera Type	Size	Connector Type
LED	R	R		80 x 80	W
	B = Blue G = Green I = Infrared R = Red W = White	R = Ring Light	Blank = Pro and P4 M = Pro Mini Camera	80 x 80 mm 62 x 62 mm	W = Pro with 2 m M = P4 with 0.3 m 3-pin Pico Pigtail QD*

IP68 LED Ring Lights (for *Pro* Models), 24 V DC Example Model Number LEDRR90S-G

Light	Color	Type of Light	Size	Housing	Window
LED	R	R	90	S	G
	B = Blue G = Green I = Infrared R = Red W = White	R = Ring Light	90 = 90 mm Diameter	S = Nickel-plated Aluminum SS = Stainless Steel	G = Glass Window M = Plastic Window

Connection options:

For 9 m cable, add suffix W/30 to the 2 m model number (example, LEDRR80X80W W/30).
For replacement windows and diffusers (see page 526).
* Splitter cordsets available for powering two lights (see page 526).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Area Lights

An area light provides even illumination in a concentrated area. When properly placed area lights can create shadows and glare, allowing the vision sensor to detect the presence or absence of a feature.

- Creates shadows to detect changes in depth, depending on mounting
- High-intensity lighting for distances greater than 12 inches
- Cordsets and brackets see page 526

IP50 High-Intensity LED Area Light Model Key, 24 V D

Example Model Number LEDRA70XD5-XM

Light	Color	Type of Light	Size	Housing Construction	Window††	Relative Intensity		Intensity Adjustment	Cable/ Connector
LED	R	A	70	X	D	5	–	X	M

- **Color:** B = Blue; G = Green; I = Infrared; R = Red; W = White; UV395 = UV 395 nm
- **Type of Light:** A = Area Light
- **Size:** 70 mm
- **Housing Construction:** X = Non-Sealed
- **Window††:** D = Diffused clear plastic
- **Intensity Adjustment:** X = Fixed; P = Potentiometer
- **Cable/ Connector:** M = 2 m 3-pin Pico Pigtail QD*; Q = 0.15 m 5-pin Euro Pigtail QD†

Connection options:

* Pico QD model required for *P4* sensors.
† Models require a mating cordset (see page 526).
†† For replacement windows and diffusers (see page 527).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

IP68 Sealed High-Intensity LED Area Light Model Key, 24 V DC Example Model Number LEDRA70AD5-XQ

Light	Color	Type of Light	Size	Housing Construction	Window†	Relative Intensity		Intensity Adjustment	Connector Type
LED	R	A	70	A	D	5	–	X	Q
	B = Blue G = Green I = Infrared R = Red W = White UV365 = UV 365 nm** UV395 = UV 395 nm	A = Area Light	70 mm	A = Nickel-plated Aluminum SS = 316 Stainless Steel	P = Plastic clear G = Glass clear D = Diffused clear plastic			X = Fixed P = Potentiometer	Q = 5-pin Euro integral QD*

IP40 LED Area Light Model Key, 24 V DC Example Model Number LEDRA80X80W

Light	Color	Type of Light	Size	Connector Type
LED	R	A	80x80	W
	B = Blue G = Green I = Infrared R = Red W = White	A = Area Light	80 x 80 mm 62 x 62 mm	W = 2 m M = 3-pin Pico integral QD*

Connection options:

For 9 m cable, add suffix W/30 to the 2 m model number (example, LEDRA80X80W W/30).
QD models can be connected directly to *P4* sensors; splitter cordset available for powering two lights (see page 526).

* Models require a mating cordset (see page 526)
** UV365 can only be used with glass window
† For replacement windows and diffusers (see page 526)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Backlights

A backlight provides even bright lighting by placing the backlight behind the target and aiming it directly towards the camera. The resulting silhouette can be inspected for proper size and shape.

- Determines the shape and size of target objects
- Offers a highly diffused surface and uniform brightness, with lower intensity than other lights
- Provides the most robust lighting for measuring and gauging
- Highlights through-holes in target objects
- Cordsets and brackets see page 526

IP67 Sealed LED Backlights Model Key, 24 V DC

Example Model Number LEDRB75X150PW2-XQ

Light	Color	Type of Light	Size	Housing Construction	Window†	Relative Intensity		Intensity Adjustment	Connector Type
LED	R	B	75X150	P	W	2	–	X	Q
	B = Blue G = Green I = Infrared R = Red W = White	B = Backlight	75 x 150 mm 150 x 150 mm 225 x 150 mm 300 x 150 mm	P = Plastic	W = White Plastic			X = Fixed	Q = 5-pin Euro integral QD*

IP40 LED Backlights, 24 V DC

Example Model Number LEDRB70X70M

Light	Color	Type of Light	Size	Connector Type
LED	R	B	70X70	M
	R = Red I = Infrared	B = Backlight	70 x 70 mm 85 x 220 mm	W = 2 m M = 3-pin Pico QD*

Connection options: A model with a QD requires a mating cordset (see page 526).

For 9 m cable, add suffix W/30 to the 2 m model number (example, LEDRB70X70W W/30).
QD models can be connected directly to *P4* sensors; splitter cordsets available for powering two lights (see page 526).

* Models require a mating cordset (see page 526).

† For replacement windows and diffusers (see page 527).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Linear Array Backlights

Linear array backlights are diffused backlights that can be used for any vision system or as a highly diffused area light. Linear array backlights are high power and have a solid-state LED array with continuous or strobed operation, which is selectable via sensor software (P4 models) or via hookup.

- Built-in constant current regulation with very even light pattern
- Optically isolated strobe signal with selectable Active High or Active Low strobe option
- Maintenance-free, rugged construction
- Four high-intensity, visible wavelengths, plus IR
- Cordsets and brackets see page 526

IP50 High-Power Linear Array Backlights Model Key, 24 V DC

Example Model Number LEDRLB145XW6-XQ

Light	Color	Type of Light	Size	Housing	Window†	Relative Intensity		Intensity Adjustment	Connector Type
LED	R	LB	145	X	W	6	–	X	Q
	B = Blue G = Green I = Infrared R = Red W = White	LB = Linear Array Backlight	145 mm 290 mm 435 mm 580 mm 870 mm 1160 mm	X = IP50	W = White Plastic			X = Fixed	Q = 5-pin Euro integral QD*

Connection options: A model with a QD requires a mating cordset (see page 526).

* Models require a mating cordset (see page 526).
† For replacement windows and diffusers (see page 527).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Linear Array Lights

Linear array lights provide high-intensity illumination of large areas, and for long distances. Available in 3 housings including: nickel-plated aluminum (IP68), stainless steel (IP68) and black anodized aluminum (IP50).

- Provides maintenance-free LED illumination of large objects from far away
- Provides superior high-intensity illumination of large areas
- Available in sealed (IP68) nickel-plated and non-sealed (IP50) housings
- Provides optically isolated strobe signal
- Cordsets and brackets see page 526

IP50 High-Intensity LED Linear Array Model Key, 24 V DC

Example Model Number LEDRLA290XD6-XQ

Light	Color	Type of Light	Size	Housing Construction	Window†	Relative Intensity		Intensity Adjustment	Connector Type
LED	R	LA	290	X	D	6	–	X	Q
	B = Blue G = Green I = Infrared R = Red W = White UV365 = UV 365 nm* UV395 = UV 395 nm	LA = Linear Array	145 mm*** 290 mm 435 mm 580 mm 870 mm 1160 mm	X = Not sealed	P = Plastic clear G = Glass clear D = Diffused clear plastic			X = Fixed PL = Pot & Analog wire (Strobe polarity = Low) PH = Pot & Analog wire (Strobe polarity = High)	Q = 5-pin Euro Integral QD**

IP68 High-Intensity LED Linear Array Model Key, 24 V DC

Example Model Number LEDRLA290AD6-XQ

Light	Color	Type of Light	Size	Housing Construction	Window†	Relative Intensity		Intensity Adjustment	Connector Type
LED	R	LA	290	A	D	6	–	X	Q
	B = Blue G = Green I = Infrared R = Red W = White UV365 = UV 365 nm* UV395 = UV 395 nm	LA = Linear Array	290 mm 435 mm 580 mm	A = Nickel-plated Aluminum SS = 316 Stainless Steel	P = Plastic clear G = Glass clear D = Diffused clear plastic			X = Fixed	Q = 5-pin Euro Integral QD**

Connection options: A model with a QD requires a mating cordset (see page 526).

* UV365 can only be used with glass window
** Models require a mating cordset (see page 526).
*** Intensity adjustment not available on 145 mm length
† For replacement windows and diffusers (see page 527).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

On-Axis Lights



On-axis lighting provides even, diffused illumination. A beam splitter directs the light rays along the same axis as the camera lens. Reflective surfaces perpendicular to the camera appear bright. Surfaces at an angle to the camera and non-reflective surfaces appear dark.

- Provides more uniform illumination than a ring light
- Delivers collimated illumination in the same optical path as camera
- Evenly illuminates flat reflective surfaces
- Provides minimum useful life of 10,000 to 60,000 hours, depending on model
- Cordsets and brackets see page 526

IP40 LED On-Axis Lights, 24 V DC Example Model Number LEDRO100M

Light	Color	Type of Light	Size	Connector Type
LED	R	O	100	M
	B = Blue G = Green I = Infrared R = Red W = White	O = On-Axis	100 = 100 x 100 mm 50 = 50 x 50 mm	M = 3-pin Pico QD*

Connection options: A model with a QD requires a mating cordset (see page 526).

QD cordsets with flying leads are available for connecting to models other than *P4* (see page 526).

* Models require a mating cordset (see page 526).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Spot Lights



A spot light provides even light with high-powered LEDs. When properly placed, spotlights can create shadows and glare, allowing the vision sensor to detect the presence or absence of a feature.

- Low-cost, compact washdown spot lights for *Presence*PLUS® sensors
- Continuous or strobed operation is selectable via sensor software
- Provides extremely bright, even light with high-power LEDs
- Adjustable spot size
- Direct connection to *Presence*PLUS® Pro sensor or to an external power supply using 3 discrete wires
- Cordsets and brackets see page 526

IP68 Sealed LED Spot Lights, 10 to 30 V DC

Example Model Number LEDRSM

Light	Color	Type of Light	Connector Type
LED	R	S	M
	R = Red W= White B = Blue G = Green	S = Spot	W = 2 m M = 3-pin Pico QD*

Connection options: A model with a QD requires a mating cordset (see page 526).

For 9 m cable, add suffix W/30 to the 2 m model number (example, LEDRSW W/30).
QD models can be connected directly to *P4* sensors; splitter cordsets available for powering two lights (see page 526).
* Models require a mating cordset (see page 526).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Spot Lights

A spot light provides even light with high-powered LEDs. When properly placed, spotlights can create shadows and glare, allowing the vision sensor to detect the presence or absence of a feature.

- Provides off-axis illumination of small areas
- Provides extremely bright, even light with high-power LEDs
- Withstands washdown
- Delivers constant, even light intensity, even if voltage fluctuate
- Cordsets and brackets see page 526

IP69K Sealed High Intensity LED Spot Lights, 12 to 30 V DC

Lens Angle	Color	Lumens	Lux 0.5 m	Lux 1 m	Connection	Models
± 5° (smaller, more focused spot)	Red	110	8,000	2,000	5-pin Euro integral QD connector (use with a 5-wire mating cordset)	LEDRS50L5-XQ
	White	295	13,780	3,445		LEDWS50L5-XQ
	Blue	85	4,880	1,220		LEDBS50L5-XQ
	Green	210	13,000	3,250		LEDGS50L5-XQ
	IR	760*	4.40**	1.10**		LEDIS50L5-XQ
	UV	480*	2.10**	0.52**		LEDUV395S50L5-XQ
± 11° (larger spot)	Red	105	2,500	625	5-pin Euro integral QD connector (use with a 5-wire mating cordset)	LEDRS50L11-XQ
	White	285	5,460	1,365		LEDWS50L11-XQ
	Blue	80	1,540	385		LEDBS50L11-XQ
	Green	200	3,900	975		LEDGS50L11-XQ
	UV	420*	0.78**	0.19**		LEDUV395S50L11-XQ
± 14° (larger spot)	IR	665*	1.16**	0.29**	5-pin Euro integral QD connector (use with a 5-wire mating cordset)	LEDIS50L14-XQ
± 20° (largest spot)	Red	100	1,040	260	5-pin Euro integral QD connector (use with a 5-wire mating cordset)	LEDRS50L20-XQ
	White	270	2,000	500		LEDWS50L20-XQ
	Blue	75	700	175		LEDBS50L20-XQ
	Green	190	1,700	425		LEDGS50L20-XQ
	UV	390*	0.42**	0.10**		LEDUV395S50L11-XQ

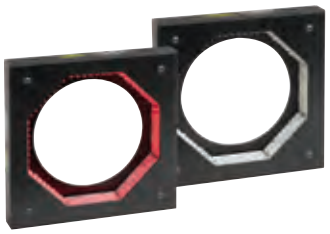
Connection options: A model with a QD requires a mating cordset (see page 526).

For 2 m cable, omit suffix XQ from model number (example, LEDRS50L5).

* Values listed in milliwatts

** Values listed in mW/cm^2

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Low-Angle Ring Lights

Low-angle lighting enhances the contrast of surface features. The low-angle light is aimed nearly perpendicular to the imaged surface of the target object so that it can highlight changes in elevation.

- Highlights surface irregularities
- Highlights slight height differences such as etching, sodder balls and embossing
- Illuminates from an angle nearly perpendicular to object
- Provides minimum useful life of 10,000 to 60,000 hours, depending on model
- Cordsets and brackets see page 526

LED Low-Angle Ring Lights, 24 V DC Example Model Number LEDRI150M

Light	Color	Type of Light	Size	Connector Type
LED	R	I	150	M
	R = Red I = Infrared	I = Low-Angle Ring	150 = 150 mm dia.	W = 2 m M = 3-pin Pico QD*



Laser Line Generator

Laser Line Generators have dynamic line balancing for repeatable performance.

- Laser line uniformity up to 95% on 100% of the line
- External user focus mechanism
- Robust thermal management, providing better stability and longer lifetime
- Remote laser monitoring and control via RS232 communication
- Brackets see page 526

Laser Line Generator, 5-24 V DC

Visible Red LED

Description	Models
Laser Line Generator	LLG660P10A60II

Connection options: A model with a QD requires a mating cordset (see page 526).

QD cordsets with flying leads are available for connecting to models other than *P4* (see page 526).

* Models require a mating cordset (see page 526).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



High-Frequency Fluorescent Tubular Lights

Tubular fluorescent lights provide easy, affordable, flicker-free illumination of large objects.

- Illuminates large objects with flicker-free white fluorescent light
- Uses waterproof housing for washdown environment – rated IP67; NEMA 4X
- Includes built-in mounting brackets in end caps
- Offers minimum useful life of 10,000 to 20,000 hours, depending on model
- Cordsets and brackets see page 526

IP67 Sealed Fluorescent Tubular Lights

Length	Voltage	Ballast	Models	
			White (4100 K)	Black UV (350-400 nm)
8"	24 V dc	Integral	HFFW8DC	HFFB8DC
8"	110 V ac		HFFW8AC110	HFFB8AC110
8"	230 V ac		HFFW8AC230	HFFB8AC230
12"	24 V dc		HFFW12DC	HFFB12DC
12"	120 to 277 V ac		HFFW12AC	HFFB12AC
14"	24 V dc		HFFW14DC	—
15"	110 V ac		HFFW15AC110	—
15"	230 V ac		HFFW15AC230	—
24"	120 to 277 V ac		HFFW24AC	—
36"	120 to 277 V ac		HFFW36AC	—
48"	120 to 277 V ac		HFFW48AC	—
8"	120 to 277 V ac	Remote	HFFW8ACR	HFFB8ACR
12"	120 to 277 V ac		HFFW12ACR	HFFB12ACR
15"	120 to 277 V ac		HFFW15ACR	—
24"	120 to 277 V ac		HFFW24ACR	—
36"	120 to 277 V ac		HFFW36ACR	—
48"	120 to 277 V ac		HFFW48ACR	—

NOTE: Replacement bulbs available, contact factory for information. All models have louvers and integral mounting flange; optional brackets are available for heavy-duty mounting (two brackets required for each light, see page 526).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD

See page 913

Length	Threaded 5-Pin	
	Nickel-plated Nut	Stainless Steel Nut
1.83 m	MQDC20-506	MQDC20SS-506
4.57 m	MQDC20-515	MQDC20SS-515
9.14 m	MQDC20-530	MQDC20SS-530



Pico QD

See page 904

Length	Threaded 3-Pin	
	Nickel-plated Nut	Stainless Steel Nut
4.00 m	—	PKGV3M-4
5.00 m	PKG3M-5	—
7.00 m	PKG3M-7	PKGV3M-7
10.0 m	PKG3M-10	PKGV3M-10



Euro QD (for Q models)

See page 912

Length	Threaded 5-Pin	
	Straight	Right-Angle
1.83 m	MQDC1-506	MQDC1-506RA
4.57 m	MQDC1-515	MQDC1-515RA
9.14 m	MQDC1-530	MQDC1-530RA





Pico QD Splitter†

See page 905

Length		Threaded 3-Pin
Branches	Trunk	
0.20 m	0.20 m	CSB-M831M831



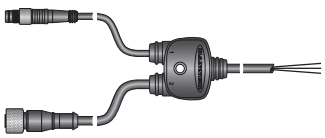
† Powers 2 lights from one *P4 Sensor*

Additional cordset information available. See page 905.

Pico QD Splitter††

See page 905

Length		Model
Branches	Trunk	
Branch 1: 3-Pin Pico QD (0.3 m) Branch 2: 4-Pin Euro QD (0.3 m)	4 m Flying Leads	CSB-UNT213M831F1241



†† Enables strobe signal from *P4* while obtaining power from an external source

Pico QD—Double-Ended

See page 904

Length	Threaded 3-Pin
0.35 m	PKG3M-35-PSG3M
2.00 m	PKG3M-2-PSG3M



Brackets

Area Lights & Backlights			Linear Array	Ring Lights	On-Axis		Tubular Lights
See page 885	See page 886	See page 883	See page 887	See page 884	See page 883	See page 884	See page 886
SMBBSSM	SMBACM	SMBP42ASM	SMBLASRA	SMBPMPRHI	SMBP4OAL..	SMBPPOAL..	SMBWFTLS

















Additional brackets and more information available. See page 846.

Polarizing Filters

Description	Models
Polarizing filter kit for 62 x 62 Ring Lights	LEDRRPFKS
Polarizing filter kit for 80 x 80 Area Lights and 70 x 70 Backlights	LEDAPFK
Polarizing filter kit for 62 x 62 Area Lights	LEDAPFKS
Polarizing filter kit for Sealed Ring Lights	LEDRPFK90
Kit with a variety of filters, diffusers and window replacements	LEDFLTK
Polarizing filter kit for 290 mm Linear Array Lights (IP68)	LEDLAPFK290S
Polarizing filter kit for 580 mm Linear Array Lights (IP68)	LEDLAPFK580S
Polarizing filter kit for 145 mm Linear Array Lights (IP50)	LEDLAPFK145
Polarizing filter kit for 290 mm Linear Array Lights (IP50)	LEDLAPFK290

Polarizing Filters

Description	Models
Polarizing filter kit for 435 mm Linear Array Lights (IP50)	LEDLAPFK435
Polarizing filter kit for 580 mm Linear Array Lights (IP50)	LEDLAPFK580
Polarizing filter kit for 870 mm Linear Array Lights (IP50)	LEDLAPFK870
Polarizing filter kit for 1160 mm Linear Array Lights (IP50)	LEDLAPFK1160
Polarizing filter kit for 70 mm High-Intensity Area Lights	LEDAPFK70
Polarizing filter kit for 70 mm High-Intensity Ring Lights	LEDRPFK70
Polarizing filter kit for 70 mm IP68 High-Intensity Area Lights	LEDAPFK70S
Polarizing filter kit for 50mm High-Intensity Spot Lights	LEDS50PFK

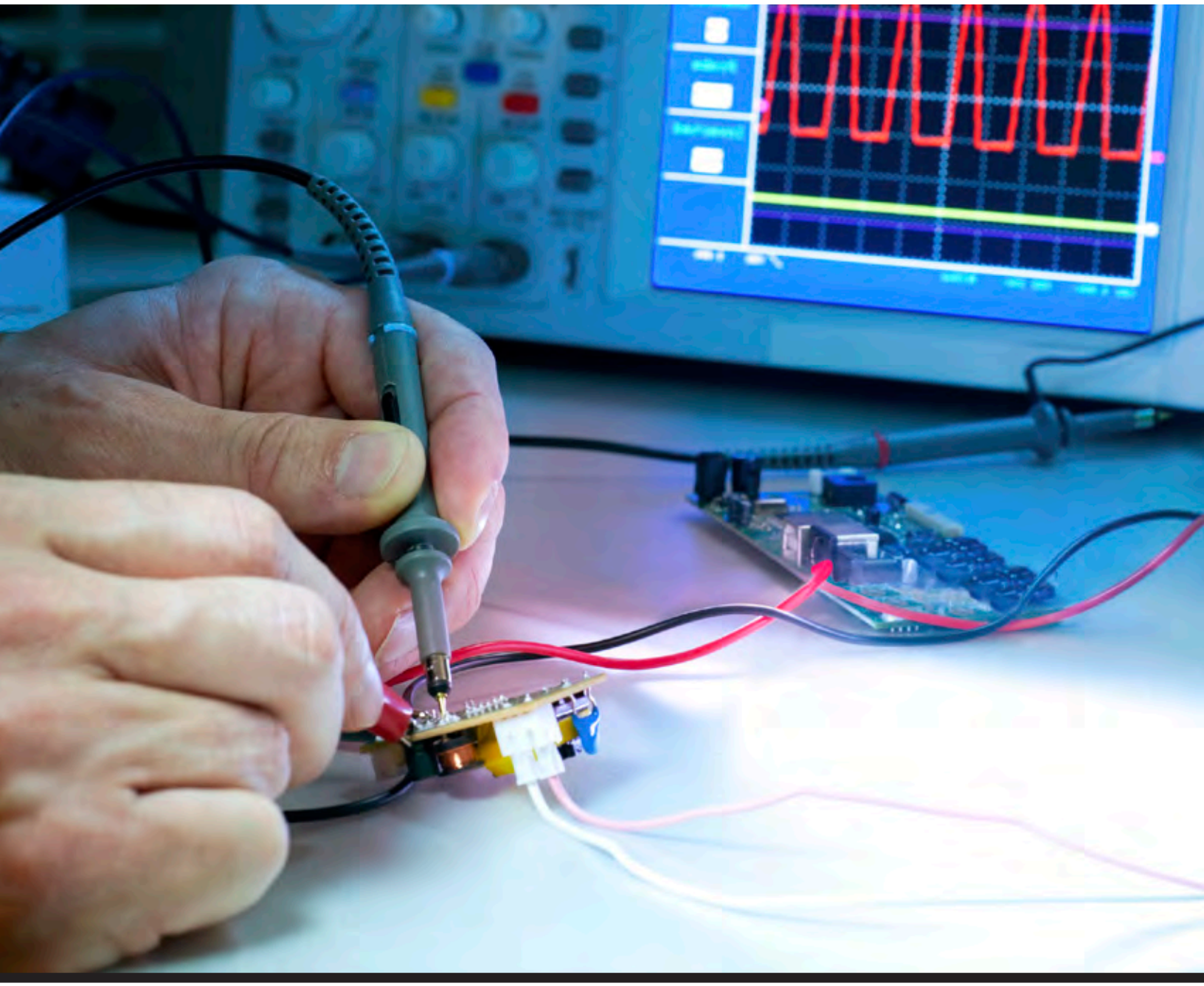
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Window Replacements and Lighting Diffusers

Use With	Models
Clear Plastic	
62 x 62 mm Ring Lights	LEDRCWS
80 x 80 mm Ring Lights	LEDRCW
62 x 62 mm Area Lights	LEDAWS
80 x 80 mm Area Lights	LEDAW
70 mm Sealed High-Intensity Area Lights	LEDA70SW-P
145 mm IP50 Linear Array Lights	LEDLA145XW-P
290 mm IP50 Linear Array Lights	LEDLA290XW-P
290 mm Sealed IP68 Linear Array Lights	LEDLA290SW-P
435 mm IP50 Linear Array Lights	LEDLA435XW-P
435 mm Sealed IP68 Linear Array Lights	LEDLA435SW-P
580 mm IP50 Linear Array Lights	LEDLA580XW-P
580 mm Sealed IP68 Linear Array Lights	LEDLA580SW-P
870 mm Sealed IP50 Linear Array Lights	LEDLA870XW-P
1160 mm IP50 Linear Array Lights	LEDLA1160XW-P
Clear Plastic Diffuse	
80 x 80 mm Ring Lights	LEDRCDW
62 x 62 mm Right Lights	LEDRCDWS
70 mm High-Intensity Ring Lights	LEDR70CDW
70 mm High-Intensity Area Lights	LEDA70CDW
70 mm Sealed IP68 High-Intensity Area Lights	LEDA70SCDW-P
145 mm IP50 Linear Array Lights	LEDLA145XCDW-P
290 mm IP50 Linear Array Lights	LEDLA290XCDW-P
290 mm Sealed IP68 Linear Array Lights	LEDLA290SCDW-P
435 mm IP50 Linear Array Lights	LEDLA435XCDW-P
435 mm Sealed IP68 Linear Array Lights	LEDLA435SCDW-P
580 mm IP50 Linear Array Lights	LEDLA580XCDW-P
580 mm Sealed IP68 Linear Array Lights	LEDLA580SCDW-P
870 mm IP50 Linear Array Lights	LEDLA870XCDW-P
1160 mm IP50 Linear Array Lights	LEDLA1160XCDW-P
Clear Glass	
70 mm Sealed IP68 High-Intensity Area Lights	LEDA70SW-G
145 mm IP50 Linear Array Lights	LEDLA145XW-G
290 mm IP50 Linear Array Lights	LEDLA290XW-G
290 mm Sealed IP68 Linear Array Lights	LEDLA290SW-G
435 mm IP50 Linear Array Lights	LEDLA435XW-G
435 mm Sealed IP68 Linear Array Lights	LEDLA435SW-G
580 mm IP50 Linear Array Lights	LEDLA580XW-G
580 mm Sealed IP68 Linear Array Lights	LEDLA580SW-G
870 mm IP50 Linear Array Lights	LEDLA870XW-G
1160 mm IP50 Linear Array Lights	LEDLA1160XW-G

Use With	Models
White Plastic	
70 x 70 mm Red Backlights	LEDBW
70 x 70 mm Infrared Backlights	LEDBIW
85 x 220 mm Red Backlights	LEDBWL
85 x 220 mm Infrared Backlights	LEDBIWL
White Plastic Diffuse	
62 x 62 mm Ring Lights	LEDRDWS
80 x 80 mm Ring Lights	LEDRDW
62 x 62 mm Area Lights	LEDADWS
80 x 80 mm Area Lights	LEDADW
70 mm Sealed High-Intensity Area Lights	LEDA70SWDW-P
145 mm IP50 Linear Array Lights	LEDLA145XWDW-P
290 mm IP50 Linear Array Lights	LEDLA290XWDW-P
290 mm Sealed IP68 Linear Array Lights	LEDLA290SWDW-P
435 mm IP50 Linear Array Lights	LEDLA435XWDW-P
435 mm Sealed IP68 Linear Array Lights	LEDLA435SWDW-P
580 mm IP50 Linear Array Lights	LEDLA580XWDW-P
580 mm Sealed IP68 Linear Array Lights	LEDLA580SWDW-P
870 mm IP50 Linear Array Lights	LEDLA870XWDW-P
1160 mm IP50 Linear Array Lights	LEDLA1160XWDW-P

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Lighting & Indicators

Banner offers a wide variety of lighting and indicator solutions, including LED lighting, signal tower lights, indicators, touch buttons and pick-to-light indicators. With flexible designs, high-quality and energy-efficient LED products, Banner's lighting and indication selection offers a unique solution that suits many environmental, workplace efficiency and mounting needs.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

LIGHTING & INDICATORS

LED LIGHTING page 532

SIGNAL TOWER LIGHTS page 554

INDICATORS page 568

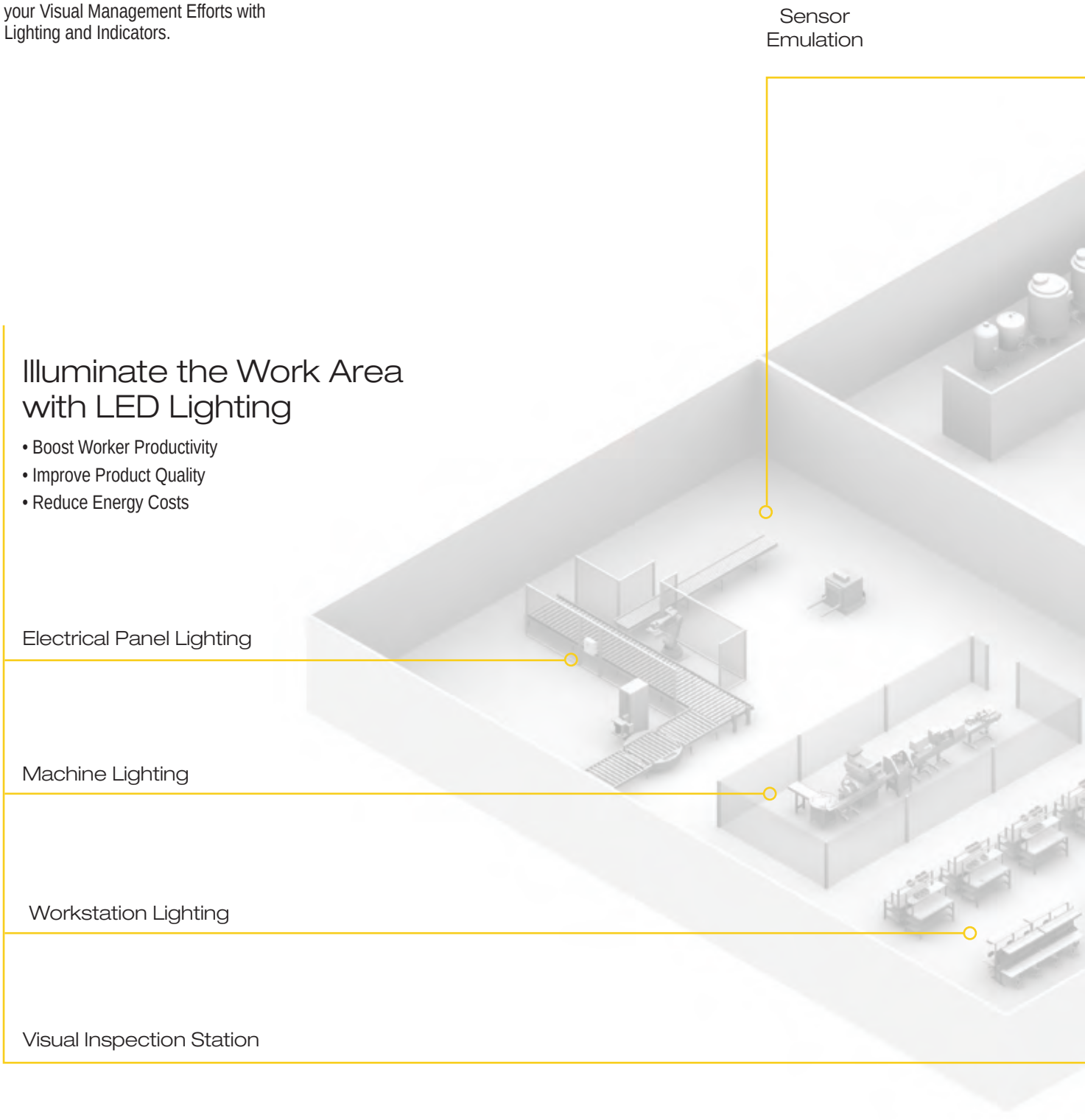
TOUCH BUTTONS page 608

PICK-TO-LIGHT page 628

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Light Up the Visual Factory

Enhance your Visual Management Efforts with Banner's Lighting and Indicators.



Illuminate the Work Area with LED Lighting

- Boost Worker Productivity
- Improve Product Quality
- Reduce Energy Costs

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

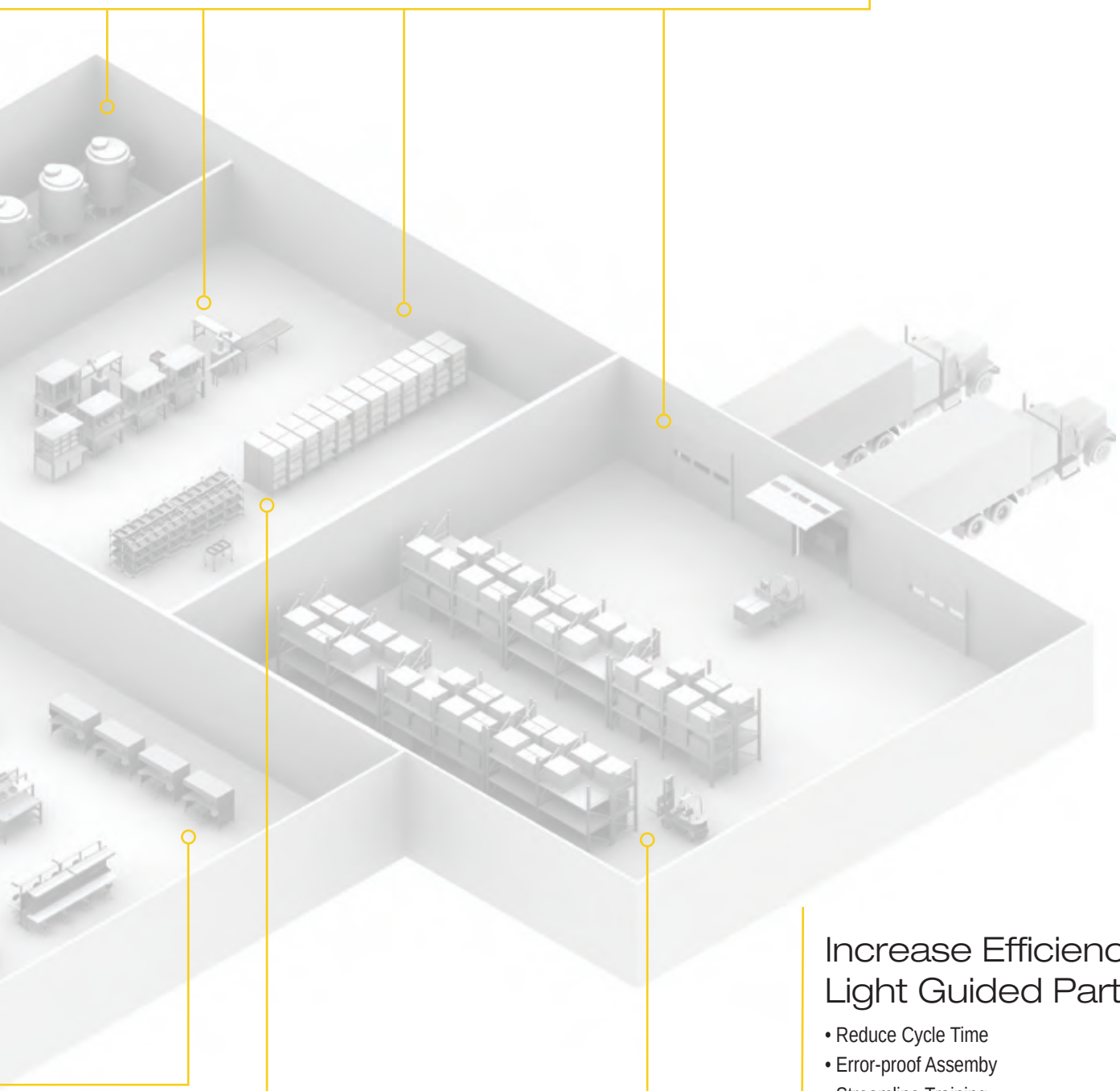
Communicate Status

- Empower Operators
- Alert Supervisors
- Accelerate Resolution

Machine and Process Status

Call for Parts

Loading Dock/Bay Communication



Increase Efficiency with Light Guided Part Picking

- Reduce Cycle Time
- Error-proof Assemby
- Streamline Training

Pick-to-Light for Assembly and Kitting

Pick-to-Light for Warehouse and Logistics

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



LED Lighting

Banner's LED lighting offers high-quality, energy-efficient products that provide bright illumination for up to 50,000 hours. Robust, vibration-resistant housings and sleek designs make Banner's LED lighting ideal for a wide range of industrial and mobile applications, including machine lighting, enclosure lighting, visual inspection illumination and work cell lighting.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Available Colors	Dimensions H x W x D	Housing Material	Power Supply
	WLS28-2 Banner's LED Strip Lights have sturdy aluminum housings, shatterproof windows and a low-profile, space-saving design. page 534	White, Warm White, Red, Green, Blue, Yellow	Varies by model	Clear anodized aluminum	12 to 30 V dc
	WLB32 Banner's WLB32 is an ultra-bright LED fixture that features an even light output for a no glare 'glow.' page 538	White	H (Varies by model) 32 x 46 mm	Anodized aluminum	12 to 30 V dc, 90 to 264 V ac
	WLC60 The WLC60 Heavy-Duty LED Light is engineered to withstand harsh environments making it the first choice for a machine lighting solution. page 540	White	H (339 or 638) x 60.9 x 31.3 mm	Nickel plated aluminum, 316 Stainless Steel	12 to 30 V dc
	WLC90 Extremely compact and bright, making them an excellent choice for machining centers and food processing equipment. page 542	White	89.0 mm x 91.0 mm x 28.2 mm	Nickel plated aluminum	12 to 30 V dc
	WLA Area Lights provide high intensity, uniform light with low energy consumption and a small footprint. page 544	White Red Green Blue Yellow	Varies by model	PBT	12 to 30 V dc
	WL50S These lights are rugged and water-resistant, making them a good choice for machine lighting, food and beverage applications and mobile applications. page 546	White, Green, Red	WL50S: 65.8 x ø 50 mm WL50S (stainless): 71 x ø 56 mm	WL50S: Black anodized aluminum SS models: Stainless Steel	12 to 30 V dc
	WL50-2 Banner's LED Work Lights are ideal in areas where space is limited. page 548	White	WL50F-2: 76 x 50 x 23 mm WL50: 47.5 x ø 50 mm	Polycarbonate	12 to 30 V dc

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



WLS28-2
LED Strip Lights

Banner's LED Strip Lights have sturdy aluminum housings, shatterproof windows and a low-profile, space-saving design. Convenient angle brackets can be used to direct the light exactly where it's needed.

- Rugged, water-resistant IP69K models
- Available in lengths from 145 to 1130 mm
- Magnetic mount options available for easy installation
- Lensed option or choice of clear or diffuse window
- Can be cascaded end-to-end to minimize wiring
- Dimmable models available (see page 550)

WLS28-2, 12-30 V DC Example Model Number WLS28-2CW145DXQ NEW

Family	Cascadable	LED Color	Lighted Length (mm)	Window	Construction	ON/OFF Switch	Connector
WLS28-2	C	W	145	D	X		Q
	C = Cascadable X = Non Cascadable	W = Cool White WW = Warm White R = Red G = Green B = Blue Y = Yellow	145 285 430 570 710 850 990 1130	Blank = Clear Plastic D = Diffused Plastic L25 = 25° Lensed window	X = Not Sealed S = Sealed†	Blank = None PB = Hi/Lo/OFF	Blank = 2 m Integral Cable Q = Integral 4-Pin Euro QD (mating cordset required)*

* Models require a mating cordset (see page 535).
† Sealed models not available with ON/OFF Switch

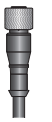
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA



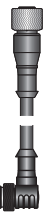


Additional cordset information available. See page 904.

Euro QD—Double-Ended (for Q models)

See page 910

Length	Threaded 4-Pin Straight/Straight	Threaded 4-Pin Straight/Right-Angle
0.31 m	MQDEC-401SS	—
0.91 m	MQDEC-403SS	MQDEC-403RS
1.83 m	MQDEC-406SS	MQDEC-406RS
3.66 m	MQDEC-412SS	MQDEC-412RS
6.10 m	MQDEC-420SS	MQDEC-420RS
9.14 m	MQDEC-430SS	MQDEC-430RS
15.2 m	MQDEC-450SS	MQDEC-450RS


Euro QD-Splitter

See page 905

Length Branches	Length Trunk	Threaded 4-Pin
0 m	0 m	CSB-M1240M1240
0.30 m	0 m	CSB-M1240M1241
0.30 m	0.30 m	CSB-M1241M1241
0.30 m	2.50 m	CSB-M1248M1241
0.30 m	4.60 m	CSB-M12415M1241
0.03 m	7.60 m	CSB-M12425M1241
0.03 m	7.60 m	CSB-UNT425M1241



Brackets

WLS28-2

SMBWLS28RA	SMBWLS28SM	SMBWLSMAG
		Set of four magnets & screws






Additional bracket information available. See page 846.

Power Supply

Description	Connection	Model
Class 2 Power Supply Input: 90-264 V ac 1.5A Output: 24 V dc 3.9A	2 m 4-Pin Euro	PSD-24-4

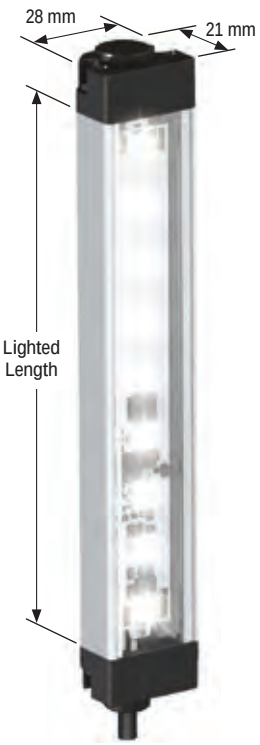


In-Line Switch

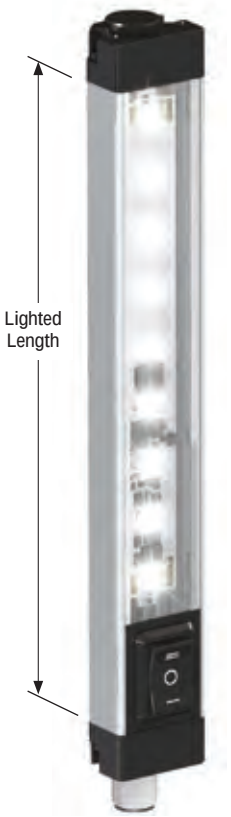
Connection	Model
M12	WLS28PBQ



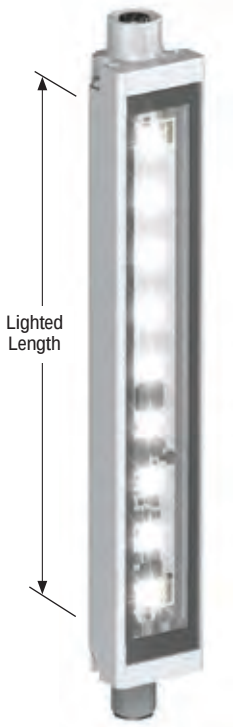
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



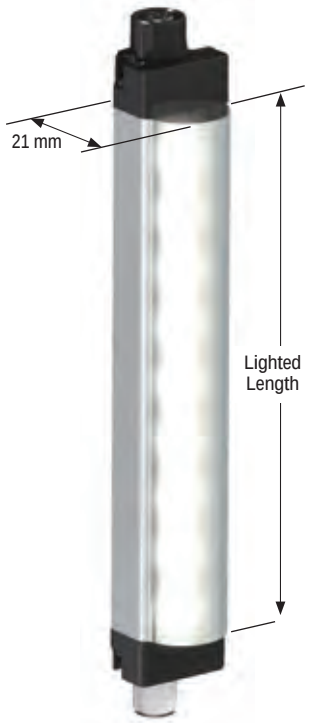
Stand Alone
Cabled Models



Stand Alone Push Button
QD Models



Sealed
Cascadable Models



Lensed
Cascade Models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WLS28-2 Specifications

Supply Voltage and Current

12 to 30 V dc (10% max. ripple)
Max. current per length:

Lighted Length	12 V dc	24 V dc	30 V dc	Max. Current (A)	Lumens* (Typical @ 25° C)
					Cool White
145 mm	0.33 A	0.15 A	0.12 A	0.4	225
285 mm	0.66 A	0.30 A	0.24 A	0.8	450
430 mm	1.01 A	0.46 A	0.36 A	1.2	675
570 mm	1.36 A	0.61 A	0.48 A	1.6	900
710 mm	1.75 A	0.77 A	0.60 A	2.0	1125
850 mm	2.13 A	0.92 A	0.73 A	2.4	1350
990 mm	2.59 A	1.08 A	1.08 A	2.8	1575
1130 mm	3.04 A	1.24A	1.24 A	3.2	1800

Light Characteristics

Color Temperature (CCT): Cool White: 6,000–7,100 K

Construction

Clear anodized aluminum housing; painted zinc end caps; clear acrylic window; zinc plated steel brackets

Mounting

(2) swivel brackets and (4) screws included

Environmental Rating

IP50, IP67/IP69K

Connections

Integral 4-pin Euro style QD or 2 m integral cable, depending on model. QD cordsets are ordered separately. See page “Cordsets” on page 535.

Operating Conditions

Temperature: -25° to +70° C
Storage Temperature: -40° to +70° C

Certifications

CE UL LISTED

Application Notes

When connecting cascadable lights in series it is important not to exceed maximum current limitations:
Maximum length of light at 12 V dc = 1.5 m
Maximum length of light at 24 V dc = 3.0 m
Maximum length of light at 30 V dc = 3.1 m

Hookup Diagrams

LI25 (p. 1007)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



WLB32
LED Light Bar

Banner's WLB32 is an ultra-bright LED fixture that features an even light output for a no glare 'glow.' Suitable for a variety of environments and applications, including work stations, machine lighting, control cabinets, and manufacturing lines.

- Highly energy efficient for overall cost savings
- High/Low/OFF switch
- Daisy chain power to multiple lights
- Metal housing, shatterproof window
- Easy installation with snap clips, or a choice of magnetic or angle brackets

WLB32, Example Model Number WLB32C285PBQ NEW

Family	Power	Cascadable	Lighted Length (mm)	ON/OFF Switch	Connector	Plug Type*
WLB32		C	285	PB	Q	
	Blank = DC Z = AC	C = Cascadable	285 570 850 1130	PB = Hi/Lo/OFF	Blank = 2 m Integral Cable (dc) Q = Integral 4-Pin Euro QD (dc) QM = AC QD models require mating cordset	* Only needed for AC models B = North & Central America, Japan, Taiwan D = India, Sri Lanka, Nepal, Namibia EF = France, Belgium, Slovakia, Tunisia, Germany, Austria, Netherlands, Spain, S. Korea G = UK, Ireland, Cyprus, Malta, Malaysia, Singapore, Hong Kong, Vietnam I = Australia, New Zealand, Papua New Guinea, Argentina, China N = Brazil, South Africa C = AC connector with flying leads Blank = AC (no power cord)

* Models require a mating cordset (see page 539).

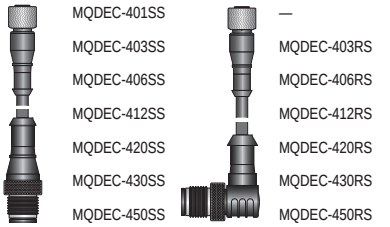
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for cascading DC models)

See page 910

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
0.31 m	MQDEC-401SS	—
0.91 m	MQDEC-403SS	MQDEC-403RS
1.83 m	MQDEC-406SS	MQDEC-406RS
3.66 m	MQDEC-412SS	MQDEC-412RS
6.10 m	MQDEC-420SS	MQDEC-420RS
9.14 m	MQDEC-430SS	MQDEC-430RS
15.2 m	MQDEC-450SS	MQDEC-450RS



For cascading AC models

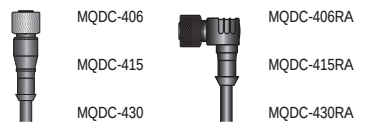
Length	NEMA 5-15 grounded (IEC Type B) (see data sheet for more options)
0.15 m	LQMAEC-3005SS
0.31 m	LQMAEC-301SS
0.91 m	LQMAEC-303SS
1.83 m	LQMAEC-306SS
3.66 m	LQMAEC-312SS
6.10 m	LQMAEC-320SS
9.14 m	LQMAEC-330SS



Euro QD (for DC power)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA





Additional cordset information available. See page 904.

AC power

Length	NEMA 5-15 grounded (IEC Type B) (see data sheet for more options)
1.8 m	LQMAC-306B

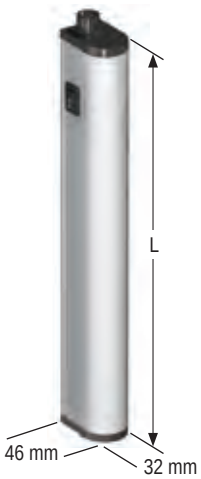


Brackets

WLB32

LMBWLB32	LMBWLB32-180S	LMBWLB32MAG





Length (L)	Model
298 mm	WLB32ZC285PBQM
580 mm	WLB32ZC570PBQM
850 mm	WLB32ZC850PBMQ
1144 mm	WLB32ZC1130PBQM

WLB32 Specifications

Supply Voltage and Current	12 to 30 V dc 90 to 264 V ac

Lighted Length (mm)	Max Current Draw (A) DC	Max Current Draw (A) AC (at 90 V ac)	Typical Current Draw (A) 12 V DC	24 V DC	30 V DC	120 V ac	230 V ac
285	0.8	0.125	0.66	0.31	0.24	0.075	0.045
570	1.6	0.250	1.36	0.62	0.48	0.150	0.080
850	2.4	0.375	2.19	0.93	0.72	0.225	0.115
1130	3.2	0.500	3.02	1.24	0.96	0.300	0.150

Light Characteristics	Color: Daylight white Color temperature (CCT): 5000K (±300K)
Useful Life	Lumen Maintenance - L70 When operating within specifications, output will decrease less than 30% after 50,000 hours.
Push Button	II = 100% intensity I = 50% intensity 0 = Off
Construction	Anodized aluminum housing; polycarbonate window and end caps; stainless steel mounting brackets
Mounting	Snap clips; optional magnetic mount or swivel bracket accessories available
Environmental Rating	IEC IP50
Operating Conditions	DC models: –25 °C to 70 °C AC models: –25 °C to 45 °C
Certifications	Approvals pending
Hookup Diagrams	See data sheet

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



WLC60
Heavy-Duty LED Light

The WLC60 Heavy-Duty LED Light is engineered to withstand harsh environments making it the first choice for a machine lighting solution. A conservative mechanical design protects against liquid ingress and state-of-the-art LED technology delivers best in class brightness. Rugged and durable for harsh environments.

- Oil, chemical and water resistant with IP67, IP68g and IP69K ratings
- High brightness paired with advanced glare-reducing optics
- Easy to install with a wide variety of mounting solutions
- Highly resistant to vibration and shock
- Dimmable models available (see page 550)

Nickel-Plated Aluminum WLC60, 12-30 V DC

Example Model Number WLC60XW340GAQ NEW

Family	Cascadable	LED Color	Lighted Length (mm)	Window	Mounting Type	Construction	Connector Exit	Connector
WLC60	X	W	340	G		A		Q
	C = Cascadable X = Non Cascadable	W = Cool White	340* 640	Blank = Polycarbonate G = Borosilicate Glass	Blank = Base Mount F = Flush Mount*	A = Nickel-Plated Aluminum	Blank = Side Exit R = Rear Exit	Blank = 2 m Integral Cable Q = Integral 4-Pin Euro QD (mating cordset required)†

Stainless Steel WLC60, 12-30 V DC

Example Model Number WLC60XW340GSSQ NEW

Family	Cascadable	LED Color	Lighted Length (mm)	Window	Mounting Type	Construction	Connector Exit	Connector
WLC60	X	W	340	G		SS		Q
	X = Non Cascadable	W = Cool White	340	Blank = Polycarbonate G = Borosilicate Glass	Blank = Base Mount	SS = 316 Stainless Steel	Blank = Side Exit	Blank = 2 m Integral Cable Q = Integral 4-Pin Euro QD (mating cordset required)†

* Flush Mount models only available in 340 mm length
† Models require a mating cordset (see page 541).

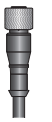
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA




Additional cordset information available. See page 904.

Double Ended Euro QD (for Q models)

Length	Threaded 4-Pin Straight to Straight
0.30 m	MQDEC-401SS-PUR
0.91 m	MQDEC-403SS-PUR
1.83 m	MQDEC-406SS-PUR



Washdown Euro QD (for Q models)

Length	Threaded 4-Pin Straight
1.83 m	MQDC-WDSS-0406
4.57 m	MQDC-WDSS-0415
9.14 m	MQDC-WDSS-0430



Brackets

WLC60

LMBWLC60F	LMBWLC60RA	LMBWLC60MAG



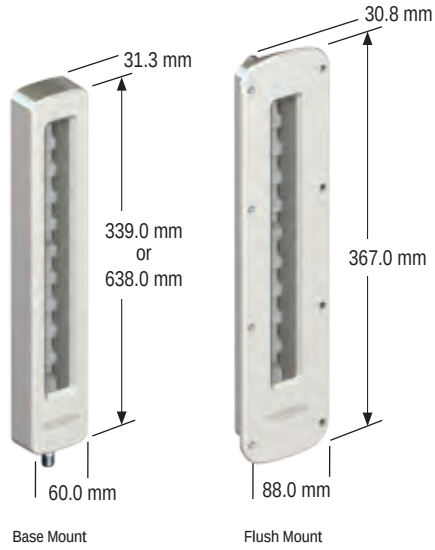


Additional bracket information available. See page 846.

Power Supply

Description	Connection	Model
Class 2 Power Supply Input: 90-264 V ac 1.5A Output: 24 V dc 3.9A	2 m 4-Pin Euro	PSD-24-4





WLC60 Specifications

Supply Voltage and Current	12 to 30 V dc Max. current per length:

Light Length	12 V dc	24 V dc	30 V dc	Watts	Lumens* (Typical @ 25° C) Cool White
340 mm	1.4 A	0.7 A	0.56 A	16.8	1300
640 mm	3.1 A	1.53 A	1.22 A	37.2	2600

Light Characteristics	Color Temperature (CCT): Cool White: 6,000–7,100 K
Construction	Nickel plated aluminum housing, polycarbonate or borosilicate glass window 316 Stainless steel
Environmental Rating	IEC IP67/IP68g / IP69K per DIN 4005
Connections	Integral 4-pin Euro style QD or 2 m integral cable, depending on model. QD cordsets are ordered separately.
Operating Conditions	Temperature: Max intensity -40° to +50° C Dim settings -40° to +70° C Storage Temperature: -40° to +70° C
Certifications	CE c UL us LISTED
Application Notes	When connecting cascadable lights in series, it is important not to exceed the maximum current limitation of 4 Amps. See datasheet for more information.
Hookup Diagrams	See data sheet.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



WLC90
Heavy-Duty LED Light

Banner's WLC90 Heavy-Duty Lights are designed to operate in harsh environments, withstanding washdown and spray from water and chemicals such as coolants and detergents. They are extremely compact and bright, making them an excellent choice for machining centers and food processing equipment.

- Rugged housing resists water, coolants, oils and detergent with IP67, IP68g and IP69K and ratings
- Wide operating temperature range with an internal monitoring circuit that will dim the LEDs to a safe level at extreme temperatures
- Three lens options to suit many application needs
- Pan and tilt brackets for versatile mounting to direct light in any direction
- All models have three discrete intensity level settings
- Dimmable models available (see page 550)

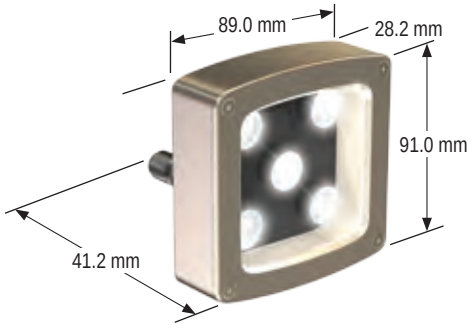
WLC90, 12-30 V DC Example Model Number WLC90WGL15Q NEW

Family	LED Color	Window	Lensing	Connector Exit	Connector
WLC90	W	G	L15		Q
	W = Cool White	Blank = Polycarbonate G = Borosilicate Glass	L8 = ± 8° L15 = ± 15° L30 = ± 30°	Blank = Side Exit R = Rear Exit	Blank = 2 m Integral Cable Q = 4-Pin Euro Integral QD (mating cordset required)*

* Models require a mating cordset (see page 543).



Side Exit



Rear Exit

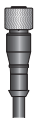
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA





Additional cordset information available. See page 904.

Washdown Euro QD (for Q models)

Length	Threaded 4-Pin Straight
1.83 m	MQDC-WDSS-0406
4.57 m	MQDC-WDSS-0415
9.14 m	MQDC-WDSS-0430



Brackets

WLC90

LMBWLC90PT	SMBAMS70AS



Additional bracket information available. See page 846.

Power Supply

Description	Connection	Model
Class 2 Power Supply Input: 90-264 V ac 1.5A Output: 24 V dc 3.9A	2 m 4-Pin Euro	PSD-24-4



WLC90 Specifications

Supply Voltage and Current	12 to 30 V dc Max. current: 850 mA at 12 V dc 410 mA at 24 V dc 330 mA at 30 V dc Max. input power: 10.2 Watts Lumens (Typical @ 25 °C): 700
Light Characteristics	Color Temperature (CCT): Cool White: 6,000–7,100 K
Construction	Nickel plated aluminum housing, polycarbonate or borosilicate glass window
Environmental Rating	IEC IP67/IP68g / IP69K per DIN 4005
Connections	Integral 4-pin M12/Euro style QD. QD cordsets are ordered separately.
Operating Conditions	Temperature: Max intensity -40° to +70° C Storage Temperature: -40° to +70° C
Certifications	CE c UL us LISTED
Hookup Diagrams	See data sheet.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



WLA
LED Area Light

Banner's LED Area Lights provide high intensity, uniform light with low energy consumption and a small footprint. Banner's Area Lights are a versatile lighting source for a wide range of indoor and outdoor applications with angle bracket or magnetic mount options available.

- Up to 2600 lumens for extremely bright illumination
- Encapsulated models available for enhanced resistance to chemicals, vibration and shock
- Choice of clear or diffuse window for reduced glare
- Optical lensed options create more focused illumination
- Rugged housing rated to IP69K for high-pressure, high-temperature washdown applications
- Dimmable models available (see page 550)

WLA, 12-30 V DC Example Model Number WLAW105X180DL11Q

Family	LED Color	Array Size (mm)	Window	Lensing	Connector
WLA	W	105x180	D	L11	Q
	W = Cool White*	105x180	Blank = Clear Plastic	Blank = No Lenses*	Blank = 2 m Integral Cable
	WW = Warm White	190x180	D = Diffused Plastic	L11 = ± 11°	Q = Integral 4-Pin Euro QD (mating cordset required)†
	R = Red	275x180	E = Encapsulated in Polyurethane*	L22 = ± 22°	
	G = Green	360x180		L30 = ± 30°	
	B = Blue				
	Y = Yellow				

* Encapsulated models only available in Cool White with no lens
† Models require a mating cordset (see page 535).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight		Threaded 4-Pin Right-Angle	
1.83 m	MQDC-406		MQDC-406RA	
4.57 m	MQDC-415		MQDC-415RA	
9.14 m	MQDC-430		MQDC-430RA	

Additional cordset information available. See page 904.

Washdown Euro QD (for Q models)

Length	Threaded 4-Pin Straight	
1.83 m	MQDC-WDSS-0406	
4.57 m	MQDC-WDSS-0415	
9.14 m	MQDC-WDSS-0430	

Power Supply

Description	Connection	Model
Class 2 Power Supply Input: 90-264 V ac 1.5A Output: 24 V dc 3.9A	2 m 4-Pin Euro	PSD-24-4



Brackets

WLA

See page 885

SMBBSSM	SMBBSRA	SMBWLAMAG
		
		Set of four magnets & screws

Additional bracket information available. See page 846.



* Varies by model

WLA Specifications

Supply Voltage and Current

12 to 30 V dc (10% max. ripple)
Max. current per length:

Size	12 V dc	24 V dc	30 V dc	Watts	Lumens* (Typical @ 25° C) Cool White	Warm White	Green	Red	Yellow	Blue
WLAW105X180	1.0A	0.5A	0.4A	12	550	435	325	125	275	95
WLAW190X180	2.0A	1.0A	0.8A	24	1100	870	650	250	550	190
WLAW275X180	3.0A	1.5A	1.2A	36	1650	1305	975	375	825	285
WLAW360X180	4.0A	2.0A	1.6A	48	2200	1740	1300	500	1100	380

Light Characteristics

Color Temperature (CCT): **Cool White:** 6,000-7,100K, **Warm White:** 2,800-3,200K, **Green:** 520-535 nm, **Red:** 620-630 nm, **Yellow:** 585-595 nm, **Blue:** 460-475 nm

Construction

PBT housing; acrylic window, nickel-plated brass connector

Environmental Rating

IP69K, IP67

Operating Conditions

Temperature: −20° to +50° C
Relative Humidity: 95% (non-condensing)
Storage Temperature: −40° to +70° C

Certifications

CE UL LISTED

Wiring Diagrams

LI25 (p. 1007)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



WL50S
LED Spot Work Lights

Banner's high-intensity LED Spot Lights emit light in a controlled beam, providing extremely bright illumination directly at a target with optimal energy efficiency. These lights are rugged and water-resistant, making them a good choice for machine lighting, food and beverage applications and mobile applications.

- Three lens options to suit many application needs
- Rugged, sealed housing rated to IP69K
- 50 mm diameter with flat profile and 30 mm mounting base
- Stainless steel version with FDA-grade silicone gasket and Viton® O-Ring seal
- Many bracket options for simple mounting and alignment
- Dimmable models available (see page 550)

WL50S, 12-30 V DC Example Model Number WL50SWL11Q

Family	LED Color	Lens Angle	Connector
WL50S	W	L11	Q
	W = White R = Red G = Green	L5 = ±5° (small) L11 = ±11° (large) L20 = ±20° (largest)	Blank = 2 m Integral Cable Q = Integral 4-Pin Euro QD (mating cordset required)*

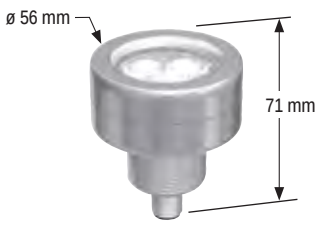
Stainless Steel WL50S, 12-30 V DC Example Model Number WL50SWSSL11Q

Family	LED Color	Housing	Window Material	Lens Angle	Connector
WL50S	W	SS		L11	Q
	W = White	SS = Stainless Steel	Blank = Acrylic G = Glass	L5 = ±5° (small) L11 = ±11° (large) L20 = ±20° (largest)	Q = Integral 4-Pin Euro QD (mating cordset required)*

* Models require a mating cordset (see page 547).



WL50S



WL50S Stainless Steel

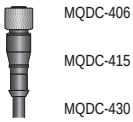
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA





Euro QD (for Q models)

See page 912

Length	Threaded 5-Pin Straight
1.83 m	MQDCWD-506
9.14 m	MQDCWD-530



Additional cordset information available. See page 904.

Brackets

WL50S

See page 869 | See page 870

SMB30A	SMB30SC





Additional bracket information available. See page 846.

Flex Arm

WL50S

See page 552

FLX18



WL50S Specifications

Supply Voltage and Current	12 to 30 V dc, 400 mA max.
Light Characteristics	See table below
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Construction	WL50S..: Black anodized aluminum housing; polycarbonate window; nickel-plated QD connector or PVC-jacketed cable; black zinc-plated steel mounting nut WL50SS..: 316 stainless steel housing, polycarbonate or glass window with Viton seal, 316 stainless steel M30 mounting nut, FDA grade silicon base gasket
Useful Life	When operating within specifications, output will decrease less than 30% after 50,000 hours
Connections	Integral 5-pin M12/Euro style QD or 2 m (6.5') integral cable, depending on model; 4-pin connecting cordset required for QD models; only 2 wires used
Operating Conditions	Temperature: −20° to +50° C Relative Humidity: 95% (non-condensing) Storage Temperature: −40° to +70° C
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements method 201A (vibration: 10 to 60 Hz max., double amplitude 0.06",maximum acceleration 10G). Also meets IEC 947-5-2; 30G 11 ms duration, half sine wave.
Certification	CE
Hookup Diagrams	LI25 (p. 1007)

Lens Angle	Model	LED Color	Window Material	Lumens* (Typical @ 25° C)
±5° (smaller, more focused spot)	WL50SWL5Q	White	Polycarbonate	295
	WL50SRL5Q	Red		110
	WL50SGL5Q	Green		210
	WL50SWSSL5Q	White	Polycarbonate	295
	WL50SWSSGL5Q		Glass	
±11° (larger spot)	WL50SWL11Q	White	Polycarbonate	285
	WL50SRL11Q	Red		105
	WL50SGL11Q	Green		200
	WL50SWSSL11Q	White	Polycarbonate	285
	WL50SWSSGL11Q		Glass	
±20° (largest spot)	WL50SWL20Q	White	Polycarbonate	270
	WL50SRL20Q	Red		100
	WL50SGL20Q	Green		190
	WL50SWSSL20Q	White	Polycarbonate	270
	WL50SWSSGL20Q		Glass	

Color Temperature (CCT): **White:** 6,000-7,100 K, **Red:** 620-630 nm, **Green:** 520-535 nm

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



WL50-2
LED Work Lights

Banner's LED Work Lights are ideal in areas where space is limited. Featuring a low-profile, 50 mm flat-pack design and robust housing, the LED Work Lights are suitable for many applications, including maintenance stations, control cabinets and general illumination applications.

- Low power consumption
- Aesthetic shape that sheds debris and moisture
- Rugged, water-resistant IP69K models
- VELCRO® brand VELCOIN® fasteners included for quick mounting and convenient repositioning of light
- Long-lasting LED technology for zero maintenance after installation
- Dimmable models available (see page 550)

WL50-2, 12-30 V DC

Description		LED Color	Connection	Standard Models	Push-Button Models
	Flat Mount†	White	2 m	WL50F-2	WL50F-2PB
			4-pin Euro QD	WL50F-2Q	WL50F-2PBQ
	30 mm Mount	White	2 m	WL50-2	WL50-2PB
			4-pin Euro QD	WL50-2Q	WL50-2PBQ

Connection options: A model with a QD requires a mating cordset (see page 549).

For 9 m cable, add suffix W/30 to 2 m model number (example, WL50F W/30).
QD models: For a 4-pin 150 mm Euro-style pigtail QD, add suffix QP to 2 m model number (example, WL50FQP).
† Flat-mount models include a 48 mm circular velcro mounting kit for easy mounting.





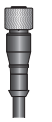
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA







Additional cordset information available. See page 904.

Flex Arm

WL50-2

See page 552

FLX18



WL50-2 Specifications

Supply Voltage	12 to 30 V dc (10% max. ripple) Max. current: 105 mA @ 12 V dc; 55 mA @ 30 V dc Max. input power: 1.7 watts
Light Characteristics	Color temperature (CCT): 5,000 to 10,000 K Color: Cool white Intensity (typical): 70 lumens; 50 lux @ 1 meter
Power-up Response Time	Light ON: 1 millisecond max. (models without push button)
Construction	Polycarbonate housing; Nickel-plated QD connector or PVC-jacketed cable
Environmental Rating	Standard models: IP69K per DIN 40050 Push-button models: IEC IP67
Connections	Integral 4-pin Euro-style QD, 150 mm PVC pigtail with QD or 2 m integral cable, depending on model. QD cordsets are ordered separately.
Operating Conditions	Temperature: −20° to +50° C Relative Humidity: 95% (non-condensing) Storage Temperature: −40° to +70° C
Application Note	Push-button models: When power is initially applied to the device, push the push button to turn the light on. If power to the device is interrupted the light will turn off and will remain off when power is restored. To turn light back on, push the push button.
Certification	CE UL LISTED
Hookup Diagrams	LI25 (p. 1007)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



LC65
LED Dimming Controller

The LED Pulse-Width Modulation (PWM) Dimming Controller allows an operator to dim an LED light source without loss of accuracy. The Dimming Controller paired with Banner's LED lighting helps further increase energy savings, helping to reduce overall energy costs.

- Ability to dim light at an operator station
- Works with special models of the strip lights, heavy-duty lights, area lights, spot lights and work lights
- Allows for control of multiple lights with one module
- Compact and easy to install
- Model keys below configured for use with Dimming Controller (LC65PIT ordered seperatly)



page 534

WLS28-2 LED Strip Lights

Family	Cascadable	LED Color	Lighted Length (mm)	Window	Construction	Intensity Control	Connector
WLS28-2	C	W	145		X	PWM	Q

- Cascadable: C = Cascadable; X = Non Cascadable
- LED Color: W = Cool White
- Lighted Length (mm): 145, 285, 430, 570, 710, 850, 990, 1130
- Window: Blank = Clear Plastic; D = Diffused Plastic; L25 = 25° Lensed Window
- Construction: S = Sealed*; X = Not Sealed
- Intensity Control: PWM Dimming
- Connector: Blank = 2 m Integral Cable; Q = Integral Euro QD (QD models require mating cordset)

* Sealed models not available with ON/OFF Switch



page 540

WLC60 Heavy-Duty LED Light

Family	Cascadable	LED Color	Lighted Length (mm)	Window	Mounting Type	Construction	Connector Exit	Intensity Control	Connector
WLC60	X	W	340	G		A		PWM	Q

- Cascadable: C = Cascadable; X = Non-Cascadable
- LED Color: W = Cool White
- Lighted Length (mm): 340*, 640
- Window: Blank = Polycarbonate; G = Borosilicate Glass
- Mounting Type: Blank = Base Mount; F = Flush Mount*
- Construction: A = Nickel-Plated Aluminum
- Connector Exit: Blank = Side Exit; R = Rear Exit
- Intensity Control: PWM Dimming
- Connector: Blank = 2 m Integral Cable; Q = Euro Integral QD (QD models require mating cordset)

* Flush Mount models only available in 340 mm length



page 542

WLC90 Heavy-Duty LED Light

Family	LED Color	Window	Lensing	Connector Exit	Intensity Control	Connector
WLC90	W	G	L15		PWM	Q

- LED Color: W = Cool White
- Window: Blank = Polycarbonate; G = Borosilicate Glass
- Lensing: L8 = ± 8°; L15 = ± 15°; L30 = ± 30°
- Connector Exit: Blank = Side Exit; R = Rear Exit
- Intensity Control: PWM Dimming
- Connector: Blank = 2 m Integral Cable; Q = Euro Integral QD (QD models require mating cordset)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



page 544

WLA LED Area Lights

Family	LED Color	Array Size (mm)	Window	Lensing	Intensity Control	Connector
WLA	W	105x180	D	L11	PWM	Q
	W = Cool White	105x180 190x180 275x180 360x180	Blank = Clear Plastic D = Diffused Plastic E = Encapsulated in Polyurethane*	Blank = No Lenses* L11 = ± 11° L22 = ± 22° L30 = ± 30°	PWM Dimming	Blank = 2 m Integral Cable Q = Integral 4-Pin Euro QD QD models require mating cordset

* Encapsulated models not available with lens options



page 546

WL50S LED Spot Lights

Family	LED Color	Lens Angle	Intensity Control	Connector
WL50S (Black Anodized Aluminum)	W	L11	PWM	Q
	W = Cool White	L5 = ±5° (small) L11 = ±11° (large) L20 = ±20° (largest)	PWM Dimming	Blank = 2 m Integral Cable Q = Euro Integral QD QD models require mating cordset

Family	LED Color	Housing	Window Material	Lens Angle	Intensity Control	Connector
WL50S (Stainless Steel)	W	SS	G	L11	PWM	Q
	W = Cool White	SS = Stainless Steel	Blank = Acrylic G = Glass	L5 = ±5° (small) L11 = ±11° (large) L20 = ±20° (largest)	PWM Dimming	Q = Euro Integral QD QD models require mating cordset



page 548

WL50-2 LED Work Lights

Family	Power Switch	Intensity Control	Connector
WL50-2	PB	PWM	Q
WL50-2 = 30 mm Mount WL50F-2 = Flat Mount	Blank = Standard PB = ON/OFF Switch	PWM Dimming	Blank = 2 m Integral Cable Q = Euro Integral QD QD models require mating cordset

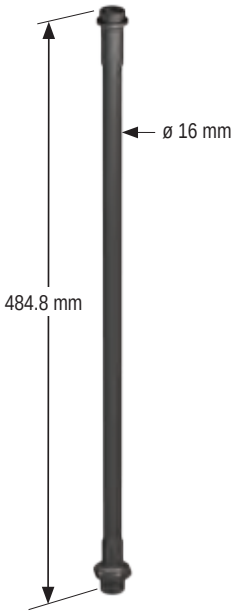
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



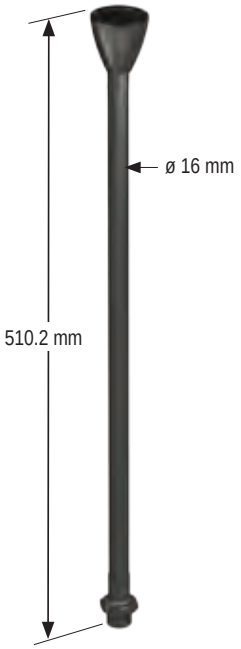
FLEX ARM
Work Lights

Banner's Flex Arm Mounting Accessories provide versatile mounting options to easily direct lighting where it is needed, whether in a work station or along a manufacturing line. The Flex Arm is available for use with spot lights, work lights and vision spot lights.

- Versatile mounting options including magnetic mount, clamp mount and flange mount
- Vinyl coated to protect against moisture
- Adjustable arm allows for easy repositioning of light to suit many application needs
- Concentrate light exactly where needed
- Portability with magnetic and clamp mount options



FLX18-1212



FLX18-12M30

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Models	Base Connection	Light Connection	Brackets		
FLX18-1212	 1/2-14 NPSM	 1/2-14 NPSM (Male) Use with: WL50 WL50PB WL50-2 WL50-2PB	 SMB22	 SMBFLXMAG	 LMB12RA
FLX18-F12	 3-Hole Flange	 1/2-14 NPSM (Male) Use with: WL50 WL50PB WL50-2 WL50-2PB		Direct Mount	
FLX18-12M30	 1/2-14 NPSM	 M30 x 1.5 (Female) Use with: WL50 WL50PB WL50-2 WL50-2PB WL50S	 SMB22	 SMBFLXMAG	 LMB12RA
FLX18-DM30	 2 x 1/4-20W 1.375 spacing	 M30 x 1.5 (Female) Use with: WL50 WL50PB WL50-2 WL50-2PB WL50S	 SMBFLXCLAMPD	 SMBFLXMAGD	
FLX18-FM30	 3-Hole Flange	 M30 x 1.5 (Female) Use with: WL50 WL50PB WL50-2 WL50-2PB WL50S		Direct Mount	

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Tower Lights

Banner's Tower Lights are designed to be exceptionally bright with a long, visible indication range, providing excellent operational status for workers and supervisors. Several models are available for use in a variety of environments, including options with audible alerts.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Number of Segments	Brightness	Dimensions	Power Supply
	TL50 Designed to be exceptionally bright with a long, visible indication range, providing excellent operational status for workers and supervisors. page 558	1 to 7	Standard or High-Brightness	30 mm base Height varies by model	DC or AC models available
	TL50BL Extremely rugged and built for use in the toughest industrial environments. With a sleek and stylish design, the TL50 Beacon's housing is UV stabilized, making it suitable for use in outdoor environments. page 560	1 to 5	Daylight Visible	30 mm base Height varies by model	DC or AC models available
	CL50 Illumination provides easy-to-see operator guidance and equipment status indication for workers and supervisors. page 564	1	Standard	30 mm base Height varies by model	DC or AC models available

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



TL50
Tower Lights

Banner's TL50 Tower Lights are designed to be exceptionally bright with a long, visible indication range, providing excellent operational status for workers and supervisors. Several models are available for use in a variety of environments, including options with audible alerts.

- Install quickly and easily with no assembly required
- Clearly evident on/off status
- Versatile mounting options
- Compact, sleek, rugged design with IP67 models available
- Audible alert: continuous, pulsed and staccato models available
- Cordsets and brackets see page 566

Audible Types



Audible
max. intensity 92 db
@ 1 meter (typical)



Sealed Audible
max. intensity 94 db
@ 1 meter (typical)



Sealed
Omni-Directional Audible
max. intensity 99 db @ 1 meter (typical)

Light Position & Color Options



Position 7 (not available with audible)

Position 6

Position 5

Position 4

Position 3

Position 2

Position 1

G = Green
Y = Yellow
R = Red
B = Blue
W = White

T = Turquoise
O = Orange
V = Violet
S = Sky Blue
M = Magenta

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Choosing a TL50 model

Example Model Number TL50HGYRQ

Housing

TL50

Brightness

H — Step One

- Blank = Standard
- H = High Brightness

Supply Voltage

Step Two

- Blank = 18 to 30 V dc
- Z = 85 to 264 V ac

Color Position (selected bottom to top)

R	1
	2
	3
	4
	5
	6*
	7*

Step Three

- R = Red
- B = Blue
- G = Green
- W = White
- Y = Yellow
- T = Turquoise*
- O = Orange*
- V = Violet*
- S = Sky Blue*
- M = Magenta*
- Blank = Audible Only

* These are not available in high brightness.
(7 color lights not available with audible)

Audible Alarm

Step Four

- Blank = None
- A = Audible (IP50)
- ALS = Sealed Audible Continuous Tone
- ALS3 = Sealed Audible Pulsed Tone
- ALS4 = Sealed Audible Staccato Tone
- AOS = Omni-Directional Sealed Audible Continuous Tone
- AOSI = Omni-Directional Sealed Audible Continuous Tone — Intensity adjustment
- AOS3 = Omni-Directional Sealed Audible Pulsed Tone
- AOS3I = Omni-Directional Sealed Audible Pulsed Tone — Intensity adjustment
- AOS4 = Omni-Directional Sealed Audible Staccato Tone
- AOS4I = Omni-Directional Sealed Audible Staccato Tone — Intensity adjustment

Housing Color

Step Five

- Blank = Black
- C = Gray

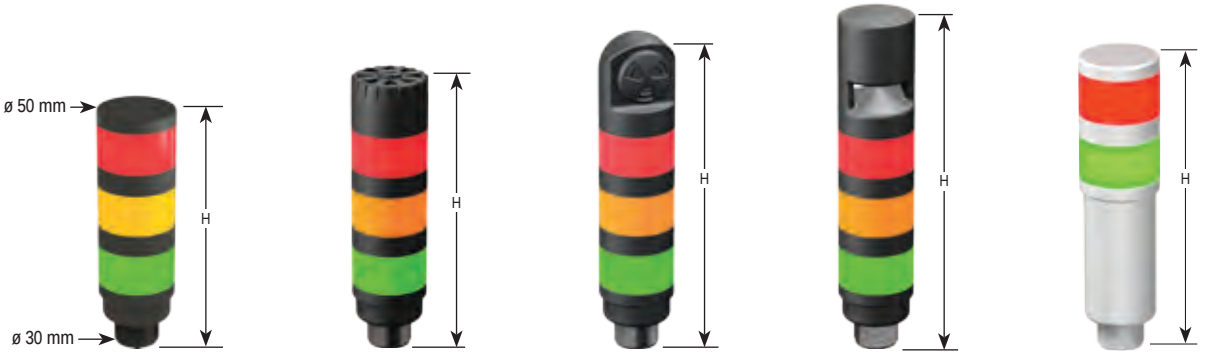
Connection

Step Six

- Blank = 2 m Integral Cable
- Q = Euro Integral QD (dc only)**
- QP = Euro Pigtail QD**
  (Available with Micro Pigtail QD for ac models if 4 segments or less)

** QD models require mating cordset. See page 566.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



General-Purpose IP67 | Audible IP50 | Sealed Audible IP67 | Sealed Omni-Directional IP67 | AC

(all models available in black or gray)

TL50

Color Count	Tower Height (H) General-Purpose IP67	Tower Height (H) Audible† IP50	Tower Height (H) Sealed Audible IP67	Tower Height (H) Sealed Omni-Directional IP67	Tower Height (H) AC
0	—	92.0 mm	74.4 mm	88.4 mm	Add 69 mm to any of these heights to get total height
1	61.2 mm	92.0 mm	115.1 mm	129.1 mm	
2	101.9 mm	132.7 mm	155.8 mm	169.8 mm	
3	142.6 mm	173.4 mm	196.5 mm	210.5 mm	
4	183.3 mm	214.1 mm	237.2 mm	—	
5	224.0 mm	254.8 mm	277.9 mm	291.1 mm	
6	264.7 mm	298.5 mm	318.6 mm	332.6 mm	—
7	305.4 mm	—	—	—	—

For more specifications see page 559.

† Tower height (H) with top unscrewed approximately 3.5 mm to allow sound to escape.

SureCross™ Wireless I/O & EZ-LIGHT® Indicators

Machine monitoring enables an entirely new category of applications and machine diagnostics free from wired limitation. Contact factory for information.



EZ-LIGHT TL50 Tower Lights are built-to-order, prewired and configured with easy mounting and connecting. Configure the model for your application today and we'll assemble it for you! Visit www.bannerengineering.com/towerlights



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-LIGHT® Tower Light Specifications

Supply Voltage and Current	DC models: 18 to 30 V dc (10% max. ripple); or 21 to 27 V ac Standard Brightness: Indicators: 45 mA max. current per LED color Standard Audible Alarm (IP50): @ 25 mA max. current Sealed Audible Alarm (IP67): 35 mA max. current High Brightness: max. current per LED color: Indicators: 18 V dc—100 mA; 30 V dc—60 mA; 21 V ac—80 mA; 27 V ac—70 mA Standard Audible (IP50): 25 mA max. current Sealed Audible Alarm (IP67): 35 mA max. current Audible only: @ 45mA max. AC models: 85 to 264 V ac; 50 or 60 Hz
Indicators	LEDs are independently selected— Green, Yellow, Red, Blue, White, Turquoise, Orange, Violet, Sky Blue or Magenta; 1-7 colors depending on model
Supply Protection Circuity	Protected against reverse polarity and transient voltages
Input Response Time	Indicators ON/OFF: 10 milliseconds (max.)
Audible Alarm	Audible measurements are made in the direction sound exits the device. For standard audible models, this is the top of the unit (when mounted vertically, sound is directed toward the ceiling). For sealed audible models (IP67), sound exits the vented openings in the side of the unit, which should be oriented so that the sound is directed toward the machine operator(s). In environments with high ambient noise levels or high ceilings that absorb sound, the sealed version is recommended. Standard Audible Alarm: 2.7 KHz ± 500 Hz oscillation frequency; max. intensity 92 db @ 1 meter (typical) Sealed Audible Alarm: 29 KHz to 250 Hz oscillation frequency; max. intensity 94 db @ 1 meter (typical)
Audible Adjustments	Standard Audible Alarm: Unscrew the cover (up to 1.5 turns max.) to adjust the audible intensity. (Do not exceed 1.5 turns or the cover may detach during operation.) For max. intensity, rotate the center plug 180° counterclockwise to remove it. Sealed Audible Alarm and Omni-Directional Sealed Audible Alarm with Intensity Adjustment: Rotate the front cover until the desired intensity
Construction	Bases and Covers— ABS Light Segment— Polycarbonate
Environmental Rating	General-Purpose— IEC IP67 Audible— IEC IP50 or IEC IP67, depending on model
Connections	Integral 4-pin, 5-pin or 8-pin Euro-style QD, 150 mm PVC pigtail with QD, or 2 m integral cable, depending on model
Operating Conditions	General-Purpose: −40° to +50° C Audible: −20° to +50° C Relative Humidity: 95% @ 50° C (non-condensing) Storage Temperature: −40° to +70° C
Certifications	CE UL LISTED
Hookup Diagrams	4-pin models: LI09 (p. 1003) 5-pin: models: LI10 (p. 1003) 8-pin models: LI11 (p. 1003)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



TL50 Beacon
Tower Lights

Banner's TL50 Beacon Tower Lights are extremely rugged and built for use in the toughest industrial environments. A sleek and stylish design make it suitable for use in outdoor environments.

- Highly visible indication for indoor or outdoor applications
- Compact, stylish design with rotating and flashing options
- Audible alert: continuous, pulsed and staccato models available
- Omni-Directional audible models provide clear annunciation in the noisiest environments
- Models available with rugged, water-resistant IP67 housing
- Cordsets and brackets see page 566

Audible Types



Audible
max. intensity 92 db
@ 1 meter (typical)



Sealed Audible
max. intensity 94 db
@ 1 meter (typical)



Sealed
Omni-Directional Audible
max. intensity 99 db
@ 1 meter (typical)

Light Position & Color Options



Position 5 (not available with audible)

Position 4

Position 3

Position 2

Position 1

G = Green

Y = Yellow

R = Red

B = Blue

W = White

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Choosing a TL50BL model

Example Model Number TL50BLG2YR1Q

Housing

TL50BL

Supply Voltage

Step One

- Blank = 12 to 30 V dc
- Z = 85 to 264 V ac

Color/Function (selected bottom to top)

Position		
G	1	2
Y	2	
R	3	1
	4	
	5*	

Step Two

Color	Function
R = Red	Blank = ON Solid
B = Blue	1 = Rotating
G = Green	2 = Flashing
W = White	
Y = Yellow	
Blank = Not Used	

* Not available with audible

Audible Alarm

Step Three

- Blank = None
- A = Audible (IP50)
- ALS = Sealed Audible Continuous Tone
- ALS3 = Sealed Audible Pulsed Tone
- ALS4 = Sealed Audible Staccato Tone
- AOS = Omni-Directional Sealed Audible Continuous Tone
- AOSI = Omni-Directional Sealed Audible Continuous Tone — Intensity adjustment
- AOS3 = Omni-Directional Sealed Audible Pulsed Tone
- AOS3I = Omni-Directional Sealed Audible Pulsed Tone — Intensity adjustment
- AOS4 = Omni-Directional Sealed Audible Staccato Tone
- AOS4I = Omni-Directional Sealed Audible Staccato Tone — Intensity adjustment

Housing Color

Step Four

- Blank = Black
- C = Gray

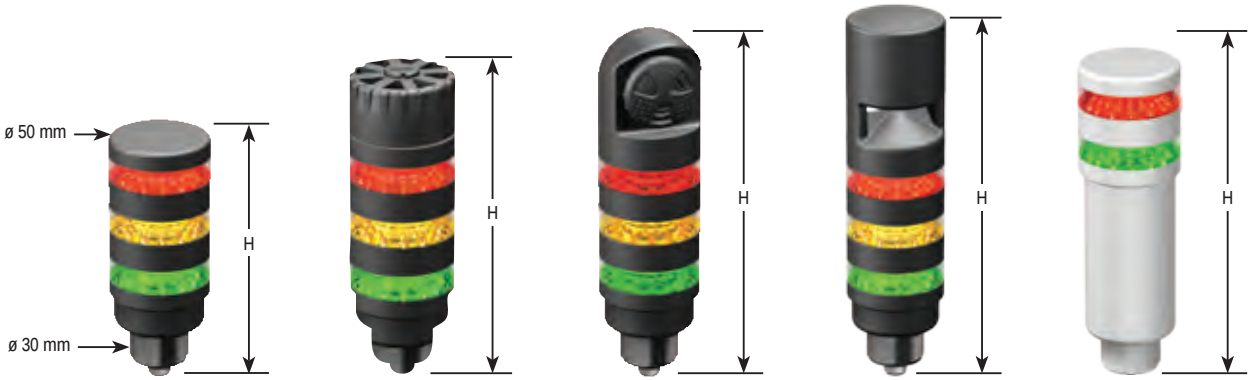
Connection

Step Five

- Blank = 2 m Integral Cable
- Q = Euro Integral QD (dc only)**
- QP = Euro Pigtail QD**
  (Available with Micro Pigtail QD for ac models if 4 segments or less)

** QD models require mating cordset. See page 566.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



General-Purpose IP67 | Audible IP50 | Sealed Audible IP67 | Sealed Omni-Directional IP67 | AC

(all models available in black or gray)

TL50BL

Color Count	Tower Height (H) General-Purpose IP67	Tower Height (H) Audible† IP50	Tower Height (H) Sealed Audible IP67	Tower Height (H) Sealed Omni-Directional IP67	Tower Height (H) AC
1	46.2 mm	77.1 mm	100.2 mm	129.1 mm	Add 69 mm to any of these heights to get total height
2	72.0 mm	102.9 mm	126.0 mm	169.8 mm	
3	97.8 mm	128.7 mm	151.8 mm	210.5 mm	
4	123.6 mm	154.5 mm	177.6 mm	—	
5	149.4 mm	—	—	—	

For more specifications see page 563.

† Tower height (H) with top unscrewed approximately 3.5 mm to allow sound to escape.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Beacon Tower Light Specifications

Supply Voltage and Current	DC models: 12 to 30 V dc (10% max. ripple); or 21 to 27 V ac Indicators — max. current per LED color: @ 12 V dc: 125 mA @ 30 V dc: 60 mA @ 21 V ac: 80 mA @ 27 V ac: 70 mA Standard Audible Alarm: 25 mA max. current Sealed Audible Alarm: 35 mA max. current AC models: 85 to 264 V ac
Indicators	1-5 colors depending on model; Green, Red, Yellow, Blue and White LEDs are independently selected
Supply Protection Circuity	Protected against reverse polarity and transient voltages
Input Response Time	1 ms (max.)
Audible Alarm	Audible measurements are made in the direction sound exits the device. For standard audible models, this is the top of the unit (when mounted vertically, sound is directed toward the ceiling). For sealed audible models, sound exits the vented openings in the side of the unit, which should be oriented so that the sound is directed toward the machine operator(s). In environments with high ambient noise levels or high ceilings that absorb sound, the sealed version is recommended. Standard Audible Alarm: 2.7 KHz ± 500 Hz oscillation frequency; max. intensity 92 db @ 1 meter (typical) Sealed Audible Alarm: 2.9 KHz ± 250 Hz oscillation frequency; max. intensity 94 db @ 1 meter (typical)
Audible Adjustments	Standard Audible Alarm: Unscrew the cover (up to 1.5 turns max.) to adjust the audible intensity. (Do not exceed 1.5 turns or the cover may detach during operation.) For max. intensity, rotate the center plug 180° counterclockwise to remove it. Sealed Audible Alarm and Omni-Directional Sealed Audible Alarm with Intensity Adjustment: Rotate the front cover until the desired intensity
Construction	Bases and Covers: ABS Light Segment: Polycarbonate
Environmental Rating	General-Purpose: −40° to +50° C Standard and Sealed Audible: −20° to +50° C Max. Rel. Humidity: 95% @ 50º C (non-condensing)
Connections	Integral 4-pin, 5-pin or 8-pin M12/Euro-style QD, 150 mm PVC pigtail with QD, or 2 m (6.5') integral cable, depending on model. See page 566.
Operating Conditions	Temperature: General-Purpose: −40° to +50° C Standard and Sealed Audible: −20° to +50° C Max. Rel. Humidity: 95% @ 50º C (non-condensing) Storage Temperature: −40° to +70° C
Certifications	CE UL LISTED

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



CL50
Column Lights

The CL50 Column Lights are rugged, cost-effective and easy-to-install multicolor indicators with highly visible illumination for clear equipment status indication.

- Up to three colors in one device for multiple status indication
- Ideal for machine process status indication and visual guidance
- Install quickly and easily, no tools required
- Large surface area can be easily seen from long distances
- Audible models available with standard or sealed audible element
- Cordsets and brackets see page 566

Audible Types



Audible
max. intensity 92 db
@ 1 meter (typical)



Sealed Audible
max. intensity 94 db
@ 1 meter (typical)



Sealed
Omni-Directional Audible
max. intensity 99 db
@ 1 meter (typical)



General-Purpose
IP67

Audible
IP50

Sealed Audible
IP67

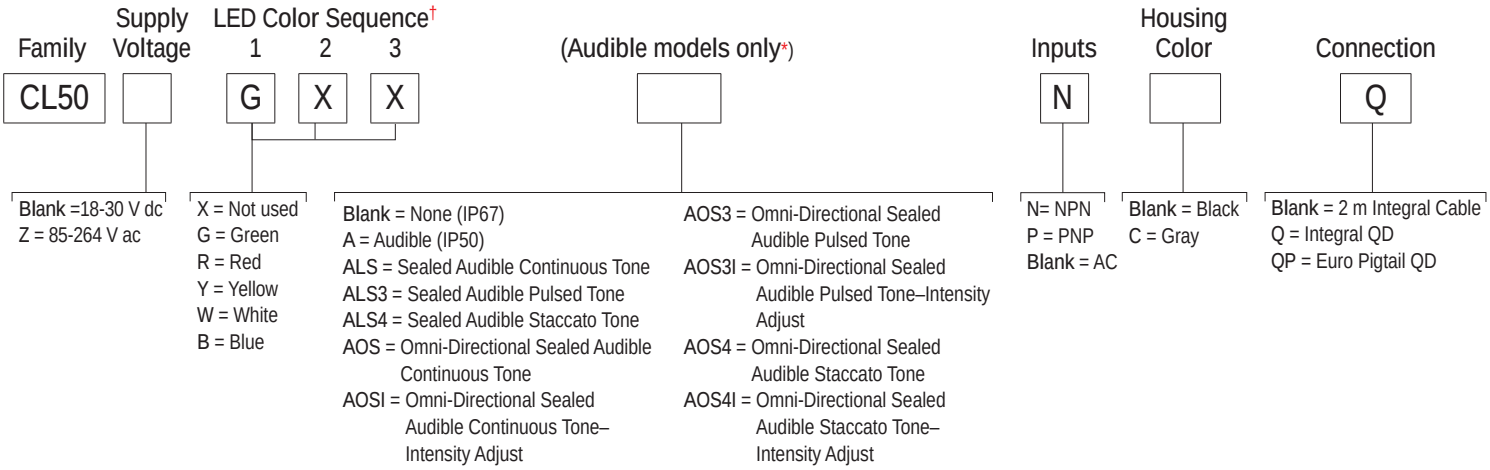
Sealed Omni-Directional
IP67

AC

(all models available in black or gray)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-LIGHT® CL50 Column Lights Model Key Example Model Number CL50GXXNQ



Connection options: A model with a QD requires a mating cordset (see page 566).

* Leave blank for non audible models (Non audible models rated IP67)

† Contact factory for other colors and color combinations

EZ-LIGHT® Column Light Specifications

Supply Voltage and Current	18 to 30 V dc (10% max. ripple) 100 mA max. current @ 18 V dc; 70 mA max. current @ 30 V dc Standard Audible Alarm: 25 mA max. current Sealed Audible Alarm: 35 mA max. current AC models: 85 to 264 V ac
Indicators	Green, Red, Yellow, Blue and White; 1-3 colors, depending on model LEDs or audible alarm are independently selected
Supply Protection Circuity	Protected against reverse polarity and transient voltage
Input Response Time	10 ms (max.)
Audible Alarm	Standard Audible Alarm: 2.7 KHz ± 500 Hz oscillation frequency; max. intensity 92 db @ 1 meter (typical) Sealed Audible Alarm: 2.9 KHz ± 250 Hz oscillation frequency; max. intensity 94 db @ 1 meter (typical)
Audible Adjustments	Standard Audible Alarm: Unscrew the cover (up to 1.5 turns max.) to adjust the audible intensity. (Do not exceed 1.5 turns or the cover may detach during operation.) For max. intensity, rotate the center plug 180° counterclockwise to remove it. Sealed Audible Alarm: Rotate the front cover until the desired intensity is reached.
Construction	Bases and Covers: ABS Light Segment: Polycarbonate
Environmental Rating	Standard Audible:IEC IP50 General-Purpose and Sealed Audible: IEC IP67
Connections	Integral 4-pin or 5-pin M12/Euro-style QD, 150 mm PVC pigtail with QD, or 2 m (6.5') integral cable, depending on model
Operating Conditions	Temperature: Standard and Sealed Audible: −20° to +50° C General-Purpose: −40° to +50° C Relative humidity: 95% @ 50º C (non-condensing) Storage Temperature: −40° to +70° C
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements method 201A (vibration: 10 to 60 Hz max., double amplitude 0.06", maximum acceleration 10G). Also meets IEC 947-5-2; 30G 11 ms duration, half sine wave.
Certifications	CE
Hookup Diagrams	LI15 (p. 1004)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	4-Pin	5-Pin	8-Pin		4-Pin	5-Pin	8-Pin
1.83 m	MQDC-406	MQDC1-506	MQDC2S-806		MQDC-406RA	MQDC1-506RA	MQDC2S-806RA
4.57 m	MQDC-415	MQDC1-515	MQDC2S-815		MQDC-415RA	MQDC1-515RA	MQDC2S-815RA
9.14 m	MQDC-430	MQDC1-530	MQDC2S-830		MQDC-430RA	MQDC1-530RA	MQDC2S-830RA

Additional cordset information available. See page 904.

Micro QD (for AC models)

Length	4-Pin	5-Pin
1.83 m	MQAC2-406	MQAC2-506
4.57 m	MQAC2-415	MQAC2-515
9.14 m	MQAC2-430	MQAC2-530

Brackets

TL50, CL50, TL50BL

See page 869	See page 870	See page 869	See page 870
SMB30A	SMB30RAVK	SMB30MM	SMBAMS30P

Additional brackets and more information available. See page 846.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Elevated Mount System

Features	Model			Components
• Streamlined black acetal or white UHMW stand-off pipe adapter/cover • Connects between 30 mm light base and ½ in. NPSM/DN15 pipe • Mounting hardware included	SA-M30TE12 (black acetal) SA-M30TE12C (white UHMW)			
• Elevated-use stand-off pipe (½ in. NPSM/DN15) • Polished 304 stainless steel, black anodized aluminum, or clear anodized aluminum surface • ½ in. NPT thread at both ends • Compatible with most industrial environments	Polished 304 Stainless Steel	Black Anodized Aluminum	Clear Anodized Aluminum	
	SOP-E12-150SS 150 mm (6″) long	SOP-E12-150A 150 mm (6″) long	SOP-E12-150AC 150 mm (6″) long	
	SOP-E12-300SS 300 mm (12″) long	SOP-E12-300A 300 mm (12″) long	SOP-E12-300AC 300 mm (12″) long	
	SOP-E12-900SS 900 mm (36″) long	SOP-E12-900A 900 mm (36″) long	SOP-E12-900AC 900 mm (36″) long	
• Streamlined black acetal or white UHMW mounting base adapter/cover • Connects between ½ in. NPSM/DN15 pipe and 30 mm (1-3/16 in) drilled hole • Mounting hardware included	SA-E12M30 (black acetal) SA-E12M30C (white UHMW)			



EZ-LIGHT® Controllers

Description	Function	Model	
5 toggle switches	ON-OFF-FLASH	LC80T	
12 position rotary switch	ON-OFF-FLASH	LC80R	

EZ-LIGHT® Sealed Right-Angle Brackets

Description	Model		
Bracket kit with base, ½-14 pipe adapter, set screw, fasteners, o-rings and gaskets. For use with stand-off pipe (listed and sold separately).	LMBE12RA		
	LMBE12RAC		
Bracket kit with base, 30 mm adapter, set screw, fasteners, o-rings and gaskets	LMB30RA		
	LMB30RAC		

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Indicators

Banner's Indicators offer a wide variety of bright, highly visible models ranging from daylight visible to multiple colors in one device. Indicators have a rugged design for long-term use and require no additional protective box. Flexibility in design, size and mounting provides a unique solution for many indication applications.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

INDICATORS

BASE MOUNT page 570

BARREL MOUNT page 582

T-STYLE MOUNT page 588

FLAT MOUNT page 594

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Base-Mount Indicators

Base-mount indicators provide a wide variety of indicators for general purpose indication applications. They have a sleek design, audible or daylight visible options available, and most appear gray when off for clear indication of on/off status.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Number of Colors	Brightness	Dimensions	Power Supply
	K50L These indicators are completely epoxy encapsulated, which protects the electronics from the harshest environments. page 572	1 to 3 (9 color options)	Standard	Base: 30 mm Dome: 50 mm	18 to 30 V dc, 85 to 130 V ac
	K50L Audible Audible alarm models available with several tones and intensity levels. page 573	1 to 3 (9 color options)	Standard	Base: 30 mm Dome: 50 mm	12 to 30 V dc
	K50BL Beacon Extremely bright and ideal for indoor and outdoor areas with high levels of ambient light. page 574	1 or 2 (5 color options)	Day Light Visible	Base: 30 mm	12 to 30 V dc, 85 to 250 V ac
	K50LD Daylight Features a brightly illuminated base for enhanced visual indication. page 575	AC: 1 DC: 1 or 3 (5 color options)	Day Light Visible	Base: 30 mm	15 to 30 V dc, 85 to 130 V ac
	K30L These small dome indicators have long-life LEDs for zero maintenance after installation. page 576	1 to 3 (9 color options)	Standard	Base: 22 mm Dome: 30 mm	10 to 30 V dc
	K50L & K30L Hazardous Area Indicator Lights for hazardous areas are safe to use in every classified zone or area with extensive intrinsically safe approvals. page 578	1 to 3 (5 color options)	Standard	K50 Base: 30 mm Dome: 50 mm K30 Base: 22 mm Dome: 30 mm	10 to 30 V dc

LOOKING FOR MORE



Barrel Mount 582



T-Style Mount 588



Flat Mount 594

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K50L
Domed Indicators

Banner's K50L is our most popular indicator light. The smooth 50 mm diameter dome gives uniform illumination from all directions. These indicators are completely epoxy encapsulated, which protects the electronics from the harshest environments, making them nearly indestructible. The neutral color when in the off condition eliminates false indication from surrounding ambient light.

- Up to three colors in one device with many different color combinations
- Long-lasting, energy-efficient LEDs for years of operation with zero maintenance
- Many models rated to IP69K to handle high-pressure washdown environments
- Base has internal and external threads allowing for a variety of mounting methods
- Multifunction models available see page 607

K50L Two or Three Color Model Key, 18-30 V DC Example Model Number K50LGRYPQ

Family	LED Color*			Input	Connection
K50L	G	R	Y†	P	Q
	G = Green	O = Orange		P = PNP	Blank = 2 m Integral Cable
	Y = Yellow	T = Turquoise		N = NPN	Q = Euro Integral QD
	R = Red	V = Violet			QP = Euro Pigtail QD
	B = Blue	M = Magenta			
	W = White	X = Not used			

K50L Two or Three Color Model Key, 85-130 V AC Example Model Number K30LGRYA120Q

Family	LED Color*			Voltage	Connection
K50L	G	R	Y	A120	Q
	G = Green	O = Orange		A120 = 120 V ac	Blank = 2 m Integral Cable
	Y = Yellow	T = Turquoise			Q = Micro Integral QD
	R = Red	V = Violet			QP = Micro Pigtail QD
	B = Blue	M = Magenta			
	W = White	X = Not used			



K50L Models

For more specifications see page 577.

Connection Option: A model with a QD requires a mating cordset (see page 581).

Multifunction models available see page 607

* Single-color models are available. Colors are independently selectable. Contact factory for other colors and color combinations.

† Add 7 after last color option for Sensor Emulators(example, K50LGYX7PQ). Use with discrete output of photoelectric and proximity sensors to duplicate the sensor's Green and Yellow indicator function. When the sensor is powered, the Green LED is ON. When the sensor's output is energized, the Yellow LED is ON.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K50L Audible
Domed Indicators

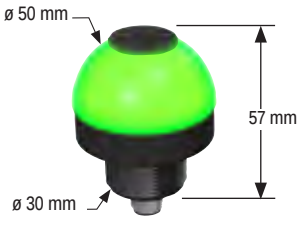
Banner's K50L Audible is a bright easy-to-install indicator with an audible alarm. The 50 mm diameter dome gives uniform illumination from all directions. These indicators are completely epoxy encapsulated, which protects the electronics from the harshest environments, making them nearly indestructible. The neutral color when in the off condition eliminates false indication from surrounding ambient light.

- Up to three colors in one device with many different color combinations
- Long-lasting, energy-efficient LEDs for years of operation with zero maintenance
- Many models rated to IP69K to handle high-pressure washdown environments
- Base has internal and external threads allowing for a variety of mounting methods

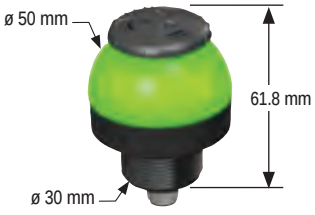
K50L Two or Three Color Audible Indicators Model Key

Example Model Number K50LGRALSYPQ

Family	LED Color		Audible Alarm	LED Color	Input/Voltage	Connection
K50L	G	R	ALS	Y	P	Q
	G = Green Y = Yellow R = Red B = Blue W = White	O = Orange T = Turquoise V = Violet M = Magenta X = Not used	A1 = Steady (75 dB) IP50 A2 = Pulsed (75 dB) IP50 AL1 = Loud Steady (95 dB) IP50 ALS = Loud Steady (94 dB) IP67 ALS4 = Loud Staccato (94 dB) IP67 AS = Steady (65 dB) IP69K Blank = None		P = PNP N = NPN	Blank = 2 m Integral Cable Q = Euro Integral QD QP = Euro Pigtail QD



K50L Audible Models



K50L Sealed Audible Models (IP67)



K50L Sealed Audible Models (IP69K)

For more specifications see page 577.

Connection Option: A model with a QD requires a mating cordset (see page 581).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K50 Beacon
High-Intensity Indicators

Banner's K50 Beacon Indicators are extremely bright, making them ideal for indoor and outdoor areas with high levels of ambient light. The tough UV-stabilized polycarbonate housing and epoxy encapsulated electronics allow for years of maintenance-free operation. They are available in five colors and a wide range of voltage levels to fit nearly any application.

- Continuous, strobing and rotating models available
- 12-30 V dc models are ideal for battery-powered mobile applications
- Models with LEDs emitting from the top in addition to the perimeter
- Rugged, sealed housing rated to IP69K for high-pressure washdown
- Models for 120 V and 230 V ac operation

K50BL & K50BCL One or Three Color Model Key, 12-30 V DC

Example Model Number K50BLR1XGXPQ

Family	Function	LED Color C1	LED Color C2	LED Color C3	Input	Connection
K50BL	R1	X	G	X	P	Q
K50BL = Perimeter View K50BCL = Perimeter & Top View	R1 = Rotating* S1 = Strobing** Blank = None	G = Green Y = Yellow R = Red B = Blue W = White X = Not used			P = PNP	Blank = 2 m Integral Cable Q = Euro Integral QD QP = Euro Pigtail QD	

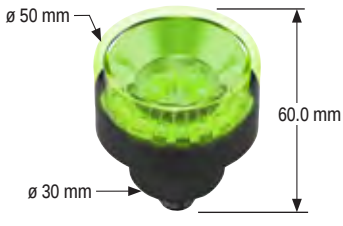
K50BL & K50BCL One Color Model Key, 85-250 V AC

Example Model Number K50BLGA120Q

Family	LED Color	Input	Connection
K50BL	G	A120	Q
K50BL = Perimeter View K50BCL = Perimeter & Top View	G = Green Y = Yellow R = Red B = Blue W = White	A120 = 85-130 V ac A230 = 100-250 V ac	Blank = 2 m Integral Cable Q = Micro Integral QD QP = Micro Pigtail QD



K50BL Beacon Models



K50BCL Beacon Models

For more specifications see page 587.

Connection Option: A model with a QD requires a mating cordset (see page 581).

* Rotating only available on K50BL models.
** Strobing only available on K50BCL models.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K50 Daylight Visible Directional Indicators

Banner's K50 Daylight Visible Indicators are rugged, cost-effective and easy-to-use indicators for use in outdoor environments or in areas with high levels of ambient light. The K50 Daylight Visible Indicator has a flat 50 mm profile with high-intensity LEDs that clearly show status indication.

- Intense levels of light output for outdoor application use
- Easy-to-install 30 mm threaded base mount, no tools required
- Up to three colors in one device to communicate multiple statuses
- Rugged design for many years of operation
- Completely self-contained, no controller needed

K50LD One or Three Color Model Key, 15-30 V DC Example Model Number K50LDXGXPQ

Family	LED Color C1	LED Color C2	LED Color C3	Input	Connection
K50LD	X	G	X	P	Q

- G = Green, Y = Yellow, R = Red, B = Blue, W = White, X = Not used
- P = PNP, N = NPN
- Blank = 2 m Integral Cable, Q = Euro Integral QD, QP = Euro Pigtail QD

K50LD One Color Model Key, 85-130 V AC Example Model Number K50LDGA120Q

Family	LED Color	Input/Voltage	Connection
K50LD	G	A120	Q

- G = Green, Y = Yellow, R = Red, B = Blue, W = White
- A120 = 120 V ac
- Blank = 2 m Integral Cable, Q = Micro Integral QD, QP = Micro Pigtail QD



K50L Daylight Models

For more specifications see page 577.

Connection Option: A model with a QD requires a mating cordset (see page 581).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



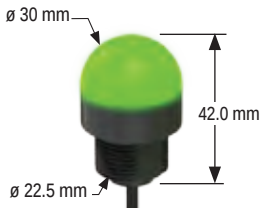
K30L
Domed Indicators

The K30L Indicators are rugged, cost-effective and easy-to-install, providing simple indication solutions on the factory floor. These small, 30 mm dome indicators have long-life LEDs for zero maintenance after installation and provide highly visible indication.

- Illuminated dome provides easy-to-see operator guidance
- Easy-to-install 22 mm threaded base mount, no tools required
- Up to three colors in one device to communicate multiple statuses
- Many colors and color combinations available
- Rugged epoxy encapsulated design

K30L Two or Three Color Model Key, 10-30 V DC Example Model Number K30LGRYPQ

Family	LED Color*			Input	Connection
K30L	G	R	Y†	P	Q
	G = Green	O = Orange		P = PNP	Blank = 2 m Integral Cable
	Y = Yellow	T = Turquoise		N = NPN	Q = Euro Integral QD
	R = Red	V = Violet			QP = Euro Pigtail QD
	B = Blue	M = Magenta			
	W = White	X = Not used			



K30L Models

Connection Option: A model with a QD requires a mating cordset (see page 581).

* Single-color models are available. Colors are independently selectable. Contact factory for other colors and color combinations.

† Add 7 after last color option for Sensor Emulators (example, T30GYX7PQ). Use with discrete output of photoelectric and proximity sensors to duplicate the sensor's Green and Yellow indicator function. When the sensor is powered, the Green LED is ON. When the sensor's output is energized, the Yellow LED is ON.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-LIGHT® Base-Mount Specifications

Supply Voltage and Current	K50L: 18 to 30 V dc (10% max. ripple) Indicators: 65 mA at 12 V dc; 35 mA at 30 V dc max. current per color Audible: 35 mA max. current K50LD: 15 to 30 V dc; 85 to 130 V ac or 75 to 120 V dc @ 16 mA max. K50BL: 12 to 30 V dc; 85 to 130 V ac or 75 to 120 V dc; 100 to 250 V ac or 90 to 240 V dc K30L: 10 to 30 V dc
Supply Protection Circuitry	Protected against reverse polarity, transient voltages
Construction	Polycarbonate housing
Environmental Rating	K50L: IEC IP67 Audible Models: Standard: IEC IP50 Sealed: IEC IP67 K50LD: IEC IP67 K50BL: IEC IP67 and IP69, per DIN 40050 K30L: IEC IP67
Operating Temperature	-40° to +50° C
Certifications	K30L, K50L & K80L: CE K50L: UL LISTED (Depending on model)
Hookups	K50L, K30L: LI12 (p. 1003) K50LD 1 color: DC LI21 (p. 1006) AC: LI23 (p. 1006) K50LD 3 color: LI22 (p. 1006) K50BL: DC LI21 (p. 1006) AC: LI23 (p. 1006)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K50L Hazardous Area
Domed Indicators

Banner's K50 Indicator Lights for hazardous areas have a smooth 50 mm diameter dome that gives uniform illumination from all directions. The indicators are available in models rated to IP67 and IP69K for use in harsh environments, making them nearly indestructible. Extensive approvals ensure indicator lights are safe to use in every classified zone or area.

- Up to three colors in one device and five colors to choose from
- Long-lasting LED technology for years of maintenance-free operation
- Unique design appears gray when off, eliminating false indication from ambient light
- Easy mounting and configuration
- Worldwide IECEx approval for quicker access into countries outside Europe and North America

Hazardous Area K50L Model Key, Example Model Number K50LIGRYPQ

Family	Protection Type	LED Color	Input	Connection
K50L	I	G R Y	P	Q
	I = Ex ia M = Ex mb/Ex ta N = Ex nA/Ex tc (see page 580 for more info)	G = Green Y = Yellow R = Red B = Blue W = White X = Not used	P = PNP	Blank = 2 m Integral Cable Q = 4-pin integral Euro QD* QP = Euro PVC Pigtail QD* W/XX = XX ft cable * QD models require mating cordset (Not available on Ex mb models)



K50L Models

For more specifications see page 580.

Connection Option: A model with a QD requires a mating cordset (see page 581).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K30L Hazardous Area
Domed Indicators

Banner's K30 Indicator Lights for hazardous areas are safe to use in every classified zone or area with extensive intrinsically safe approvals. These small, 30 mm dome indicators have long-life LEDs for zero maintenance after installation.

- Up to three colors in one device and five colors to choose from
- Models rated to IP67 and IP69K for use in harsh environments
- Unique design appears gray when off, eliminating false indication from ambient light
- Easy mounting and configuration
- Worldwide IECEx approval for quicker access into countries outside Europe and North America

Hazardous Area K30L Model Key, Example Model Number K30LIGRYPQ

Family	Protection Type	LED Color	Input	Connection
K30L	I	G R Y	P	Q
	I = Ex ia M = Ex mb/Ex ta N = Ex nA/Ex tc (see page 580 for more info)	G = Green Y = Yellow R = Red B = Blue W = White X = Not used	P = PNP	Blank = 2 m Integral Cable Q = 4-pin integral Euro QD* QP = Euro PVC Pigtail QD* W/XX = XX ft cable * QD models require mating cordset (Not available on Ex mb models)



K30L Models

For more specifications see page 581.

Connection Option: A model with a QD requires a mating cordset (see page 581).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

K50L & K30L Hazardous Area Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple)
Supply Protection Circuitry	Protected against reverse polarity, transient voltages
Construction	Polycarbonate housing
Environmental Rating	IEC IP67
Operating Temperature	-40° to +50° C
Certifications	CE
Hookups	See data sheet

Indicator Family	Protection Method	Suitable for ATEX	Suitable for NEC & CEC	
Ex ia	Intrinsically Safe	Gas Zones: 0, 1, & 2 Dust Zones: 20, 21, & 22 mines	Gas zones: 0, 1, & 2	Class I Division 1 & 2 Class II/III Division 1 & 2
Ex mb/Ex ta	Encapsulation/ Enclosure	Gas Zones: 1 & 2 Dust Zones: 20, 21 & 22	Gas zones: 1 & 2	Class I Division 2 Class II/III Division 1 & 2
Ex nA/Ex tc	Non-Sparking/Enclosure	Gas Zones: 2 Dust Zones: 22	Gas zones: 2	Class I Division 2 Class II/III Division 2

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight		Threaded 4-Pin Right-Angle	
1.83 m		MQDC-406		MQDC-406RA
4.57 m		MQDC-415		MQDC-415RA
9.14 m		MQDC-430		MQDC-430RA


Additional cordset information available.
See page 904.

Micro QD (for ..Q2 models)

See page 925

Length	Threaded 3-Pin Straight	
1.83 m		MQDC-306
4.57 m		MQDC-315
9.14 m		MQDC-330

Brackets

K50L, K50BL, K50LD, K30L

See page 869	See page 870	See page 869	
SMB30A	SMB30SC	SMB30FA	SMB30FVK
			


Additional brackets and more information available.
See page 846.

Elevated Mounting



Description		Model
Black Acetal adapter/cover		SA-M30E12
White UHMW adapter/cover		SA-M30E12C
Black anodized aluminum pipe	(150 mm)	SOP-E12-150A
	(300 mm)	SOP-E12-300A
	(900 mm)	SOP-E12-900A
Clear anodized aluminum pipe	(150 mm)	SOP-E12-150AC
	(300 mm)	SOP-E12-300AC
	(900 mm)	SOP-E12-900AC
304 stainless steel pipe	(150 mm)	SOP-E12-150SS
	(300 mm)	SOP-E12-300SS
	(900 mm)	SOP-E12-900SS
Black Acetal mounting base		SA-E12M30
White UHMW mounting base		SA-E12M30C

EZ-LIGHT Controllers

	Description	Function	Model
 pg. 970	5 toggle switches	ON-OFF-Flash	LC80T
	12 position rotary switch	ON-OFF-Flash	LC80R

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Barrel-mount Indicators

Barrel-mount indicators have a space-saving design with various sizes for use in standard mounting holes, allowing for easy installation. Barrel mount indicators are available in various models, including daylight visible.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Number of Colors	Brightness	Dimensions	Power Supply
	S18L Standard intensity and high intensity daylight visible models available in a variety of colors with 18 mm bases. page 584	1 to 3 (9 color options)	Varies by model	Base:18 mm	10 to 30 V dc
	S22L Standard intensity and high intensity daylight visible models available in a variety of colors with 22 mm bases. page 585	1 to 3 (9 color options)	Varies by model	Base: 22 mm	10 to 30 V dc
	M18 These compact devices are completely self-contained and offer easy-to-see operator guidance on the factory floor. page 586	1 to 3 (5 color options)	Standard	50.5 x ø 18.0 mm	10 to 30 V dc

LOOKING FOR MORE



Base Mount 570



T-Style Mount 588



Flat Mount 594

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



S18L
Barrel-Mount Indicators

The overmolded IP69K rated design makes the S18L Indicators extremely rugged and able to withstand harsh environments. There are standard intensity and high intensity daylight visible models available in a variety of colors with 18 mm bases.

- Designed for panel-mount or stand-alone applications
- Daylight visible models available for use in outdoor applications or in areas with high levels of ambient light
- Up to three colors available in one device allowing one S18L to replace three conventional panel indicators
- Compact and light weight, but extremely rugged
- Terminal connection models have color-coded screw heads for quick, error-free wiring

S18L Multi-Color General-Purpose Model Key, 10-30 V DC Example Model Number S18LGRYP

Family	LED Color*			Input	Connection
S18L	G	R	Y	P	

LED Color*: G = Green, Y = Yellow, R = Red, B = Blue, W = White, O = Orange, T = Turquoise, V = Violet, M = Magenta, X = Not used

Input: P = PNP, N = NPN

Connection: Q = Euro QD, QP = Euro Pigtail QD, Blank = 2 m Integral cable, T = 4 screw terminals

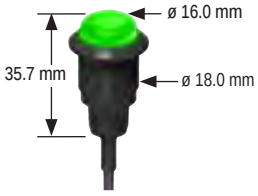
S18DL Daylight Visible General-Purpose Model Key, 10-30 V DC Example Model Number S18DLGRYP

Family	LED Color*			Input	Connection
S18DL	G	R	Y	P	

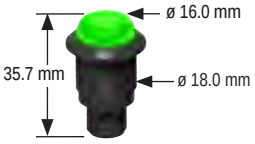
LED Color*: G = Green, Y = Yellow, R = Red, B = Blue, W = White, O = Orange, X = Not used

Input: P = PNP, N = NPN

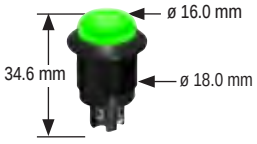
Connection: Q = Euro QD, QP = Euro Pigtail QD, Blank = 2 m Integral cable, T = 4 screw terminals



S18L Cabled Models



S18L QD Models



S18L Field Wired Models

For more specifications see page 587.

Connection Option: A model with a QD requires a mating cordset (see page 587).

* Single-color models are available. Colors are independently selectable. Contact factory for other colors and color combinations.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



S22L
Barrel-Mount Indicators

The overmolded IP69K rated design makes the S22L Indicators extremely rugged and able to withstand harsh environments. There are standard intensity and high intensity daylight visible models available in a variety of colors with 22 mm bases.

- Designed for panel-mount or stand-alone applications
- Daylight visible models available for use in outdoor applications or in areas with high levels of ambient light
- Up to three colors available in one device allowing one S22L to replace three conventional panel indicators
- Compact and light weight, but extremely rugged
- Terminal connection models have color-coded screw heads for quick, error-free wiring

S22L Multi-Color General-Purpose Model Key, 10-30 V DC Example Model Number S22LGRYP

Family	LED Color*			Input	Connection
S22L	G	R	Y	P	

LED Color*: G = Green, Y = Yellow, R = Red, B = Blue, W = White, O = Orange, T = Turquoise, V = Violet, M = Magenta, X = Not used

Input: P = PNP, N = NPN

Connection: Q = Euro QD, QP = Euro Pigtail QD, Blank = 2 m Integral cable, T = 4 screw terminals

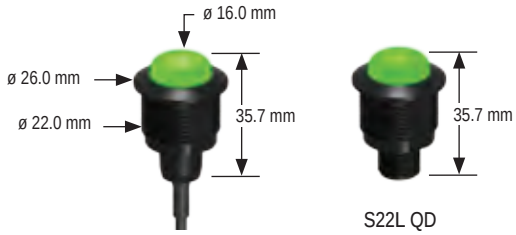
S22DL Daylight Visible General-Purpose Model Key, 10-30 V DC Example Model Number S22DLGRYP

Family	LED Color*			Input	Connection
S22DL	G	R	Y	P	

LED Color*: G = Green, Y = Yellow, R = Red, B = Blue, W = White, O = Orange, X = Not used

Input: P = PNP, N = NPN

Connection: Q = Euro QD, QP = Euro Pigtail QD, Blank = 2 m Integral cable, T = 4 screw terminals



S22L Cabled Models

S22L QD Models

For more specifications see page 587.

Connection Option: A model with a QD requires a mating cordset (see page 587).

* Single-color models are available. Colors are independently selectable. Contact factory for other colors and color combinations.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



M18
Barrel-Mount Indicators

The M18 Indicators are compact, yet extremely rugged indicators that are easy-to-install with an 18 mm threaded base. These compact devices are completely self-contained and offer easy-to-see operator guidance on the factory floor.

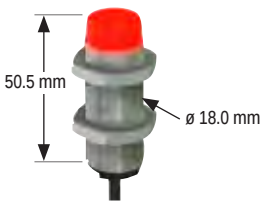
- Up to three colors in one device to communicate multiple statuses
- 18 mm barrel-mount indicator with nickel-plated brass housing
- Ideal for operator guidance and equipment status indication
- Rugged, completely epoxy encapsulated design can withstand harsh conditions

M18 Multi-Color General-Purpose Model Key, 10-30 V DC

Example Model Number M18GRXPQ

Family	LED Color*			Input	Connection
M18	G	R	X†	P	Q

- LED Color: R = Red, G = Green, Y = Yellow, B = Blue, W = White, X = Not used
- Input: P = PNP, N = NPN
- Connection: Q = Euro Pigtail QD



M18 Models

Connection Option: A model with a QD requires a mating cordset (see page 587).

* Single-color models are available. Colors are independently selectable. Contact factory for other colors and color combinations.

† Add 7 after last color option for Sensor Emulators (example, M18GRX7PQ). Use with discrete output of photoelectric and proximity sensors to duplicate the sensor's Green and Yellow indicator function. When the sensor is powered, the Green LED is ON. When the sensor's output is energized, the Yellow LED is ON.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin	
	Straight	Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA



Additional cordset information available.
See page 904.

Brackets

S18L, S22L, M18

See page 859	See page 864	See page 864	See page 860
SMB18A	SMBAMS18P	SMBAMS18RA	SMB18FA







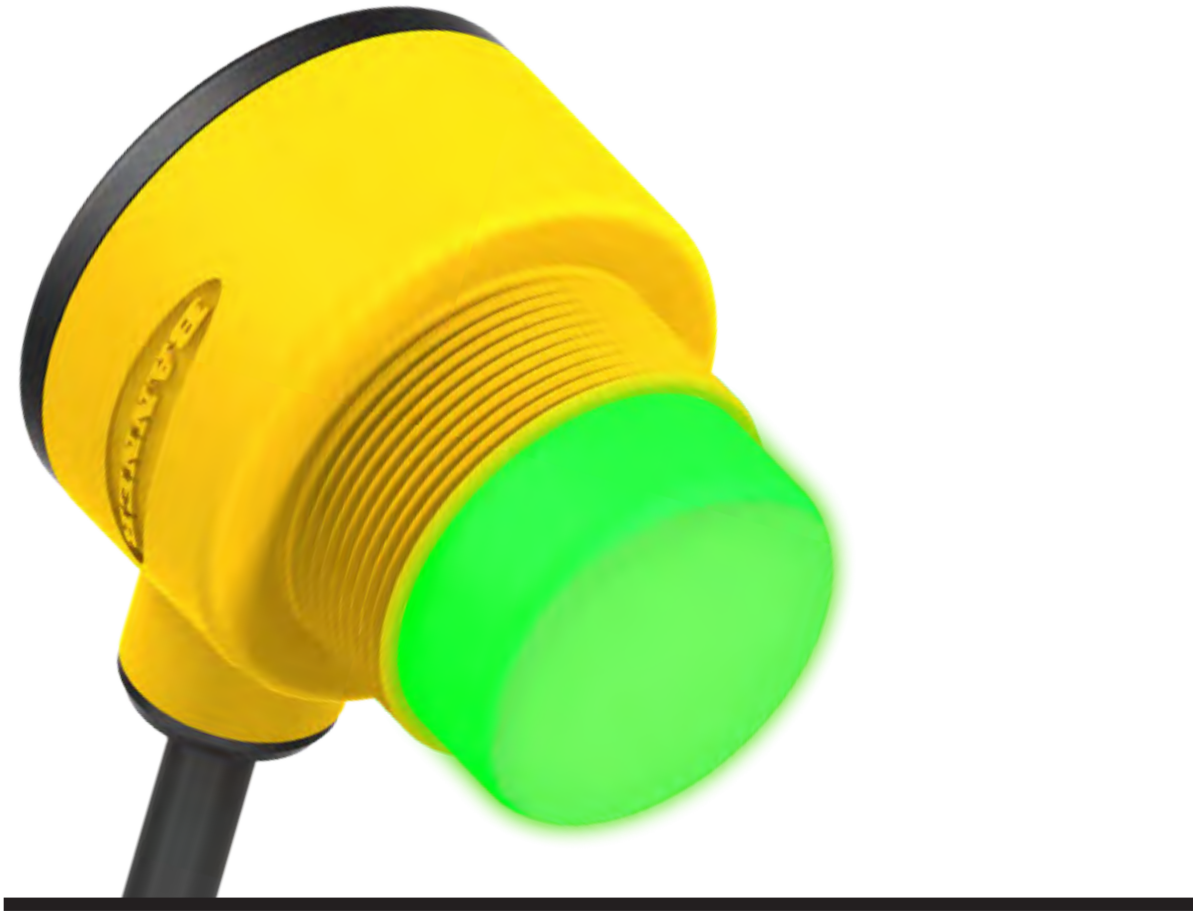


Additional brackets and more information available.
See page 846.

EZ-LIGHT® Barrel Mount Specifications

Supply Voltage and Current	10 to 30 V dc @ 25 mA max. per LED color
Supply Protection Circuitry	Protected against reverse polarity, transient voltages
Construction	M18: Nickel plated brass with thermoplastic diffuser S18L: Polycarbonate
Environmental Rating	M18: IEC IP67 S18L: IK69K
Operating Temperature	-40° to +50° C
Certifications	CE
Hookups	LI12 (p. 1003)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



T-Style Indicators

T-Style indicators come in Banner's most popular sensor housings, using the same easy-to-mount brackets and style. They come in a variety of sizes for simple setup and many application uses.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Number of Colors	Brightness	Dimensions	Power Supply
	T30 The T30 Indicators have a 30 mm T-Style housing that is easy to install in a punched hole or directly on a machine. page 590	1 to 3 (5 color options)	Standard	30 mm light	10 to 30 V dc
	T18 The T18 Indicators have a 18 mm T-Style housing that is easy to install in a punched hole or directly on a machine. page 591	1 to 3 (5 color options)	Standard	18 mm light	10 to 30 V dc
	T8 The T8L Indicators have a low profile, ideal for simple panel mounting or use on a machine. page 592	1 or 2 (3 color options)	Standard	8 mm light	10 to 30 V dc

LOOKING FOR MORE



Base Mount 570



Barrel Mount 582



Flat Mount 594

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



T30
T-Style Indicators

The T30 Indicators have a 30 mm T-Style housing that is easy to install in a punched hole or directly on a machine.

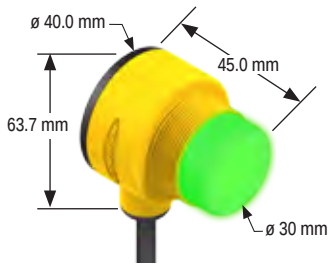
- Up to three colors in one device to communicate multiple statuses
- Designed for panel-mount or stand-alone applications
- Right-angle wiring connection for low profile applications
- Rugged, fully encapsulated design rated to IP67
- Multifunction models available see page 607

T30 Multi-Color General-Purpose Model Key, 10-30 V DC

Example Model Number T30GRYPQ

Family	LED Color*			Input	Connection
T30	G	R	Y†	P	Q

- LED Color*: R = Red, G = Green, Y = Yellow, B = Blue, W = White, X = Not used
- Input: P = PNP, N = NPN
- Connection: Blank = 2 m Integral Cable, Q = Euro Integral QD, QP = Euro Pigtail QD



T30 Models

For more specifications see page 593.

Connection Option: A model with a QD requires a mating cordset (see page 593).

* Single-color models are available. Colors are independently selectable. Contact factory for other colors and color combinations.

† Add 7 after last color option for Sensor Emulators (example, T30GYX7PQ). Use with discrete output of photoelectric and proximity sensors to duplicate the sensor's Green and Yellow indicator function. When the sensor is powered, the Green LED is ON. When the sensor's output is energized, the Yellow LED is ON.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



T18
T-Style Indicators

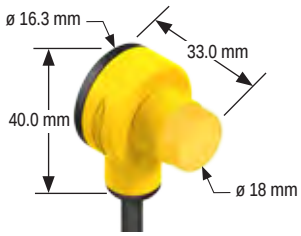
The T18 Indicators have an 18 mm T-Style housing that is easy to install in a punched hole or directly on a machine.

- Up to three colors in one device to communicate multiple statuses
- Designed for panel-mount or stand-alone applications
- Right-angle wiring connection for low profile applications
- Rugged, fully encapsulated design rated to IP67
- Multifunction models available see page 607

T18 Multi-Color General-Purpose Model Key, 10-30 V DC

Example Model Number T18GRXPQ

Family	LED Color*			Input	Connection
T18	G	R	X†	P	Q
	R = Red G = Green Y = Yellow B = Blue W = White X = Not used			P = PNP N = NPN	Blank = 2 m Integral Cable Q = Euro Integral QD QP = Euro Pigtail QD



T18 Models

For more specifications see page 593.

Connection Option: A model with a QD requires a mating cordset (see page 593).

* Single-color models are available. Colors are independently selectable. Contact factory for other colors and color combinations.

† Add 7 after last color option for Sensor Emulators (example, T30GYX7PQ). Use with discrete output of photoelectric and proximity sensors to duplicate the sensor's Green and Yellow indicator function. When the sensor is powered, the Green LED is ON. When the sensor's output is energized, the Yellow LED is ON.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



T8L
T-Style Indicators

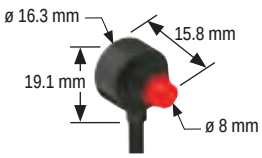
Banner's T8L T-Style Mount Indicators have a low profile, ideal for simple panel mounting or use on a machine. The T8L can be easily assembled into a punched hole with the included mounting hardware, no additional hardware needed.

- Up to two colors in one device with an 8 mm threaded nose
- Designed for panel-mount or stand-alone applications
- Right-angle wiring exit for low profile applications
- Ideal for operator guidance and equipment status indication
- Rugged design rated to IP67

T8L One or Two Color General-Purpose Model Key, 10-30 V DC

Example Model Number
T8LGRXPQP

Family	LED Color*			Input	Connection
T8L	G	R	X†	P	QP
	R = Red G = Green Y = Yellow X = Not used			P = PNP N = NPN	Blank = 2 m Integral Cable QP = Euro Pigtail QD



T8 Models

For more specifications see page 593.

Connection Option: A model with a QD requires a mating cordset (see page 593).

* Single-color models are available. Colors are independently selectable. Contact factory for other colors and color combinations.

† Add 7 after last color option for Sensor Emulators (example, T8LGYX7PQP). Use with discrete output of photoelectric and proximity sensors to duplicate the sensor's Green and Yellow indicator function. When the sensor is powered, the Green LED is ON. When the sensor's output is energized, the Yellow LED is ON.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin			
	Straight		Right-Angle	
1.83 m		MQDC-406		MQDC-406RA
4.57 m		MQDC-415		MQDC-415RA
9.14 m		MQDC-430		MQDC-430RA



Additional cordset information available.
See page 904.

Brackets

T30	T18	T8L
See page 869	See page 859	See page 858
SMB30A	SMB18A	SMB8MM
		



Additional brackets and more information available.
See page 846.

EZ-LIGHT® T-Style Mount Specifications

Supply Voltage and Current	T30: 10 to 30 V dc @ 40 mA max. per LED color T18: 10 to 30 V dc @ 25 mAmax. per LED color T8L: 10 to 30 V dc @ 20 mA max.
Supply Protection Circuitry	Protected against reverse polarity, transient voltages
Construction	T8L: Polycarbonate/ABS housing T18 & T30: Polyester
Environmental Rating	IEC IP67
Operating Temperature	-40° to +50° C
Certifications	CE
Hookups	LI22 (p. 1006)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Flat Mount Indicators

Flat-mount indicators have large faces for clear indication, even at long distances. Flat-mount indicators come in a variety of styles, including a sleek domed design, daylight visible models for outdoor indication and all models are easy to mount to flat surfaces, such as walls and panels.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Number of Colors	Brightness	Dimensions	Power Supply
	K80L Easy to mount to flat surfaces such as walls and panels page 596	1 to 5	Standard	80 mm housing ø 50 mm light	18 to 30 V dc
	K80 Call Light Portable, battery-powered lights provide operational status indication for personnel and are ideal in locations where power is limited or unavailable page 598	1	Standard	80 mm housing ø 50 mm light	Two 9 V batteries
	K50FL Ideal for operator guidance and equipment status indication page 599	1 to 5	Standard	60 x 40 mm ø 50 mm light	18 to 30 V dc
	K80FL Extremely bright indicator with selectable flash rates page 600	1 to 3	Standard or Daylight Visible	80 mm housing ø 66 mm light	12 to 30 V dc
	K80 Segmented Up to four individual segments that can be lighted separately page 602	1 to 4	Standard	80 mm housing ø 66 mm light	18 to 30 V dc
	SP Signal Lights Rugged and easy-to-install signal lights that provide high visibility outdoors page 603	1 to 3	Daylight Visible	Varies by model	15 to 30 V dc, 85 to 130 V ac
	TL30F A low-profile, flat-mount indicator with multiple color segments can be lit simultaneously page 604	3 or 5	Standard	H(varies) 30 x 19 mm	18 to 30 V dc

LOOKING FOR MORE



Base Mount 570



Barrel Mount 582



T-Style Mount 588

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K80L Flat-Mount
Domed Indicators

The K80L Indicators are rugged, cost-effective, flat-mount indicators that provide easy-to-see operator guidance with a 50 mm dome.

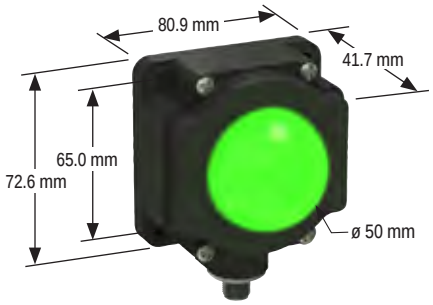
- Easy to mount to flat surfaces such as walls or panels
- High-intensity LEDs give highly visible indication and provide zero-maintenance operation
- Audible alarm models available with several tones and intensity levels
- Rugged, fully encapsulated design rated to IP67
- Up to five colors in one device to communicate multiple statuses
- Multifunction models available see page 607

K80L One, Two or Three Color Model Key, 18-30 V DC Example Model Number K08LGRYPQ

Family	LED Color†			Input	Connection
K80L	G	R	Y	P	Q
	G = Green Y = Yellow R = Red	B = Blue W = White X = Not used		P = PNP N = NPN	Blank = 2 m Integral Cable Q = Euro Integral QD QP = Euro Pigtail QD

K80L One, Two or Three Color Model Key, 85-130 V AC Example Model Number K80LGRYA120

Family	LED Color (fixed)			Power	Connection
K80L	GRY			A120	
	G = Green Y = Yellow R = Red	B = Blue W = White X = Not used		A = AC	Blank = 2 m Integral Cable Q = 5-Pin Micro QD QP = Terminal Wired



K80L Models

For more specifications see page 593.

Connection Option: A model with a QD requires a mating cordset (see page 606).

Single-color models are available. Colors are independently selectable. Contact factory for other colors and color combinations.

† Add 7 after last color option for Sensor Emulators (example, K80LGRX7PQ). Use with discrete output of photoelectric and proximity sensors to duplicate the sensor's Green and Yellow indicator function. When the sensor is powered, the Green LED is ON. When the sensor's output is energized, the Yellow LED is ON.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K80L Audible Flat-Mount Domed Indicators

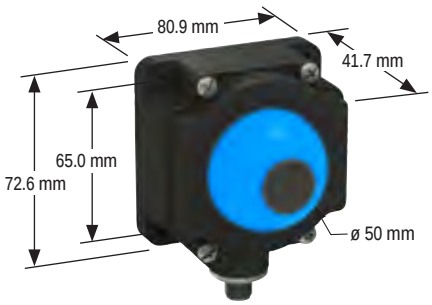
Easy-to-mount to flat surfaces such as walls and panels

- Battery-operated model for areas with no power source
- Segmented models available to show the status of several items simultaneously
- Standard intensity and high intensity daylight visible models available
- No enclosure necessary
- Models available with audible alarm
- Available in several package sizes and functionalities
- 35 mm snap-in DIN mount bracket works with 80 mm devices for quick installation

K80L Two or Three Color and Audible Model Key, 18-30 V DC

Example Model Number K08LGRA1YPQ

Family	LED Color*		Audible Alarm	LED Color†	Input	Connection
K80L	G	R	A1	Y	P	Q
	G = Green Y = Yellow R = Red B = Blue W = White X = Not used		A1 = Steady (75 dB) IP50 A2 = Pulsed (75dB) IP50 AL1 = Loud Steady (95 dB) IP50		P = PNP N = NPN	Blank = 2 m Integral Cable Q = Euro Integral QD QP = Euro Pigtail QD



K80L Audible Models

For more specifications see page 605.

Connection Option: A model with a QD requires a mating cordset (see page 606).

* Single-color models are available. Colors are independently selectable. Contact factory for other colors and color combinations.

† Add 7 after last color option for Sensor Emulators (example, K80LGRX7PQ). Use with discrete output of photoelectric and proximity sensors to duplicate the sensor's Green and Yellow indicator function. When the sensor is powered, the Green LED is ON. When the sensor's output is energized, the Yellow LED is ON.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



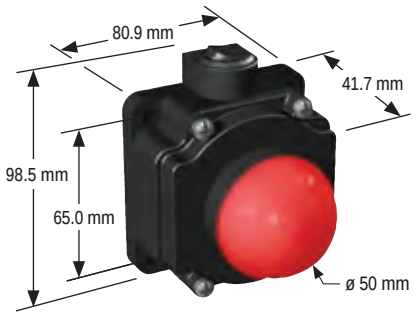
K80 Call Light
Battery Powered

Banner's portable, battery-powered K80 Call Lights provide operational status indication for personnel and are ideal in locations where power is limited or unavailable. The preassembled housing and multiple mounting options make the indicator light cost-effective and easy to install.

- Flashes ON/OFF
- Switch activated
- No assembly required
- Rugged and easy to install
- Long-life LED technology gives up to 100 hours of operation on two 9V batteries (included)

K80CL Call Lights, 18V (two 9V batteries)

Construction	LED Function	Connection	Input	Model
Flat or DIN-mount polycarbonate	Red 1 second flash	ON/OFF switch	ON/OFF switch	K80CLR



K80 Call Light Model

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K50FL Flat-Mount
Domed Indicators

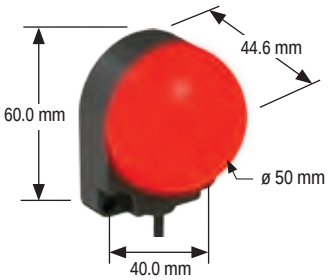
Banner's K50FL can display up to five colors in a single device for various application uses. With a bright, highly visible illuminated dome, K50FLs are ideal for operator guidance and equipment status indication.

- Flat-pack mounting allows for indicators to be mounted on any flat surface
- Fully encapsulated indicators with most models rated to IP69K for high-pressure washdown environments
- Many colors and color combinations available
- Long-lasting LED technology with low power consumption
- Multifunction models available with steady ON, flashing or alternating frequencies (see page 607)

K50FL One, Two or Three Color Model Key, 18-30 V DC

Example Model Number K50FLGRYPQ

Family	LED Color			Input	Connection
K50FL	G	R	Y†	P	Q
	G = Green Y = Yellow R = Red B = Blue W = White	T = Turquoise O = Orange V = Violet M = Magenta X = Not Used		P = PNP N = NPN	Blank = 2 m Integral Cable Q = Euro Integral QD QP = Euro Pigtail QD



K50FL Models

For more specifications see page 605.

Connection Option: A model with a QD requires a mating cordset (see page 606).

† Add 7 after last color option for Sensor Emulators (example, K50FLGYX7PQ). Use with discrete output of photoelectric and proximity sensors to duplicate the sensor's Green and Yellow indicator function. When the sensor is powered, the Green LED is ON. When the sensor's output is energized, the Yellow LED is ON.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K80FL
Flat-Mount Indicators

The K80FL standard intensity models have uniform lighting, viewable from nearly 180 degrees. These indicators are ideal for a variety of applications including indoor traffic control at truck docks and general machine status indication.

- Extremely bright indicator with selectable flash rates
- Up to three colors in one device with a choice of many colors or color combinations
- Large flat face allows for clear indication from farther distances
- Easy to mount to flat surfaces such as walls or panels
- Long-lasting LED technology with low power consumption

K80FL One, Two or Three Color Model Key, 12-30 V DC Example Model Number K80FLGYRPQ

Family	LED Color			Input	Connection
K80FL	G	Y	R	P	Q

LED Color

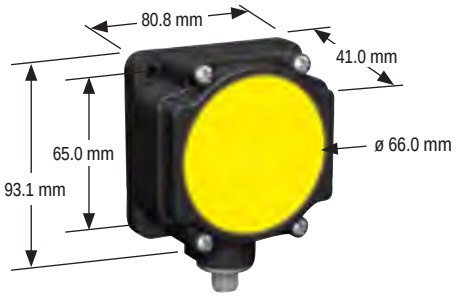
G = Green	O = Orange
Y = Yellow	T = Turquoise
R = Red	V = Violet
B = Blue	M = Magenta
W = White	X = Not used

Input

P = PNP

Connection

Blank = Terminal wired
Q = Euro Integral QD
QP = Euro Pigtail QD



K80FL Models

For more specifications see page 605.

Connection Option: A model with a QD requires a mating cordset (see page 606).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K80FDL Daylight Visible Flat-Mount Indicators

The K80FDL daylight visible models are more intense with a narrower field-of-view for use in areas with high levels of ambient light, including outdoor applications. These indicators are ideal for a variety of applications including outdoor traffic control at truck docks and car washes.

- Extremely bright indicator for outdoor use
- Up to three colors in one device with a choice of many colors or color combinations
- Large flat face allows for clear indication from farther distances
- Easy to mount to flat surfaces such as walls or panels
- Long-lasting LED technology with low power consumption

K80FDL One, Two or Three Color Model Key, 12-30 V DC Example Model Number K80FDLGYRPQ

Family	LED Color			Input	Connection
K80FDL	G	Y	R	P	Q
	G = Green Y = Yellow R = Red B = Blue	W = White O = Orange X = Not used		P = PNP	Blank = Terminal wired Q = Euro Integral QD QP = Euro Pigtail QD



K80FDL
Daylight Visible Models

For more specifications see page 605.

Connection Option: A model with a QD requires a mating cordset (see page 606).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



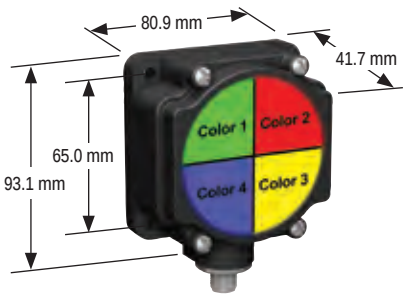
K80 Segmented
Flat-Mount Indicators

Banner's K80L Segmented Indicator has up to four individual segments that can be lighted separately or in combination for error-proofing and operator guidance applications.

- Easily mounted on flat surfaces
- Up to four individual color segments can show status of items simultaneously or in combination
- Optional, customizable labels available for enhanced segment identification
- Highly visible color segments allow for quick and easy identification of statuses

K80L Segmented Model Key, 18-30 V DC Example Model Number K80L4GRYB1PQ

Family	Segment Configuration		LED Color*				Function	Input	Connection
			C1	C2	C3	C4			
K80L	4		G	R	Y	B	1	P	Q
	4 = 4 segments 3 = 1 half & 2 qtr. 2 = 2 halfs 1 = Entire area	Blank = 4 segments or 1 solid color H = Horizontal split TH = Top half	G = Green Y = Yellow R = Red B = Blue X = Not used				1 = Multi function	P = PNP N = NPN	Blank = Terminal-wired Q = Integral QD QP = Euro Pigtail QD



K80L Segmented Models (4 segments)



(3 segments)



(2 segments)

For more specifications see page 605.

Connection Option: A model with a QD requires a mating cordset (see page 606).

* For less than 4 colors, use X as model placeholder (example, K80L2HGXX1PQ)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



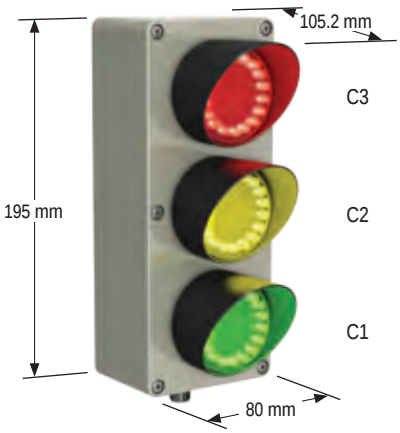
SP Series Signal Lights
Flat-Mount Indicators

Banner's SP Series Indicators are rugged, easy-to-install signal lights that provide high visibility outdoors or in other applications where there are high levels of ambient light. These signal lights are preassembled with up to three indicators per unit. The rugged housing is designed to withstand wet and dirty environments.

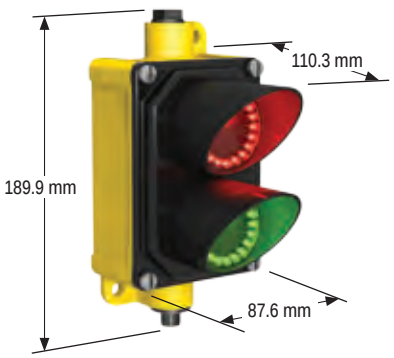
- Intense levels of light output for use outdoors or in environments with high levels of ambient light
- Controlled field-of-view for signage and narrow lane use
- Shock, vibration and impact resistant
- Convenient Euro quick-disconnect option for easy installation
- 15 to 30 V dc or 85 to 130 V ac supply voltage, depending on model

SP Series Signal Light Indicators Model Key Example Model Number SP150GYRPQ

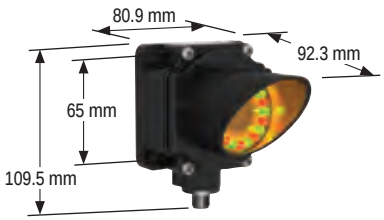
Family	LED Color C1	LED Color C2	LED Color C3	Input**	Connection
SP150	G	Y	R	P	Q
SP150*	G = Green	B = Blue		P = PNP	Blank = Field-wired
SP250	Y = Yellow	W = White		N = NPN	Q = Euro Integral QD
SP350	R = Red	Blank = Not used		A120 = 85-130 V ac	QP = Euro Pigtail QD



SP350 Models



SP250 Models



SP150 Models

For more specifications see page 605.

Connection Option: A model with a QD requires a mating cordset (see page 606).

* SP150 only available in 1 or 3 color options. For 1 color SP150 models input is PNP/NPN selectable.
** A120 models are only available with field-wired connection.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



TL30F Segmented
Flat-Mount Indicators

Banner's TL30F Segmented Indicator is a low-profile, flat-mount indicator. Multiple color segments can be lit simultaneously, making this a useful option for operator guidance or machine indication. This versatile product is also frequently used with pick-to-light products to give operators additional visual indication such as number of parts to pick or color-coded part picking.

- Displays three or five colors in single device
- Durable, rugged metal housing rated to IP65
- Easily mounts on horizontal or vertical work centers or automation machinery
- Compact devices easily fit on work stations
- 18 to 30 V dc bimodal (NPN or PNP) and 21 to 27 V ac inputs

TL30F Three Color Model Key

Example Model Number TL30FGYRQ

Family	LED Color C1	C2	C3	Connection
TL30F	G	Y	R	Q

Q: Blank = 2 m Integral Cable; Q = Euro Integral QD

TL30F Five Color Model Key

Example Model Number TL30FWBGYRQ

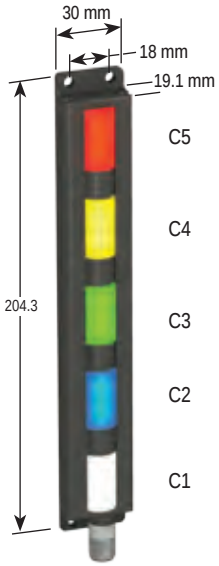
Family	LED Color C1	C2	C3	C4	C5	Connection
TL30F	W	B	G	Y	R	Q

Q: Blank = 2 m Integral Cable; Q = Euro Integral QD

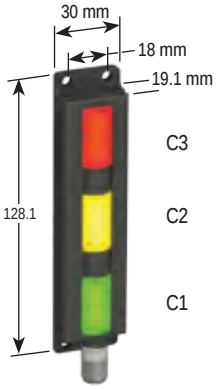
For more specifications see page 605.

Connection Option: A model with a QD requires a mating cordset (see page 606).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Five Color
General-Purpose
IP65



Three Color
General-Purpose
IP65

Flat-Mount Specifications

Supply Voltage and Current	K80L: 10-30 V dc K80CL: 18 V (two batteries) K80FL: 12-30 V dc K80FDL: 12-30 V dc K80 Segmented displays: 18-30 V dc K80L4: @ 35 mA max. per LED color, @ 90 mA max. with all LEDs ON; K80L3 @ 50 mA max. with color 1 ON, @ 35 mA max. with colors 2 or 3 ON, @ 90 mA max. with all LEDs ON; K80L2: @ 50 mA max. with colors 1 or 2 ON, @ 90 mA max. with all LEDs ON; K80L1: @ 90 mA max SP150, SP250, SP350: 15-30 V dc 1-Color: @ 120 mA max. per LED color; 3-Color: @ 40 mA max. per LED color K50FL: 18-30 V dc TL30F: 18-30 V dc (10% max. ripple) or 21-27 V ac @ 18mA max. per LED color
Supply Protection Circuitry	Protected against reverse polarity, transient voltages
Environmental Rating	K80L: IP67 K80L Audible: IP50 K80CL: IP50 K80FL: IP67 K80FDL: IP67 K80 Segmented displays: IP67 SP150: IP67 SP250, SP350: IP65 K50FL: IP69K TL30F: IP65
Operating Temperature	-40° to +50° C
Certifications	CE
Hookups	K80L, K80FL, K80FDL, SP150, K50FL, TL30F: LI12 (p. 1003) K80 Segmented: LI20 (p. 1005) SP250: LI24 (p. 1006) SP350: LI12 (p. 1003)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Straight			Right-Angle		
	4-Pin	5-Pin	8-Pin	4-Pin	5-Pin	8-Pin
1.83 m	MQDC-406	MQDC1-506	MQDC2S-806	MQDC-406RA	MQDC1-506RA	MQDC2S-806RA
4.57 m	MQDC-415	MQDC1-515	MQDC2S-815	MQDC-415RA	MQDC1-515RA	MQDC2S-815RA
9.14 m	MQDC-430	MQDC1-530	MQDC2S-830	MQDC-430RA	MQDC1-530RA	MQDC2S-830RA





Micro QD (for Q models)

See page 925

Length	Straight		Right-Angle	
	3-Pin	5-Pin (With Shield)	3-Pin	5-Pin (With Shield)
1.83 m	MQDC-306	MQVR3S-506	MQDC-306RA	MQVR3S-506RA
4.57 m	MQDC-315	MQVR3S-515	MQDC-313RA	MQVR3S-515RA
9.14 m	MQDC-330	MQVR3S-530	MQDC-330RA	MQVR3S-530RA





Additional cordset information available.
See page 904.

Brackets

K80L		TL30F
See page 854	See page 854	See page 889
SMBDX80D	DIN-35...	SMBPVA1







Additional brackets and more information available.
See page 846.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

LOOKING FOR MORE

These multicolor indicator lights are extremely versatile. They allow for any of the colors to be ON, steady or flashing, or you can alternate between colors. The functionality is easily controlled with simple combinations of the hookup wires. Choose up to five colors in a single device with several different housing styles available.

Three Color Multifunction Model Key, 18-30 V DC Example Model Number K50LGRY2PQ

Family	LED Color	Function	Input	Connection
K50L	G R Y	2	P	Q
K50L K50FL K80L T30 M18	G = Green Y = Yellow R = Red B = Blue W = White T = Turquoise O = Orange V = Violet M = Magenta		P = PNP N= NPN	Blank = 2 m Integral Cable Q = Euro Integral QD QP = Euro Pigtail QD



K50L page 572



K50FL page 599

Four Color Multifunction Model Key, 18-30 V DC Example Model Number K50LGRYB4PQ

Family	LED Color	Function	Input	Connection
K50L	G R Y B	4	P	Q
K50L K50FL K80L	G = Green Y = Yellow R = Red B = Blue W = White T = Turquoise O = Orange V = Violet M = Magenta		P = PNP N= NPN	Blank = 2 m Integral Cable Q = Euro Integral QD QP = Euro Pigtail QD



K80L page 596



T30 page 590

K50L Five Color Multifunction Model Key, 18-30 V DC Example Model Number K50LGRYBWPQ8

Family	LED Color	Input	Connection
K50L	G R Y B W	P	Q8
K50L K50FL K80L	G = Green Y = Yellow R = Red B = Blue W = White T = Turquoise O = Orange V = Violet M = Magenta	P = PNP N= NPN	Blank = 2 m Integral Cable Q = Euro Integral QD QP = Euro Pigtail QD



M18 page 586

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Touch Buttons

Banner is the leader in ergonomic, visual and sealed operator touch buttons for industrial applications. Since Banner's Touch Buttons can have multiple colors and I/O capabilities, they can replace several conventional buttons, making them ideal in lean manufacturing environments.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Number of Colors	Brightness	Dimensions	Power Supply
	K50 Versatile family that combines a large, bright indicator with solid-state switching capability activated by a simple touch. page 610	1 to 3 (9 color options)	Standard	Base: 30 mm Button: 50 mm	12 to 30 V dc
	K30 Versatile family that combines a small, bright indicator with solid-state switching capability activated by a simple touch. page 615	1 or 2 (9 color options)	Standard	Base: 22 mm Button : 30 mm	12 to 30 V dc
	OTB/LTB The industry standard for ergonomic touch buttons and are ideal as replacements for mechanical pushbuttons. page 618	—	—	74.2 x 59.9 x 43.2 mm Base: 30 mm	12 to 30 V dc
	VTB Features a brightly illuminated base for enhanced visual indication. page 622	2 (3 color options)	Standard	73.3 x 59.9 x 43.2 mm Base: 30 mm	12 to 30 V dc
	K30 Features a brightly illuminated base for enhanced visual indication. page 624	1 to 3 (9 color options)	Standard	Base: 22 mm Dome : 30 mm	12 to 30 V dc
	K50 Features a brightly illuminated base for enhanced visual indication. page 625	1 to 3 (9 color options)	Standard	Base: 30 mm Dome: 50 mm	12 to 30 V dc

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K50
MultipurposeTouch Buttons

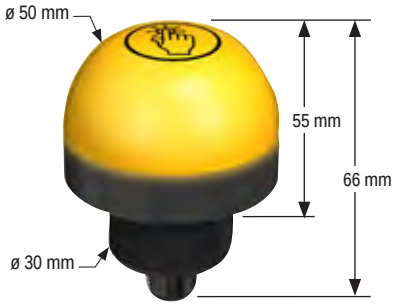
Touch buttons have up to three colors in one unit and are ergonomically designed to eliminate hand, wrist and arm stress associated with repeated switch operation. The indicator inputs are totally independent of the touch activated output, making these devices flexible for use in countless applications.

- Up to three independent colors in one unit with many color options available
- Rugged, cost-effective and easy-to-install multicolor indicator with touch button output
- Touch-activated, solid-state output will last for millions of cycles
- Can be actuated with bare hands or work gloves
- Water resistant IP69K design for washdown environments
- Cordsets and brackets see page 612

K50 One, Two or Three Color Model Key, 12-30 V DC Example Model Number K50APTGRYF2Q

Family	Output State	Input/ Output	Activation Method	Color 1	Color 2	Color 3	Function	Connection
K50	A	P	T	G	R	Y	F2	Q

- **Output State:** A = Normally Open; R = Normally Closed
- **Input/Output:** P = PNP; N = NPN
- **Activation Method:** T = Touch
- **Color 1, 2, 3:** G = Green; Y = Yellow; R = Red; B = Blue; W = White; O = Orange; T = Turquoise; V = Violet; M = Magenta; X = Not used
- **Function:** F2 = Multifunction
- **Connection:** Blank = 2 m Integral Cable; Q = Euro Integral QD; QP = Euro Pigtail QD



Connection Option: A model with a QD requires a mating cordset (see page 612).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K50
Illuminated Touch Buttons

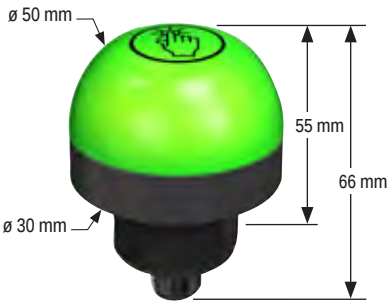
Rugged, cost-effective and easy-to-install touch buttons that have momentary versions and latching versions to meet the requirements of various applications.

- Momentary versions remain activated as long as touch is present
- Latching versions toggle between activated and not activated states on successive touches
- Rugged, water resistant IP69K design for washdown environments
- Ergonomically designed to eliminate hand, wrist and arm stresses, requiring no physical pressure to operate
- Can be actuated with bare hands or work gloves
- Cordsets and brackets see page 612

K50 One or Two Color Model Key, 12-30 V DC Example Model Number K50ALBTGRHQ

Family	Output State	Output Function	Output Type	Activation Method	Color (not activated)	Color (activated)	Function	Connection
K50	A	L	B	T	G	R	H	Q

- **Output State:** A = Normally Open; R = Normally Closed
- **Output Function:** Blank = Momentary; L = Latching
- **Output Type:** B = Bipolar Output (NPN & PNP)
- **Activation Method:** T = Touch
- **Color (not activated) / (activated):** G = Green; Y = Yellow; R = Red; B = Blue; W = White; O = Orange; T = Turquoise; V = Violet; M = Magenta; X = Not used
- **Function:** H = Output only
- **Connection:** Blank = 2 m Integral Cable; Q = Euro Integral QD; QP = Euro Pigtail QD



Connection Option: A model with a QD requires a mating cordset (see page 612).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD

See page 912

Length	Threaded 5-Pin			
	Straight		Right-Angle	
0.5 m	MQDC1-501.5		–	
1.83 m	MQDC1-506		MQDC1-506RA	
4.57 m	MQDC1-515		MQDC1-515RA	
9.14 m	MQDC1-530		MQDC1-530RA	


Additional cordset information available.
See page 904.

Brackets

K50

See page 869	See page 869	See page 870
SMB30A	SMB30MM	SMB30SC
		


Additional bracket information available.
See page 846.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

K50 Touch Specifications

Supply Voltage	12 to 30 V dc
Supply Current	Less than 75 mA max current at 12 V dc (exclusive of load) Less than 50 mA max current at 30 V dc (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages (fast transient and over-voltage) and reverse polarity
Construction	Housing: Polycarbonate Translucent dome: Polycarbonate Mounting Nut: PBT
Environmental Rating	IEC IP67, IP69K per DIN 40050-9. Cabled models also meet IP69K if the cable and cable entrance are protected from high-pressure spray
Connections	Integral 5-pin Euro style QD, or 2 m PVC integral cable, or 5-pin 150 mm Euro-style PVC pigtail QD
Operating Conditions	Temperature: −40° to +50° C Max. Relative Humidity: 90% @ +50° C max. relative humidity (non-condensing) Storage Temperature: −40° to +70° C
Certifications	CE
Hookup Diagrams	LI27 (p. 1007)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K30
MultipurposeTouch Buttons

Have up to two colors in one unit and are ergonomically designed to eliminate hand, wrist and arm stress associated with repeated switch operation. The indicator inputs are totally independent of the touch activated output, making these devices flexible for use in countless applications.

- Up to two independent colors in one unit with many color options available
- Rugged, cost-effective and easy-to-install multicolor indicator with touch button output
- Touch-activated, solid-state output will last for millions of cycles
- Can be actuated with bare hands or work gloves
- Water-resistant IP69K design for washdown environments
- Cordsets and brackets see page 616

Touch K30 One or Two Color Model Key, 12-30 V DC Example Model Number K30APTGRF2Q

Family	Output State	Input/ Output	Activation Method	Color 1	Color 2	Function	Connection
K30	A	P	T	G	R	F2	Q
	A = Normally Open R = Normally Closed	P = PNP N = NPN	T = Touch	G = Green Y = Yellow R = Red B = Blue W = White O = Orange T = Turquoise V = Violet M = Magenta X = Not used		F2 = Multifunction	Blank = 2 m Integral Cable Q = Euro Integral QD QP = Euro Pigtail QD



Connection Option: A model with a QD requires a mating cordset (see page 616).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K30
Illuminated Touch Buttons

Rugged, cost-effective and easy-to-install touch buttons that have momentary versions and latching versions to meet the requirements of various applications.

- Momentary versions remain activated as long as touch is present
- Latching versions toggle between activated and not activated states on successive touches
- Rugged, water-resistant IP69K design for washdown environments
- Ergonomically designed to eliminate hand, wrist and arm stresses, requiring no physical pressure to operate
- Can be actuated with bare hands or work gloves
- Cordsets and brackets see page 616

Touch K50 One or Two Color Model Key, 12-30 V DC Example Model Number K30ALBTGRHQ

Family	Output State	Output Function	Output Type	Activation Method	Color (not activated)	Color (activated)	Function	Connection
K30	A	L	B	T	G	R	H	Q

- **Output State**: A = Normally Open; R = Normally Closed
- **Output Function**: Blank = Momentary; L = Latching
- **Output Type**: B = Bipolar Output (NPN & PNP)
- **Activation Method**: T = Touch
- **Color (not activated) / (activated)**: G = Green; Y = Yellow; R = Red; B = Blue; W = White; O = Orange; T = Turquoise; V = Violet; M = Magenta; X = Not used
- **Function**: H = Output only
- **Connection**: Blank = 2 m Integral Cable; Q = Euro Integral QD; QP = Euro Pigtail QD



Connection Option: A model with a QD requires a mating cordset (see page 616).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q5 models)

See page 908

Length	Threaded 4-Pin Straight		Threaded 4-Pin Right-Angle	
1.83 m		MQDC-406		MQDC-406RA
4.57 m		MQDC-415		MQDC-415RA
9.14 m		MQDC-430		MQDC-430RA



Additional cordset information available. See page 904.

Brackets

K30

SMB22A	SMB22FVK	SMBAMS22P	SMB22RAVK
			



Additional bracket information available. See page 846.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

K30 Touch Specifications

Supply Voltage	12 to 30 V dc
Supply Current	Less than 75 mA max current at 12 V dc (exclusive of load) Less than 50 mA max current at 30 V dc (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages (fast transient and over-voltage) and reverse polarity
Construction	Housing: Polycarbonate Translucent dome: Polycarbonate Mounting Nut: PBT
Environmental Rating	IEC IP67, IP69K per DIN 40050-9. Cabled models also meet IP69K if the cable and cable entrance are protected from high-pressure spray
Connections	Integral 4-pin Euro style QD, or 2 m PVC integral cable, or 4-pin 150 mm Euro-style PVC pigtail QD
Operating Conditions	Temperature: −40° to +50° C Max. Relative Humidity: 90% @ +50° C max. relative humidity (non-condensing) Storage Temperature: −40° to +70° C
Certifications	CE
Hookup Diagrams	LI27 (p. 1007)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



OTB
Optical Touch Buttons

Banner's OTB and LTB are the industry standard for ergonomic touch buttons and are ideal as replacements for mechanical push buttons. These touch buttons have LED indicators to signal "power on" and "output active" conditions.

- Optimized for easy mounting with 30 mm threaded base
- Ergonomic design eliminates hand, wrist and arm stress
- Momentary and alternate action models available
- Available in a wide variety of voltage ranges and output types to suit any application
- Field covers (black) included to prevent inadvertent activation from loose clothing, debris, etc.
- Cordsets and brackets see page 620

OTB Model Key, 12-30 V DC Example Model Number OTBVP6QD

Family	Output	Upper Housing Material	Connection
OTB	VP6		QD
OTB = Momentary Action	VP6 = Complementary PNP (1 NO & 1 NC) VN6 = Complementary NPN (1 NO & 1 NC) VR81 = 20-30 V ac or dc SPDT electromechanical relay A5 = 120 V ac SPDT electromechanical relay B5 = 220/240 V ac SPDT electromechanical relay	Blank = Polysulfone L = Polycarbonate	Blank = 2 m Integral Cable QD = Mini Integral QD QDH = Euro Integral QD*

Connection Option: A model with a QD requires a mating cordset (see page 620).

For 9 m cable, add suffix W/30 to the 2 m model number (example, OTBVN6 W/30).

* Only available for OTBVP6 or OTBVN6 models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



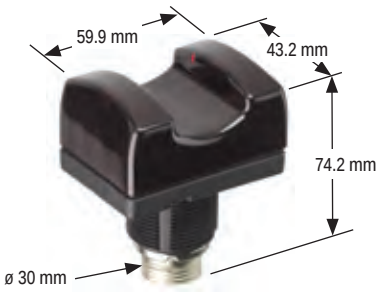
LTB
Optical Touch Buttons

Banner's LTB and OTB are the industry standard for ergonomic touch buttons and are ideal as replacements for mechanical push buttons. These touch buttons have LED indicators to signal "power on" and "output active" conditions.

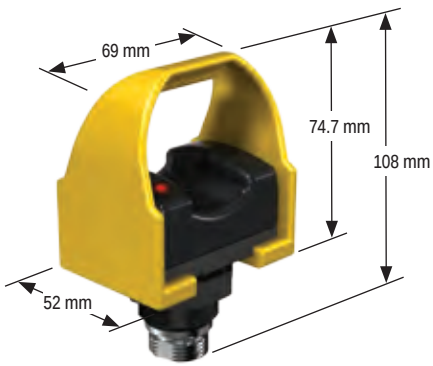
- Optimized for easy mounting with 30 mm threaded base
- Ergonomic design eliminates hand, wrist and arm stress
- Momentary and alternate action models available
- Available in a wide variety of voltage ranges and output types to suit any application
- Field covers (black) included to prevent inadvertent activation from loose clothing, debris, etc.
- Cordsets and brackets see page 620

LTB Model Key, 12-30 V DC Example Model Number LTBA5QD

Family	Output	Upper Housing Material	Connection
LTB	A5		QD
LTB = Alternate Action	A5 = 120 V ac SPDT electromechanical relay B5 = 220/240 V ac SPDT electromechanical relay	Blank = Polysulfone L = Polycarbonate	Blank = 2 m Integral Cable QD = Mini Integral QD



OTB and LTB Models



OTB and LTB Models with cover

Connection Option: A model with a QD requires a mating cordset (see page 620).

For 9 m cable, add suffix W/30 to the 2 m model number (example, LTBVR81 W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q5 models)

See page 908

Length	Threaded 4-Pin Straight		Threaded 4-Pin Right-Angle	
1.83 m	MQDC-406		MQDC-406RA	
4.57 m	MQDC-415		MQDC-415RA	
9.14 m	MQDC-430		MQDC-430RA	

Additional cordset information available. See page 904.

Mini QD

See page 928

Length	Straight 4-Pin	Straight 5-Pin	
1.83 m	MBCC-406	MBCC-506	
3.66 m	MBCC-412	MBCC-512	
9.14 m	MBCC-430	MBCC-530	

Brackets

OTB & LTB

See page 869	See page 869	See page 870
SMB30A	SMB30MM	SMB30SC
		

Additional bracket information available. See page 846.

Field Covers

OTB/LTB

Black	OTC-1-BK		OTCL-1-BK
Green	OTC-1-GN		OTCL-1-GN
Red	OTC-1-RD		OTCL-1-RD
Yellow	OTC-1-YW		OTCL-1-YW



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

OTB/LTB Specifications

Supply Voltage and Current	OTBVR81 models: 20 to 30 V ac/dc OTBA5 & LTBA5 models: 105 to 130 V ac, 50-60 Hz OTBB5 & LTBB5 models: 210 to 250 V ac, 50-60 Hz OTBVN6/VP6 models: 10 to 30 V dc All models require less than 25 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	OTBVR81, OTBA5, OTBB5 and all LTB models: SPDT electromechanical relay OTBVN6 models: Complementary NPN (sinking) open-collector transistor; 1 normally open (NO) and 1 normally closed (NC) OTBVP6 models: Complementary PNP (sourcing) open-collector transistors; 1 normally open (NO) and 1 normally closed (NC)
Output Rating	Electromechanical relay models: Max. switching current: 7 amps (resistive load), 1 HP max. Min. load: 0.05 watts (dc), 0.05 VA (ac) Mechanical life of relay: 50,000,000 operations (min.) Electrical life of relay: 100,000 operations (min.) at full resistive load Transient suppression is recommended when switching inductive loads Solid-state output models: 150 mA max. load (each output) ON-state saturation voltage: less than 1 volt at signal levels; less than 1.5 volts at full load OFF-state leakage current: less than 1 µA
Response Time	100 milliseconds ON/OFF
Output Protection	All models protected against false pulse on power-up Models with solid-state outputs have overload and short circuit protection
Indicators	Two Red indicator LEDs: one lights whenever power is applied; the other lights whenever the switch is activated making the normally-open (NO) output conduct
Construction	Totally encapsulated, non-metallic enclosure. Black polysulfone or red polycarbonate upper housing (see Application Notes below); fiber-reinforced thermoplastic polyester base. Electronics fully epoxy-encapsulated. Supplied with a field cover of polypropylene (TP).
Environmental Rating	Meets NEMA standards 1, 3, 4, 4X, 12 and 13; IEC IP66
Connections	PVC-jacketed 2 m or 9 m cables, or Mini-style quick-disconnect (QD) fitting. QD cordsets are ordered separately. See page 620.
Ambient Light Immunity	120,000 lux (direct sunlight)
EMI/RFI Immunity	Immune to both single and mixed EMI and RFI noise sources
Operating Conditions	Temperature: -20° to +50° C Relative humidity: 90% at 50° C (non-condensing)
Application Notes	Environmental considerations for models with polysulfone upper housings: The polysulfone upper housing will become embrittled with prolonged exposure to outdoor sunlight. Window glass effectively filters longer wavelength ultraviolet light and provides excellent protection from sunlight. Environmental considerations for models with polycarbonate upper housings: Avoid prolonged exposure to hot water and moist high-temperature environments above 66° C. Avoid contact with aromatic hydrocarbons (such as xylene and toluene), halogenated hydrocarbons and strong alkalis. Clean periodically using mild soap solution and a soft cloth. Avoid strong alkaline materials.
Certifications	CE CSA® UL LISTED
Hookup Diagrams	DC Models: DC03 (pg. 974) AC/DC Models: OTBVR81 Models: UN01 (pg. 984) AC Models: OTBA5 & LTB Models: AC08 (pg. 982) OTBB5 Models: AC08 (pg. 982)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



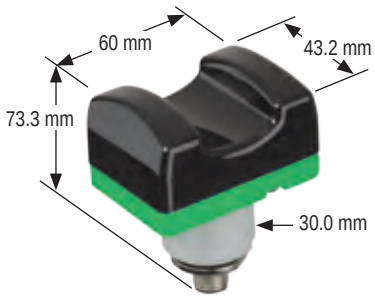
VTB
Optical Touch Buttons

The VTB features a brightly illuminated base for enhanced visual indication. Like the OTB, the VTB is an ergonomic touch button that requires no physical pressure to operate, and is ideal for machine start/stop and other applications where clear, visual indication of the touch button status is desired.

- Illuminated version of the Optical Touch Button
- Ergonomic design eliminates hand, wrist and arm stress
- Provides bright, easy-to-see status indication that can be seen in almost any environment
- One- and two-color models available
- 30 mm threaded base for convenient mounting

VTB One or Two Color Model Key, 12-30 V DC Example Model Number VTBP6Q

Family	Output	Job Light 1 Color	Job Light 2 Color	Upper Housing Material	Connection
VTB	P6				Q
	N6 = NPN P6 = PNP	Blank = Green R = Red B = Blue		Blank = Polysulfone L = Polycarbonate	Blank = 2 m Integral Cable Q = Euro Integral QD QP = Euro Pigtail QD



Connection Option: A model with a QD requires a mating cordset (see page 623).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q5 models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA



Additional cordset information available. See page 904.

Brackets

VTB

See page 869	See page 869	See page 870
SMB30FA	SMB30MM	SMB30SC







Additional bracket information available. See page 846.

Field Covers

VTB

Black	OTC-1-BK	OTCL-1-BK	
Green	OTC-1-GN	OTCL-1-GN	
Red	OTC-1-RD	OTCL-1-RD	
Yellow	OTC-1-YW	OTCL-1-YW	





VTB Specifications

Supply Voltage and Current	12 to 30 V dc (10% max. ripple) Single-color models: Less than 120 mA max. current @ 12 V dc (exclusive of load) Less than 70 mA max. current @ 30 V dc (exclusive of load) Two-color models: Less than 67 mA max. current @ 12 V dc (exclusive of load) Less than 40 mA max. current @ 24 V dc (exclusive of load) Less than 35 mA max. current @ 30 V dc (exclusive of load)
Supply Protection Circuitry	Protected against transient voltages (fast-transient and over-voltage) and reverse polarity
Output Configuration	Choose 1 current sinking (NPN) open collector transistor or 1 current sourcing (PNP) open collector transistor, depending on model
Output Rating	Max. load: 150 mA ON-state saturation voltage: less than 1.5 V @ 150 mA OFF-state leakage current: less than 10 µA
Output Protection	All models protected against false pulse on power-up (outputs held OFF for 1 second at power-up). Models with solid-state outputs have overload and short-circuit protection.
Response Time	100 milliseconds ON/OFF
Indicators	2 Red LED indicators: Power ON and Output Conducting Base: Lights green, red, blue, or green and red as a job light when input line is enabled. One-color models may be wired for flashing rather than solid color operation.
Construction	Totally encapsulated, non-metallic enclosure. Black polysulfone or red polycarbonate upper housing (see Application Note); translucent white polycarbonate base. Electronics fully epoxy-encapsulated.
Environmental Rating	IEC IP66 ; NEMA 1, 3, 4, 4X, 12
Connections	2 m or 9 m attached cable, or 4-pin (single color) or 5-pin (two color) Euro-style QD fitting. QD cordsets are ordered separately.
Ambient Light Immunity	Up to 120,000 lux (direct sunlight)
EMI/RFI Immunity	Immune to EMI and RFI noise sources, per IEC 947-5-2.
Operating Conditions	Temperature: -20° to +50° C Relative humidity: 90% @ +50° C (non-condensing)
Certifications	
Hookup Diagrams	NPN Single-Color Models: LI06 (p. 1002) PNP Single-Color Models: LI07 (p. 1002) Two-Color Models: LI22 (p. 1006)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



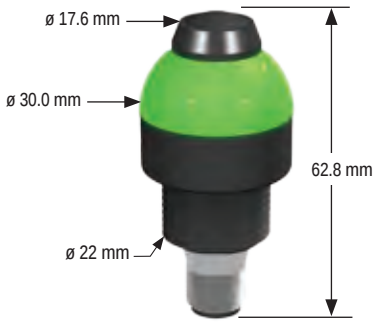
K30L
Illuminated Push Button

Banner's popular K30L indicators feature a sealed push button that can withstand washdown applications. Unlike typical lighted push buttons, these devices are extremely bright and can be seen from all directions due to their unique shape. The rugged, encapsulated construction allows them to be used as stand alone devices without an enclosure.

- Up to three colors in one device with a variety of colors for customized indication
- Quick-disconnect models for easy installation
- Dry contact switch output is completely isolated from the LED indicator input
- Designed for panel-mount or stand-alone applications
- Cordsets and brackets see page 626

K30L Illuminated Push Button Model Key, 10-30 V DC Example Model Number K30LGRYPPB2Q

Family	LED Color C1	LED Color C2	LED Color C3	Input	Output	Connection
K30L	G	R	Y	P	PB2	Q
	G = Green	O = Orange		P = PNP	PB2 = Momentary Push Button	Blank = 2 m Integral Cable
	Y = Yellow	T = Turquoise				Q = Euro Integral QD
	R = Red	V = Violet				QP = Euro Pigtail QD
	B = Blue	M = Magenta				
	W = White	X = Not used				



K30L Push Models

Connection Option: A model with a QD requires a mating cordset (see page 626).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K50L
Illuminated Push Button

Banner's popular K50L indicators feature a sealed push button that can withstand washdown applications. Unlike typical lighted push buttons, these devices are extremely bright and can be seen from all directions due to their unique shape. The rugged, encapsulated construction allows them to be used as stand alone devices without an enclosure.

- Up to three colors in one device with a variety of colors for customized indication
- Quick-disconnect models for easy installation
- Dry contact switch output is completely isolated from the LED indicator input
- Designed for panel-mount or stand-alone applications
- Cordsets and brackets see page 626

K50L Illuminated Push Button Model Key, 10-30 V DC Example Model Number K50LGRYPPB2Q

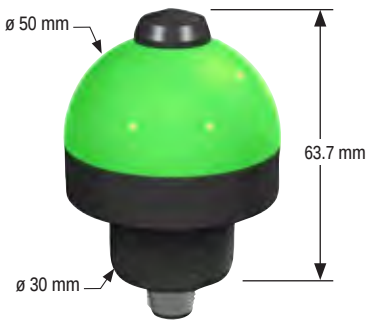
Family	LED Color C1	LED Color C2	LED Color C3	Input	Output	Connection
K50L	G	R	Y	P	PB2	Q

LED Color C1, C2, C3:
G = Green, Y = Yellow, R = Red, B = Blue, W = White
O = Orange, T = Turquoise, V = Violet, M = Magenta, X = Not used

Input:
P = PNP

Output:
PB2 = Momentary Push Button

Connection:
Blank = 2 m Integral Cable
Q = Euro Integral QD
QP = Euro Pigtail QD



K50L Push Models

Connection Option: A model with a QD requires a mating cordset (see page 626).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q5 models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA



Additional cordset information available. See page 904.

Euro QD

See page 912

Length	Threaded 5-Pin Straight	Threaded 5-Pin Right-Angle
0.5 m	MQDC1-501.5	–
1.83 m	MQDC1-506	MQDC1-506RA
4.57 m	MQDC1-515	MQDC1-515RA
9.14 m	MQDC1-530	MQDC1-530RA




Euro QD

See page 915

Length	Threaded 4-Pin Straight
1.83 m	MQDC-806
4.57 m	MQDC-815
9.14 m	MQDC-830



Brackets

K30L	K50L
	See page 869
SMB22A	SMB30A




Additional bracket information available. See page 846.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

K30L and K50L Illuminated Push Button Specifications

Supply Voltage and Current	K30: 10 to 30 V dc @ 40 mA max. per LED color K50: 12 to 30 V dc 65 mA @ 12 V dc; 35 mA @ 30 Vdc max. per LED color
Supply Protection Circuitry	Protected against reverse polarity and transient voltages (fast transient and over-voltage) and reverse polarity
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of output
Construction	Base: Polycarbonate Translucent dome: Polycarbonate Push button: Thermoplastic
Environmental Rating	IEC IP65
Connections	Integral Euro-style QD fitting, PVC-jacketed 2 m cable or 150 mm PVC pigtail with QD, depending on model
Operating Conditions	Temperature: −40° to +50° C Max. Relative Humidity: 90% @ +50° C max. relative humidity (non-condensing) Storage Temperature: −40° to +70° C
Certifications	CE
Hookup Diagrams	See data sheet

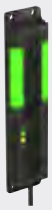
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Pick-to-Light

Banner offers the most extensive line of light-guided assembly solutions. Pick-to-Light products have unique, rugged packages with a choice of verification functions and are easy to mount for quick installation.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Number of Colors	Dimensions H x W x D	Power Supply
	PVD A compact, one-piece solutions useful in many part assembly, pick-to-light and error-proofing applications. page 630	3	H (137.8 or 266.4) 30 x 16.4 mm	12 to 30 V dc
	PVL A retroreflective sensor that offers a reliable, cost-effective solution for bin-picking processes. page 632	3	H (225 or 500) 32.9 x 37.3 mm	12 to 30 V dc
	PVA Helps reduce missed and misassembled parts for increased quality and reduced production costs. page 634	3	H (varies by model) 30 x 15 mm	12 to 30 V dc
	K50 A versatile family that combines a large, bright indicator with solid-state switching capability activated by a simple touch. page 636	1 or 2	ø 30 mm base with ø 50 mm light	12 to 30 V dc
	K30 A versatile family that combines a small, bright indicator with solid-state switching capability activated by a simple touch. page 638	1 or 2	ø 22 mm base with ø 30 mm light	12 to 30 V dc
	K50 A rreliable photoelectric sensing for non-contact part-picking applications. page 640	1 or 3	ø 30 mm base with ø 50 mm light	12 to 30 V dc
	K30, K50 & K80 Push Buttons 30 or 50 mm translucent dome containing one to three colored lights and a push button. page 642	1 to 3	K30 ø 22 mm base with ø 30 mm light K50 ø 30 mm base with ø 50 mm light K80 80 mm housing with ø 50 mm light	12 to 30 V dc
	VTB Features a brightly illuminated base for enhanced visual indication. page 646	1	57 x 60 43 mm	12 to 30 V dc

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



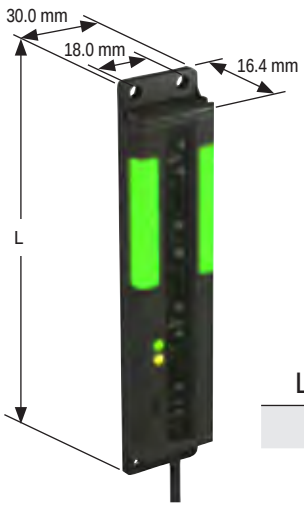
PVD
Parts Verification Array

PVD Pick-to-Light Sensors are compact, one-piece solutions useful in many part assembly, pick-to-light and error-proofing applications.

- Innovative, low-profile design with auto-configuration feature for diffuse or retroreflective modes
- Ideal for bin picking in tube rack or shelving applications
- Green light for pick and red light for mispick with selectable control features
- Rugged housing for high durability
- Protective mounting brackets available

PVD Model Key, 12-30 V DC Example Model Number PVD100Q

Family	Sensing Length (L1)	Connection
PVD	100	Q
	100 = 100 mm 225 = 225 mm	Blank = 2 m Integral Cable Q = 2 m Euro Pigtail QD



Length (L)	Models
137.8 mm	PVD100
266.4 mm	PVD225

Connection options: A model with a QD requires a mating cordset (see page 631).

For 9 m cable, add W/30 to the 2 m model number (example, PVD100 W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

PVD Specifications

Sensing Range	**Retroreflective applications:** 2 m, using 25 mm wide retroreflective tape **Diffuse applications:** 400 mm, with 18% reflectivity gray card target
Sensing Beam	630 nm, Visible red
Beam Spacing	28.6 mm
Sensing Height	**4-channel models:** 111 mm **8-channel models:** 240 mm
Supply Voltage and Current	**Input Voltage:** 12 to 30 V dc (10% max. ripple @ 10% duty cycle) **Input Current:** less than 40 mA @ 24 V dc and less than 70 mA @ 12 V dc (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient over-voltage
Sensing Resolution	**Retroreflective:** 51 mm at 406 mm range, 100 mm at 2 m **Diffuse:** 55 mm dia. at 400 mm range
Output Configuration	**User-selectable via DIP switch:** 1 open-collector PNP (current sourcing) or 1 open-collector NPN (current sinking)
Output Rating	150 mA max. **OFF-state leakage current:** less than 10 µA **ON-state saturation voltage:** NPN: less than 1.0 V dc at 150 mA PNP: less than 2.0 V dc at 150 mA
Output Protection Circuitry	Protected against false pulse at power-up and short circuit of outputs
Output Response Time	400 milliseconds (Includes standard 100 milliseconds ON-delay and 100 milliseconds OFF-delay)
Delay at Power-Up	Less than 1.0 second
Indicators	**Green:** LED to indicate power ON/OFF **Yellow:** LED to indicate output ON/OFF **Job Light:** (Diffused Green LED) Turned ON and OFF by applying an external signal to the Job input (white wire). The job lights will be active high or active low, depending on user selection of DIP switch 4. **Error Light:** (Diffused Red LED) Turned ON and OFF by detection of an output event when job light is not ON.
Adjustments	**4 DIP switches, located behind access panel** († denotes default setting): 1. PNP†/ NPN output 2. Normally Open operation†/Normally Closed 3. Job light ON solid†/Job light flashing 4. Job light input high†/Job light input low
Construction	Black painted aluminum housing; acrylic lenses; thermoplastic polyester end caps; thermoplastic elastomer programming switch cover; stainless steel mounting brackets and hardware
Environmental Rating	NEMA 2; IEC IP62
Connections	5-conductor PVC-jacketed 2 m cable which is either unterminated or terminated with a 5-pin Euro-style quick-disconnect connector, depending on model. Cable diameter is 3.3 mm. QD cordsets are ordered separately.
Operating Conditions	**Temperature:** 0° to +50° C **Relative humidity:** 90% relative humidity @ 50° C (non-condensing)
Certifications	CE c UL us
Hookup Diagrams	LI03 (p. 1001)

Cordsets

Euro QD (for Q models)

See page 912

Length	Threaded 5-Pin Straight		Threaded 5-Pin Right-Angle	
1.83 m	MQDC1-506		MQDC1-506RA	
4.57 m	MQDC1-515		MQDC1-515RA	
9.14 m	MQDC1-530		MQDC1-530RA	


Additional cordset information available. See page 904.

Brackets

PVD

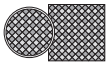
See page 890	See page 890	See page 891
SMBPVD...	SMBPVA..C	SMBPVA6
		


Additional bracket information available. See page 846.

Other Accessories

Reflectors

See page 940



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



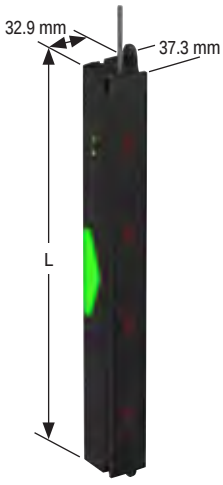
PVL
Parts Verification Array

Banner's PVL Pick-to-Light Retroreflective Sensor offers a reliable, cost-effective solution for bin-picking processes. The PVL is easy to install with no assembly required.

- Rugged housing for high durability and works well for larger openings and parts
- 70 mm beam spacing with two available lengths
- Highly visible pick/mispick dual-function indicator
- Can mount directly to a racking profile vertically or horizontally
- Slotted housing design allows cable to exit on either end

PVD Model Key, 12-30 V DC Example Model Number PVL225PQ

Family	Sensing Length	Output	Connection
PVL	225	P	Q
	225 = 225 mm 500 = 500 mm	P = PNP N = NPN	Blank = 2 m Integral Cable Q = 2 m Euro Pigtail QD



Length (L)	Models
327.5 mm	PVL225
608 mm	PVL500

Connection options: A model with a QD requires a mating cordset (see page 633).

For 9 m cable, add W/30 to the 2 m model number (example, PVL250P W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

PVL Specifications

Sensing Range	1.5 m, using 25 mm wide retroreflective tape
Sensing Beam	630 nm, Visible red
Beam Spacing	70 mm
Supply Voltage and Current	**Input Voltage:** 12 to 30 V dc (10% max. ripple) PLV225; **Input Current:** less than 140 mA @ 12 V dc and less than 70 mA @ 30 V dc (exclusive of load) PVL500; **Input Current:** less than 220 mA @ 12 V dc and less than 100 mA @ 30 V dc (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient over-voltage
Output Rating	150 mA max. **OFF-state leakage current:** less than 10 µA **ON-state saturation voltage:** NPN: less than 1.5 V at 10 mA dc; PNP: less than 2.0 V dc at 10 mA NPN: less than 2.0 V at 150 mA dc; PNP: less than 2.5 V dc at 150 mA
Output Response Time	Less than 2 milliseconds ON and OFF
Delay at Power-Up	Less than 1.0 second
Indicators	**Green:** LED to indicate power ON/OFF **Yellow:** LED to indicate output ON/OFF **Job Light:** (Diffused Green LED) Turned ON and OFF by applying an external signal to the Job input (white wire). The job lights will be active high or active low, depending on user selection of DIP switch 4. **Error Light:** (Diffused Red LED) Turned ON and OFF by detection of an output event when job light is not ON.
Construction	Black anodized aluminum housing, painted zinc end caps, thermoplastic front face and lenses
Environmental Rating	IEC IP50
Connections	2 m PVC-jacketed cable which is either unterminated or terminated, depending on model. QD cordsets are ordered separately.
Operating Conditions	**Temperature:** 0° to +50° C **Relative humidity:** 90% relative humidity @ 50° C (non-condensing)
Certifications	CE
Hookup Diagrams	LI04 (p. 1001)

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA



Additional cordset information available. See page 904.

Brackets

PVL

See page 892	See page 893	See page 893	See page 892	See page 892
SMBPVL1	SMBPVL2-(225 or 500)	SMBPVL3-(225 or 500)	SMBPVL4	SMBPVL5



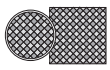



Additional bracket information available. See page 846.

Other Accessories

Reflectors

See page 940



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



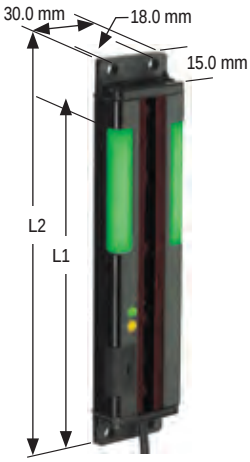
PVA
Parts Verification Array

The PVA Pick-to-Light Sensor helps reduce missed and misassembled parts for increased quality and reduced production costs. With highly visible job lights, Banner's PVA provides the most reliable solution for error proofing.

- Emitter/receiver arrays for high resolution sensing
- Four lengths to cover a variety of openings and applications
- Highly reliable sensing over a long operating range
- Wide field-of-view makes alignment easy
- Protective mounting brackets available

PVA Model Key, 12-30 V DC Example Model Number PVA100P6EQ

Family	Length	Output	Emitter/ Receiver	Connection
PVA	100	P6	E	Q
	100 = 100 mm 225 = 225 mm 300 = 300 mm 375 = 375 mm	P6 = PNP N6 = NPN	E = Emitter R = Receiver Blank = E/R Pair	Blank = 2 m Integral Cable Q = 2 m Euro Pigtail QD



Models	No. of Beams	Length (L1)	Length (L2)
PVA100	5	100	137.8 mm
PVA225	10	225	266.4 mm
PVA300	13	300	341.4 mm
PVA375	16	375	416.6 mm

Connection options: A model with a QD requires a mating cordset (see page 635).

For 9 m cable, add W/30 to the 2 m model number (example, PVA100P6E W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA



Additional cordset information available. See page 904.

Brackets

PVA

See page 890	See page 890	See page 890
SMBPVA...	SMBPVA..C	SMBPVA2



Additional bracket information available. See page 846.

PVA Specifications

Beam Spacing	25.0 mm
Sensing Height	100, 225, 300 or 375 mm, depending on emitter and receiver models
Supply Voltage and Current	12 to 30 V dc (10% max. ripple) at less than 62 mA for the emitter and 50 mA for the receiver (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity
Output Configuration	Receivers have one solid-state dc output, programmable for Light or Dark Operate: Models PVA...N6R have current sinking (NPN) open-collector transistor Models PVA...P6R have current sourcing (PNP) open-collector transistor
Output Rating	150 mA max. OFF-state leakage current: less than 2 µA ON-state saturation voltage: less than 1 V dc at 10 mA and less than 1.5 V dc at 100 mA
Output Response Time	Sensor Size / Standard / With Crosstalk from Adjacent Units 100 mm / 20 milliseconds / 30 milliseconds max. 225 mm / 40 milliseconds / 60 milliseconds max. 300 mm / 52 milliseconds / 78 milliseconds max. 375 mm / 64 milliseconds / 96 milliseconds max.
Output Protection Circuitry	Protected against false pulse at power-up and continuous overload or short circuit of outputs
Sensing Resolution	35 mm min. diameter
Status Indicators	Emitter: One Green LED to indicate power ON/OFF One Red LED to indicate frequency selected Receiver: One Green LED to indicate power ON/OFF One Yellow LED to indicate output state Emitter & Receiver: Both have two highly visible "job lights" which are turned ON/OFF by applying an external signal to the white wire. The job lights may be programmed for steady or flashing green.
Construction	Black painted aluminum housing; acrylic lenses; PBT polyester end caps; thermoplastic elastomer programming switch cover; stainless steel mounting brackets and hardware
Environmental Rating	IEC IP62; NEMA 2
Connections	Emitter: 3-conductor PVC-jacketed 2 m cable which is either unterminated or terminated with a 4-pin Euro-style quick-disconnect connector, depending on model. Cable diameter is 3.3 mm. Receiver: 4-conductor PVC-jacketed 2 m cable which is either unterminated or terminated with a 4-pin Euro-style quick-disconnect connector, depending on model. Cable diameter is 3.3 mm.
Operating Temperature	0° to +50° C
Certifications	CE cULus
Hookup Diagrams	Emitters: LI05 (p. 1002) All others: LI04 (p. 1001)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K50 Touch
Pick-to-Light Sensor

The K50 Touch Series is a versatile family that combines a large, bright indicator with solid-state switching capability activated by a simple touch. These easy-to-use lighted touch button indicators allow for increased productivity with highly visible indication.

- Ergonomic design requires no physical pressure to operate, preventing stress on hands and wrists
- Ideal for efficient pick-to-light applications where a rugged device is needed
- Simple operation with the touch of a finger, hand or whole palm with or without gloves
- One-, two- and three-color models available with a variety of colors and option of custom laser surface marking
- Rugged, water-resistant IP69K housing

K50 Touch One or Two Color Model Key, 12-30 V DC

Example Model Number K50APTGRCQ

Family	Output	Input	Actuation Method	1 or 2 Color Models: Job	1 or 2 Color Models: Sense	Function	Connection
K50	A	P	T	G	R	C	Q

Output
- A = Normally Open
- R = Normally Closed

Input
- P = PNP
- N = NPN

Actuation Method
- T = Touch

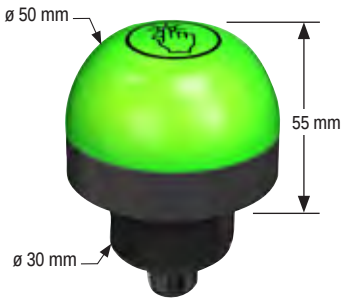
1 or 2 Color Models: Job / Sense
- G = Green
- Y = Yellow
- R = Red
- B = Blue
- W = White
- O = Orange
- T = Turquoise
- V = Violet
- M = Magenta
- X = Not used

Function

1-Color Only
- D = Job light always ON with job input. Touch activates output.

2-Color Only
- C = Job light always ON with job input until touched. Touch activates output and overrides job light with sense light.
- E = Job light always ON with job input. Touch activates output. Touch with inactivate job input activates sense light.

Connection
- Blank = 2 m Integral cable
- Q = Euro Integral QD
- QP = Euro Pigtail QD



Connection options: A model with a QD requires a mating cordset (see page 637).

* For less than 4 colors, use X as model placeholder (example, K80L2HGXX1PQ)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

K50 Touch Three Color Model Key, 12-30 V DC

Example Model Number K50APTGRYC4Q

Family	Output	Input	Actuation Method	Job	Mispick	Sense	Function	Connection
K50	A	P	T	G	R	Y	C4	Q

- **Output**
  - A = Normally Open
  - R = Normally Closed
- **Input**
  - P = PNP
  - N = NPN
- **Actuation Method**
  - T = Touch
- **Job / Mispick / Sense**
  - G = Green
  - Y = Yellow
  - R = Red
  - B = Blue
  - W = White
  - O = Orange
  - T = Turquoise
  - V = Violet
  - M = Magenta
  - X = Not used
- **Function**
  - C3 = Job light always ON with job input until touched. Touch activates output and overrides job light with sense light. Touch with inactive job input activates mispick light and activates output.
  - C4 = Job light always ON with job input until touched. Touch activates output and overrides job light with sense light until job input is removed. Touch with inactive job input activates mispick light for 5 seconds after touched and activates output.
- **Connection**
  - Blank = 2 m Integral cable
  - Q = Euro Integral QD
  - QP = Euro Pigtail QD

Cordsets

Euro QD (for Q models)

See page 912

Length	Threaded 5-Pin Straight	Threaded 5-Pin Right-Angle
1.83 m	MQDC1-506	MQDC1-506RA
4.57 m	MQDC1-515	MQDC1-515RA
9.14 m	MQDC1-530	MQDC1-530RA





Additional cordset information available. See page 904.

Brackets

K50

See page 869	See page 891	See page 870
SMB30A	SMBPVA..C	SMB30SC







Additional bracket information available. See page 846.

K50 Touch Specifications

Supply Voltage	12 to 30 V dc
Supple Current	Less than 75 mA max current at 12 V dc (exclusive of load) Less than 50 mA max current at 30 V dc (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages (fast transient and over-voltage) and reverse polarity
Construction	Housing: Polycarbonate Translucent dome: Polycarbonate Mounting Nut: PBT
Environmental Rating	IEC IP67, IP69K per DIN 40050-9 Cabled models also meet IP69K if the cable and cable entrance are protec-ted from high-pressure spray
Connections	Integral 4-pin Euro style QD, or 2m PVC integral cable
Operating Conditions	Temperature: −40° to +50° C Max. Relative Humidity: 90% @ +50° C max. relative humidity (non-condensing) Storage Temperature: −40° to +70° C
Certifications	CE
Hookup Diagrams	LI02 (p. 1001)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K30 Touch
Pick-to-Light Sensor

Banner's K30 Touch Pick-to-Light Series is a versatile family that combines a small, bright indicator with solid-state switching capability activated by a simple touch. These easy-to-use small indicators are cost effective with a 22 mm threaded base to fit into industry standard punched holes and are ideal for error proofing of bin-picking and parts-verification applications.

- Ergonomic design requires no physical pressure to operate, preventing stress on hands and wrists
- Ideal for efficient pick-to-light applications where a rugged device is needed
- Simple operation with the touch of a finger, hand or whole palm with or without gloves
- One- and two-color models available with a variety of colors and option of custom laser surface marking
- Rugged, water-resistant IP69K housing

K30 Touch One or Two Color Model Key, 12-30 V DC

Example Model Number
K30APTGRCQ NEW

Family	Output State	Input	Activation Method	Color Job	Color Sense	Function	Connection
K30	A	P	T	G	R	C	Q

Output State
A = Normally Open
R = Normally Closed

Input
P = PNP
N = NPN

Activation Method
T = Touch

Color Job / Color Sense
G = Green
Y = Yellow
R = Red
B = Blue
W = White
T = Turquoise
O = Orange
V = Violet
M = Magenta
X = Not Used

Function
1-Color Only
D = Job light always ON with job input. Touch activates output.

2-Color Only
C = Job light always ON with job input until touched. Touch activates output and overrides job light with sense light.
E = Job light always ON with job input. Touch activates output. Touch with inactivate job input activates sense light.

Connection
Blank = 2 m Integral Cable
Q = Euro Integral QD
QP = Euro Pigtail QD
QPMA = PUR Euro Pigtail QD



Connection options: A model with a QD requires a mating cordset (see page 639).

For 9 m cable, add W/30 to the 2 m model number (example, K30APTGRCQ W/30)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q models)

See page 908

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA



Additional cordset information available. See page 904.

Brackets

K30

SMB22A	SMB22FVK	SMBAMS22P	SMB22RAVK
			



Additional bracket information available. See page 846.

K30 Touch Specifications

Supply Voltage	12 to 30 V dc
Supple Current	55 mA max current (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Construction	Housing: Polycarbonate Translucent dome: Polycarbonate Mounting Nut: PBT
Environmental Rating	IEC IP67, IP69K per DIN 40050-9 Cabled models also meet IP69K if the cable and cable entrance are protected from high-pressure spray
Connections	Integral 4-pin Euro style QD, or 2m PVC integral cable
Operating Conditions	Temperature: −40° to +50° C Max. Relative Humidity: 90% @ +50° C max. relative humidity (non-condensing) Storage Temperature: −40° to +70° C
Certifications	CE

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



K50 Optical
Pick-to-Light Sensor

The K50FF and K50LP use reliable photoelectric sensing for non-contact part-picking applications.

- Photoelectric pick acknowledgment
- Fixed-field or polarized retroreflective depending on model
- Simple, one-piece, cost-effective installations
- Easily mounted on any type of tube rack or shelving
- Several logic functions available to customize the operation of the application and control system

K50 One Color Model Key, 12-30 V DC Example Model Number K50APLPGXD

Family	Output	Input	Sensing Mode	Range	LED Color		Function	Connection
K50	A	P	LP		G	X	D	

- **Output:** A = Normally Open; R = Normally Closed
- **Input:** P = PNP; N = NPN
- **Sensing Mode:** LP = Polar Retro; FF = Fixed-Field
- **Range:** Blank = LP models; 50 = 50 mm; 100 = 100 mm
- **LED Color:** G = Green; Y = Yellow; R = Red; B = Blue; W = White; X = Not used
- **Function:**
  - *1-Color Only*
  - D = Job light always ON with job input. Touch activates output.
  - *2-Color Only*
  - C = Job light always ON with job input until touched. Touch activates output and overrides job light with sense light.
  - E = Job light always ON with job input. Touch activates output. Touch with inactivate job input activates sense light.
- **Connection:** Blank = 2 m Integral cable; Q = Euro Integral QD; QP = Euro Pigtail QD

K50 Three Color Model Key, 12-30 V DC Example Model Number K50RPLPGRYC3QPMA

Family	Output	Input	Sensing Mode	Range	LED Color			Function	Connection
K50	R	P	LP		G	R	Y	C3	QPMA

- **Output:** R = Normally Closed*; A = Normally Open**
- **Input:** P = PNP
- **Sensing Mode:** LP = Polar Retro; FF = Fixed-Field
- **Range:** Blank = LP models; 50 = 50 mm; 100 = 100 mm
- **Function:** C3 = Job light always ON with job input until touched. Touch activates output and overrides job light with sense light. Touch with inactive job input activates mispick light and activates output.

* Polar Retro only available with Normally Closed input
** Fixed-Field only available with Normally Open input

Connection options: A model with a QD requires a mating cordset (see page 641).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q5 models)

See page 908

Length	Straight 4-Pin	Straight 5-Pin	Right-Angle 4-Pin	Right-Angle 5-Pin
1.83 m	MQDC-406	MQDC1-506	MQDC-406RA	MQDC1-506RA
4.57 m	MQDC-415	MQDC1-515	MQDC-415RA	MQDC1-515RA
9.14 m	MQDC-430	MQDC1-530	MQDC-430RA	MQDC1-530RA

Additional cordset information available. See page 904.

Brackets

K50

SMB30A	SMB30FA..	SMB30RAVK
See page 869	See page 869	



Additional bracket information available. See page 846.

Andon Solutions

K50



SMBARPL30 (Left Side)

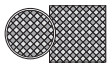
SMBARPR30 (Right Side)

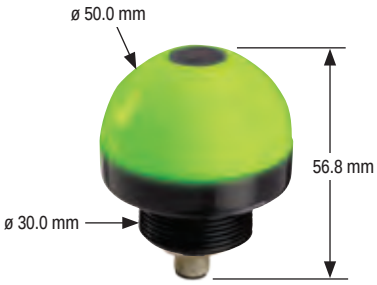
SMBARPB30 (Both Sides)

Other Accessories

Reflectors

See page 940





K50 Specifications

Supply Voltage and Current	12 to 30 V dc, (10% max. ripple)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages (fast transient and over-voltage) and reverse polarity
Output Configuration	PNP or NPN (depending on model)
Output Rating	150 mA max. C3 models: ON-state saturation voltage: PNP models: Less than 2 V @ 10 mA dc; less than 2.5 V @ 150 mA dc NPN models: Less than 1.5 V @ 10 mA dc; less than 2 V @ 150 mA dc OFF-state leakage current: Less than 10 µA @ 30 V dc All others: OFF-state leakage current: Less than 10 µA @ 30 V dc ON-state voltage: less than 2 V @ 10 mA dc; less than 2.5 V @ 150 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of output
Output Response Time	C3 models: 5 milliseconds ON/OFF All others: 3 milliseconds ON/OFF
Indicators	C3 models: Entire translucent dome provides indicator light. Job ("Pick") indicator–Green Pick Sensed indicator–Yellow Mispick indicator–Red All others: Entire translucent dome provides indicator light; either Job or Pick Sensed indicator inhibits the other light, depending on model. Job ("Pick") indicator–Green Pick Sensed indicator–Red or OFF, depending on model
Job Light Enable Input	Input impedance: 8000Ω Sinking–Input low less than 1.5 V Sourcing–Input high greater than 7 V
Construction	Base and translucent dome: Polycarbonate Lens: Polycarbonate or acrylic Push Button: Thermoplastic
Environmental Rating	Fully encapsulated; IEC IP67 Integral QD models: IP69K when using IP69K-rated cordsets Pigtail and cable models: IP69K when mounted with conduit
Connections	C3 models: 5-pin 150 mm PUR pigtail Euro-style QD (QPMA). QD cordsets are ordered separately. All others: 2 m or 9 m 4-wire attached cable, 4-pin integral Euro-style QD (Q) or 4-pin 150 mm PVC pigtail Euro-style QD (QP),depending on model. QD cordsets are ordered separately.
Ambient Light Immunity	Up to 5,000 lux
EMI/RFI Immunity	Immunity to EMI and RFI noise sources per IEC 947-5-2
Operating Conditions	Temperature: -40° to +50° C Relative Humidity: 90% at 50° C (non-condensing)
Certifications	K30, K50 & K80: CE K50: c UL us LISTED
Hookup Diagrams	1- & 2-color models: LI01 (p. 1001) 3-color models: LI02 (p. 1001)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Push Button

EZ-LIGHT® K30, K50 & K80

- Requires no external controller to operate; completely self-contained
- Indicates job pick status with 30 & 50 mm translucent dome containing one, two or three colored lights
- Shows correct order for selecting parts using a green job light in all models
- Models available with a red light to indicate detection of operator action or mispick
- Models available with 30 mm, Flat or DIN-rail mounting
- Ideal for use in abusive environments—fully encapsulated IP67 construction; some models rated to IP69K depending on installation
- QPMA model options also available

K30, K50 & K80 One or Two-Color Model Key, 12-30 V DC Example Model Number K30APPBGXD

- Job light is ON at all times while job input is active.
- Pressing push-button initiates output change of state.

Family	Output		Sensing Mode	LED Color		Function	Connection
K30	A	P	PB	G	X	D	
K30*	A = Normally Open	P = PNP	PB = Push-Button	G = Green		*1-Color Only* D = Job light always ON with job input. Touch activates output.	**Blank** = 2 m Integral cable
K50	R = Normally Closed	N = NPN		R = Red		*2-Color Only* C = Job light always ON with job input until touched. Touch activates output and overrides job light with sense light.	Q = Euro Integral QD
K80				X = Not used		E = Job light always ON with job input. Touch activates output. Touch with inactivate job input activates sense light.	QP = Euro Pigtail QD

* K30 models only available with Normally Open PNP output

Connection options: A model with a QD requires a mating cordset (see page 644).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-LIGHT® K50 & K80 Three-Color C-Series Model Key, 12-30 V DC

- Job light is ON at all times while job input is active (unless hand is present)
- Presence of hand (or pressing button) activates output and turns job light Yellow for visual verification that action was sensed
- Presence of hand (or pressing button) while job input is not active turns light Red signaling mispick

Family	Output	Input	Sensing Mode	LED Color				Connection
K50	A	P	PB	G	R	Y	C3	QPMA

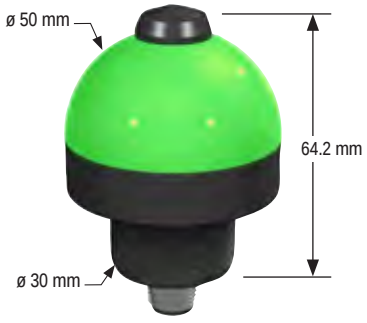
- K50, K80
- A = Normally Open
- P = PNP
- PB = Push-Button
- C3 = Job light always ON with job input until touched. Touch activates output and overrides job light with sense light. Touch with inactive job input activates mispick light and activates output.

* K30 models only available with Normally Open PNP output

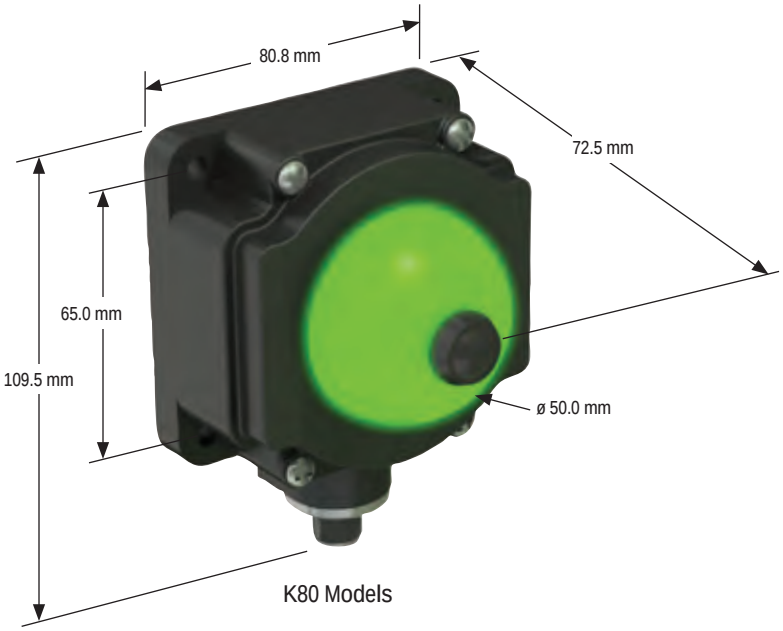
Connection options: A model with a QD requires a mating cordset (see page 644).



K30 Push Models



K50 Push Models



K80 Models

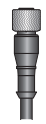
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q5 models)

See page 908

Length	Straight 4-Pin	Straight 5-Pin	Right-Angle 4-Pin	Right-Angle 5-Pin
1.83 m	MQDC-406	MQDC-506	MQDC-406RA	MQDC-506RA
4.57 m	MQDC-415	MQDC-515	MQDC-415RA	MQDC-515RA
9.14 m	MQDC-430	MQDC-530	MQDC-430RA	MQDC-530RA





Additional cordset information available. See page 904.

Brackets

K50			K30
See page 869	See page 869	See page 870	
SMB30A	SMB30FA..	SMB30SC	SMB22A









Additional bracket information available. See page 846.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

K30, K50 & K80 Specifications

Supply Voltage and Current	12 to 30 V dc, (10% max. ripple)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages (fast transient and over-voltage) and reverse polarity
Output Configuration	PNP or NPN (depending on model)
Output Rating	150 mA max. C3 models: ON-state saturation voltage: PNP models: Less than 2 V @ 10 mA dc; less than 2.5 V @ 150 mA dc NPN models: Less than 1.5 V @ 10 mA dc; less than 2 V @ 150 mA dc OFF-state leakage current: Less than 10 µA @ 30 V dc All others: OFF-state leakage current: Less than 10 µA @ 30 V dc ON-state voltage: less than 2 V @ 10 mA dc; less than 2.5 V @ 150 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of output
Output Response Time	C3 models: 5 milliseconds ON/OFF All others: 3 milliseconds ON/OFF
Indicators	C3 models: Entire translucent dome provides indicator light. Job ("Pick") indicator–Green Pick Sensed indicator–Yellow Mispick indicator–Red All others: Entire translucent dome provides indicator light; either Job or Pick Sensed indicator inhibits the other light, depending on model. Job ("Pick") indicator–Green Pick Sensed indicator–Red or OFF, depending on model
Job Light Enable Input	Input impedance: 8000Ω Sinking–Input low less than 1.5 V Sourcing–Input high greater than 7 V
Construction	Base and translucent dome: polycarbonate Lens: polycarbonate or acrylic Push Button: thermoplastic
Environmental Rating	Fully encapsulated; IEC IP67 Integral QD models: IP69K when using IP69K-rated cordsets Pigtail and cable models: IP69K when mounted with conduit
Connections	C3 models: 5-pin 150 mm PUR pigtail Euro-style QD (QPMA). QD cordsets are ordered separately. See page 644. All others: 2 m or 9 m 4-wire attached cable, 4-pin integral Euro-style QD (Q) or 4-pin 150 mm PVC pigtail Euro-style QD (QP), depending on model. QD cordsets are ordered separately. See page 644.
Ambient Light Immunity	Up to 5,000 lux
EMI/RFI Immunity	Immunity to EMI and RFI noise sources per IEC 947-5-2
Operating Conditions	Temperature: -40° to +50° C Relative Humidity: 90% at 50° C (non-condensing)
Certifications	K30, K50 & K80: CE
Hookup Diagrams	1- & 2-color models: LI01 (p. 1001) 3-color models: LI02 (p. 1001)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



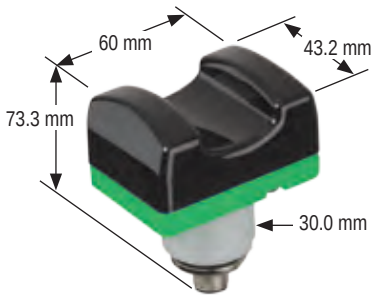
VTB
Optical Touch Buttons

The VTB features a brightly illuminated base for enhanced visual indication. Like the OTB, the VTB is an ergonomic touch button that requires no physical pressure to operate, and is ideal for machine start/stop and other applications where clear, visual indication of the touch button status is desired.

- Illuminated version of the Optical Touch Button
- Ergonomic design eliminates hand, wrist and arm stress
- Provides bright, easy-to-see status indication that can be seen in almost any environment
- One- and two-color models available
- 30 mm threaded base for convenient mounting

VTB One or Two Color Model Key, 12-30 V DC Example Model Number VTBP6RQ

Family	Output	Job Light 1 Color	Job Light 2 Color	Upper Housing Material	Connection
VTB	P6		R		Q
	N6 = NPN P6 = PNP	Blank = Green R = Red B = Blue		Blank = Polysulfone L = Polycarbonate	Blank = 2 m Integral Cable Q = Euro Integral QD QP = Euro Pigtail QD



Connection Option: A model with a QD requires a mating cordset (see page 647).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD (for Q5 models)

See page 908

Length	Threaded 4-Pin Straight		Threaded 4-Pin Right-Angle	
1.83 m		MQDC-406		MQDC-406RA
4.57 m		MQDC-415		MQDC-415RA
9.14 m		MQDC-430		MQDC-430RA


Additional cordset information available.
See page 904.

Brackets

VTB

See page 869	See page 869	See page 870
SMB30FA	SMB30MM	SMB30SC
		


Additional bracket information available.
See page 846.

Field Covers

OTB/LTB

Black	OTC-1-BK		OTCL-1-BK	
Green	OTC-1-GN		OTCL-1-GN	
Red	OTC-1-RD		OTCL-1-RD	
Yellow	OTC-1-YW		OTCL-1-YW	

VTB Specifications

Supply Voltage and Current	12 to 30 V dc (10% max. ripple) Single-color models: Less than 120 mA max. current @ 12 V dc (exclusive of load) Less than 70 mA max. current @ 30 V dc (exclusive of load) Two-color models: Less than 67 mA max. current @ 12 V dc (exclusive of load) Less than 40 mA max. current @ 24 V dc (exclusive of load) Less than 35 mA max. current @ 30 V dc (exclusive of load)
Supply Protection Circuitry	Protected against transient voltages (fast-transient and over-voltage) and reverse polarity
Output Configuration	Choose 1 current sinking (NPN) open collector transistor or 1 current sourcing (PNP) open collector transistor, depending on model
Output Rating	Max. load: 150 mA ON-state saturation voltage: less than 1.5 V @ 150 mA OFF-state leakage current: less than 10 µA
Output Protection	All models protected against false pulse on power-up (outputs held OFF for 1 second at power-up). Models with solid-state outputs have overload and short-circuit protection.
Response Time	100 milliseconds ON/OFF
Indicators	2 Red LED indicators: Power ON and Output Conducting Base: Lights green, red, blue, or green and red as a job light when input line is enabled. One-color models may be wired for flashing rather than solid color operation.
Construction	Totally encapsulated, non-metallic enclosure. Black polysulfone or red polycarbonate upper housing (see Application Note); translucent white polycarbonate base. Electronics fully epoxy-encapsulated.
Environmental Rating	IEC IP66 ; NEMA 1, 3, 4, 4X, 12
Connections	2 m or 9 m attached cable, or 4-pin (single color) or 5-pin (two color) Euro-style QD fitting. QD cordsets are ordered separately. See page 647.
Ambient Light Immunity	Up to 120,000 lux (direct sunlight)
EMI/RFI Immunity	Immune to EMI and RFI noise sources, per IEC 947-5-2.
Operating Conditions	Temperature: -20° to +50° C Relative humidity: 90% @ +50° C (non-condensing)
Certifications	CE c UL us
Hookup Diagrams	NPN Single-Color Models: LI06 (p. 1002) PNP Single-Color Models: LI07 (p. 1002) Two-Color Models: LI22 (p. 1006)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

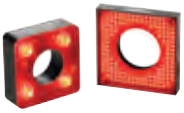
LOOKING FOR MORE



Vision Lighting
Critical For Successful Vision Sensing

Hundreds of lighting solutions and accessories—the most by any single source

- Robust solutions rated to IP68/NEMA 4X
- LEDs for up to 50,0000+ hours of maintenance-free illumination
- Internal self-regulation for consistent illumination
- Built-in universal strobe control
- A comprehensive selection of lighting accessories



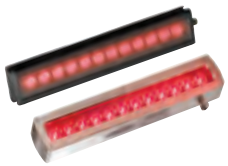
Ring Lights page 514
Mounts directly to the sensor for easy setup and illuminates any object directly in front of the sensor



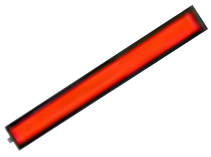
Area Lights page 516
Provides even illumination in a concentrated area



Backlights page 518
Installs behind the target, directly facing the sensor; has a highly diffused surface and uniform brightness



Linear Array Lights page 520
Provides high-intensity illumination of large areas, at long distances



Linear Array Backlights page 519
Diffused backlights that can be used for any vision system or as a highly diffused area light



On-Axis Lights page 521
Provides collimated illumination along the same optical path as camera



Low-Angle Ring Lights page 524
Illuminates nearly perpendicular to the direction of an inspection



Spot Lights page 522
Provides even illumination in a small concentrated spot



Tubular Fluorescent Lights page 525
Features flicker-free high-intensity illumination of large areas



Laser Line Generator page 524
Generates a high quality, uniform laser line, making it especially suitable for machine vision applications

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Wireless

Banner Engineering's SureCross wire replacement products are designed to be easy to use. The most basic network includes a Gateway and one Node. Many of these simple-to-use models include pre-defined I/O mapping between two devices.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WIRELESS

DISCRETE

PM8 page 654
Q45 Remote Device page 657
Q45 Button Light page 658

DISCRETE & ANALOG

PM2 page 654
PB2 page 660

SERIAL

Serial Data Radio page 662

SERIAL & ETHERNET

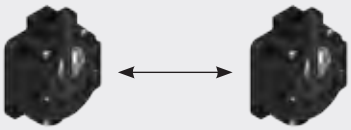
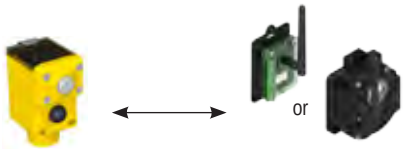
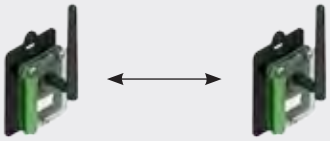
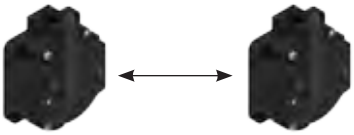
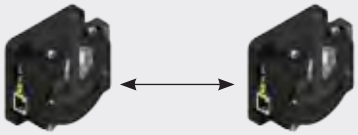
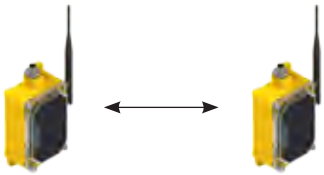
Ethernet Data Radio page 664
DXER9 page 666

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Simple Wire Replacement

Extend your range and eliminate the need for wires for the most common communication signals including discrete, analog, serial and Ethernet.

- Easy to apply, use and support
- Simple yet highly expandable
- Easy to deploy

Model	Inputs/Outputs		Inputs/Outputs	Page
PM Series	PM8: 6 sourcing discrete inputs 6 sourcing outputs PM2: 4 selectable discrete/ 2 analog inputs 4 selectable discrete/ 2 analog outputs	 Node Gateway	PM8: 6 sourcing discrete inputs 6 sourcing outputs PM2: 4 selectable discrete/ 2 analog inputs 4 selectable discrete/ 2 analog outputs	654
Q45 Wireless	Q45 Button/Light: 2 push button position inputs 2 LED lights (outputs) Q45 RD: 2 discrete(dry contact) inputs	 Node or Gateway	PB2: 2 sourcing discrete inputs 2 sourcing discrete outputs -Q: 6 sourcing discrete inputs 6 sourcing discrete outputs PB2: 2 sourcing discrete outputs -Q: 6 sourcing discrete outputs	658 657
PB2	2 selectable discrete & 2 analog inputs 2 selectable discrete & 2 analog outputs	 Node Gateway	2 selectable discrete & 2 analog inputs 2 selectable discrete & 2 analog outputs	660
Serial Radio	RS-232 or RS-485	 Slave Master	RS-232 or RS-485	662
Ethernet Radio	Ethernet TCP/IP, RS-232 or RS-485	 Slave Master	Ethernet TCP/IP, RS-232 or RS-485	664
DXER9	Ethernet TCP/IP		Ethernet TCP/IP	666

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Radio Network Topologies

A Radio Network Topology is constructed of basic building blocks. Banner offers two radio network types for the Factory Automation Industry.

Stand Alone: (Wireless I/O) Consists of Gateways and Nodes. The Gateway is the brains of this network and orchestrates the timing of information exchange between it and the Node or Nodes.

Host Controlled: (Data Radio) Consists of a Master, Repeaters and Slaves. This network can consists of a simple Master and Slave pair or grow to include a single Master with varying number of Repeaters and Slaves.

	 PM Series	 Q45 Wireless	 PB2	 Serial Radio	 Ethernet Radio	 Ethernet Radio
Point to Point	✓	✓	✓	✓	✓	✓
Point to Point with Repeater	✓	–	–	✓	✓	
Star	✓	✓	✓	✓	✓	✓
Tree	–	–	–	✓	✓	



Point to Point

The most basic form of a radio network is called point to point. As the name implies, in this network only two radios are connected to each other.

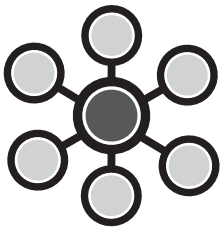
- For a Stand Alone Network a Gateway and a Node are needed
- A Host Controlled Network will need a Master radio and a Slave radio



Point to Point with Repeater

The advantage of using a repeater is its ability to extend range and get around radio signal obstacles.

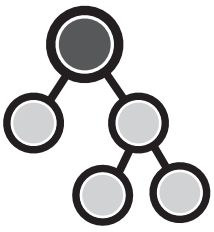
- For a Stand Alone Network a Gateway is used as a repeater between two Nodes
- A Host Controlled Network uses a Master and Slave Radio with a Repeater between them



Star

This network is formed by connecting multiple radios to a single point. If the communication between one of the nodes and the master device fails, the rest of the network remains unaffected.

- For a Stand Alone Network a single Gateway can control multiple Nodes
- A Host Controlled Network will need a Master radio and several Slave radios



Tree

This network involves several slaves which transmit information to repeaters which then transmit to a Master.

- The Stand Alone Network is unable to support this Topology
- A Host Controlled Network needs a Master radio that supports a varying number of Repeaters and Slaves

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



PM2 Series
Digital Wire Replacement

The SureCross® PM Series radios easily replaces Discrete and Analog signal wires, and with no setup software needed, the radios are easy to apply, use and support.

- Simple yet highly expandable
- Eight LCD menu selectable I/O mapping options
- IP67 rated housing for use in demanding environments
- One Gateway can support up to 6 nodes

PM2 Gateway, 10-30 V DC

I/O	Frequency	Range†	Environmental Rating	Models*
Inputs: Four selectable discrete & Two 0-20 mA analog Outputs: Four sourcing discrete & Two 0-20 mA analog	900 MHz	6 miles	IP67, NEMA 6	DX80G9M6S-PM2
	2.4 GHz	2 miles		DX80G2M6S-PM2

PM2 Node, 10-30 V DC

I/O	Frequency	Range†	Environmental Rating	Models*
Inputs: Four selectable discrete & Two 0-20 mA analog Outputs: Four sourcing discrete & Two 0-20 mA analog	900 MHz	6 miles	IP67, NEMA 6	DX80N9X6S-PM2
	2.4 GHz	2 miles		DX80N2X6S-PM2

For accessories see page 669.
* Must be used with 900 MHz Node
** Must be used with 2.4 GHz Node
† Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See page 668.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



PM8 Series
Digital Wire Replacement

The SureCross® PM Series radios easily replaces Discrete and Analog signal wires, and with no setup software needed, the radios are easy to apply, use and support.

- Simple yet highly expandable
- Eight LCD menu selectable I/O mapping options
- IP67 rated housing for use in demanding environments
- One Gateway can support up to 6 nodes

PM8 Gateway, 10-30 V DC

I/O	Frequency	Range†	Environmental Rating	LCD Screen	Models*
Inputs: Six sourcing discrete Outputs: Six sourcing discrete	900 MHz	6 miles	IP67, NEMA 6	Yes	DX80N9X6S-PM8
	2.4 GHz	2 miles			DX80G2M6S-PM8

PM8 Node, 10-30 V DC

I/O	Frequency	Range†	Environmental Rating	LCD Screen	Models*
Inputs: Six sourcing discrete Outputs: Six sourcing discrete	900 MHz	6 miles	IP67, NEMA 6	Yes	DX80N9X6S-PM8
	2.4 GHz	2 miles			DX80N2X6S-PM8

PM8L Node, 10-30 V DC

I/O	Frequency	Range†	Environmental Rating	LCD Screen	Models*
Inputs: Six sourcing discrete Outputs: Six sourcing discrete	900 MHz	6 miles	IP67, NEMA 6	No	DX80N9X6S-PM8L
	2.4 GHz	2 miles			DX80N2X6S-PM8L

For accessories see page 669.
* Must be used with 900 MHz Gateway
** Must be used with 2.4 GHz Gateway
† Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See page 668.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

PM Series Specifications

Power	10 to 30 V dc (For European applications: 12 to 24 V dc, +/- 10%)
Radio Range	900 MHz: Up to 9.6 kilometers (6 miles)* 2.4 GHz: Up to 3.2 kilometers (2 miles)* * Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See page 668.
Transmit Power	900 MHz (1 Watt): 30 dBm (1 W) conducted (up to 36 dBm EIRP) 2.4 GHz: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP)
Network Size	1 Gateway and 1 Node, pre-mapped from factory Other advanced options available. See data sheet for more information.
I/O	Discrete and Analog depending on model
Power Consumption	900 MHz Consumption: Maximum current draw is <100 mA and typical current draw is <50 mA at 24 V dc. 2.4 GHz consumption is less
Environmental Rating	IEC IP67; NEMA 6

See Bannerengineering.com for more detailed specifications.



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Q45 Remote Device Node
Digital Wire Replacement

SureCross® Wireless Q45 Nodes are self-contained and require no cables, cordsets or external power. They are designed for the most challenging control and monitoring applications. Easily add discrete signal monitoring and control in minutes without pulling cables.

- Simple yet highly expandable
- IP67 rated housing for use in demanding environments
- Supports Point to Point and Star network topologies

2.4 GHz Node, battery power

I/O	Range	Environmental Rating	Models*
Input: One discrete	1,000 m	IP67, NEMA 6	DX80N2Q45-RD

* Must be used with 2.4 GHz Gateway

2.4 GHz Gateway, 10-30 V DC

I/O	Range†	Environmental Rating	Housing	Models*
Inputs: Two sourcing discrete Outputs: Two sourcing discrete	1,000 m	—		DX80G2M6-B2Q
Inputs: Six sourcing discrete Outputs: Six sourcing discrete	1,000 m	IP20, NEMA 1		DX80G2M6-QC
Inputs: Six sourcing discrete Outputs: Six sourcing discrete	1,000 m	IP67, NEMA 6		DX80G2M6-Q

* Must be used with 2.4 GHz Node

For accessories see page 669.

† With included 2 dB antenna and a Q45 Wireless Node. High-gain antennas available for increased range. See page 668.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Q45 Button Light Node
Digital Wire Replacement

SureCross® Wireless Q45 Nodes are self-contained and require no cables, cordsets or external power. They are designed for the most challenging control and monitoring applications. Easily add discrete signal monitoring and control in minutes without pulling cables.

- Simple yet highly expandable
- IP67 rated housing for use in demanding environments
- Supports Point to Point and Star network topologies

2.4 GHz Node, battery power

I/O	Range	Environmental Rating	Models*
Input: one button Output: two color light	1,000 m	IP67, NEMA 6	DX80N2Q45BL-RG

* Must be used with 2.4 GHz Gateway

2.4 GHz Gateway, 10-30 V DC

I/O	Range	Environmental Rating		Models*
Inputs: Two sourcing discrete Outputs: Two sourcing discrete	1,000 m†	—		DX80G2M6-B2Q
Inputs: Six sourcing discrete Outputs: Six sourcing discrete	1,000 m†	IP20, NEMA 1		DX80G2M6-QC
Inputs: Six sourcing discrete Outputs: Six sourcing discrete	1,000 m†	IP67, NEMA 6		DX80G2M6-Q

* Must be used with 2.4 GHz Node

For accessories see page 669.
† Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See page 668.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Q45 Wireless Specifications

Range	2.4 GHz: Up to 1,000 meters* * With line of sight
Transmit Power	2.4 GHz: 65 mW EIRP
Network Size	1 Gateway and 1 Node, pre-mapped from factory Other advanced options available. Contact factory for more information.
Power	Two lithium AA batteries
Battery Life	Q45-RD (Typical Battery LIfe): One Dry Contact Input: More than five years at a 62.5 ms sample rate; more than five years at a 250 ms sample rate. Assumes an average of 10 seconds between changes of state and a Gateway heartbeat setting of 30 seconds. Two Dry Contact Inputs: Four years at a 62.5 ms sample rate; more than five years at a 250 ms sample rate. Assumes an average of 10 seconds between changes of state and a Gateway heartbeat setting of 30 seconds. Bi2 and Bi5 Namur Inputs: Two years at a 2 ms warmup time and 62.5 ms sample rate; four years at a 2 ms warmup time and 250 ms sample rate. Assumes an average of 10 seconds between changes of state and a Gateway heartbeat setting of 30 seconds. Bi10 Namur Inputs: Two years at a 5 ms warmup time and 125 ms sample rate; four years at a 5 ms warmup time and 500 ms sample rate. Assumes an average of 10 seconds between changes of state and a Gateway heartbeat setting of 30 seconds. Q45BL-RG: Two years. A typical battery life assumes an average of 10 seconds between sensor changes of state and the default 62.5 millisecond sample rate. Battery life is reduced to one year with an average of one second between changes of state. Battery life with light in flashing mode: One year Battery life with light in solid mode: One month
Environmental Rating	IEC IP67; NEMA 6

See Bannerengineering.com for more detailed specifications.

PB2 Specifications

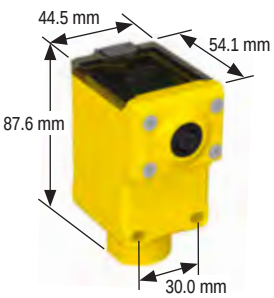
See PB2 spec for more information page 661

See Bannerengineering.com for more detailed specifications.

-Q Gateway for Q45 Specifications

Power	10 to 30 V dc (For European applications: 12 to 24 V dc, +/- 10%)
Range	2.4 GHz: Up to 1,000 m
Transmit Power	2.4 GHz: 65 mW conducted, less than or equal to 20 dBm (100mW) EIRP
Network Size	1 Gateway and 1 Node, pre-mapped from factory Other advanced options available. Contact factory for more information.
I/O	Discrete
Environmental Rating	IEC IP67; NEMA 6

See Bannerengineering.com for more detailed specifications.



Q45 Remote Device



Q45 Push Button

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



PB2 Gateway
Discrete & Analog Wire Replacement

SureCross® Performance embeddable board modules were specifically designed for the needs of industrial users to provide connectivity where traditional wired connections are not possible or cost prohibitive.

- Simple yet highly expandable
- Supports Point to Point and Star network topologies
- One Gateway can support up to 2 nodes

PB2 Gateway, 10-30 V DC

I/O	Frequency	Range†	Environmental Rating	Models*
Inputs: Two sourcing discrete & Two 0-20 mA analog Outputs: Two sourcing discrete & Two 0-20 mA analog	900 MHz	6 miles	IP67, NEMA 6	DX80G9M6S-PB2
	2.4 GHz	2 miles		DX80G2M6S-PB2

PB2 Node, 10-30 V DC

I/O	Frequency	Range†	Environmental Rating	Models*
Inputs: Two sourcing discrete & Two 0-20 mA analog Outputs: Two sourcing discrete & Two 0-20 mA analog	900 MHz	6 miles	IP67, NEMA 6	DX80N9X6S-PB2
	2.4 GHz	2 miles		DX80N2X6S-PB2

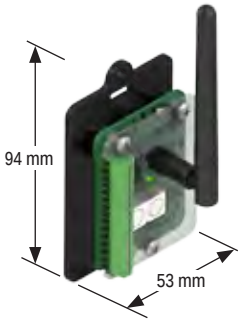
For accessories see page 669.
† Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See page 668.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

PB2 Specifications

Range	900 MHz: Up to 9.6 kilometers (6 miles)* 2.4 GHz: Up to 3.2 kilometers (2 miles)* * Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See page 668.
Transmit Power	900 MHz (1 Watt): 30 dBm (1 W) conducted (up to 36 dBm EIRP) 2.4 GHz: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EI
Network Size	1 Gateway and 1 Node, pre-mapped from factory Other advanced options available. Contact factory for more information.
I/O	Discrete, Analog
Power	10 to 30 V dc (For European applications: 12 to 24 V dc, +/- 10%)
Power Consumption	900 MHz, 1 Watt: Aprox. 30 mA 900 MHZ, 250 mW: Approx. 25 mA 2.4 GH, 65 mW: Approx. 20 mA

See Bannerengineering.com for more detailed specifications.



For accessories see page 669.
† Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See page 668.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Serial Data Radio
Serial Wire Replacement

SureCross® MultiHop Serial Data Radios are wireless industrial communication devices used to extend the range of serial communication networks.

- DIP switches select operational modes
- FHSS radios operate and synchronize automatically
- Support RS-232 or RS-485

SR 900 MHz, 10-30 V DC

Environmental Rating	Protocol	Range	Models*
IP67, NEMA 6	RS-232 or RS-45	6 miles**	DX80SR9M-H

* Must be used with 900 MHz Node

SR 2.4 GHz, 10-30 V DC

Environmental Rating	Protocol	Range	Models*
IP67, NEMA 6	RS-232 or RS-45	2 miles**	DX80SR2M-H

* Must be used with 2.4 GHz Node

For accessories see page 668.
** Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See page 668.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Serial Radio Specifications

Range	900 MHz: Up to 9.6 kilometers (6 miles)* 2.4 GHz: Up to 3.2 kilometers (2 miles)* * Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See page 668.
Transmit Power	900 MHz (1 Watt): 30 dBm (1 W) conducted (up to 36 dBm EIRP) 2.4 GHz: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EI
Network Size	One Master Radio and multiple Slave radios per network. Other advanced options available. Contact factory for more information.
Power	10 to 30 V dc (For European applications: 12 to 24 V dc, +/- 10%)
Environmental Rating	IEC IP67; NEMA 6

See Bannerengineering.com for more detailed specifications.



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Ethernet Data Radio

Ethernet & Serial Wire Replacement

SureCross® MultiHop Ethernet Data Radios are wireless industrial communication devices used to extend the range of serial communication networks.

- No IP address configuration is required
- Built-in site survey mode enables rapid assessment of a location's RF transmission properties

ER 900 MHz, 10-30 V DC

Environmental Rating	Protocol	Range	Models*
IP20, NEMA 1	Ethernet	6 miles**	DX80ER9M-H

* Must be used with 900 MHz models

ER 2.4 GHz, 10-30 V DC

Environmental Rating	Protocol	Range	Models*
IP20, NEMA 1	Ethernet	2 miles**	DX80ER2M-H

* Must be used with 2.4 GHz models

For accessories see page 668.
** Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See page 668.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Ethernet Radio Specifications

Range	900 MHz: Up to 9.6 kilometers (6 miles)* 2.4 GHz: Up to 3.2 kilometers (2 miles)* * Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See page 668.
Transmit Power	900 MHz (1 Watt): 30 dBm (1 W) conducted (up to 36 dBm EIRP) 2.4 GHz: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EI
Network Size	One Master Radio and multiple Slave radios per network. Other advanced options available. Contact factory for more information.
Power	10 to 30 V dc (For European applications: 12 to 24 V dc, +/- 10%)
Environmental Rating	IEC IP67; NEMA 6

See Bannerengineering.com for more detailed specifications.



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



DXER9 Ethernet Data Radio
Ethernet Wire Replacement

The SureCross® Ethernet radio is an industrial grade, long range, 900 MHz radio used to create point to multipoint configurations of wireless Ethernet networks.

- DIP switches select operational modes
- FHSS radios operate and synchronize automatically

DXER9 900 MHz, 10-30 V DC

Environmental Rating	Transmit Range	Range	Models*
IP55	125 mW	40 miles LOS with 15 dBi antenna	DXER9

* Available in 900 MHz frequency only

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DXER9 Specifications

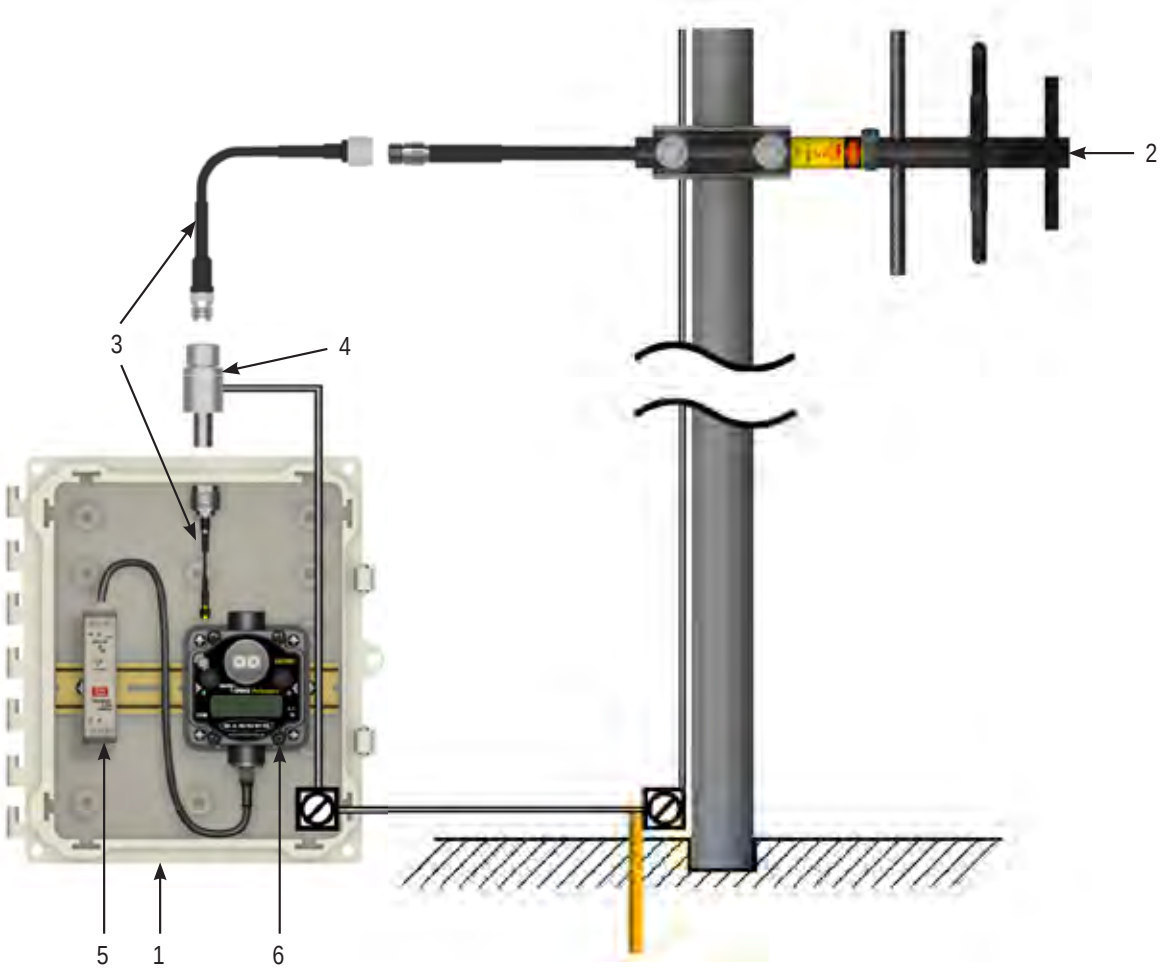
Range	900 MHz: Up to 40 miles* * Line of sight with 15 dBi antenna
Output Power	+21 dBm (4 Watts EIRP used with 15 dBi antenna)
Power Consumption	Transmit: 1.7 Watts Receive: 0.8 Watts
Power	10 to 30 V dc (For European applications: 12 to 24 V dc, +/- 10%)
Environmental Rating	IEC IP55; NEMA 4X

See Bannerengineering.com for more detailed specifications.



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Accessories



NOTE: The Surecross® radio installation shown includes wireless accessories available from Banner. It is for illustration purposes only. Installations may vary.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

(1) Enclosures



Description	Model
Enclosure, Polycarbonate, with Opaque Cover, 6 × 6 × 4 in.	BWA-AH664
Enclosure, Polycarbonate, with Opaque Cover, 8 × 6 × 4 in.	BWA-AH864
Enclosure, Polycarbonate, with Opaque Cover, 10 × 8 × 4 in.	BWA-AH1084
Enclosure, Polycarbonate, with Opaque Cover, 12 × 10 × 6 in.	BWA-AH12106
Enclosure, Polycarbonate, with Opaque Cover, 14 × 12 × 6 in.	BWA-AH14126
Enclosure, Polycarbonate, with Opaque Cover, 16 × 14 × 8 in.	BWA-AH16148
Enclosure, Polycarbonate, with Opaque Cover, 18 × 16 × 10 in.	BWA-AH181610
Enclosure, Polycarbonate, with Clear Cover, 6 × 6 × 4 in.	BWA-AH664C
Enclosure, Polycarbonate, with Clear Cover, 8 × 6 × 4 in.	BWA-AH864C
Enclosure, Polycarbonate, with Clear Cover, 10 × 8 × 4 in.	BWA-AH1084C
Enclosure, Polycarbonate, with Clear Cover, 12 × 10 × 6 in.	BWA-AH12106C
Enclosure, Polycarbonate, with Clear Cover, 14 × 12 × 6 in.	BWA-AH14126C
Enclosure, Polycarbonate, with Clear Cover, 16 × 14 × 8 in.	BWA-AH16148C
Enclosure, Polycarbonate, with Clear Cover, 18 × 16 × 10 in.	BWA-AH181610C

Swing Panel Kits

Description	Model
Swing Panel Kit, 6 × 6, Includes Mounts, Screws, and Panel	BWA-AH66SPK
Swing Panel Kit, 8 × 6, Includes Mounts, Screws, and Panel	BWA-AH86SPK
Swing Panel Kit, 8 × 10, Includes Mounts, Screws, and Panel	BWA-AH108SPK
Swing Panel Kit, 12 × 10, Includes Mounts, Screws, and Panel	BWA-AH1210SPK
Swing Panel Kit, 14 × 12, Includes Mounts, Screws, and Panel	BWA-AH1412SPK
Swing Panel Kit, 16 × 14, Includes Mounts, Screws, and Panel	BWA-AH1614SPK
Swing Panel Kit, 18 × 16, Includes Mounts, Screws, and Panel	BWA-AH1816SPK

DIN Rail Kits

Description	Model
DIN Rail Kit, 6”, Includes 2 Nuts, 2 Screws, and DIN Rail	BWA-AH6DRK
DIN Rail Kit, 8”, Includes 2 Nuts, 2 Screws, and DIN Rail	BWA-AH8DRK
DIN Rail Kit, 10”, Includes 2 Nuts, 2 Screws, and DIN Rail	BWA-AH10DRK
DIN Rail Kit, 12”, Includes 2 Nuts, 2 Screws, and DIN Rail	BWA-AH12DRK
DIN Rail Kit, 14”, Includes 2 Nuts, 2 Screws, and DIN Rail	BWA-AH14DRK
DIN Rail Kit, 16”, Includes 2 Nuts, 2 Screws, and DIN Rail	BWA-AH16DRK
DIN Rail Kit, 18”, Includes 2 Nuts, 2 Screws, and DIN Rail	BWA-AH18DRK

Mounting Accessories

Description	Model
Slot Nut Kit, Includes 2 Nuts and 2 Screws	BWA-AHSNK
Swing Panel Mounts (4 per Kit)	BWA-AHSPM
Latch Kit, 2 Latches per Kit, Replacement Only	BWA-AHLK
Accessory Kit, Includes all screws, inserts, and mounting feet (Replacement Only)	BWA-AHAK

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

(2) Antennas

Omni-Directional Antennas with RP-SMA Male Connections



		Model
900 MHz	2 dBi, Rubber swivel (ships with 900 MHz radios)	BWA-9O2-C
	5 dBi, Rubber swivel	BWA-9O5-C
2.4 GHz	2 dBi, Rubber swivel, 3 1/4 inches (ships with 2.4 GHz radios)	BWA-2O2-C
	5 dBi, Rubber swivel, 6 1/2 inches	BWA-2O5-C
	7 dBi, Rubber swivel, 9 1/4 inches	BWA-2O7-C

Omni-Directional Dome Antennas



			Model
900 MHz	2 dBi, 18-inch cable	RP-SMA Box Mount	BWA-9O2-D
2.4 GHz	2 dBi, 18-inch cable	RP-SMA Box Mount	BWA-2O2-D

Omni-Directional Magnetic Whip Antenna



			Model
2.4 GHz	5 dBi, Magnetic whip antenna, 12 ft cable	RP-SMA Male	BWA-2O5-M

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Omni-Directional Fiberglass Antennas with N-Type Female Connections			Model
	900 MHz	6 dBd, Fiberglass, 71.5 inches	BWA-9O6-A
		6 dBi, Fiberglass, 23.6 inches (1.3 inch dia.)	BWA-9O6-AS
		8 dBi, Fiberglass, 63 inches (1.5 inch dia.)	BWA-9O8-AS
	2.4 GHz	8.5 dBi, Fiberglass, 24 inches	BWA-2O8-A
		6 dBi, Fiberglass, 16 inches (shown)	BWA-2O6-A

Directional (Yagi) Antennas with N-Type Female Connection			Model
	900 MHz	6.5 dBd, 6.8 × 13 inches Outdoor	BWA-9Y6-A
		10 dBd, 6.8 × 24 inches Outdoor	BWA-9Y10-A

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

(3) Antenna Cables

Antenna Cables: RP-SMA to RP-SMA		Model
	RG58, RP-SMA Male to RP-SMA Female Bulkhead, 0.2 m	BWC-1MRSFRSB0.2
	RG58, RP-SMA Male to RP-SMA Female Bulkhead, 1 m	BWC-1MRSFRSB1
	RG58, RP-SMA Male to RP-SMA Female Bulkhead, 2 m	BWC-1MRSFRSB2
	RG58, RP-SMA Male to RP-SMA Female Bulkhead, 2 m	BWC-1MRSFRSB4
	LMR200, RP-SMA Male to RP-SMA Female, 3 m	BWC-2MRSFRS3
	LMR200, RP-SMA Male to RP-SMA Female, 6 m	BWC-2MRSFRS6
	LMR200, RP-SMA Male to RP-SMA Female, 9 m	BWC-2MRSFRS9
	LMR200, RP-SMA Male to RP-SMA Female, 12 m	BWC-2MRSFRS12

Antenna Cables: RP-SMA to N-Type		Model
	LMR100 RP-SMA to N-Type Male, 0.5 m	BWC-1MRSMN05

Antenna Cables: N-Type		Model
	LMR400 N-Type Male to N-Type Female, 3 m	BWC-4MNFN3
	LMR400 N-Type Male to N-Type Female, 6 m	BWC-4MNFN6
	LMR400 N-Type Male to N-Type Female, 15 m	BWC-4MNFN15
	LMR400 N-Type Male to N-Type Female, 30 m	BWC-4MNFN30

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

(4) Surge Suppressors

	Description	Model
	Surge Suppressor, bulkhead, N-Type Female, N-Type Male, dc Blocking	BWC-LFNBMN-DC
	Surge Suppressor, bulkhead, RPSMA to RP-SMA	BCW-LMRSFRPB

(5) Power Supplies

		Model
	DC Power Supply, 500 mA, 24 V dc, Demo kit power supply	PS24W
	DC Power Supply, 0.4 Amps, 24 V dc, with DIN Rail Mount	PSDINM-24-04
	DC Power Supply, 1.0 Amps, 24 V dc, with DIN Rail Mount	PSDINM-24-10
	DC Power Supply, 1.7 Amps, 24 V dc, with DIN Rail Mount	PSDINM-24-17
	DC Power Supply, 2.5 Amps, 24 V dc, with DIN Rail Mount	PSDINM-24-25

Relays

		Model
	Interface Relay Box, 18 to 26 V dc inputs, isolated relay outputs (not shown)	IB6RP
	Relay, Blade Style with Base, 12 V	BWA-RELAY-12V
	Relay, Blade Style with Base, 24 V	BWA-RELAY-24V
	Relay, Blade Style, No Base, 12 V (replacement part)	BWA-RH1B-UDC12V
	Relay, Blade Style, No Base, 24 V (replacement part)	BWA-RH1B-UDC24V
	Relay Base Only (replacement part)	BWA-SH1B-05

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

(6) Brackets

	Description	Model
	Black reinforced thermoplastic Bracket for mounting on a 35 mm DIN rail	SMBDX80DIN
	• DIN rail clip, black plastic • Used with the M-HBx MultiHop and -PBx Performance board modules	BWA-HW-034

Mounting Kit

Description	Model
Screw, M5-0.8 x 25 mm, SS (4) Screw, M5-0.8 x 16 mm, SS (4) Hex nut, M5-0.8 mm, SS (4) Bolt, #8-32 x 3/4", SS (4)	BWA-HW-001

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

LOOKING FOR MORE



Q45 Wireless page 92

SureCross Wireless Q45 Sensors combine the best of Banner's flexible Q45 sensor family with its reliable, field-proven, SureCross wireless architecture.

WEB ONLY



DX80 Performance

Create point-to-multi-point networks that distribute I/O over large areas. I/O types include discrete (dry contact, PNP/NPN), analog (0-10 V dc, 0-20 mA), temperature (thermocouple and RTD), and pulse counter.



Modbus MultiHop

The SureCross® MultiHop Modbus Data Radios extend the range of Modbus networks. Each radio may be set to act as either a master radio, a repeater radio, or a slave radio. Models are available with built-in I/O, which can be accessed using the Modbus RTU protocol.



DX99

The DX99 FlexPower® Nodes are certified for use in a variety of hazardous locations and come in two housing types: polycarbonate or metal.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Safety

Banner produces a wide range of safety-related products, including safety light screens, safety interlock switches, e-stop modules and two-hand control safety modules that protect personnel and equipment.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SAFETY

LIGHT SCREENS page 682

LASER SCANNERS page 710

EMERGENCY STOP & STOP CONTROL page 716

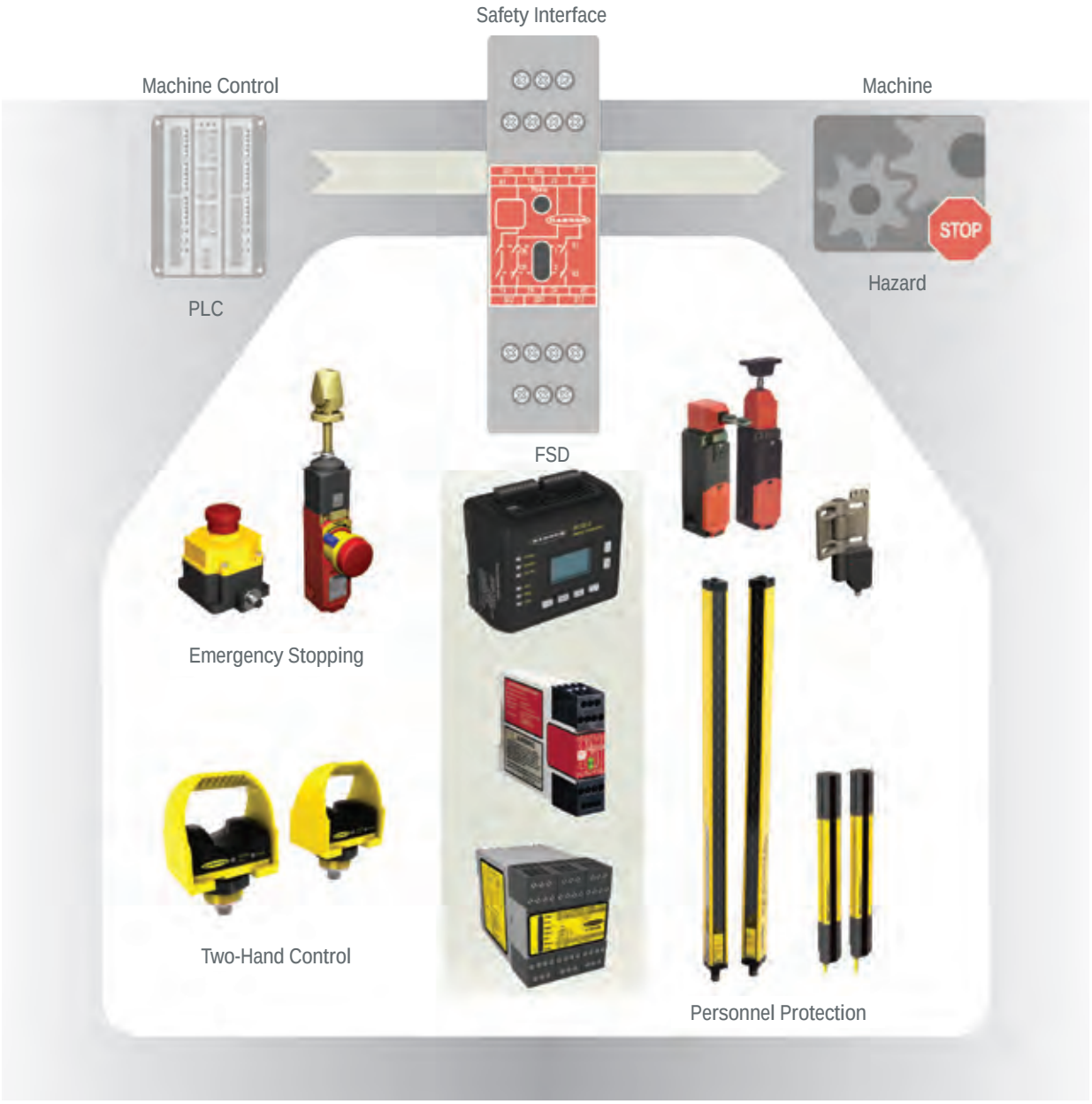
INTERLOCK SWITCHES page 758

CONTROLLERS & MODULES page 798

TWO-HAND CONTROL page 832

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Safeguarding Basics



Basics of Safeguarding

Machine and personnel safeguarding refers to the combination of requirements, methods and solutions used to protect people who come in contact with dangerous machines in the industrial environment.

Requirements

National and regional governmental bodies have regulations, mandates, standards and recommendations for implementing a safety method or a solution.

Key regulations regarding general machine guarding include the following:

- Machinery Directive - EU
- OSHA General Duty Clause – USA

Device Requirements

Safety devices must be able to consistently and reliably bring a machine hazard to an orderly stop.

To be considered a safety device, the following methods must be used to ensure reliable operation: fault exclusion, redundancy and self-checking.

Safety Circuit Requirements

A safety stop circuit typically comprises 2 normally-open contact from mechanically-linked relays. The circuit is monitored to detect certain failures that could lead to the loss of the safety function.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Methods: Risk Assessment

The Risk Assessment Process in machine safeguarding is a process used to identify hazards through each phase of the machine's life cycle and to minimize dangers to personnel and equipment.

The basic steps in a Risk Assessment Process:

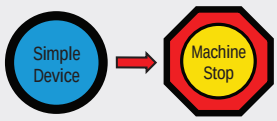
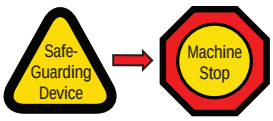
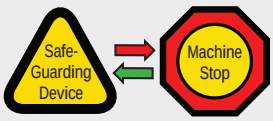
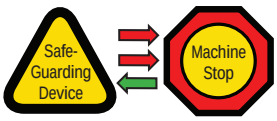
1. Identify hazards and where they occur.
2. Assess risk by severity of harm and probability of occurrence.
3. Reduce the risk through the use of protective measures.
4. Validate and document results.

Risk Assessment Standards

- OSHA 3071, Job Hazard Analysis
- MIL-STD-8820, US DOD System Safety Program
- ANSI B11.0 General (Safety) Requirements and Risk Assessment
- ISO 12100, General Principles for Design, Risk Assessment and Risk Reduction
- SEMI S10, Risk Assessment, Semiconductor Manufacturing Equipment

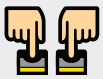
Methods: Safety Circuits

Depending on the level of risk associated with the machine or operations, an appropriate level of control circuitry performance must be incorporated into safety device design.

	Basic	Single	Single with Monitoring	Dual with Monitoring
Generic	Stop Command  • Non safety-rated components • Integrated in accordance with relevant standards • Reliability depends on robust components • Redundancy not required	Protective Command  • Safety-rated components • Integrated in accordance with safety principles and design • Redundancy not required	Protective Command Monitoring Signal  • Safety-rated components • Conducts periodic test of system • Normal operation allowed if no faults are found • If unsafe fault is found, system will default to safe state or indicate that unsafe system exists	Redundant (Safety) Stop Commands Monitoring Signal  • Safety-rated components • Greatest degree of fault tolerance • Redundancy and self-checking • Single failure cannot cause loss of safety function • Faults detected immediately or at next demand on system
Fault	Possible loss of safety function	Greater reliability, but possible loss of safety function	Fault detected at each test	Safety function is ensured with a single fault. An accumulation of faults is detected or not possible.
Risk	Very Low Minor bump or bruise with no lost time	Low Minor first aid, infrequent exposure or high likelihood of avoiding the hazard	Mid Range Injuries that are slight or normally reversible, requiring normal healing or only first aid	High or Very High Normally reserved for hand-fed applications where injuries could be severe to irreversible
ANSI / B11	—	—	—	Control Reliable ANSI B11.19 (Clause 6.1 and Annex C) Category 3 or 4 and/or PL d or PL e per ISO 13849-1 satisfy Control Reliability requirements
ANSI / RIA	Simple	Single Channel	Single Channel with Monitoring	Typically, a minimum of PL=d with Category 3 per ISO 13849-1:2006 or control reliable (see ANSI B11.TR6 or ANSI B11.19)
ISO / EN	Category B ISO 13849-1/EN 954-1	Category 1 ISO 13849-1/EN 954-1	Category 2 ISO 13849-1/EN 954-1	Category 3 & 4 ISO 13849-1/EN 954-1

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Solutions: Comparing Guards and Devices*

Type	Safety Function	Advantages	Limitations	Requirements	Standards
Guards: protective physical barrier used to prevent access.					
Fixed Guard 	Provides a fixed barrier to the hazard	• Low maintenance • Long life • Low cost for small areas • Protects all individuals • Can contain ejected materials	• Poor ergonomics • Limited visibility • Limited access • Costly for large areas • Maintenance may require removal of guard	• Protect from identified hazard • Prevent user from reaching over, under, around or through the barrier • Provide safe openings	• ANSI B11.19 • ISO 14120 • ISO 13857
Interlocked Guard 	Interrupts power to machine when guard is opened	• Low initial investment • Can be placed close to hazard • Protects all individuals • Can contain ejected materials	• Costly for large areas • Increased maintenance	• Must be difficult to defeat • Guard may open only after machine has stopped–or must be installed at a safe distance	• ANSI B11.19 • NFPA 79 • ISO 14119 • ISO 14120 • IEC 60204-1 • ISO 13857 • ISO 13855
Safeguarding Devices: components, attachments or mechanisms designed to perform a specific safeguarding function.					
Safety Light Screen 	Arrests power to machine when sensing field is interrupted	• Excellent ergonomics • Allows frequent access • Protects all individuals • Cost effective for large areas • Allows for good visibility	• Limited to machines that can be stopped quickly • No protection from ejected parts • May require the use of additional guards • May create a pass-through hazard	• Initiate immediate stop when sensing field is interrupted • Appropriate resolution required to detect objects the size of a torso, ankle, hand or finger	• ANSI B11.19 • IEC 61496 • ISO 13855
Multiple-Beam System: • Grids • Points 	Arrests power to machine when sensing field is interrupted	• Low initial investment • Allows frequent access • Allows for good visibility • Protects all individuals	• Limited to machines that can be stopped quickly • No protection from ejected parts • Large safety distance • May create a pass-through hazard	• Initiate immediate stop when sensing field is interrupted • Appropriate resolution required to detect objects the size of a torso	• ANSI B11.19 • IEC 61496 • ISO 13855
Two-Hand Control 	Operator must use both hands to actuate machine motion hereby preventing operator access to hazardous area	• Operator's hands are away from hazardous area • Low initial investment • Low maintenance	• Potential ergonomic impact • Provides protection only for operator • No protection from ejected parts	• Concurrent actuation within 1/2 second • Release and reactivation required before machine motion may be reinitiated	• ANSI B11.19 • NFPA 79 • ISO 13851 • IEC 60204-1 • ISO 13855
Safety Mat Monitor 	Interrupts power to machine when a minimum pressure is applied	• Excellent ergonomics • Protects all individuals • Allows for good visibility	• Costly for large areas • Maintenance intensive • Large safety distance	Minimum object sensitivity of 66 lbs on and 3-1/8" surface to detect a foot	• ANSI B11.19 • ISO 13855 • ISO 13856
Complementary (Safety) Equipment: used to supplement/augment safeguarding.					
E-Stop • Button • Rope Pull 	Operator activates button in emergency situation to shut off power to machine	• Immediate response • Safe shutdown of machine process	• Not considered a safeguard • Requires conscious act of operator • Limits injury or machine damage but typically does not prevent it	• Overrides all other functions and operations • Reset of E-stop doesn't initiate machine motion • Button must be red with yellow background • Should be located at each operation station • Final removal of power done by electromechanical components	• ANSI B11.19 • NFPA 79 • ISO 12100 • IEC 60204-1 • ISO 13850

*This represents a partial list of available safeguards & devices.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Solutions: Choosing and Locating a Safeguard

When choosing a safeguard, ask yourself the following questions:
1) is it safe, 2) is it legal and 3) does it make sense for the application?

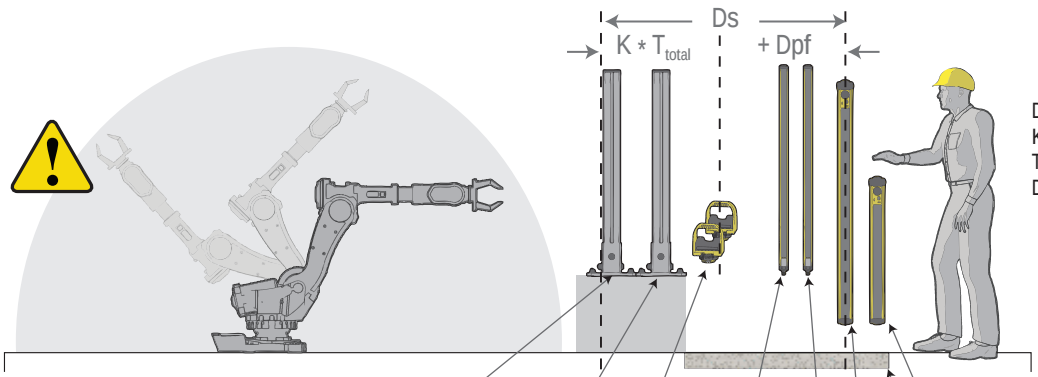
Choosing a Safety Product

- ☐ Who will use it?
- ☐ How will they use it?
- ☐ What hazards are associated with which task?
- ☐ What are the types of hazards?
- ☐ Where will the safeguard be located?

E = Excellent
A = Acceptable
P = Poor
X = Not Acceptable

Guarding Solutions	Maintenance $	Frequent Access	Infrequent Access	Locate Close to Hazard	Long Machine Stop Time	Ergonomic	Visibility	Multiple Operators	Guards Against Ejected Material	Comments
Fixed Hard Guard	P	P	E	E	E	P	P	E	E	• Limited access • Limited visibility to the machine • Costly for large areas • Costly to maintain and fix
Locking Guard	P	P	E	E	E	P	P	E	E	
Interlock Guard	P	P	A	E	A	P	P	E	E	
Two-Hand Control	A	A	A	A	A	A	A	P	P	• Only protects operator(s)
High-Resolution SLS	E	E	P	E	P	E	E	E	X	• Locate closer to hazard
Low-Resolution SLS	E	E	P	E	P	E	E	E	X	• Costs less than high resolution SLS
3- or 4-Beam Perimeter	E	A	A	P	A	E	E	E	X	• Takes less space than 2-beam
2-Beam Perimeter	E	A	A	P	A	E	E	E	X	• Costs less than 3- or 4-beam
Safety Mats	P	A	A	P	A	E	E	E	X	• Maintenance-intensive

Locating a Safety Product



Safety Distance
Ds = K (Ts + Tr) + Dpf

Ds = Safety Distance (inches)
K = OSHA Hand-Speed Constant
Ts = Machine Response (sec)
Dpf = Depth Penetration Factor (inches)

Hard guard or solenoid-locking guard

Standard or magnetic interlock hard guard interlocked guard opens away or laterally from the hazard (+/- Dpf)

Two-hand control (0" Dpf)

High-resolution safety light screen (1" to 2" Dpf)

Low-resolution two-beam safety grid (48" Dpf)

Horizontal sensing fields, including safety mats, horizontal safety light screens and area scanning devices (48" Dpf)

Low-resolution three- or four-beam safety grid (36" Dpf)

Standard-resolution safety light screen (3" to 8" Dpf)

NOTE: Illustration examples are based upon the described safeguards being used as the primary safeguarding device, all examples having identical stopping time, and following generally accepted industrial engineering practices that are found within ANSI B11.19 safety standard.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Light Screens

Safety light screens protect personnel from injury and machines from damage by guarding points of operation, access, areas and perimeters. Type 4 safety light screens provide control reliability and high levels of fault tolerance and Type 2 safety light screens are cost effective for guarding lower-risk applications.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Max Sensing Range	Defined Area	Safety Rating	Dimensions H x W x D	Power Supply
	EZ-SCREEN Two-piece system with 14 or 30 mm resolution provides finger, hand and ankle detection. page 686	14 mm: 6 m 30 mm: 18 m	150 to 1800 mm 150 to 2400 mm	Type 4 /Category 4/PLe	H (varies by model) 35 x 45.2 mm	24 V dc
	EZ-SCREEN LP Two-piece system with 14 or 25 mm resolution provides finger, hand and ankle detection. page 692	14 or 25 mm: 7 m	270 to 1810 mm	Type 4 /Category 4/PLe	H (varies by model) 28 x 26 mm	24 V dc
	EZ-SCREEN Grids Two-piece perimeter guarding system with up to four beams of torso detection. page 700	70 m	500 to 1066 mm	Type 4 /Category 4/PLe	H (varies by model) 52 x 55 mm	24 V dc
	EZ-SCREEN Points Two-piece perimeter guarding system with 1 beam of torso detection. page 701	70 m	25 mm beam diameter	Type 4 /Category 4/PLe	149 x 52 x 55 mm	24 V dc
	EZ-SCREEN Type 2 Suited for lower risk applications where the result is only a slight injury. page 706	15 m	150 to 1800 mm	Type 2 /Category 2/PLe	H (varies by model) 25.2 x 31.8 mm	24 V dc

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Choosing a Safety Light Screen Model

1 Select Hazard Level

Type 4

Protect personnel from injury and machines from damage by guarding points of operation, access, areas and perimeters. With self-checking circuitry, Type 4 light curtains provide control reliability and high levels of fault tolerance.

2 Select Resolution

Finger



14 mm resolution for finger, hand and ankle detection

Hand



lower resolution for hand and ankle detection

Body



2, 3, or 4 beams to protect personnel and machinery

3 Select Housing

Standard



Non-contact machine guarding systems protect fingers, hands and ankles, and guard perimeters and access, using self-contained emitters and receivers without a separate control box.
See page 686

Low-Profile



The space-saving, compact profile is ideal for smaller machines, yet robust enough to meet the demands of large power presses.
See page 692

Grids & Points



Point and Grid systems allow one-, two-, three- or four-beam perimeter and access guarding.
See page 700

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Select Hazard Level

1

Type 2

Used for lower-risk applications, where the result of an accident is only a slight injury. Type 2 Light curtains feature a large field of view and use fault exclusion to ensure the integrity of safeguarding.

Select Resolution

2

Hand/Body



30 mm resolution for bump, bruise or knock-down detection

Select Housing

3

Standard



Inexpensive, compact optical safeguarding solution designed for lower-risk applications where risk of injury is limited but some guarding is necessary.
See page 706

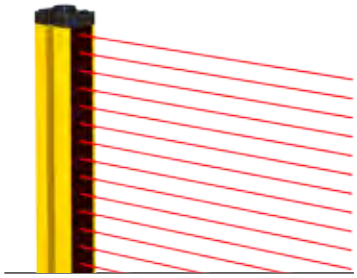
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



EZ-SCREEN
Safety Light Screens

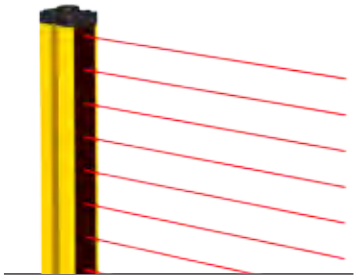
EZ-SCREEN point-of-operation systems provide finger, hand and ankle detection in a robust housing and metal endcaps.

- Operating range up to 18 m
- Displays operating status, configuration error codes, and blocked beams
- Exceeds OSHA/ANSI Control Reliability requirements, certified to cULus NIPF, and CE certified to Type 4, Cat 4 PLe, and SIL3
- Resists impact, twisting, and abusive environments with durable aluminum housing or nickel-plated ESD-safe housing for protection against electrostatic discharges
- Available in 14 or 30 mm resolution
- Cordsets and brackets see page 689



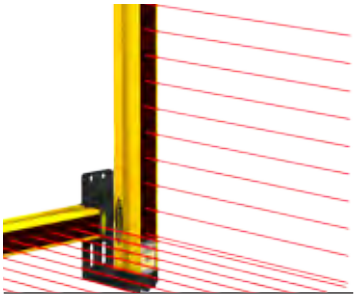
14 mm Resolution

14 mm resolution safety light screens can be used for finger, hand and ankle protection.



30 mm Resolution

30 mm resolution safety light screens can be used for hand and ankle protection.



Cascade

Cascading models allow four systems of any length and resolution to be connected in a series, forming a single safety device.

Some of the Available Finishes



Yellow Painted Aluminum



Clear Anodized Aluminum



Nickel-Plated ESD

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-SCREEN® Systems, 14 mm Resolution Model Key, 24 V DC

Example Model Number SLSP14-150Q88

Model Style		Resolution		Defined Area	Finish	Connection Emitter/Receiver		Connection Pair***
SLS	P	14	—	150			or	Q88

Model Style
- SLS = Light Screen
- SLSC = Cascading Light Screen

Model Style
- E = Emitter
- R = Receiver
- P = Pair***

Resolution
- 14 = 14 mm

Defined Area

	Housing Length	Response Time†
150* =	262 mm	11 ms
300 =	372 mm	15 ms
450 =	522 mm	19 ms
600 =	671 mm	23 ms
750 =	821 mm	27 ms
900 =	971 mm	32 ms
1050 =	1120 mm	36 ms
1200 =	1270 mm	40 ms
1350 =	1420 mm	43 ms
1500 =	1569 mm	48 ms
1650 =	1719 mm	52 ms
1800 =	1869 mm	56 ms

Finish
- Blank = Yellow powder coat
- N = Nickel-plated ESD**
- A = Clear Anodized Aluminum
- S = Nickel-plated (silver)

Connection Emitter/Receiver
- Q8 = 8-pin QD
- P8 = 8-pin Pigtail QD

Connection Pair***
- Q88 = Emitter with 8-pin QD
Receiver with 8-pin QD
- P88 = Emitter with 8-pin pigtail QD
Receiver with 8-pin pigtail QD

EZ-SCREEN® Systems, 30 mm Resolution Model Key, 24 V DC

Example Model Number SLSP30-150Q88

Model Style		Resolution		Defined Area	Finish	Connection Emitter/Receiver		Connection Pair***
SLS	P	30	—	150			or	Q88

Model Style
- SLS = Light Screen
- SLSC = Cascading Light Screen

Model Style
- E = Emitter
- R = Receiver
- P = Pair***

Resolution
- 30 = 30 mm

Defined Area

	Housing Length	Response Time†
150* =	262 mm	9 ms
300 =	372 mm	11 ms
450 =	522 mm	13 ms
600 =	671 mm	15 ms
750 =	821 mm	17 ms
900 =	971 mm	19 ms
1050 =	1120 mm	21 ms
1200 =	1270 mm	23 ms
1350 =	1420 mm	25 ms
1500 =	1569 mm	27 ms
1650 =	1719 mm	30 ms
1800 =	1869 mm	32 ms
1950 =	2018 mm	34 ms
2100 =	2168 mm	36 ms
2250 =	2318 mm	38 ms
2400 =	2468 mm	40 ms

Finish
- Blank = Yellow powder coat
- N = Nickel-plated ESD**
- A = Clear Anodized Aluminum
- S = Nickel-plated (silver)

Connection Emitter/Receiver
- Q8 = 8-pin QD
- P8 = 8-pin Pigtail QD

Connection Pair***
- Q88 = Emitter with 8-pin QD
Receiver with 8-pin QD
- P88 = Emitter with 8-pin pigtail QD
Receiver with 8-pin pigtail QD

For more specifications see page 690.

QD models: A model with a QD requires a mating cordset (see page 689).

For an emitter with TEST function, replace Q8 with Q5 on emitter model numbers (example, SLSE14-150Q5) and Q88 with Q85 on pair model numbers (example, SLSP14-150Q85).
For a 5-pin 300 mm M12/Euro pigtail QD with No EDM or TEST functions, replace Q8 with P5NT on emitter or receiver (example, SLSE14-150P5NT) and Q88 with P55NT on pair model numbers (example, SLSP14-150P55NT).
For a 4-pin 300 mm M12/Euro pigtail QD with no EDM or TEST functions (GND/PE via mounting), replace Q8 with P4NT or Q88 with P44NT (example, SLSP14-150P4NT or SLSP14-150P44NT).

* 150 mm not available in cascade models

** ESD-safe models are not available with the pigtail QD option

*** A pair includes an emitter and receiver (example, SLSP30-150Q88)

† Cascading system response time: To the response time of the slowest pair, add 2 ms for each additional pair.
Example: slowest pair's response time is 15 ms, and the system has three additional pairs (four pairs total), so the system maximum response time is 15 ms + 6 ms (3 pairs x 2 ms) = 21 ms.

Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



EZ-SCREEN V-Series
Type 4 Safety Light Screens

The V-Series Safety Light Screens require no configuration and are pre-configured for Trip Output, Scan Code 1, and 2-Channel EDM.

- Provides external device monitoring (EDM) that can be deselected via wiring hookup
- Operating range up to 18 m
- Displays operating status, configuration error codes, and blocked beams
- Exceeds OSHA/ANSI Control Reliability requirements, certified to cULus NIPF, and CE certified to Type 4, Cat 4 PLe, and SIL 3
- Resists impact, twisting and abusive environments with a durable aluminum housing and metal endcaps

EZ-SCREEN® V-Series Systems, 30 mm Resolution Model Key, 24 V DC

Example Model Number SLSVAP30-150Q88

Model Style

- SLSVA = V-series Safety Light Screen
- P = Pair †

Resolution

- 30 = 30 mm

Defined Area

	Housing Length	Response Time
150 =	262 mm	9 ms
300 =	372 mm	11 ms
450 =	522 mm	13 ms
600 =	671 mm	15 ms
750 =	821 mm	17 ms
900 =	971 mm	19 ms
1050 =	1120 mm	21 ms
1200 =	1270 mm	23 ms
1350 =	1420 mm	25 ms
1500 =	1569 mm	27 ms
1650 =	1719 mm	30 ms
1800 =	1869 mm	32 ms

Connection

Emitter/Receiver or Pair †

- Q8 = 8-pin QD
- Q88 = Emitter with 8-pin QD, Receiver with 8-pin QD

For more specifications see page 690.

QD models: A model with a QD requires a mating cordset (see page 689).

† A pair includes an emitter and receiver (example, SLSVAP30-150Q88)

Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD

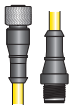
See page 916

Length	8-Pin QD Straight
4.57 m	QDE-815D
7.62 m	QDE-825D
15.3 m	QDE-850D
22.9 m	QDE-875D
30.5 m	QDE-8100D

Euro QD—Double-Ended

See page 921

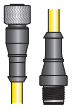
Length	8-Pin QD Straight
0.31 m	DEE2R-81D
0.91 m	DEE2R-83D
2.44 m	DEE2R-88D
4.57 m	DEE2R-815D
7.62 m	DEE2R-825D
15.3 m	DEE2R-850D
22.9 m	DEE2R-875D
30.5 m	DEE2R-8100D



Euro QD Adaptor*

See page 917

Length	8-Pin/4-Pin Straight	8-Pin/5-Pin Straight
0.31 m	DEE8-41D	DEE8-51D
2.44 m	DEE8-48D	DEE8-58D
4.57 m	DEE8-415D	DEE8-515D
7.62 m	DEE8-425D	DEE8-525D

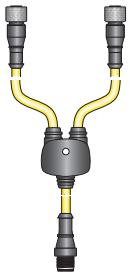


* For SLS/SLP sensors with Q8 or P8 connection to safety BUS gateway/node, "smart" self-monitored safety module, safety controller or safety PLC see page 917.

Euro QD Splitter

See page 919

Length	5-Pin QD Straight
0 m	CSB-M1280M1280
0.30 m	CSB-M1281M1281
2.50 m	CSB-M1288M1281
4.60 m	CSB-M12815M1281
7.60 m	CSB-M12825M1281
7.60 m	CSB-UNT825M1281



Additional cordset information available. See page 904.

NOTE: See page 705 for interfacing solutions.
Additional accessories are listed on page 844.

Brackets

14 & 30 mm			Cascade
See page 894	See page 894	See page 895	See page 895
EZA-MBK-12*	EZA-MBK-11*	EZA-MBK-20	EZA-MBK-21

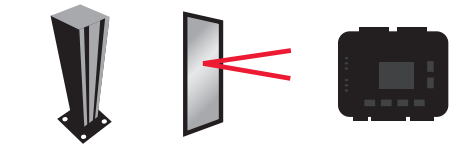


Additional brackets and information available. See page 846.

* Standard brackets included with emitter/receiver.

Other Accessories

Stands	Mirrors	Interface
See page 952	See page 956	See page 705

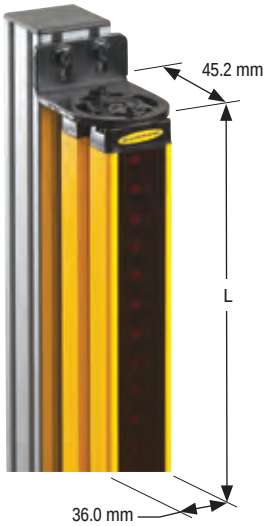


Replacement Parts

Model	Description
EZA-ADE-1	Copolyester access cover with label for 14 or 30 mm resolution emitters
EZA-ADE-2	Copolyester access cover with inverted label for 14 or 30 mm resolution emitters
EZA-ADR-1	Copolyester access cover with label for 14 or 30 mm resolution receiver
EZA-ADR-2	Copolyester access cover with inverted label for 14 or 30 mm resolution receiver
EZA-MBK-12	Center bracket kit (includes 1 bracket and hardware to mount to MSA Series stands) for 14 or 30 mm resolution EZ-SCREEN
EZA-MBK-11	Standard bracket kit with hardware (includes 2 end brackets and hardware to mount to MSA Series stands) for 14 or 30 mm resolution EZ-SCREEN
EZA-TP-1	Access cover security plate (includes 2 screws, wrench) for 14 or 30 mm resolution EZ-SCREEN
EZA-RR-1	External normally open reset switch with 8-pin/M12 Euro-style QD
MGA-K-1	Replacement key for switch MGA-KS0-1
MGA-KS0-1	Panel-mount keyed normally open reset switch
EZA-HK-1	Wrench, Security
EZA-RTP-1	Terminator plug for cascade receiver
STP-13	14 mm test piece (14 mm resolution systems)
STP-14	30 mm test piece (14 mm resolution systems with 2-beam Reduced Resolution and for 30 mm resolution systems)
STP-15	60 mm test piece (30 mm resolution systems with 2-beam Reduced Resolution)

NOTE: See Installation manual p/n 112852 for complete list of replacement parts and accessories.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



EZ-SCREEN Systems

EZ-SCREEN® 14 & 30 mm Resolution and V-Series Specifications

Supply Voltage at the Device	24 V dc ±15% (use a SELV-rated supply according to EN IEC 60950) (The external voltage supply must be capable of buffering brief mains interruptions of 20 ms, as specified in EN/IEC 60204-1.)
Residual Ripple	± 10% maximum
Supply Current	**Emitter:** 100 mA max., 40 mA at 24 V dc typical **Receiver:** 275 mA max., 160 mA at 24 V dc typical, exclusive of OSSD1 and OSSD2 loads (up to an additional 0.5A each) and AUX output load (up to 75 mA)
Response Time	9 to 56 milliseconds (see model number tables) **Cascade Safety Stop Interface (CSSI):** 40 milliseconds max.
Remote Test Input (Optional – available only on model SLSE..-..Q5 emitters)	Test Mode is activated either by applying a low signal (less than 3 V dc) to emitter TEST #1 terminal for a minimum of 50 milliseconds, or by opening a switch connected between TEST #1 and TEST #2 for a minimum of 50 milliseconds. Beam scanning stops to simulate a blocked condition. A high signal at TEST #1 deactivates Test Mode. **High signal:** 10 to 30 V dc **Low signal:** 0 to 3 V dc **Input current:** 35 mA inrush, 10 mA max.
Wavelength of Emitter Elements	Infrared LEDs, 950 nm at peak emission
Recovery Time–Blocked to clear (OSSDs turn ON; varies with total number of sensing beams and whether Sync beam is blocked)	<table><tr><th></th><th>Beam 1 (Sync Beam)</th><th>All Other Beams</th></tr><tr><td>14 mm Models</td><td>109 to 800 ms</td><td>33 to 220 ms</td></tr><tr><td>30 mm Models</td><td>81 to 495 ms</td><td>25 to 152 ms</td></tr></table>
EDM Input	+24 V dc signals from external device contacts can be monitored (one-channel, two-channel or no monitoring) via EDM1 and EDM2 terminals in the receiver **High signal:** 10 to 30 V dc at 30 mA typical **Low signal:** 0 to 3 V dc
Reset Input	The Reset input must be high for 0.25 to 2 seconds and then low to reset the receiver **High signal:** 10 to 30 V dc at 30 mA typical **Low signal:** 0 to 3 V dc **Closed switch time:** 0.25 to 2 sec
Safety Outputs (OSSDs)	Two redundant solid-state 24 V dc, 0.5 A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.) Capable of the Banner "Safety Handshake" **ON-State voltage:** ≥ Vin-1.5 V dc **OFF-State voltage:** 1.2 V dc max. (0-1.2 V dc) **Max. load capacitance:** 1.0 µF **Max. load inductance:** 10 H **Leakage current:** 0.50 mA maximum **Cable resistance:** 10 Ω maximum **OSSD test pulse width:** 100 to 300 microseconds **OSSD test pulse period:** 10 to 27 milliseconds (varies with number of beams) **Switching current:** 0-0.5 A
Auxiliary (Aux.) Output Switching Capacity	Current-sourcing (PNP) solid-state output, 24 V dc at 75mA max that follow the safety outputs (lockout function optional)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-SCREEN® 14 & 30 mm Resolution and V-Series Specifications (cont'd)

Controls and Adjustments	Emitter: Scan Code selection: 2-position switch (code 1 or 2). Factory default position is code 1 Receiver: Scan Code selection: 2-position switch (code 1 or 2). Factory default position is code 1 Trip/Latch Output selection: Redundant switches. Factory default position is T (Trip). EDM/MPCE monitor selection: 2-position switch selects between 1- or 2-channel monitoring Factory default position is 2 Reduced Resolution (2-beam Floating Blanking): Redundant switches. Factory default is OFF
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24 V dc or dc common
Electrical Safety Class (IEC 61140)	III
Operating Range	14 mm models: 0.1 m to 6 m 30 mm models: 0.1 m to 18 m Range decreases with use of mirrors and/or lens shields: Lens shields – approximately 10% less range per shield Glass-surface mirrors – approximately 8% less range per mirror See Accessory section for more information on a specific mirror, page 690.
Ambient Light Immunity	> 10,000 lux at 5° angle of incidence
Strobe Light Immunity	Totally immune to one Federal Signal Corp. "Fireball" model FB2PST strobe
Effective Aperture Angle (EAA)	Meets Type 4 requirements per IEC 61496-2, ± 2.5° @ 3 m
Enclosure	Materials: Extruded aluminum housing with yellow polyester powder (optional black or white or nickel-plated silver finish) and well-sealed, rugged die-cast zinc end caps, acrylic lens cover, copolyester access cover. Endcaps on silver models are also nickel-plated. Rating: IP65
Operating Conditions	Temperature: 0° to +55° C Relative humidity: 95% (non-condensing)
Status Indicators	Emitter: One Bi-color (Red/Green) Status Indicator – indicates operating mode, Lockout or power OFF condition 7-segment Diagnostic Indicator (1 digit) – indicates proper operation, scan code or error code Receiver: Yellow Reset Indicator – indicates whether system is ready for operation or requires a reset Bi-Color (Red/Green) Status Indicator – indicates general system and output status Bi-Color (Red/Green) Zone Status Indicators – indicates condition (clear or blocked beam) of a defined group of beams 7-Segment Diagnostic Indicator (3-digit) – indicates proper operation, scan code or error code, total number of blocked beams
Mounting Hardware	Emitter and receiver each are supplied with a pair of swivel end-mounting brackets. Models longer than 900 mm also include a swivel center-mount bracket. Mounting brackets are 8-gauge cold-rolled steel, black zinc finish.
Shock and Vibration	EZ-SCREEN components have passed vibration and shock tests according to IEC 61496-1. This includes vibration (10 cycles) of 10-55 Hz at 0.35 mm single amplitude (0.70 mm peak-to-peak) and shock of 10 g for 16 milliseconds (6,000 cycles).
Design Standards	Designed to comply with Type 4 per IEC 61496; Category 4 PLe per EN ISO 13849-1; SIL 3 per IEC 61508, SIL CL 3 per IEC 62061; Type 4 per UL 61496-1/-2
Certifications	CE c UL us LISTED
Wiring Diagrams	WD001, WD003, WD004, WD005, WD006, WD007, WD013, WD014, WD015, WD016, WD017, WD018, WD019 (p. 1008)

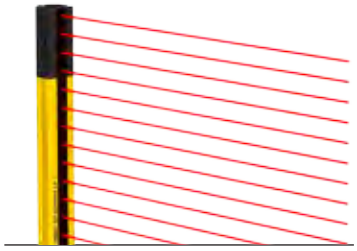
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



EZ-SCREEN Low-Profile (LP)
Type 4 Safety Light Screens

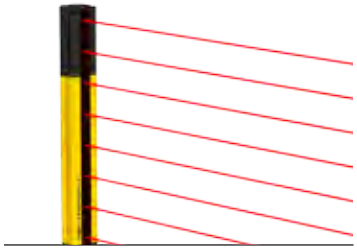
The Low-Profile Safety Light Screen provides a small, compact design with end-to-end sensing.

- Operating range up to 7 m
- Features seven-segment display for diagnostic information and number of blocked beams
- Offers reduced resolution and fixed blanking to ignore tooling or constant inflow of materials
- Identifies clear and blocked beams using zone indicators
- Exceeds OSHA/ANSI Control Reliability requirements, certified to cTUVus, and CE certified to Type 4, Cat 4 PLe, and SIL 3
- Cordsets and brackets see page 696



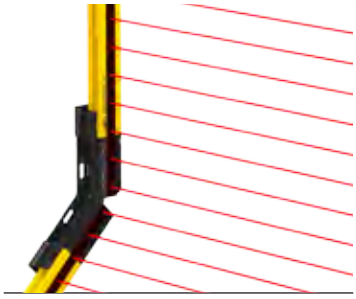
14 mm Resolution

14 mm resolution safety light screens can be used for finger, hand and ankle protection.



25 mm Resolution

25 mm resolution safety light screens can be used for hand and ankle protection.



Cascading

Low-profile cascading models allow four systems of any length and resolution to be connected in a series, forming a single safety device.



Yellow Painted Aluminum | Clear Anodized Aluminum | Nickel-Plated ESD

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-SCREEN® Low-Profile Systems, 14 mm Resolution Model Key, 24 V DC Example Model Number SLPP14-270P88

Model Style

- SLP = Light Screen; SLPC = Cascading Light Screen
- P = E = Emitter; R = Receiver; P = Pair***

Resolution

- 14 = 14 mm

Defined Area

	Housing Length	Response Time†
270*	270 mm	10.5 ms
410	410 mm	13.5 ms
550	549 mm	16.5 ms
690	689 mm	19.5 ms
830	829 mm	22.5 ms
970	969 mm	25.5 ms
1110	1108 mm	28.5 ms
1250	1248 mm	31.5 ms
1390	1388 mm	34.5 ms
1530	1528 mm	37.5 ms
1670	1667 mm	40.5 ms
1810	1807 mm	43.5. ms

Finish

- Blank = Yellow powder coat
- N = Nickel-plated ESD**
- A = Clear Anodized Aluminum

Connection

Emitter/Receiver

- Blank = Integral RD
- P8 = 8-pin Pigtail QD

or

Pair***

- Blank = Receiver with Integral RD Emitter with Integral RD
- P88 = Receiver with 8-pin pigtail QD Emitter with 8-pin pigtail QD

RD = Removable disconnect

EZ-SCREEN® Low-Profile Systems, 25 mm Resolution Model Key, 24 V DC Example Model Number SLPP25-270P88

Model Style

- SLP = Light Screen; SLPC = Cascading Light Screen
- P = E = Emitter; R = Receiver; P = Pair***

Resolution

- 25 = 25 mm

Defined Area

	Housing Length	Response Time†
270*	270 mm	8 ms
410	410 mm	9.5 ms
550	549 mm	11 ms
690	689 mm	12.5 ms
830	829 mm	14 ms
970	969 mm	15.5 ms
1110	1108 mm	17 ms
1250	1248 mm	18.5 ms
1390	1388 mm	20 ms
1530	1528 mm	21 ms
1670	1667 mm	22.5 ms
1810	1807 mm	24 ms

Finish

- Blank = Yellow powder coat
- N = Nickel-plated ESD**
- A = Clear Anodized Aluminum

Connection

Emitter/Receiver

- Blank = Integral RD
- P8 = 8-pin Pigtail QD

or

Pair***

- Blank = Receiver with Integral RD Emitter with Integral RD
- P88 = Receiver with 8-pin pigtail QD Emitter with 8-pin pigtail QD

RD = Removable disconnect

For more specifications see page 696.

QD models: A model with a QD requires a mating cordset (see page 696).

QD models: Pigtail QD models require mating cordsets with an 8-pin M12/Euro-style connector (such as QDE-8..D, DEE2R-8..D or CSB-M128..M1281; see page 696).
Integral RD models require mating cordsets with a removable disconnect connector (such as RDLP-8..D or DELPE-8..D; see page 696).

* 270 mm not available in cascade models

** ESD-safe models are not available with the pigtail QD option

*** A pair includes an emitter and receiver (example, SLSP30-150Q88)

† Cascading system response time: To the response time of the slowest pair, add 2 ms for each additional pair.
Example: slowest pair's response time is 15 ms, and the system has three additional pairs (four pairs total), so the system maximum response time is 15 ms + 6 ms (3 pairs x 2 ms) = 21 ms.

Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



EZ-SCREEN Low-Profile (LP) with Muting

Type 4 Safety Light Screens

The EZ-SCREEN® with Muting has a built-in muting function with no third box required.

- Eight pre-defined muting configuration options including Bypass, Mute-Dependent Override, Mute Enable, and Mute-cycle time extensions (four seconds) for "L"-style cell exit applications
- Mute Lamp and Status Outputs to EZ-LIGHT (or other indicating devices)
- Lower power consumption allows for energy savings and fewer/smaller power supplies
- Exceeds OSHA/ANSI Control Reliability requirements, certified to cTUVus, and CE certiffed to Type 4, Cat 4 PLe, and SIL 3
- Cordsets and brackets see page 696

EZ-SCREEN® Low-Profile with Muting Systems, 14 and 25 mm Resolution Model Key, 24 V DC

Example Model Number SLPMP14-410P128

Model Style	Resolution		Defined Area	Finish	Connection: Emitter/Receiver		Connection: Pair*
SLPMP	14	—	410			or	P128

Model Style
- SLPE = Emitter
- SLPMR = Muting Receiver
- SLPMP = Muting LP Pair

Resolution
- 14 = 14 mm
- 25 = 25 mm

Defined Area

	Housing Length	Response Time(14 mm)	Response Time(25 mm)
410 =	410 mm	13.5 ms	9.5 ms
550 =	549 mm	16.5 ms	111 ms
690 =	689 mm	19.5 ms	12.5 ms
830 =	829 mm	22.5 ms	14 ms
970 =	969 mm	25.5 ms	15.5 ms
1110 =	1108 mm	28.5 ms	17 ms
1250 =	1248 mm	31.5 ms	18.5 ms
1390 =	1388 mm	34.5 ms	20 ms
1530 =	1528 mm	37.5 ms	21 ms
1670 =	1667 mm	40.5 ms	22.5 ms
1810 =	1807 mm	43.5. ms	24 ms

Finish
- Blank = Yellow powder coat
- N = Nickel-plated ESD
- A = Clear Anodized Aluminum

Connection: Emitter/Receiver
- Blank = Integral RD
- P8 = 8-pin Pigtail QD (SLP Emitter)
- P12 = 12-pin Pigtail QD (SLPM Receiver)

Connection: Pair*
- Blank = Receiver with Integral RD Emitter with Integral RD
- P128 = Emitter with 8-pin pigtail QD Receiver with 12-pin pigtail QD (SLPM Receiver)

RD = Removable disconnect

For more specifications see page 698.

QD models: A model with a QD requires a mating cordset (see page 696).

QD models: Pigtail QD models require mating cordsets with an 8 or 12-pin M12/Euro-style connector (such as QDE-8..D, QDE-12..E, DEE2R-8..D; see page 696).
Integral RD models require mating cordsets with a removable disconnect connector (such as RDLP-8..D or RDLP-11..E; see page 696).

* A pair includes an emitter and receiver (example, SLPMP14-410P128)

Contact Banner Engineering Corp. for additional information and/or verification of valid model numbers.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-SCREEN® LPM Cordset Overview*

Muting Splitter Cordsets	
3-Branch models	Banner sensors (PNP)
CSM3DO-M12121FM12121M	Dark Operate (pin 2)
CSM3LO-M12121FM12121M	Light Operate (pin 4)
4-Branch models (With Emitter hookup)	
CSM4DO-M12121FM12121M	Dark Operate (pin 2)
CSM4LO-M12121FM12121M	Light Operate (pin 4)
Muting Sensor Cordsets (C & D)	Length
DEE2R-51D	0.3 m (1')
DEE2R-53D	1 m (3')
DEE2R-58D	2.5 m (8')
DEE2R-815D	4.5 m (15')



"A" (Receiver cordset): On RD models = DELPE-12xxE; On P12 models cordset "A" is a preinstalled DELPE-121E.
"B": Machine interface cordset = QDE-12xxE.
"C" and "D": Muting Sensor cordsets = DEE2R-5xxD. Ensure sensors connected to Cordsets C & D are PNP output with Dark Operate on pin 2 or Light Operate on pin 4.
"E" (Emitter cordset): On RD models = DELPE-12xxE; On P8 models (shown), use a DEE2R-8xxD double-ended cordset. If using a 3-Branch Muting Splitter cordset, use appropriate Emitter cordset.
"F": QS18VP6LPQ8 (4-pin M12/Euro QD) sensor shown as example. Other sensors or switches may be used.

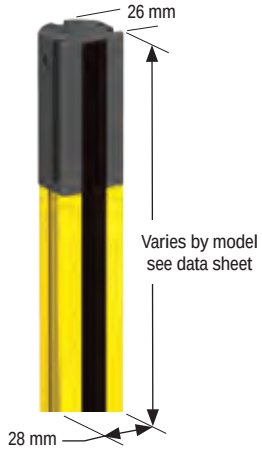
* Note: See EZ-SCREEN Low Profile with Muting manual (p/n 150216) for complete information.

EZ-SCREEN® Muting Indicators

TL50WQ	Single Color (White)
DELPEF-40D	Single Color Cordset 0.05 m
DELPEF-41D	Single Color Cordset 0.3 m
DELPEF-43D	Single Color Cordset 1 m
K50LGRW2PQ-18886	Three Color (Green/Red/White)
TL50GYRWQ	Four Color (Green/Yellow/Red/White)
DELPEF-50D	Multi-Color Cordset 0.05 m
DELPEF-51D	Multi-Color Cordset 0.3 m
DELPEF-53D	Multi-Color Cordset 1 m
LPA-MBK-15	Optional mounting bracket (Used with DELPEF-..0D cordset)



Additional Indicators available, see EZS LPM manual



EZ-SCREEN LP Systems

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

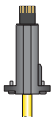
Cordsets

For use with models with integral RD connections. All standard cordsets are yellow PVC with black overmold.
For black PVC cable and overmold, add suffix B to model number (example, RDLP-815DB).

RD

See page 922

Length	8-Wire*	11-Wire
4.57 m	RDLP-815D	RDLP-1115E
7.62 m	RDLP-825D	RDLP-1125E
15.2 m	RDLP-850D	RDLP-1150E
22.9 m	RDLP-875D	RDLP-1175E
30.5 m	RDLP-8100D	RDLP-11100E



RD to Euro QD**

See page 921

Length	8-Pin Male	12-Pin Male	8-Pin Female
0.31 m	DELPE-81D	DELPE-121D	DELPEF-81D
0.91 m	DELPE-83D	DELPE-123D	DELPEF-83D
2.44 m	DELPE-88D	DELPE-128D	DELFEF-88D
4.57 m	DELPE-815D	DELPE-1215D	DELPEF-815D
7.62 m	DELPE-825D	DELPE-1225D	—
15.2 m	DELPE-850D	DELPE-1250D	—
22.9 m	DELPE-875D	DELPE-1275D	—
30.5 m	DELPE-8100D	DELPE-12100D	—





RD to RD

See page 922

Length	Cascade
0.05 m	DELP-110E
0.30 m	DELP-111E
0.91 m	DELP-113E
2.44 m	DELP-118E
4.57 m	DELP-1115E
7.62 m	DELP-1125E
15.2 m	DELP-1150E
22.9 m	DELP-1175E
30.5 m	DELP-11100E



* For connection of E-Stop or other hard/relay contacts see page 922.
** Requires mating 8-pin M12/Euro cordset. 8-pin Male used for Machine Interface connection (indicator end of sensor). 8-pin Female used for cascade connection when using M12/Euro QDs.
See page 695 for EZ-SCREEN® LPM cordset overview.

For use with models with
Pigtail QD and DELPE-8xxD connections.

Euro QD–Double-Ended

See page 917

Length	8-Pin*
0.31 m	DEE2R-81D
0.91 m	DEE2R-83D
2.44 m	DEE2R-88D
4.57 m	DEE2R-815D
7.62 m	DEE2R-825D
15.2 m	DEE2R-850D
22.9 m	DEE2R-875D
30.5 m	DEE2R-8100D



Euro QD

See page 916

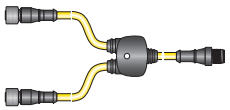
Length	8-Pin	12-Pin
4.57 m	QDE-815D	QDE-1215D
7.62 m	QDE-825D	QDE-1225D
15.3 m	QDE-850D	QDE-1250D
22.9 m	QDE-875D	QDE-1275D
30.5 m	QDE-8100D	QDE-12100D



Euro QD Splitter

See page 919

Length	8-Pin
0 m	CSB-M1280M1280
0.30 m	CSB-M1281M1281
2.50 m	CSB-M1288M1281
4.60 m	CSB-M12815M1281
7.60 m	CSB-M12825M1281
7.60 m	CSB-UNT825M1281



* For connection to safety BUS gateway/node, a "smart" self-monitored safety module, safety controller or safety PLC see page 917.



Additional cordset information available.
See page 904.

Note: See page 705 for interfacing solutions, additional accessories are listed on page 844.

Brackets

Low-Profile 14 & 25 mm

See page 896	See page 896	See page 897	See page 898
LPA-MBK-11*	LPA-MBK-12*	LPA-MBK-20	LPA-MBK-22









Low-Profile 14 & 25 mm–Cascade

See page 898	See page 898	See page 897	See page 897
LPA-MBK-21	LPA-MBK-90	LPA-MBK-120	LPA-MBK-135











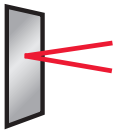
Additional brackets and information available.
See page 846.

* Standard brackets included with emitter/receiver.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Other Accessories

Stands	Mirrors	Interface
See page 952	See page 956	See page 705


Remote Fixed Blanking Switch



Allows frequent configuration of a fixed blanked area, without using the receiver DIP switches.

EZA-RBK-1

Replacement Parts

Model	Description
STP-13	14 mm test piece (for 14 mm resolution systems)
STP-16	25 mm test piece (for 25 mm resolution systems)
STP-17	34 mm test piece (for 14 mm resolution systems with 2-beam reduced resolution enabled)
STP-18	65 mm test piece (for 25 mm resolution systems with 2-beam reduced resolution enabled)
LPA-TP-1	Terminator plug, for SLPC... emitter/receiver (included with sensor)
EZA-RR-1	External normally open reset switch with 8-pin M12/Euro-style QD
MGA-KSO-1	Panel-mount keyed normally open reset switch

Model	Description
MGA-K-1	Replacement key for switch MGA-HSO-1
DELPE-81D	Replacement for M12-terminated pigtail QD, as shipped with standard pigtail QD models; 8-conductor cable, 22 AWG; 0.3 m long
LPA-MBK-11	End-cap bracket kit (includes 2 end brackets and hardware to mount one sensor to MSA series stands; 360° sensor rotation; 14 ga (1.9 mm) steel, black zinc plated; die-cast zinc end-cap plate
LPA-MBK-12	Side-mount bracket kit (includes 1 bracket and hardware to mount to MSA Series stands; +10°/ −30° sensor rotation; 14 ga (1.9 mm) steel, black zinc plated; die-cast zinc clamp

NOTE: See installation manual p/n 112852 for complete list of replacement parts and accessories.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-SCREEN® Low-Profile 14 & 25 mm Resolution Specifications

Supply Voltage at the Device	24 V dc ±15% (use a SELV-rated supply according to EN IEC 60950) (The external voltage supply must be capable of buffering brief mains interruptions of 20 milliseconds, as specified in EN IEC 60204-1.)
Residual Ripple	± 10% maximum
Supply Current	Emitter: 60 mA max., exclusive of fault load Receiver: 150 mA max., exclusive of OSSD1 and OSSD2 loads (up to an additional 0.5A each) and Aux Output load (up to an additional 0.25A)
Response Time	8 to 43.5 milliseconds (see model number tables) Cascade safety stop interface (CSSI): 40 milliseconds max. (contacts must be open for 60 milliseconds min.)
Remote Test Input	Test mode is activated either by applying a low signal (less than 3 V dc) to emitter Test/Reset terminal for a minimum of 50 milliseconds, or by opening a switch connected between Test/Reset and 24 V dc for a minimum of 50 milliseconds. Beam scanning stops to simulate a blocked condition. A high signal at Test/Reset deactivates Test Mode. High Signal: 10 to 30 V dc Low Signal: 0 to 3 V dc Input Current: 35 mA inrush, 10 mA max.
Wavelength of Emitter Elements	Infrared LEDs, 850 nm at peak emission
Recovery Time–Blocked to clear (OSSDs turn ON; varies with total number of sensing beams and whether Sync beam is blocked)	<table><tr><th></th><th>Beam 1 (Sync Beam)</th><th>All Other Beams</th></tr><tr><td>14 mm Models</td><td>109 to 800 ms</td><td>33 to 220 ms</td></tr><tr><td>25 mm Models</td><td>81 to 495 ms</td><td>25 to 152 ms</td></tr></table>
EDM Input	+24 V dc signals from external device contacts can be monitored (one-channel, two-channel or no monitoring) via EDM1 and EDM2 terminals in the receiver High Signal: 10 to 30 V dc at 30 mA typical Low Signal: 0 to 3 V dc
Reset Input	The Reset input must be high for 0.25 to 2 seconds and then low to reset the receiver High Signal: 10 to 30 V dc at 30 mA typical Low Signal: 0 to 3 V dc Closed Switch Time: 0.25 to 2 seconds
Safety Outputs (OSSDs)	Two redundant solid-state 24 V dc, 0.5 A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.) Capable of the Banner "Safety Handshake" ON-State voltage: ≥ Vin-1.5 V dc OFF-State voltage: 1.2 V dc max. (0-1.2 V dc) Max. load capacitance: 1.0 µF Max. load inductance: 10 H Leakage Current: 0.50 mA maximum Cable Resistance: 10 Ω maximum OSSD test pulse width: 100 to 300 microseconds OSSD test pulse period: 10 to 22 milliseconds (varies with number of beams) Switching Current: 0-0.5 A
Auxiliary (Aux.)/Fault Output Switching Capacity	Current-sourcing (PNP) Solid-state output, 24 V dc at 250 mA max. that follow safety outputs or lock out status (configurable)
External Remote Indicator Outputs (SLPMR models only)	Current sourcing (PNP), solid-state, 24 V dc outputs for the connection of remote indicator lamps such as EZ-LIGHTs. See EZ-LIGHT™ for EZ-SCREEN® Low Profile with Muting in manual 150216 for compatible EZ-LIGHTs and associated cordsets. Rated Current: 100 mA maximum at 24 V dc
Controls and Adjustments	Emitter: Scan Code selection: 2-position switch (code 1 or 2). Factory default position is code 1. Test/Reset: 2-position switch. Factory default position is Reset. Invert Display: 2-position switch. Factory default position is OFF (Standard display). Fault: 2-position switch. Factory default position is OFF. Receiver: Scan Code selection: 2-position switch (code 1 or 2). Factory default position is code 1. Trip/Latch Output selection: Redundant switches. Factory default position is T (trip). EDM/MPCE monitor selection: 2-position switch selects between 1- or 2-channel monitoring. Factory default position is 2-channel monitoring. (SLPMR models: 1-channel monitoring only) Mute Lamp Monitoring: ON/OFF switch. Factory default position is ON (SLPMR models only) Reduced Resolution: Redundant switches. Factory default position is OFF. Aux/Fault: 2-position switch. Factory default position is Aux. Invert Display: 2-position switch. Factory default position is OFF.
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24 V dc or dc common

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-SCREEN® Low-Profile 14 & 25 mm Resolution Specifications (cont'd)

Electrical Safety Class (IEC 61140)	III
Operating Range	0.1 to 7 m Range decreases with use of mirrors and/or lens shields: Lens shields – approximately 10% less range per shield Glass-surface mirrors – approximately 8% less range per mirror See the Accessory section for more information on a specific mirror page 956, for further information.
Ambient Light Immunity	> 10,000 lux at 5° angle of incidence
Strobe Light immunity	Totally immune to one Federal Signal Corp. "Fireball" model FB2PST strobe
Effective Aperture Angle (EAA)	Meets Type 4 requirements per IEC 61496-2, ± 2.5° @ 3 m
Enclosure	Materials: Extruded aluminum housing with yellow polyester powder finish standard (optional clear anodized aluminum or nickel-plated silver finish) and well-sealed, rugged die-cast zinc end caps, acrylic lens cover, copolyester access cover. End caps on silver models are also nickel-plated. ESD-safe models have static-dissipative acrylic lens cover. Rating: IP65
Operating Conditions	Temperature: 0° to +55° C Max. Relative Humidity: 95% maximum relative humidity (non-condensing)
Status Indicators	Emitter: One Bicolor (Red/Green) status indicator– indicates operating mode, lockout or power OFF condition 7-segment Diagnostic Indicator (1 digit) – indicates proper operation, scan code or error code Receiver: Yellow Reset indicator – indicates whether system is ready for operation or requires a reset Bicolor (Red/Green) Status indicator – indicates general system and output status Bicolor (Red/Green) Zone Status indicators – indicate condition (clear or blocked beam) of a defined group of beams 7-Segment Diagnostic indicator (1 digit) – indicates proper operation, scan code, or error code, total number of blocked beams Yellow Mute Device Input Indicators – indicates status of mute device inputs (SLPMR models only)
Mounting Hardware	Emitter and receiver each are supplied with a pair of swivel end-mounting brackets and two swivel side-mounting brackets. Models longer than 690 mm also include one or more additional side-mount brackets for center support.
Shock and Vibration	EZ-SCREEN LP components have passed vibration and shock tests according to IEC 61496-1. This includes vibration (10 cycles) of 10-55 Hz at 0.35 mm single amplitude (0.70 mm peak-to-peak) and shock of 10 g for 16 milliseconds (6,000 cycles).
Design Standards	Designed to comply with Type 4 per IEC 61496-1/-2; Category 4 PLe per EN ISO 13849-1; SIL 3 per IEC 61508, SIL CL3 per IEC 62061
Certifications	CE TUV Rheinland of North America, a Nationally Recognized Test Laboratory (NRTL) in the United States according to OSHA 29 CFR 1910.7, and accredited by the Standards Council of Canada to test and certify products to Canadian National Standards, has certified the EZ-SCREEN Low Profile to all applicable U.S. and Canadian National Standards. The cTUVus mark is recognized throughout the United States and Canada by OSHA and the SCC. C US Actual certification mark on EZ-SCREEN Low Profile product labels. This simplified certification mark is used on the product labels due to limited space.
Wiring Diagrams	WD002, WD003, WD004, WD005, WD006, WD007, WD013, WD014, WD015, WD016, WD017, WD018, WD019 (p. 1008)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



EZ-SCREEN Grids
Type 4 Multi-Beam Systems

The EZ-SCREEN Grids have strong, durable housings and are an optically synchronized, opposed-mode optoelectronic light grid, requiring no external controller.

- Operates in range up to 70 m
- Resists impact, twisting and abusive environments with a durable aluminum housing
- Exceeds OSHA/ANSI Control Reliability requirements and is certified to cULus NIPF, and complies with Type 4 (IEC 61496) and Category 4 (EN 954)
- Includes blocked beam zone indicators
- Can be combined with other devices, such as mirrors and Points, for a custom configuration
- Cordsets and brackets see page 702

EZ-SCREEN® Grid Systems Model Key, 24 V DC Example Model Number SGP3-533Q88E

Model Style		Number of Beams		Beam Spacing (mm)	Connection Emitter/Receiver		Pair †
SG	P	3	—	533		or	Q88E

- SG = Safety Grid (Receiver & Short Range Emitters)
  SGXL = Safety Grid (Long Range Emitters & Pairs)
- P:
  E = Emitter
  R = Receiver
  P = Pair †
- 3:
  2 = 500 or 584
  3 = 400 or 533
  4 = 300
- 533:

Beam Spacing		Protected Height (mm)
300	=	900
400	=	800
500	=	500
533	=	1066
584	=	584

- Connection Emitter/Receiver: Q8E = 8-pin QD
- Pair †: Q88E = Emitter with 8-pin QD, Receiver with 8-pin QD

For more specifications see page 703.

A model with a QD requires a mating cordset (see page 702).

For emitters and receivers with a wiring terminal chamber, remove the Q8E or Q88E from the model number (example, SGE4-300).
For an emitter with a 5-pin Mini QD and TEST function, replace Q8E with Q5 on emitter model numbers (example, SGE4-300Q5) and Q88E with Q85 on pair model numbers (example, SGP4-300Q85).
For emitters with a 3-pin Mini QD, replace Q8E with Q3 (example, SGE4-300Q3); and
for receivers with an 8-pin Mini QD, replace Q8E with Q8 on model numbers (example, SGR4-300Q8); or for a pair replace Q88E with Q83 (example, SGP4-300Q83).

† A pair includes an emitter and receiver (example, SGP3-533Q88E)
Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



EZ-SCREEN Points
Type 4 Single-Beam Systems

EZ-SCREEN Point systems have strong, durable housings and are a synchronized, opposed-mode single optoelectronic light beam, requiring no external controller.

- Operates in range up to 70 m
- Resists impact, twisting and abusive environments with a durable aluminum housing
- Exceeds OSHA/ANSI Control Reliability requirements and is certified to cULus NIPF, and complies with Type 4 (IEC 61496) and Category 4 (EN 954)
- Includes blocked beam zone indicators
- Can be combined with other devices, such as mirrors and Points, for a custom configuration
- Cordsets and brackets see page 702

EZ-SCREEN® Point Systems Model Key, 24 V DC Example Model Number SPP1Q88E

Model Style		Number of Beams	Connection Emitter/Receiver		Pair †
SP	P	1		or	Q88E
SP = Safety Point (Receiver & Short Range Emitters) SPXL = Safety Point (Long Range Emitters & Pairs)	E = Emitter R = Receiver P = Pair †	1 = Point Models	Q8E = 8-pin QD		Q88E = Emitter with 8-pin QD Receiver with 8-pin QD

For more specifications see page 703.

A model with a QD requires a mating cordset (see page 702).

For emitters and receivers with a wiring terminal chamber, remove the Q8E or Q88E from the model number (example, SPE1).
For an emitter with a 5-pin Mini QD and TEST function, replace Q8E with Q5 on emitter model numbers (example, SPE1Q5) and Q88E with Q85 on pair model numbers (example, SP1Q85).
For emitters with a 3-pin Mini QD, replace Q8E with Q3 (example, SPE1Q3); and for receivers with an 8-pin Mini QD, replace Q8E with Q8 on model numbers (example, SPR1Q8); or for a pair replace Q88E with Q83 (example, SPP1Q83).

† A pair includes an emitter and receiver (example, SPP1Q88E)
Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD

See page 916

Length	8-Pin
4.57 m	QDE-815D
7.62 m	QDE-825D
15.3 m	QDE-850D
22.9 m	QDE-875D
30.5 m	QDE-8100D

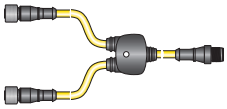


Additional cordset information available.
See page 904.

Euro QD Splitter

See page 919

Length	8-Pin
0 m	CSB-M1280M1280
0.30 m	CSB-M1281M1281
2.50 m	CSB-M1288M1281
4.60 m	CSB-M12815M1281
7.60 m	CSB-M12825M1281
7.60 m	CSB-UNT825M1281



Euro QD–Double-Ended

See page 917

Length	8-Pin*
0.31 m	DEE2R-81D
0.91 m	DEE2R-83D
2.44 m	DEE2R-88D
4.57 m	DEE2R-815D
7.62 m	DEE2R-825D
15.2 m	DEE2R-850D
22.9 m	DEE2R-875D
30.5 m	DEE2R-8100D



* For connection to safety BUS gateway/node, a "smart" self-monitored safety module, safety controller or safety PLC see page 917.

Brackets

Grids & Points–Type 4				Points–Type 4	
See page 894	See page 895	See page 896	See page 894	See page 895	See page 896
EZA-MBK-1*	EZA-MBK-3	EZA-MBK-9	EZA-MBK-2**	EZA-MBK-4	EZA-MBK-5















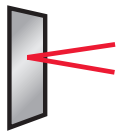
Additional brackets and information available.
See page 846.

* Standard brackets included with emitter/receiver.
** One EZA-MBK-2 adapter bracket kit required per sensor when mounting to MSA series stands.
NOTE: See page 706 for interfacing solutions.

Other Accessories

Stands	Mirrors	Interface
See page 952	See page 956	See page 970







Replacement Parts

Model	Description
EZA-AP-1	Access port plug with o-ring
EZA-CP-13	Pg13.5 plug with o-ring
EZA-ECE-1	Emitter wiring chamber end cap (with gasket, captive screws, 3 plugs with o-rings, terminal block)
EZA-ECR-1	Receiver wiring chamber end cap (with gasket, captive screws, 3 plugs with o-rings, terminal block)
EZA-SW-1	Spanner wrench for Grid and Point
EZA-TBE-1	Emitter terminal block
EZA-TBR-1	Receiver terminal block
MGA-K-1	Replacement key for switch MGA-KS0-1
MGA-KS0-1	Panel-mount keyed normally open reset switch
STP-3	Specified test piece, 45 mm dia.

NOTE: See installation manual p/n 112852 for complete list of replacement parts and accessories.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



EZ-SCREEN Grid Systems



EZ-SCREEN Point Systems

EZ-SCREEN® Grid & Point Specifications

Supply Voltage	24 V dc ±15%, 10% max. ripple
Supply Current	Emitter: 150 mA max. Receiver: 500 mA max., exclusive of OSSD1 and OSSD2 loads (up to an additional 0.5A each)
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24 V dc or dc common (except Emitter AUX power connections)
Response Time	24 milliseconds or less from interruption of light grid beam to safety outputs going to OFF-state
EDM Input	+24 V dc signals from external device contacts can be monitored (single-channel, dual-channel or no monitoring) via EDM1 and EDM2 terminals in the receiver. Monitored devices must respond within 200 milliseconds of an output change.
Reset Input	The Reset input must be high (10 to 30 V dc at 30 mA) for 0.25 to 2 seconds and then low (less than 3 V dc) to reset the receiver.
Remote Test Input (optional- available only on certain models)	Test mode is activated either by applying a low signal (less than 3 V dc) to emitter TEST1 terminal for a minimum of 50 milliseconds, or by opening a switch connected between TEST1 and TEST2 terminals for a minimum of 50 milliseconds. Beam scanning stops to simulate a blocked condition. A high signal (10 to 30 V dc, 35 mA inrush, 10 mA max.) at TEST1 terminal deactivates Test mode and allows the emitter to operate normally. TEST1 and TEST2 are factory jumpered on models with wiring chamber.
Safety Outputs	Two diverse-redundant solid-state 24 V dc, 0.5 A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.) Capable of the Banner "Safety Handshake." ON-State voltage: ≥Vin-1.5 V dc — OFF-State voltage: 1.2 V dc max. Max. load resistance: 1000 Ω — Max. load capacitance: 0.1 µF OSSD test pulse width: 250 microseconds — OSSD test pulse period: 6 milliseconds
Controls and Adjustments	Emitter: Scan code selection: 2-position switch (code 1 or 2). Factory default position is 1. Receiver: Scan code selection: 2-position switch (code 1 or 2). Factory default position is 1. Trip/latch output selection: redundant switches. Factory default position is L (latch) EDM/MPCE monitor selection: redundant switches select between 1- or 2-channel monitoring. Factory default position is 2.
Emitter/Receiver Operating Range	Short-range models: 0.8 m to 20 m — Long-range models: 15 m to 70 m Range decreases with use of mirrors and/or lens shields.

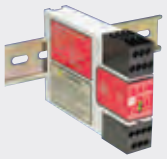
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-SCREEN® Grid & Point Specifications (cont'd)

Beam Spacing	Model SG...4-300: 300 mm Model SG...2-500: 500 mm Model SG...2-584: 584.2 mm Model SG...3-400: 400 mm Model SG...3-533: 533.4 mm
Beam Diameter	25 mm
Ambient Light Immunity	> 10,000 lux at 5° angle of incidence
Strobe Light Immunity	Totally immune to one Federal Signal Corp. "Fireball" model FB2PST strobe
Emitter Elements	Infrared LEDs, 880 nm at peak emission
Effective Aperture Angle (EAA)	Meets Type 4 requirements per IEC 61496-2 Short-range models: ± 2.5° @ 3 m Long-range models: ± 2.5° @ 15 m
Enclosure	Materials: Extruded aluminum housings with yellow polyester powder finish and well-sealed, rugged molded PBT end caps, acrylic lens cover Rating: NEMA 4, 13; IP65
Operating Conditions	Temperature: 0° to +50° C Relative humidity: 95% (non-condensing)
Shock and Vibration	EZ-SCREEN systems have passed vibration and shock tests according to IEC 61496-1/-2. This includes vibration (10 cycles) of 10-55 Hz at 0.35 mm single amplitude (0.70 mm peak-to-peak) and shock of 10 g for 16 milliseconds (6,000 cycles).
Status Indicators	7-Segment Diagnostic Indicators, Both Emitter and Receiver Dash (–) = System is OK Error Codes = See product manuals (p/n 68410 or 68413) for code definitions and recommended action Scan code setting = Appears during power-up or after scan code is changed. (C1 or C2) (Temporary indication; normal display resumes within a few seconds.) Emitter: One bicolor (red/green) Status indicator Green steady = RUN mode Green single flashing = TEST mode Red single flashing = Lockout OFF = No power to sensor Receiver: Two System Status indicators, plus one bi-color (red/green) Beam Status indicator for each beam Yellow Reset Indicator ON steady = RUN mode Double flashing = Waiting for manual reset after power-up Single flashing = Waiting for manual latch reset OFF = No power to sensor or system is not ready for operation Bicolor (Red/Green) Status Indicator Green steady = Outputs ON Red steady = RUN mode, outputs OFF Red single flashing = Lockout OFF = No power to sensor or system is not ready for operation Bicolor (Red/Green) Beam Status Indicators Green steady = Clear beam, strong signal Green flickering = Clear beam, weak signal Red steady = Beam blocked OFF = No power to sensor or no scanning
Mounting Hardware	Emitter and receiver each are supplied with a pair of swivel end mounting brackets. Mounting brackets are 8-gauge cold-rolled steel, black zinc finish.
Cables and Connections	Cables are user-supplied. Wiring terminals accommodate one 22 to 16 ga. wire or two wires up to 18 ga.; Pg 13.5 wiring chamber access port capacity varies, depending on cable gland or strain relief fitting used. Supplied cable gland is for a cable diameter of 6 to 12 mm.
Design Standards	Designed to comply with Type 4 per IEC 61496-1, -2; Type 4 per UL 61496-1/-2; Category 4 per ISO 13849-1 (EN 954-1)
Certifications	CE c UL us LISTED Important Notice: European Community Machinery Directive 2006/42/EC EZ-SCREEN grids and points comply with Machinery Directive 98/37/EC, but not with Machinery Directive 2006/42/EC. Therefore, the EZ-SCREEN grids and points can only be installed as a replacement component within the European Union (EU). For more information, please see www.bannerengineering.com/144763 or call 1-888-373-6767.
Wiring Diagrams	WD011, WD012, WD013, WD014, WD015, WD016, WD017, WD018, WD019 (p . 1013)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-SCREEN® Interfacing Products

		Description	Models	Product Information
Interface Modules and Controllers		• Interface modules provide two or three normally open force-guided relay outputs rated at 6 A (-9A) or 7A (-11A) • EZ-SCREEN monitors these interface modules when they are connected to the EZ-SCREEN External Device Monitoring (EDM) inputs • Convenient plug-in terminal blocks on a 22.5 mm DIN-rail mountable housing are included	IM-T-9A (3 NO) IM-T-11A (2 NO/1 NC)	Page 828
		• Control system monitors a variety of input devices such as e-stop buttons, rope pulls, enabling devices, protective safety stops, interlocked guards or gates, optical sensors, two-hand controls and safety mats • Intuitive programming environment for easy implementation • Configure inputs, outputs and functionality of the controller for more usability • Base controller allows eight of the 26 inputs to be configured as outputs for efficient terminal utilization • Ethernet models available providing up to 64 virtual status outputs, fault diagnostic codes and messages	SC26-2 SC26-2D SC26-2E SC26-2DE	Page 800
		• One controller provides configurable monitoring of multiple safety devices • 22 input terminals can monitor both contact-based and PNP solid-state input devices • 3 pairs of independent solid-state safety outputs can be used with selectable one- or two-channel external device monitoring • Ten configurable non-safety status outputs track inputs, outputs, lockout, I/O status and other functions • All SC22-3 modules use 24 V dc • 10/100 Base TX Ethernet communication option using EtherNet/IP and Modbus TCP protocols (SC22-3E models)	SC22-3-S... SC22-3-C... SC22-3E-S... SC22-3E-C...	Page 806
Muting Modules		• The Muting Module temporarily inhibits a safety light screen so materials can safely pass through the screen without stopping the machinery • The module uses redundant microcontroller-based logic • MMD Modules can be used as dual controllers when muting function is not used	MMD-TA-12B MMD-TA-11B	Page 822
Receiver AC Interface Boxes		• Versatile power supplies allow EZ-SCREEN systems to connect to AC power sources • Models are available to accommodate receivers only, emitters only or both • Receiver models include 8 amp safety relay output	EZAC-R9-QE8 EZAC-R11-QE8 EZAC-R15A-QE8-QS83 EZAC-R8N-QE8-QS53 EZAC-R10N-QE8-QS53	Page 971
Emitter AC Interface Boxes		• Versatile power supplies allow EZ-SCREEN systems to connect to AC power sources • Models are available to accommodate emitters only • Receiver models include 8 amp safety relay output	EZAC-E-QE8 EZAC-E-QE5 EZAC-E-QE8-QS3 EZAC-E-QE5-QS5	Page 971
Contactors		• Pairs of contactors create safety stop circuits with two normally open contacts in series • EZ-SCREEN can monitor the circuit because of the contacts' force-guided mechanically linked design • Contactors add 10 or 18 amp current carrying capability to any safety system • Auxiliary contacts add 3 or 4 normally open contacts • Suppressors extend the life of an actuating device that uses a contactor. • Modular design simplifies assembly and installation	**Mechanically Linked Contactors** 11-BG00-31-D-024 BF1801L-024 **Aux. Contacts** 11-BGX10-40 11-G484-30 **Suppressors** 11-BGX77-048 11-G318-48	Page 972

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



EZ-SCREEN Type 2
Type 2 Safety Light Screens

A low-cost solution is suited to lower risk applications where the result is only a slight injury.

- Operating range up to 15 m
- Simple, two-piece system requires no control box
- System meets all requirements for Type 2 devices per IEC 61496 and Cat 2 PL d per EN ISO 13849-1 (CE certified) and cULus NIPF
- Fast response times of 11 to 29 milliseconds shutdown machinery quickly
- Dedicated models eliminate selectable functions, DIP switches and programming

EZ-SCREEN® Type 2 Systems, 30 mm Resolution Model Key, 24 V DC

Example Model Number LS2TP30-150Q88

Model Style			Resolution		Defined Area	Connection: Emitter/Receiver		Connection: Pair †
LS2	T	P	30	—	150		or	Q88

- T = Trip, L = Latch
- E = Emitter, R = Receiver, P = Pair †
- 30 = 30 mm

	Housing Length	Response Time
150 =	215 mm	11 ms
300 =	365 mm	13 ms
450 =	515 mm	14 ms
600 =	665 mm	16 ms
750 =	815 mm	17 ms
900 =	964 mm	19 ms
1050 =	1114 mm	21 ms
1200 =	1264 mm	22 ms
1350 =	1414 mm	24 ms
1500 =	1563 mm	25 ms
1650 =	1713 mm	27 ms
1800 =	1863 mm	29 ms

- Q8 = 8-pin QD
- Q88 = Receiver with 8-pin QD, Emitter with 8-pin QD

For more specifications see page 709.

A model with a QD requires a mating cordset (see page 707).

† A pair includes an emitter and receiver (example, LS2TP30-150Q88)

Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD

See page 916

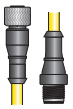
Length	8-Pin QD Straight	5-Pin QD Straight
4.57 m	QDE-815D	QDE-515D
7.62 m	QDE-825D	QDE-525D
15.3 m	QDE-850D	QDE-550D
22.9 m	QDE-875D	QDE-575D
30.5 m	QDE-8100D	QDE-5100D

Additional cordset information available. See page 904.

Euro QD—Double-Ended

See page 917

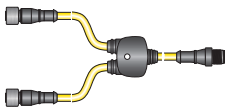
Length	8-Pin QD Straight
0.31 m	DEE2R-81D
0.91 m	DEE2R-83D
2.44 m	DEE2R-88D
4.57 m	DEE2R-815D
7.62 m	DEE2R-825D
15.3 m	DEE2R-850D
22.9 m	DEE2R-875D
30.5 m	DEE2R-8100D



Euro QD Splitter

919

Length	8-Pin
0 m	CSB-M1280M1280
0.30 m	CSB-M1281M1281
2.50 m	CSB-M1288M1281
4.60 m	CSB-M12815M1281
7.60 m	CSB-M12825M1281
7.60 m	CSB-UNT825M1281



NOTE: See page 693 for interfacing solutions.
Additional accessories are listed on page 844.

Brackets

30 mm—Type 2

See page 900	See page 901	See page 901	See page 901
USCMB-..**	USMB-1*	USMB-6	USMB-8









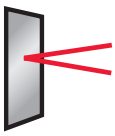
Additional brackets and information available. See page 846.

NOTE: See page 706 for interfacing solutions.
** USCMB-1/-2 are dependent on length
* USMB-1 brackets are supplied

Other Accessories

Stands	Mirrors	Interface
See page 952	See page 956	See page 705





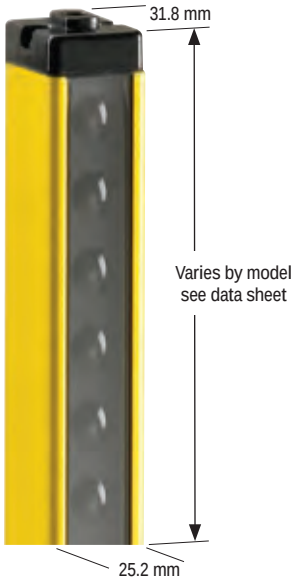


Replacement Parts

Description	Model
Replacement key for switch MGA-KS0-1	MGA-K-1
Panel-mount keyed normally open reset switch	MGA-KS0-1
30 mm test piece	STP-14
Standard end brackets with hardware to mount to MSA series stands	USMB-1
Center bracket kit and standard end brackets with hardware to mount to MSA series stands (1 bracket, for 600 to 900 mm long sensors)	USCMB-1
Center bracket kit and standard end brackets with hardware to mount to MSA series stands (2 brackets, for 1050 to 1500 mm long sensors)	USCMB-2

NOTE: See installation manual p/n 112852 for complete list of replacement parts and accessories.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



EZ-SCREEN
Type 2 Systems

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-SCREEN® Type 2 Specifications

Supply Voltage at the Device	24 V dc ±20% (PELV) (The external voltage supply must be capable of buffering brief mains interruptions of 20 milliseconds as specified in EN/IEC 60204-1.)
Supply Current	Emitter: 50 mA max. Receiver: 90 mA max., exclusive of OSSD1 and OSSD2 loads (up to an additional 0.5A each)
Wavelength of Emitter Elements	Infrared LEDs, 950 nm at peak emission
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24 V dc or dc common
Electrical Safety Class (IEC 61140)	III
Operating Range	0.2 m to 15 m Range decreases with use of mirrors and/or lens shields: Lens shields – approximately 10% less range per shield Glass-surface mirrors – approximately 8% less range per mirror See Accessory section for more information on a specific mirror, page 956
Effective Aperture Angle (EAA)	Meets Type 2 requirements per IEC 61496-2; ± 5° @ 3 m
Ambient Light Immunity	> 10,000 lux at 5° angle of incidence
Strobe Light Immunity	Immune as per IEC 61496-2
Response Time	Dependent on number of beams; see Models key on page 706
EDM Input	"Power Monitoring" accomplished via Reset/Remote Test input
Reset Input / Remote Test Input	Connect to +24 V dc via a normally closed (NC) reset switch Auto Rest (Trip Output) Models: Test/Reset Manual Rest (Latch Output) Models: Test/Restart/Reset
Safety Outputs	Two redundant solid-state 24 V dc, 0.5 A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.) Not compatible with the Banner "Safety Handshake" ON-State voltage: > Vin-1.5 V dc OFF-State voltage: 0.2 V dc max. Max. load capacitance: 0.1 µF Min. load resistance: 48 Ω Open ground leakage current: 0.65 mA max. OSSD test pulse width: 0.2 - 0.25 milliseconds OSSD test pulse period: 260 milliseconds typical
Enclosure	Materials: Extruded aluminum housing with yellow polyester powder finish and well-sealed, rugged die-cast zinc end caps, acrylic lens cover Rating: IP65
Operating Conditions	Temperature: 0° to +55° C Relative humidity: 95% maximum (non-condensing)
Shock and Vibration	EZ-SCREEN Type 2 components have passed vibration and shock tests according to IEC 61496-1. This includes vibration (10 cycles) of 10-55 Hz at 0.35 mm single amplitude (0.70 mm peak-to-peak) and shock of 10 g for 16 milliseconds (6,000 cycles).
Design Standards	Designed to comply with Type 2 per IEC 61496-1/-2; Category 2 Pl d per EN ISO 13849-1; SIL 2 per IEC 61 508; Type 2 per UL 61496-1/-2
Certifications	CE c UL us LISTED
Wiring Diagrams	Emitter: WD008 (p. 1011) Receiver with 2 Solid-State OSSDs, 2 FSDs and Power Monitoring: WD009 (p. 1012) Power Monitoring of IM-T-9A Interface Module: WD010 (p. 1012)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Laser Scanners

Safety laser scanners provide a safety solution for mobile vehicles and stationary applications, such as the interior of robotic work cells, that cannot be solved by other safeguarding solutions.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



AG4
Safety Laser Scanners

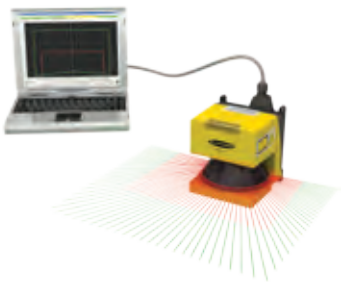
Two-dimensional laser scanners effectively protect personnel, as well as stationary and mobile systems within a user designated area.

- Eight protective warning field pairs are individually defined using a PC
- Scanner has 0.36° lateral resolution and detects objects in 190° working zone
- The highly flexible protective and warning fields can be set to match the shape of the work area
- Exceeds OSHA/ANSI Control Reliability requirements, certified to cTUVus, and CE certified to Type 3, Cat 3 PLd, and SIL 2
- Compact design with a rugged, die-cast aluminum housing for simple installation into work areas
- Cordsets and brackets see page 713

AG4 Safety Laser Scanners, 24 V DC

Range		Safety	Aux.	Scanning	Response	
Protective Fields	Warning Fields	Output	Outputs	Angle	Time	Model*
30 mm Resolution = 1.6 m 40 mm Resolution = 2.2 m 50 mm Resolution = 2.8 m 70 mm Resolution = 4.0 m 150 mm Resolution = 4.0 m	150 mm Resolution = 15 m	2 PNP OSSD	2 PNP	190°	80 ms (Default) adjustable to 640 ms	AG4-4E
30 mm Resolution = 1.6 m 40 mm Resolution = 2.2 m 50 mm Resolution = 2.8 m 70 mm Resolution = 6.25 m 150 mm Resolution = 6.25 m	150 mm Resolution = 15 m	2 PNP OSSD	2 PNP	190°	80 ms (Default) adjustable to 640 ms	AG4-6E

* Model includes scanner, plugs and CD with diagnostic and configuration software. Cordset ordered separately (see page 713).



Configuration and Diagnostic Software
Graphically adjust all device parameters and the protective field contours to both local conditions and required safety distances.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Test Box



With the test box it's possible to test the following Scanner functions without hooking it up to the machine interface:

- Can be used as a "cloning" device to load the same configuration into multiple scanners
- Switch over between the different field pairs
- Indication of the Safety OSSD outputs (when entering protective field)
- Indication of the Alarm outputs (when entering warning field)
- Machine Interface-to-Test Box cordset included
- Power supply not included

Test Box for AG4 Safety Laser Scanners

Description	Model
AG4 Test Box	AG4-TB1

AG4 Safety Laser Scanner Kits



You can purchase a kit that contains a laser scanner, optional interfacing solutions and cordsets.

- *Scanner* *page 711*
- *Interfacing Options* *715*
- *Cordsets* *713*

To Order:
1. Choose an optional interfacing solution, such as an UM-FA-9A or -11A universal input safety module.
2. Choose a DB15 machine interface cordset, such as AG4-CPD15...
3. Choose a PC communication cordset, such as AG4-PCD9...

See www.bannerengineering.com for complete documentation and a current listing of accessories.

AG4 Safety Laser Scanner Kit Model Key

Model Family	Kit	Range	Interfacing Options	Machine Interface Cordset Options	PC Cordsets
AG4	K	4E	10	M10	P10
	K = Kit	4E = 4 m 6E = 6 m	Blank = None 10 = UM-FA-9A 11 = UM-FA-11A 12 = MMD-TA-11A 13 = MMD-TA-12A	M5 = 5 m M10 = 10 m M25 = 25 m M50 = 50 m	P3 = 3 m P5 = 5 m P10 = 10 m Blank = none

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

DB15 Machine Interface

See page 932

Length	Model
5.00 m	AG4-CPD15-5
10.0 m	AG4-CPD15-10
25.0 m	AG4-CPD15-25
50.0 m	AG4-CPD15-50



Additional cordset information available. See page 904.

DB9 PC Communication*

See page 932

Length	Model
3.00 m	AG4-PCD9-3
5.00 m	AG4-PCD9-5
10.0 m	AG4-PCD9-10



* RS-232 Serial protocol

DB9 to USB†

See page 932

Length	Model
1.00 m	AG4-PCD9USB-1



† Not recommended for use with AG4-PCD9-10

Brackets

AG4

See page 899

AG4-MBK1



Additional brackets and information available. See page 846.

Misc. Replacement Parts

Description	Model
Replacement window	AG4-WIN1
Replacement configuration plug, straight	AG4-CP
Replacement PC plug, straight	AG4-PCD9

Description	Model
Cleaning set (150 ml fluid)	AG4-CLN1
Cleaning set (1000 ml fluid)	AG4-CLN2



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

AG4 Laser Scanner Specifications

Supply Voltage (UB)	24 V dc (+20% / -30%) Power supply in acc. with IEC 742 with safe supply isolation and compensation with voltage dips of up to 20 milliseconds in acc. with EN 61496-1. **Over current protection:** Via 1.6 A fuse, melting fuse in the cabinet **Over-voltage protection:** Over-voltage protection with safe limit stop **Protective earth conductor:** Connection not permitted
Supply Current	420 mA approx. (use 2.5 A power supply)
Fuse (power supply)	1.6A normal blow, medium time lag fuse (user supplied)
Response Time	Min. 80 milliseconds (2 scans) Max. 640 milliseconds (16 scans)
Wavelength	905 nm
Protection Field (Sensing Range)	AG4-4E: **150 mm resolution:** 200 mm to 4.0 m (radius) **70 mm resolution:** 200 mm to 4.0 m (radius) **50 mm resolution:** 200 mm to 2.8 m (radius) **40 mm resolution:** 200 mm to 2.2 m (radius) **30 mm resolution:** 200 mm to 1.6 m (radius) **Sensing object reflectance:** Minimum 1.8% AG4-6E: **150 mm resolution:** 200 mm to 6.25 m (radius) **70 mm resolution:** 200 mm to 6.25 m (radius) **50 mm resolution:** 200 mm to 2.8 m (radius) **40 mm resolution:** 200 mm to 2.2 m (radius) **30 mm resolution:** 200 mm to 1.6 m (radius) **Sensing object reflectance:** Minimum 1.8%
Warning Field	**Resolution:** 150 mm (at 15 m) **Sensing range (radius):** 200 mm to 15 m **Sensing object reflectance:** Minimum 20%
Monitored Area	0-50 m
Scanning Angle	max. 190°
Output Signal Switching Devices (OSSD1, OSSD2)	**PNP open-collector transistor 2 outputs:** short circuit proofed **Rated operating voltage:** supply voltage (UB) -3.2 V **Max. source current:** 250 mA **Residual voltage:** 3.2 V or less **Operation mode:** **No object in protection field:** ON **Object inside protection field:** OFF **Response Time:** Min. 80 milliseconds (2 scans) to max. 640 milliseconds (16 scans) switching method
Alarm (Auxiliary) Outputs 1 & 2	PNP open-collector transistor **Rated operating voltage:** supply voltage (UB) -4 V **Max. source current:** 100 mA **Residual voltage:** 4 V or less **Operation mode:** Switching method of operation mode (set below) **Scanner at normal operation:** ON **Abnormal operation:** OFF **No object inside Warning Field:** ON **Object inside Warning Field:** OFF **Response Time:** Min. 80 milliseconds (2 scans) to max. 640 milliseconds (16 scans) switching method
Start-restart	+24 V opto-uncoupled, dynamically monitored
Field Pair Switchover	Selection of 4 or 8 field pairs via 4 control lines, +24 V opto-uncoupled, dynamically monitored, logically 1 = field pair activated
Input Signal Definition	**High/logical 1:** 16-30 V **Low/logical 0:** less than 3 V
Laser Protection Class	Class 1 (IEC 60825-1)
Number of Field Pair Configurations	8 Field Pairs in combination of Protective Field and Warning Field can be switched over by external input. Field Pair number 8 is not user configurable.
Environmental Rating	IP65 (per IEC 60529)
Housing Material	Die-cast aluminum with a thermoplastic resin window
Weight	2.1 kg
Operating Conditions	**Temperature:** 0° to 50°C **Humidity:** Max. 95%
Indicators	Five LEDs on front show Safety Sensor Status
Shock and Vibration	10 to 150 Hz frequency, 5 G max. (50 m/s^2 approx.) in X, Y and Z directions for twenty times each
Max Cordset Length	**15-pin plug:** 50 m **9-pin plug:** 10 m (RS-232C), 50 m (RS-422)
Design Standards	IEC 61496-1/-3 (Type 3), ISO 13849-1 (Category 3, PLd), IEC 61508-1 to -7 (SIL2) and IEC 62061 SIL CL2
Certifications	TUV Rheinland of North America, a Nationally Recognized Test Laboratory (NRTL) in the United States according to OSHA 29 CFR 1910.7, and accredited by the Standards Council of Canada to test and certify products to Canadian National Standards, has certified the AG4 Laser Scanner to all applicable U.S. and Canadian National Standards. The cTUVus mark is recognized throughout the United States and Canada by OSHA and the SCC.
Wiring Diagrams	WD20, WD21, WD22 (p. 1018)

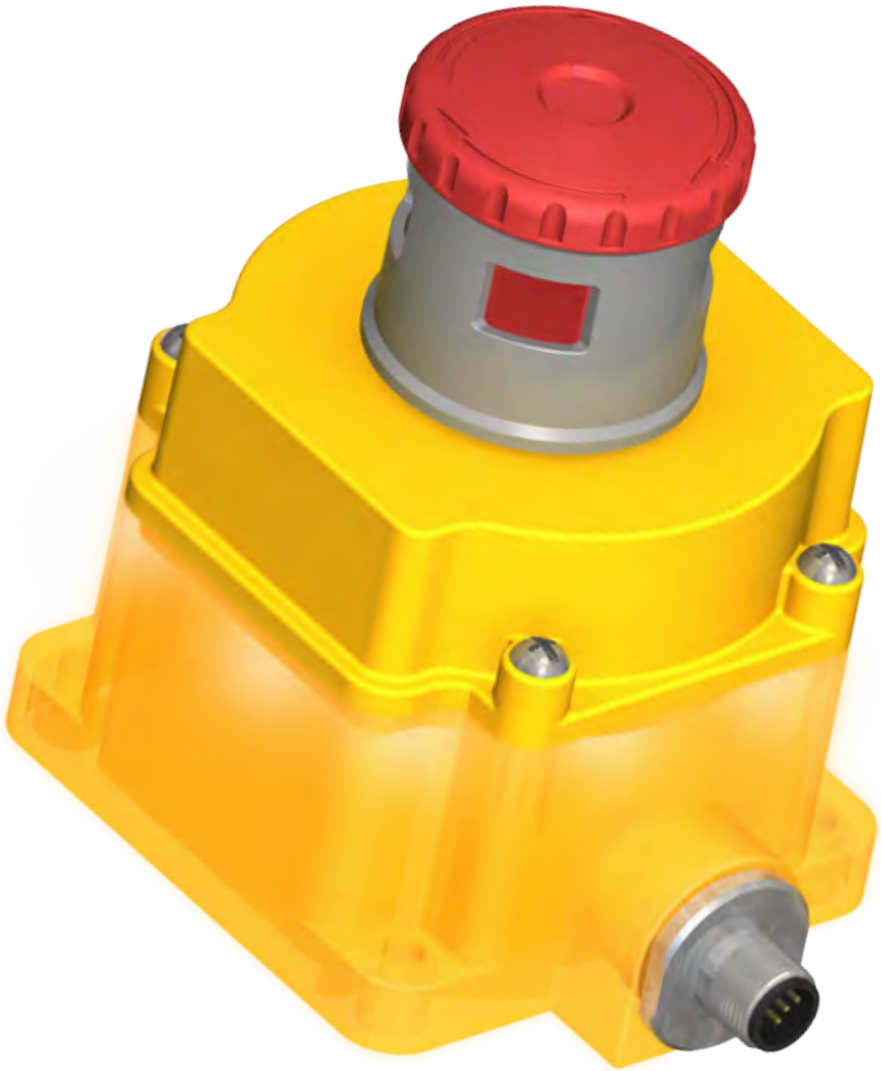
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

AG4 Interfacing Products

		Description	Models	Product Information
Interface Modules and Controllers		• Universal input safety modules monitors both contact-based and PNP solid-state input devices • Convenient plug-in terminal blocks on a 22.5 mm DIN-rail mountable housing	UM-FA-9A (3 NO) UM-FA-11A (2 NO/1NC)	Page 818
		• Control system monitors a variety of input devices such as e-stop buttons, rope pulls, enabling devices, protective safety stops, interlocked guards or gates, optical sensors, two-hand controls and safety mats • Intuitive programming environment for easy implementation • Configure inputs, outputs and functionality of the controller for more usability • Base controller allows eight of the 26 inputs to be configured as outputs for efficient terminal utilization • Ethernet models available providing up to 64 virtual status outputs, fault diagnostic codes and messages	SC26-2 SC26-2D SC26-2E SC26-2DE	Page 800
		• One controller provides configurable monitoring of multiple safety devices • 22 input terminals can monitor both contact-based and PNP solid-state input devices • 3 pairs of independent solid-state safety outputs can be used with selectable one- or two-channel external device monitoring • Ten configurable non-safety status outputs track inputs, outputs, lockout, I/O status and other functions • All SC22-3 modules use 24 V dc • 10/100 Base TX Ethernet communication option using EtherNet/IP and Modbus TCP protocols (SC22-3E models)	SC22-3-S... SC22-3-C... SC22-3E-S... SC22-3E-C...	Page 804
Muting Modules		• The Muting Module temporarily inhibits a safety light screen so materials can safely pass through the screen without stopping the machinery • The module uses redundant microcontroller-based logic • MMD Modules can be used as dual controllers when muting function is not used	MMD-TA-12B MMD-TA-11B	Page 822

NC = Normally closed, NO = Normally open

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Emergency Stop Buttons

Push-to-stop/twist-to-release Emergency Stop palm buttons are available in panel-mount or remotely located IP65 enclosures. Illuminated models help operators quickly identify actuated buttons, allowing for a quick return to normal operations.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Options	Mounting	Dimensions H x W x D	Protection Rating
	Easy to install 30 mm mount. page page 718	Non-Illuminated Illuminated	30 mm	119.8 x ø 80 mm	IP65
	Flat mount with wide variety of options. page page 719	Non-Illuminated Illuminated Non-Illuminated Locking Illuminated Locking	Flat mount	102.1 x 80.8 x 80.3 mm	IP65
	Panel mount E-Stop buttons. page page 730	Non-Illuminated Illuminated Locking Illuminated Locking	Panel	Varies by model	IP65
	Mechanical E-Stop button kits. page page 734	High current Plastic shaft Metal shaft	Panel or flat	106 x 70 x 70 mm	IP65

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



E-Stop Buttons
Illuminated 30 mm Mount

Illumination allows for easy identification of which E-stop has been activated.

- Easy installation and no assembly or individual wiring required
- Push-to-stop, twist-to-release or pull-to-release operation per IEC 60947-5-5
- Compliant with ANSI B11.19, ANSI NFPA79 and IEC/EN 60204-1 Emergency Stop requirements
- Incorporate with OTB/STB optical touch button for a simplified operator station that does not require an additional enclosure.
- "Safe Break Action" ensures NC contacts will open if the contact block is damaged or separated from the actuator
- Models designed to interface with Safety BUS nodes/gateways

Illuminated Base-mount E-Stop Push-Buttons

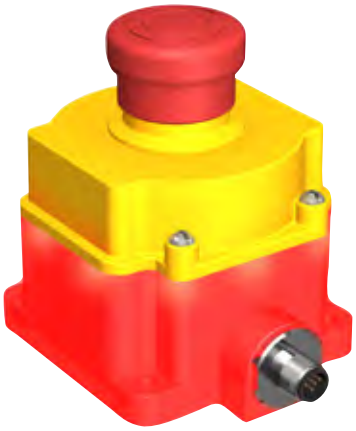
Description	Illumination**	Models
2NC / 1NO (PNP)	YEtL/RED-Flash/Solid	SSA-EB1PLYR-12ECQ8
2NC / 1NO (PNP)	GREEN/RED-Flash/Solid	SSA-EB1PLGR-12ECQ8
2NC / 1NO (PNP)	OFF/RED-Flash/Solid	SSA-EB1PLXR-12ECQ8
2NC / 1NO (PNP)	OFF/RED-Solid/Solid	SSA-EB1PL-12ECQ8
2NC – Safety BUS node compatible*	YEL/RED-Flash	SSA-EB1PLYR-02ECQ5A
2NC – Safety BUS node compatible*	YEL/RED-Flash	SSA-EB1PLYR-02ECQ5B
2NC – Safety BUS node compatible*	OFF/RED-Flash	SSA-EB1PLXR-02ECQ5A
2NC – Safety BUS node compatible*	OFF/RED-Flash	SSA-EB1PLXR-02ECQ5B
2NC – Safety BUS node compatible*	OFF/RED-Solid	SSA-EB1PL-02ECQ5A
2NC – Safety BUS node compatible*	OFF/RED-Solid	SSA-EB1PL-02ECQ5B

For more specifications see page 727.

Connection options: A model with a QD requires a mating cordset (see page 724).

* For pinout information see page 724.
** For EZ-LIGHT Illumination logic see page 725.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



E-Stop Buttons
Illuminated Flush Mount

Illumination allows for easy identification of which E-stop has been activated.

- Easy installation with no assembly or individual wiring required
- Remotely located E-Stop buttons can be positioned to be clearly identified, clearly visible and readily accessible
- Push-to-stop, twist-to-release or pull-to-release operation per IEC 60947-5-5
- Compliant with ANSI B11.19, ANSI NFPA79 and IEC/EN 60204-1 Emergency Stop requirements
- "Safe Break Action" ensures NC contacts will open if the contact block is damaged or separated from the actuator
- Models designed to interface with Safety BUS nodes/gateways

Illuminated Flush-mount E-Stop Push-Buttons

Description	Illumination**	Models
2NC / 1NO (PNP)	YEL/RED-Flash/Solid	SSA-EB1PLYR-12ED1Q8
2NC / 1NO (PNP)	GREEN/RED-Flash/Solid	SSA-EB1PLGR-12ED1Q8
2NC / 1NO (PNP)	OFF/RED-Flash/Solid	SSA-EB1PLXR-12ED1Q8
2NC / 1NO (PNP)	OFF/RED-Solid/Solid	SSA-EB1PL-12ED1Q8
2NC – Safety BUS node compatible*	YEL/RED-Flash	SSA-EB1PLYR-02ED1Q5A
2NC – Safety BUS node compatible*	YEL/RED-Flash	SSA-EB1PLYR-02ED1Q5B
2NC – Safety BUS node compatible*	OFF/RED-Flash	SSA-EB1PLXR-02ED1Q5A
2NC – Safety BUS node compatible*	OFF/RED-Flash	SSA-EB1PLXR-02ED1Q5B
2NC – Safety BUS node compatible*	OFF/RED-Solid	SSA-EB1PL-02ED1Q5A
2NC – Safety BUS node compatible*	OFF/RED-Solid	SSA-EB1PL-02ED1Q5B

For more specifications see page 727.

Connection options: A model with a QD requires a mating cordset (see page 724).

* For pinout information see page 724.
** For EZ-LIGHT Illumination logic see page 725.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



E-Stop Buttons
30 mm Mount

The 30 mm Mount E-Stop Buttons allow for easy installation with no assembly or individual wiring required.

- Rugged design
- Push-to-stop, twist-to-release or pull-to-release operation per IEC 60947-5-5
- Compliant with ANSI B11.19, ANSI NFPA79 and IEC/EN 60204-1 Emergency Stop requirements
- "Safe Break Action" ensures NC contacts will open if the contact block is damaged or separated from the actuator
- Models designed to interface with Safety BUS nodes/gateways

Base-mount E-Stop Push-Buttons

Description	Models
2NC	SSA-EB1P-02ECQ4
1NC / 1NO	SSA-EB1P-11ECQ4
2NC – Safety BUS node compatible*	SSA-EB1P-02ECQ5A
2NC – Safety BUS node compatible*	SSA-EB1P-02ECQ5B
2NC / 2NO	SSA-EB1P-22ECQ8

For more specifications see page 727.

Connection options: A model with a QD requires a mating cordset (see page 724).

* For pinout information see page 724.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



E-Stop Buttons
Flush Mount

Flush Mount E-Stop Buttons are easy to install with no assembly or individual wiring required.

- Models designed to interface with Safety BUS nodes/gateways
- Rugged design
- Push-to-stop, twist-to-release or pull-to-release operation per IEC 60947-5-5
- Compliant with ANSI B11.19, ANSI NFPA79 and IEC/EN 60204-1 Emergency Stop requirements
- "Safe Break Action" ensures NC contacts will open if the contact block is damaged or separated from the actuator

Flush-mount E-Stop Push-Button

Description	Standard Models
2NC	SSA-EB1P-02ED1Q4
1NC/1NO	SSA-EB1P-11ED1Q4
2NC, Safety BUS node compatible*	SSA-EB1P-02ED1Q5A
2NC, Safety BUS node compatible*	SSA-EB1P-02ED1Q5B
2NC/2NO	SSA-EB1P-22ED1Q8
2NC/1NO, Illuminated button—Push ON RED	SSA-EB1PL2-12ED1Q8

For more specifications see page 727.

Connection options: A model with a QD requires a mating cordset (see page 724).

* For pinout information see page 724.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Lockable E-Stop Buttons
Illuminated Flush Mount

Illuminated Flush Mount Lockable E-Stop Buttons are easy to install and have a locking capability.

- Push-to-stop, twist-to-release operation per IEC 60947-5-5
- Compliant with ANSI B11.19, ANSI NFPA79 and IEC/EN 60204-1 Emergency Stop requirements
- "Safe Break Action" ensures NC contacts will open if the contact block is damaged or separated from the actuator
- Models designed to interface with Safety BUS nodes/gateways
- Rugged design is easy to install with no assembly or individual wiring required

Lockable Illuminated Flush-mount E-Stop Push-Buttons

Description	Illumination*	Models
2NC / 1NO (PNP)	YEL/RED-Flash/Solid	SSA-EB1MLYRP-12ED1Q8
2NC / 1NO (PNP)	GREEN/RED-Flash/Solid	SSA-EB1MLGRP-12ED1Q8
2NC / 1NO (PNP)	OFF/RED-Flash/Solid	SSA-EB1MLXRP-12ED1Q8
2NC / 1NO (PNP)	OFF/RED-Solid/Solid	SSA-EB1MLP-12ED1Q8

For more specifications see page 728.

Connection options: A model with a QD requires a mating cordset (see page 724).

* For EZ-LIGHT Illumination logic see page 725.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Lockable E-Stop Buttons
Flush Mount

Flush Mount Lockable E-Stop Buttons are easy to install and have a locking capability.

- Push-to-stop, twist-to-release operation per IEC 60947-5-5
- Compliant with ANSI B11.19, ANSI NFPA79 and IEC/EN 60204-1 Emergency Stop requirements
- "Safe Break Action" ensures NC contacts will open if the contact block is damaged or separated from the actuator
- Models designed to interface with Safety BUS nodes/gateways
- Rugged design is easy to install with no assembly or individual wiring required

Lockable Flush-mount E-Stop Push-Button

Description	Models
2NC	SSA-EB1MP-02ED1Q4
1NC/1NO	SSA-EB1MP-11ED1Q4
2NC, Safety BUS node compatible*	SSA-EB1MP-02ED1Q5A
2NC, Safety BUS node compatible*	SSA-EB1MP-02ED1Q5B
2NC/2NO	SSA-EB1MP-22ED1Q8
2NC/1NO, Illuminated button—Push ON RED	SSA-EB1ML2P-12ED1Q8

For more specifications see page 728.

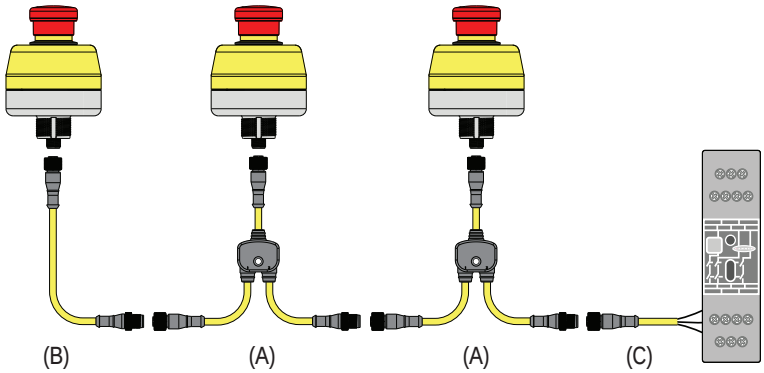
Connection options: A model with a QD requires a mating cordset (see page 724).

* For pinout information see page 724).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series Hookup Cordset Solution

This interconnection solution allows for quick hookup of a series string of emergency stop buttons. For the CSS models (A) Branch #1 and Branch #2 are 300 mm (12") in length and the length of the trunk is listed below. See "Cordsets" below and specific model E-Stop datasheet for compete information, including installation instructions, hookup, and accessories.

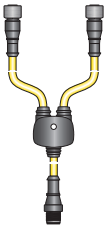


Cordsets

Euro QD Splitter (A)

See page page 905

Length	4-Pin
0.31 m	CSS-M12F41M12M41M12F41
0.91 m	CSS-M12F43M12M41M12F41
2.44 m	CSS-M12F48M12M41M12F41
	8-Pin
0.31 m	CSS-M12F81M12M81M12F81
0.91 m	CSS-M12F83M12M81M12F81
2.44 m	CSS-M12F88M12M81M12F81



Additional cordset information available. See page page 904.

Euro QD–Double-Ended (B)

See page page 917

Length	5-Pin	8-Pin
0.31 m	DEE2R-51D	DEE2R-81D
0.91 m	DEE2R-53D	DEE2R-83D
2.44 m	DEE2R-58D	DEE2R-88D
4.57 m	DEE2R-515D	DEE2R-815D
7.62 m	DEE2R-525D	DEE2R-825D
15.2 m	DEE2R-550D	DEE2R-850D
22.9 m	DEE2R-575D	DEE2R-875D
30.5 m	DEE2R-5100D	DEE2R-8100D



Euro QD (C)

See page page 908

Length	Threaded 4-Pin	Threaded 8-Pin
	Straight	
1.83 m	MQDC-406	MQDC2S-806
4.57 m	MQDC-415	MQDC2S-815
9.14 m	MQDC-430	MQDC2S-830
15.2 m	MQDC-450	MQDC2S-850



Brackets

30 mm Mount

See page page 860	See page page 860	See page page 861
SSA-MBK-EEC1	SSA-MBK-EEC2	SSA-MBK-EEC3



Additional brackets and information available. See page page 846.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

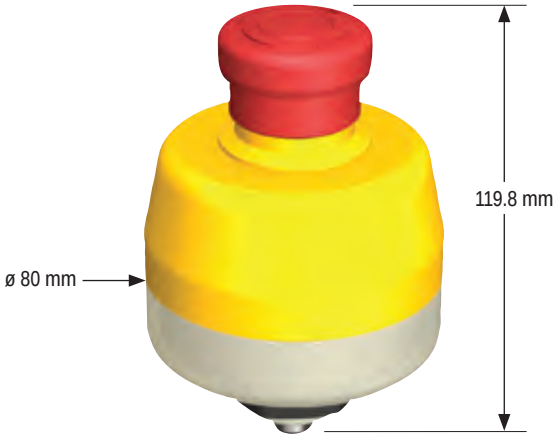
E-Stop Legend Labels (adhesive backed label)

Product	Description	Models†
	60 mm diameter (OD) E-Stop Legend with “EMERGENCY STOP” inscription and ISO 13850 E-Stop symbol. 41 mm hole for application around SSA-EB1P... (Pack of 10 each).	ESL-41/60-10
	60 mm diameter (OD) E-Stop Legend with “EMERGENCY STOP” and “PARADA DE EMERGENCIA” inscription and ISO 13850 E-Stop symbol. 41 mm hole for application around SSA-EB1P... (Pack of 10 each).	ESL-41/60-ENES-10
	70 mm diameter (OD) E-Stop Legend with “EMERGENCY STOP” and “PARADA DE EMERGENCIA” inscription and ISO 13850 E-Stop symbol. 44 mm hole for application around SSA-EB1M... (Pack of 10 each).	ESL-44/70-10

EZ-LIGHT™ Illumination Logic for Emergency Stop buttons

Situation	Indication	Illumination Logic
SSA-EB1xxLYR-xxxxQx or SSA-EB1xxLGR-xxxxQx		
Button Armed Pin 3 open	YELLOW / SOLID or GREEN / SOLID	• Indicates button is armed • If used, ES-FA-11AA Module is in a RESET/RUN condition (33/34 open)
Button Pushed Pin 3 open or +V dc	RED / FLASH	• Indicates the button that is pushed (actuated) • Signal on Pin 3 has no effect on a button that has been pushed (actuated)
Button Armed Pin 3 = +V dc	RED / SOLID	• Indicates the machine is in an Emergency Stop or other stop condition, but that specific button has not been pushed (actuated) • This optional signal (12 to 30 V dc) allows the user to indicate a stop condition by turning the armed indication to a RED (steady) Indication
SSA-EB1xxLXR-xxxxQx		
Button Armed Pin 3 open	OFF	• Indicates button is armed • If used, ES-FA-11AA Module is in a RESET/RUN condition (33/34 open)
Button Pushed Pin 3 open or +V dc	RED / FLASH	• Indicates the button that is pushed (actuated) • Signal on Pin 3 has no effect on a button that has been pushed (actuated)
Button Armed Pin 3 = +V dc	RED / SOLID	• Indicates the machine is in an Emergency Stop or other stop condition, but that specific button has not been pushed (actuated) • This optional signal (12 to 30 V dc) allows the user to indicate a stop condition by turning the armed indication to a RED (steady) Indication
SSA-EB1xxL-xxxxQx		
Button Armed Pin 3 open	OFF	• Indicates button is armed • If used, ES-FA-11AA Module is in a RESET/RUN condition (33/34 open)
Button Pushed Pin 3 open or +V dc	RED / SOLID	• Indicates the button that is pushed (actuated) • Signal on Pin 3 has no effect on a button that has been pushed (actuated)
Button Armed Pin 3 = +V dc	RED / SOLID	• Indicates the machine is in an Emergency Stop or other stop condition, but that specific button has not been pushed (actuated) • This optional signal (12 to 30 V dc) allows the user to indicate a stop condition by turning the armed indication to a RED (steady) Indication

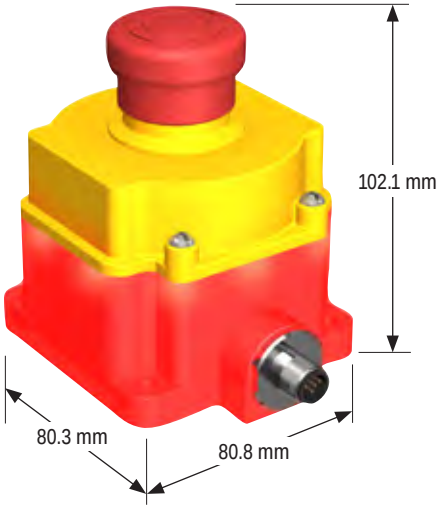
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Illuminated models



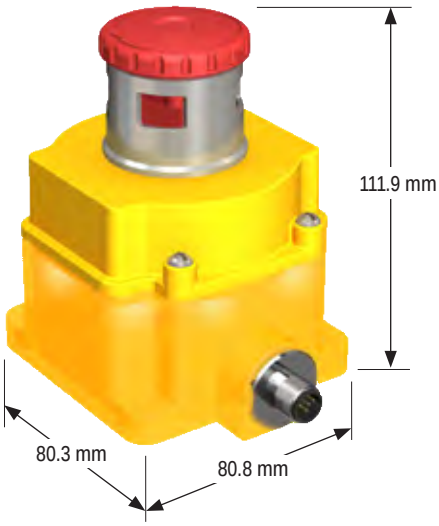
Non-Illuminated models



Illuminated models



Non-Illuminated models



Illuminated models



Non-Illuminated models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

30 mm E-Stop Push Button Specifications

Housing / Button Mounting	Polycarbonate / Polyamide Threaded base has M30 x 1.5 external threads.(M30 hardware included) Max. Tightening Torque: 0.56 N·m (5 in·lbf)
Operating Temperature	–25 to +55°C
Environmental rating	IP65 (IEC60529)
Operating Humidity	45% to 85% RH (no condensation)
Insulation Resistance	100M minimum (500 V dc megger)
Impulse Withstand Voltage	2.5 kV
Pollution Degree	3
Overvoltage Category	II
Contact material / bounce*	Gold plated silver / 20 ms
Electrical Life	100,000 operations minimum, 250,000 operations minimum at 24 V ac/dc, 100 mA
Mechanical Life	250,000 operations
B10d	100,000 (based on ISO13849-1(2006))
Shock & Vibration Resistance	Operating extremes: 150m/s2 (15G) Operating extremes: 10 to 500 Hz, amplitude 0.35 mm acceleration 50 m/s2
LED Illumination	Color: Yellow - 590 nm, Red - 618 nm, Green - 525 nm; Flash Rate: 1.6 Hz at 50% duty cycle; Voltage/Current: 12 – 30 V dc; 120 mA at 12 V dc, 65 mA at 24 Vdc, 60 mA at 30 V dc, SSA-EB1..LGR-.. (GREEN) only: 12 – 30 V dc; 135 mA @ 12 V dc, 75 mA @ 24 V dc, 70 mA @ 30 V dc
Electrical Rating	Minimum load: 1 mA @ 5 V ac/dc SSA-EB1xx-..Q5A/Q5B: 3A @ 250 V maximum SSA-EB1xx-xxED1Q8: 2A at 60 V ac/75 V dc maximum UL Applications (UL/cUL): 1.5A @ 250 V ac, 1A @ 30 V dc (pilot duty) CE Applications: AC-15: 1.5A @ 250 V ac, DC-13: 1A @ 30 V dc
Rated Insulation Voltage (Ui)	250 V
Rated Current (Ith)	3A

Rated Operating Voltage (Ue) — See Electrical Rating

Rated Operating Current

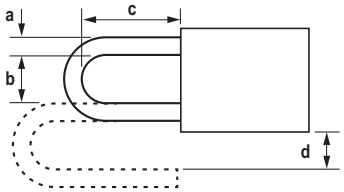
			30 V	60 V ac/75 V dc	125 V	250 V
SSA-EB1xxLxx-02ED1Q5A/Q5B						
Safety Contact (NC)	AC 50/60 Hz	Resistive Load (AC-12)	—	—	—	3A
		Inductive Load (AC-15)	—	—	3A	1.5A
	DC	Resistive Load (DC-12)	2A	—	0.4A	0.2A
		Inductive Load (DC-13)	1A	—	0.22A	0.1A
Monitor Contacts (NO)	AC 50/60 Hz	Resistive Load (AC-12)	—	—	1.2A	0.6A
		Inductive Load (AC-15)	—	—	0.6A	0.3A
	DC	Resistive Load (DC-12)	2A	—	0.4A	0.2A
		Inductive Load (DC-13)	1A	—	0.22A	0.1A
SSA-EB1PLxx-02ECQ5A/Q5B (illuminated)						
Safety Contact (NC)	AC 50/60 Hz	Resistive Load (AC-12)	—	—	—	3A
		Inductive Load (AC-15)	—	—	3A	1.5A
	DC	Resistive Load (DC-12)	2A	—	0.4A	0.2A
		Inductive Load (DC-13)	1A	—	0.22A	0.1A
SSA-EB1Pxx-xxECQ8 See above for SSA-EB1P-22ECQ8 Monitor Contacts						
Safety Contact (NC)	AC 50/60 Hz	Resistive Load (AC-12)	—	2A	—	—
		Inductive Load (AC-15)	—	2A	—	—
	DC	Resistive Load (DC-12)	2A	0.4A	—	—
		Inductive Load (DC-13)	1A	0.22A	—	—
Auxiliary Output (NO)	12 to 30 V dc (from pin 2)	Resistive Load (DC-12)	0.25A	—	—	—
		Inductive Load (DC-13)	0.25A	—	—	—

- The rated operating currents are measured at resistive/inductive load types specified in IEC 60947-5-1.
- See “Electrical Rating” above for maximum voltage/current rating per model.

Design Standards	Compliant with EN/IEC 60497-1 / -5-1, ISO 13850, ANSI B11.19 , ANSI NFPA79, IEC 60204-1
Certifications	E-stop button: CE c UL us LISTED (pending)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Lockable and Illuminated E-Stop Push-Button Specifications

Housing / Button Mounting	Polycarbonate / Polyamide #10 or M5 (M5 hardware included), Max. Tightening Torque: 0.56 N•m (5 in•lbf)
Operating Temperature	–25 to +55°C
Environmental rating	IP65 (IEC60529)
Operating Humidity	45% to 85% RH (no condensation)
Insulation Resistance	100MΩ minimum (500 V dc megger)
Impulse Withstand Voltage	2.5kV
Pollution Degree	3
Overvoltage Category	II
Contact material / bounce	Gold plated silver / 20ms
Electrical Life	100,000 operations minimum, 250,000 operations minimum at 24 V ac/dc, 100 mA
Mechanical Life	250,000 operations,
B10d	100,000 (based on ISO13849-1(2006)
Total Weight of Padlock and Hasp (SSA-EB1M..P-.. only)	1500g (3.3 lb) maximum Since various form and sizes are available, ensure applicability of padlock and hasp before use. If total weight exceeds 1500g, the switch may malfunction or fail. Padlock size a: 7 mm max; b: 19 mm min; c: 39 mm min; d: 15 mm min  Dimension “d” is 6 mm or more when attaching a padllock from the side of a switch.
Shock Resistance	Operating extremes: 150m/s2 (15G)
Vibration Resistance	Operating extremes: 10 to 500 Hz, amplitude 0.35 mm acceleration 50 m/s2
LED Illumination	Color: Yellow - 590 nm, Red - 618 nm, Green - 525 nm Flash Rate: 1.6 Hz @ 50% duty cycle Voltage/Current: 12 – 30 V dc; 120 mA @ 12 V dc, 65 mA @ 24 V dc, 60 mA @ 30 V dc, SSA-EB1..LGR-..(GREEN) only: 12 - 30 V dc; 135 mA @ 12 V dc, 75 mA @ 24 V dc, 70 mA @ 30 V dc
Electrical Rating	Minimum load: 1 mA @ 5 V ac/dc SSA-EB1xx-..Q5A/Q5B: 3A @ 250 V maximum SSA-EB1xx-xxED1Q8: 2A @ 60 V ac/75 V dc maximum UL Applications (UL/cUL): 1.5A @ 250 V ac, 1A @ 30 V dc (pilot duty) CE Applications: AC-15: 1.5A @ 250 V ac, DC-13: 1A @ 30 V dc
Rated Insulation Voltage (Ui)	250 V
Rated Current (Ith)	3A

Rated Operating Voltage (Ue) — See Electrical Rating

Rated Operating Current

			30 V	60 V ac/75 V dc	125 V	250 V
SSA-EB1xxLxx-02ED1Q5A/Q5B						
Safety Contact (NC)	AC 50/60 Hz	Resistive Load (AC-12)	—	—	—	3A
		Inductive Load (AC-15)	—	—	3A	1.5A
	DC	Resistive Load (DC-12)	2A	—	0.4A	0.2A
		Inductive Load (DC-13)	1A	—	0.22A	0.1A
SSA-EB1xx-xxED1Q8						
Safety Contact (NC)	AC 50/60 Hz	Resistive Load (AC-12)	—	2A	—	—
		Inductive Load (AC-15)	—	2A	—	—
	DC	Resistive Load (DC-12)	2A	0.4A	—	—
		Inductive Load (DC-13)	1A	0.22A	—	—
Auxiliary Output (NO)	12 to 30 V dc (from pin 2)	Resistive Load (DC-12)	0.25A	—	—	—
		Inductive Load (DC-13)	0.25A	—	—	—

- The rated operating currents are measured at resistive/inductive load types specified in IEC 60947-5-1.
- See “Electrical Rating” above for maximum voltage/current rating per model.

Design Standards	Compliant with EN/IEC 60497-1 / -5-1, ISO 13850, ANSI B11.19 , ANSI NFPA79, IEC 60204-1
Certifications	E-stop button: CE (pending) c UL us LISTED (pending)

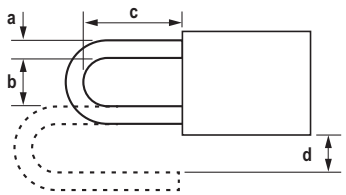
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Lockable E-Stop Push-Button Specifications

Housing / Button Mounting	Polycarbonate / Polyamide #10 or M5 (M5 hardware included), Max. Tightening Torque: 0.56 N•m (5 in•lbf)
Operating Temperature	–25 to +55°C
Environmental rating	IP65 (IEC60529)
Operating Humidity	45% to 85% RH (no condensation)
Insulation Resistance	100MΩ minimum (500 V dc megger)
Impulse Withstand Voltage	2.5kV
Pollution Degree	3
Overvoltage Category	II
Contact material / bounce	Gold plated silver / 20 ms
Electrical Life	100,000 operations minimum, 250,000 operations minimum at 24 V ac/dc, 100 mA
Mechanical Life	250,000 operations,
B10d	100,000 (based on ISO13849-1(2006)
Total Weight of Padlock and Hasp (SSA-EB1M..P-.. only)	1500g (3.3 lb) maximum Since various form and sizes are available, ensure applicability of padlock and hasp before use. If total weight exceeds 1500g, the switch may malfunction or fail.

Padlock size

a	b	c	d
7 mm max	19 mm min	39 mm min	15 mm min



Dimension “d” is 6 mm or more when attaching a padllock from the side of a switch.

Shock Resistance	Operating extremes: 150m/s2 (15G)
Vibration Resistance	Operating extremes: 10 to 500 Hz, amplitude 0.35mm acceleration 50m/s2
LED Voltage/Current	24 V ac/dc ±10%, 15mA @ 24 V ac/dc (SSA-EB1PL2-12ED1Q8 only)
Electrical Rating	Minimum load: 1 mA @ 5 V ac/dc SSA-EB1xx-..Q4 and -..Q5: 3A @ 250 V maximum SSA-EB1xx-..Q8: 2A @ 60 V AC/75 V DC maximum UL Applications (UL/cUL): 1.5A @ 250 V ac, 1A @ 30 V dc (pilot duty) CE Applications: AC-15: 1.5A @ 250 V ac, DC-13: 1A @ 30 V dc
Rated Insulation Voltage (Ui)	250 V
Rated Current (Ith)	3A
Rated Operating Voltage (Ue)	See Electrical Rating

Rated Operating Current

			30 V	125 V	250 V
Safety Contact (NC)	AC 50/60 Hz	Resistive Load (AC-12)	-	-	3A
		Inductive Load (AC-15)	-	3A	1.5A
	DC	Resistive Load (DC-12)	2A	0.4A	0.2A
		Inductive Load (DC-13)	1A	0.22A	0.1A
Monitor Contacts (NO)	AC 50/60 Hz	Resistive Load (AC-12)	-	1.2A	0.6A
		Inductive Load (AC-14)	-	0.6A	0.3A
	DC	Resistive Load (DC-12)	2A	0.4A	0.2A
		Inductive Load (DC-13)	1A	0.22A	0.1A

• The rated operating currents are measured at resistive/inductive load types specified in IEC 60947-5-1.
• See “Electrical Rating” above for maximum voltage/current rating per model.

Design Standards	Compliant with EN/IEC 60497-1 / -5-1, ISO 13850, ANSI B11.19 , ANSI NFPA79, IEC 60204-1
Certifications	E-stop button: CE (pending) cULus LISTED (pending)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



E-Stop Buttons
30 mm Panel Mount

Easy to install with locking and illuminated models available.

- Up to four contacts; various configurations available
- Push-to-stop, twist-to-release (standard and lockable), or pull-to-release (standard) operation per IEC60947-5-5
- Latching design complies with ISO 13850; direct (positive) opening operation per IEC 60947-5-1
- Compliant with ANSI B11.19, ANSI NFPA79, and IEC/EN 60204-1 Emergency Stop requirements
- "Safe Break Action" ensures N.C. contacts will open if the contact block is separated from the actuator

Panel Mount E-Stop Push-Buttons

Description	Models 40 mm Button		Models 60 mm Button	
2NC	SSA-EB1P-02	NEW	SSA-EB2P-02	NEW
4NC	SSA-EB1P-04	NEW	SSA-EB2P-04	NEW
1NC / 1NO	SSA-EB1P-11	NEW	SSA-EB2P-11	NEW
3NC / 1NO	SSA-EB1P-13	NEW	SSA-EB2P-13	NEW
2NC / 2NO	SSA-EB1P-22	NEW	SSA-EB2P-22	NEW

Lockable Panel Mount E-Stop Push-Buttons

Description	Models 44 mm Button	
2NC	SSA-EB1MP-02	NEW
4NC	SSA-EB1MP-04	NEW
1NC / 1NO	SSA-EB1MP-11	NEW
3NC / 1NO	SSA-EB1MP-13	NEW
2NC / 2NO	SSA-EB1MP-22	NEW

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Illuminated E-Stop Buttons
30 mm Panel Mount

Easy to install with locking and illuminated models available.

- Up to four contacts; various configurations available
- Push-to-stop, twist-to-release (standard and lockable), or pull-to-release (standard) operation per IEC60947-5-5
- Latching design complies with ISO 13850; direct (positive) opening operation per IEC 60947-5-1
- Compliant with ANSI B11.19, ANSI NFPA79, and IEC/EN 60204-1 Emergency Stop requirements
- "Safe Break Action" ensures N.C. contacts will open if the contact block is separated from the actuator

Illuminated Panel Mount E-Stop Push-Buttons

Description	Models 40 mm Button	
2NC	SSA-EB1PL1-02	NEW
4NC	SSA-EB1PL1-04	NEW
1NC / 1NO	SSA-EB1PL1-11	NEW
3NC / 1NO	SSA-EB1PL1-13	NEW
2NC / 2NO	SSA-EB1PL1-22	NEW
2NC / 1NO	SSA-EB1PL2-12	NEW

Illuminated Lockable Panel Mount E-Stop Push-Buttons

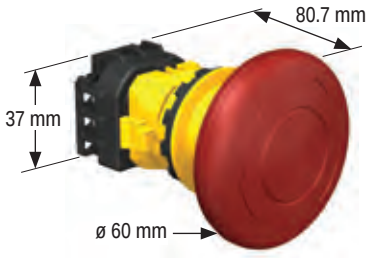
Description	Models 44 mm Button	
2NC	SSA-EB1PL1P-02	NEW
4NC	SSA-EB1PL1P-04	NEW
1NC / 1NO	SSA-EB1PL1P-11	NEW
3NC / 1NO	SSA-EB1PL1P-13	NEW
2NC / 2NO	SSA-EB1PL1P-22	NEW
2NC / 1NO	SSA-EB1PL2P-12	NEW

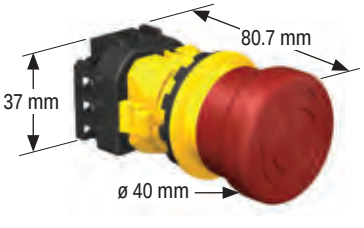
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

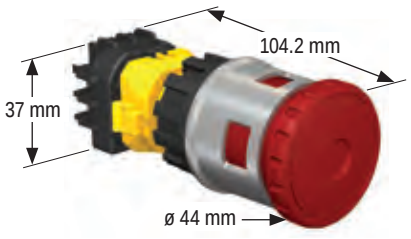
E-Stop Legend Labels (adhesive backed label)

Product	Description	Models†
	60 mm diameter (OD) E-Stop Legend with “EMERGENCY STOP” inscription and ISO 13850 E-Stop symbol. 41 mm hole for application around SSA-EB1P... (Pack of 10 each).	ESL-41/60-10
	60 mm diameter (OD) E-Stop Legend with “EMERGENCY STOP” and “PARADA DE EMERGENCIA” inscription and ISO 13850 E-Stop symbol. 41 mm hole for application around SSA-EB1P... (Pack of 10 each).	ESL-41/60-ENES-10
	70 mm diameter (OD) E-Stop Legend with “EMERGENCY STOP” and “PARADA DE EMERGENCIA” inscription and ISO 13850 E-Stop symbol. 44 mm hole for application around SSA-EB1M... (Pack of 10 each).	ESL-44/70-10

See data sheet for more information







Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

E-Stop Push Button Specifications

Button/Locking Collar	Polyamide/Aluminum
Operating Temperature	Non-illuminated: –25 to +60°C Illuminated: –25 to +55°C
Environmental rating	IP65 (IEC60529)
Operating Humidity	45% to 85% RH (no condensation)
Insulation Resistance	100M minimum (500 V dc megger)
Impulse Withstand Voltage	2.5kV
Pollution Degree	3
Overvoltage Category	II
Contact material / bounce*	Gold plated silver / 20 ms
Electrical Life	100,000 operations minimum, 250,000 operations minimum at 24 V ac/dc, 100 mA
Mechanical Life	250,000 operations
B10d	100,000 (based on ISO13849-1(2006))
Shock & Vibration Resistance	Shock Operating extremes: 150m/s2 (15G) Vibration Operating extremes: 10 to 500 Hz, amplitude 0.35 mm acceleration 50 m/s2
Electrical Rating	Minimum load: 1 mA @ 5 V ac/dc UL Applications: 1.5A @ 250 V ac, 1A @ 30 V dc (pilot duty) CE Applications: AC-15: 1.5A @ 250 V ac, DC-13: 1A @ 30 V dc
Rated Insulation Voltage (Ui)	250 V
Rated Current (Ith)	3A
Rated Operating Current	

Safety Contact (NC)		30 V	125 V	250 V
AC 50/60 Hz	Resistive Load (AC-12)	—	—	—
	Inductive Load (AC-15)	—	—	3A
DC	Resistive Load (DC-12)	2A	—	0.4A
	Inductive Load (DC-13)	1A	—	0.22A

Monitor Contact (NO)		30 V	125 V	250 V
AC 50/60 Hz	Resistive Load (AC-12)	—	1.2A	0.6A
	Inductive Load (AC-15)	—	0.6A	0.3A
DC	Resistive Load (DC-12)	2A	0.4A	0.2A
	Inductive Load (DC-13)	1A	0.22A	0.1A

The operating current is classified according to JIS C 8201-5-1-1999 making and breaking capacities and are measured at resistive/inductive load types specified in IEC 60947-5-1. See “Electrical Rating” above for specific model and UL/CE maximum ratings.

Design Standards	Compliant with EN/IEC 60497-1 / -5-1, ISO 13850, ANSI B11.19 , ANSI NFPA79, IEC 60204-1
Certifications	CE c UL us LISTED

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



E-Stop Buttons
Emergency Stop Push Buttons

E-Stop button solution available as individual components or as kits for easy ordering.

- Higher current rating
- Metal shaft button available
- Modular design makes assembly and installation easy for either panel-mount or enclosure mounting
- Push-to-stop, twist-to-release operation per IEC 60497-5-5
- Compliant with ANSI B11.19, ANSI NFPA79, and IEC/EN 60204-1 Emergency Stop requirements
- Panel mount through 22 mm mounting hole

E-Stop Push-Button Components

Product	Description	Models
	22.5 mm plastic button (mounting adapter included)	8-LP2T-B6644*
	22.5 mm metal button (8-LM2T-AU120 mounting adapter sold separately)	8-LM2T-B6644*
	Metal mounting adapter (for metal button)	8-LM2T-AU120
	Normally closed (NC) positively driven contact element	8-LM2T-C01**
	Normally open (NO) auxiliary contact element	8-LM2T-C10
	One 22 mm button enclosure, maximum of three contact blocks, wire entry through three sides (M16, M20 or M25) or the bottom (M16)	LPZP1A5***
	60 mm diameter, non-adhesive plastic legend with “Emergency Stop” inscription	8-LM2T-AU115†
	60 mm diameter (OD) E-Stop Legend (adhesive backed label) with “EMERGENCY STOP” inscription and ISO 13850 E-Stop symbol. 30 mm hole for application around SSA-EBM… or SAA-EBP... (Pack of 10 each.)	ESL-30/60-10†

* Twist to release, mechanical latching ISO 13850 (EN 418) compliant. Diameter 40 mm (without mounting adapter).
** Direct (positive) opening operation per IEC/EN 60947-5-1.
*** The LPZP1A5 enclosure has replaced 8-L2PP-1A5 (discontinued). Please note changes in size (8-L2PP-1A5: 72mm x 85mm) and mounting hole location (8-L2PP-1A5: 49mm x 54mm).
† Additional E-Stop background labels are available (see p/n 121976).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

E-Stop Push-Buttons

E-Stop Button		Contacts	Legend	Enclosure	Models
	Metal-base	2 NC	Yes	No	SSA-EBM-02L
		1 NC & 1 NO			SSA-EBM-11L
		2 NC & 1 NO			SSA-EBM-12L
	Plastic-base	2 NC	Yes	No	SSA-EBP- 02L
		1 NC & 1 NO			SSA-EBP-11L
		2 NC & 1 NO			SSA-EBP-12L

NC= Normally closed contact, NO= Normally open contact

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

E-Stop Push-Buttons Kits

E-Stop Button		Contacts	Legend	Enclosure	Models*
	Metal	2 NC			SSA-EBM-02E
		1 NC & 1 NO	Yes	Yes	SSA-EBM-11E
		2 NC & 1 NO			SSA-EBM-12E
	Plastic	2 NC			SSA-EBP-02E
		1 NC & 1 NO	Yes	Yes	SSA-EBP-11E
		2 NC & 1 NO			SSA-EBP-12E

NC = Normally Closed Contact, NO = Normally Open Contact

* The LPZP1A5 enclosure has replaced 8-L2PP-1A5 (discontinued). Please note changes in size (8-L2PP-1A5: 72mm x 85mm) and mounting hole location (8-L2PP-1A5: 49mm x 54mm).



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

E-Stop Push-Button Specifications

Mechanical Life	300,000 operations
Operating Force	0.8 kg
Mounting Adapter	**Plastic button:** The adapter is fixed to the mounting surface by means of incorporated screws (T_{max} = 0.6 Nm) **Metal button:** The adapter is fixed to the mounting surface by means of incorporated screws (T_{max} = 0.8 Nm)
Construction	**Plastic parts:** Polyamide and polycarbonate **Metal parts:** Aluminum and zinc alloy
Environmental Rating	IP65
Operating Temperature	-25° to +60° C

Contact Specifications

European Rating	**Utilization categories:** AC15 and DC13 U_i = 690 V ac I_{th} = 10A UL designation = A 600 Q600
Rated Operating Voltage (Ue) and Current	IEC operational power in AC15

V	12	24	48	120	240	400	480	500	600
A	6	6	6	6	3	1.9	1.5	1.4	1.2

IEC operational power in DC13

V	12	14	48	125	250	440	500	600	
A	3	3	1.5	0.55	0.27	0.15	0.13	0.1	

Mechanical Life	1,000,000 operations
Connections	(1 or 2) 12 AWG (2.5 mm^2) maximum wire size, tightening torque: Tmax = 1 Nm
Construction	Polyamide and polycarbonate
Environmental Rating	IP20
Operating Temperature	-25° to +60° C
Application Notes	Normally Closed safety contacts (8-LM2T-C01) should only be attached to the left and right snap-on positions of the mounting adaptor. A maximum of two contact elements can be used in a single snap-on position.
Certifications	CE c UL us LISTED Compliant with EN/IEC 60947-1; -5-1

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Emergency Stop & Stop Control

Rope pull emergency stop switches, when used with steel wire rope, provide emergency stop actuation for conveyors and large machinery.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Application	Dimensions H x W x D	Actuation	Housing Material
	RP-RM83 Rated for use in harsh environments and outdoors, and activates if the rope is pulled, becomes loose or breaks. page 740	Emergency Stop	H (varies by model) 90 x 53 mm	Latch	Plastic
	RP-LS42 Rugged plastic housing to withstand harsh environments and is available withan E-stop button with manual reset. page 741	Emergency Stop	H (varies by model) 42 x 45 mm	Latch	Metal
	RP-QM72 Heavy-duty switch housing withstands harsh environments. page 742	Stop-Control	RP-QM72: 142 x 69 x 82 mm RP-QMT72: 181 x 69 x 82 mm	Latch	Metal
	RP-LM40 Heavy-duty switch housing withstands harsh environments. page 743	Stop-Control	RP-LM40D-6: 124.5 x 40 x 37.5 mm RP-LM40D-6L: 147.5 x 40 x 37.5 mm	Trip & Latch	Metal
	RP-QM90 Heavy-duty switch housing withstands harsh environments. page 744	Stop-Control	137 x 206 x 90 mm	Latch	Metal
	ED1G Handheld grip-style switch is typically used for manual control of machine functions, including visual observations, minor adjustments, troubleshooting, calibration and more. page 754	Stop-Control	260 x 46 x 58 mm		Plastic

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



RP-RM83
Rope Pull E-Stop Devices

The RP-RM83 Rope Pull Switch has a heavy-duty housing rated to IP67 for use in harsh environments and outdoors, and activates if the rope is pulled, becomes loose or breaks.

- Additional solid-state auxiliary output for remote tension monitoring
- Tension indicators
- Operates in a range up to 75 m
- Design meets positive opening requirements for rope pull switches (IEC 60947-5-1)
- Complies with ANSI NFPA 79, ANSI B11.19, IEC 60204-1, EN 13850 and EN ISO 60947-5-5 for Emergency Stop applications



Components for wire rope assembly kits (page 747)

RP-RM83 Series E-Stop and Stop Control Device

Max. Rope Length	Safety Contacts	Auxiliary Contacts	Action	Contact State				Model*
				Safety 1	Safety 2	Auxiliary 1	Auxiliary 2	
38 m	2 NC in →	2 NO in →	Cable Pulled	open	open	closed	closed	RP-RM83F-38LTE RP-RM83F-38LRE
			Cable Break	open	open	closed	closed	RP-RM83F-38LT RP-RM83F-38LR
75 m	2 NC in →	2 NO in →	Cable Pulled	open	open	closed	closed	RP-RM83F-75LTE RP-RM83F-75LRE
			Cable Break	open	open	closed	closed	RP-RM83F-75LT RP-RM83F-75LR

For more specifications see page 750.

→ Run Position Cable Pulled Cable Break NC = Normally Closed Contact, NO = Normally Open Contact

RP-RM83 rope pulls comply with IEC 60947-5-1 Positive Opening requirements.

* See data sheet or Contact Configuration and Switching Diagrams for more information/clarification.(page 751)

For dimensions see page 745.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



RP-LS42
Rope Pull E-Stop Devices

The RP-LS42 Rope Pull Switch has a rugged plastic housing to withstand harsh environments and has an E-stop button model with manual reset.

- Tension indicators
- Operates in ranges up to 75 m
- Switch activates if the rope is pulled, becomes loose or breaks
- Design meets positive opening requirements for rope pull switches (IEC 60947-5-1)
- Complies with ANSI NFPA 79, ANSI B11.19, IEC 60204-1, EN 13850 and EN ISO 60947-5-5 for Emergency Stop applications

RP-LS42 Series E-Stop and Stop Control Device

Max. Rope Length	Safety Contacts	Auxiliary Contacts	Action	Contact State				Model
				Safety 1	Safety 2	Auxiliary 1	Auxiliary 2	
25 m	2 NC in →	2 NO in →		open	open	closed	closed	RP-LS42F-25L
				open	open	closed	closed	RP-LS42F-25LE
								RP-LS42F-25LF
37.5 m	2 NC in →	2 NO in →		open	open	closed	closed	RP-LS42F-38L
				open	open	closed	closed	RP-LS42F-38LE
								RP-LS42F-38LF
75 m	2 NC in →	2 NO in →		open	open	closed	closed	RP-LS42F-75L
				open	open	closed	closed	RP-LS42F-75LE
								RP-LS42F-75LF



Components for wire rope assembly kits (page 747)

For more specifications see page 750

→ Run Position | Cable Pulled | Cable Break | NC = Normally Closed Contact, NO = Normally Open Contact

RP-LM42 rope pulls comply with IEC 60947-5-1 Positive Opening requirements.

See data sheet or Contact Configuration and Switching Diagrams for more information/clarification.(page 751)

For dimensions see page 745.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



RP-QM72/QMT72
Rope Pull Switches

Heavy-duty switch housing withstands harsh environments and have a max rope pull length of 6, 12 or 20 m depending on model.

- Switches activate if the rope is pulled, becomes loose or breaks
- Manual reset (Latch) design if the rope is pulled
- Rugged metal housing with protective earth terminal (IEC 60947-1)
- Comply with ANSI NFPA 79 and IEC 60204-1 for Stop Control applications



Components for wire rope assembly kits (page 747)

RP-QM72/QMT72 Series Stop Control Device

Max. Rope Length	Safety Contacts	Auxiliary Contacts	Action	Contact State	Model
6 m 12 m 20 m	2 NC in →	—		Safety 1: open Auxiliary 1: closed open / closed	RP-QM72D-6L RP-QM72D-12L RP-QMT72D-20L
12 m	4 NC in →	—		Safety 1: open, 2: open Auxiliary 1: closed, 2: closed closed closed / open open	RP-QMT72F-12L
12 m	2 NC in →	1 NO in →		Safety 1: open, 2: closed Auxiliary 1: closed, 2: closed closed open / open open	RP-QMT72E-12L

For more specifications see page 750

→ Run Position Cable Pulled Cable Break NC = Normally Closed Contact, NO = Normally Open Contact

RP-RM83 rope pulls comply with IEC 60947-5-1 Positive Opening requirements.

See data sheet or Contact Configuration and Switching Diagrams for more information/clarification.(page 748)

For dimensions see page 746.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



RP-LM40
Rope Pull Switches

Heavy-duty switch housing withstands harsh environments.

- Manual reset (Latch) design after the rope is pulled and Auto Reset (Trip) models
- Rugged metal housing with protective earth terminal (IEC 60947-1)
- Switches activate if the rope is pulled, becomes loose or breaks
- Design meets positive opening requirements for rope pull switches (IEC 60947-5-1)
- Comply with ANSI NFPA 79 and IEC 60204-1 for Stop Control applications

RP-LM40 Series Stop Control Device

Max. Rope Length	Safety Contacts	Auxiliary Contacts	Action	Contact State		Model
				Safety 1	Auxiliary 1	
6 m	2 NC in →	—	Cable Pulled	open	closed	RP-LM40D-6*
			Cable Break	closed	open	RP-LM40D-6L

* Trip actuation see data sheet for more information.



Components for wire rope assembly kits (page 747)

For more specifications see page 750

→ Run Position | Cable Pulled | Cable Break | NC = Normally Closed Contact, NO = Normally Open Contact

RP-LM42 rope pulls comply with IEC 60947-5-1 Positive Opening requirements.

See data sheet or Contact Configuration and Switching Diagrams for more information/clarification. (page 752)

For dimensions see page 746.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



RP-QM90
Rope Pull Switches

Heavy-duty switch housing withstands harsh environments.

- Manual reset (Latch) design after the rope is pulled
- Rugged metal housing with protective earth terminal (IEC 60947-1)
- Switch activates if the rope is pulled, becomes loose or breaks
- Operates in a range up to 100 m
- Design meets positive opening requirements for rope pull switches (IEC 60947-5-1)



Components for wire rope assembly kits (page 747)

RP-QM90 Series Stop Control Device

Max. Rope Length	Safety Contacts	Auxiliary Contacts	Action	Contact State				Model
				Safety 1	Safety 2	Auxiliary 1	Auxiliary 2	
100 m (50 m each side)	2 NC in →	2 NO in →	Cable Pulled	open	open	closed	closed	RP-QM90F-100L
			Cable Break	open	open	closed	closed	

For more specifications see page 750

→ Run Position Cable Pulled Cable Break NC = Normally Closed Contact, NO = Normally Open Contact

RP-QM90 rope pulls comply with IEC 60947-5-1 Positive Opening requirements.

See data sheet or Contact Configuration and Switching Diagrams for more information/clarification. (page 752)

For dimensions see page 746.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



RP-RM83F-75LT.. and
RP-RM83F-38LT.. Models



RP-RM83F-75LR.. and
RP-RM83F-38LR.. Models



RP-LS42F-..L Model

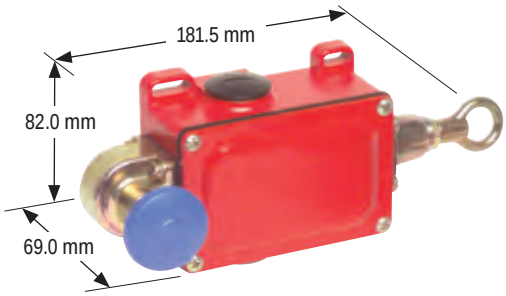


RP-LS42F-..LF Model

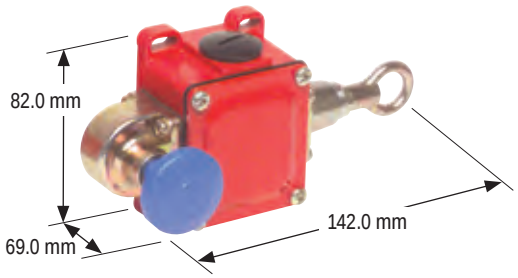


RP-LS42F-..LE Model
(with E-Stop Button)

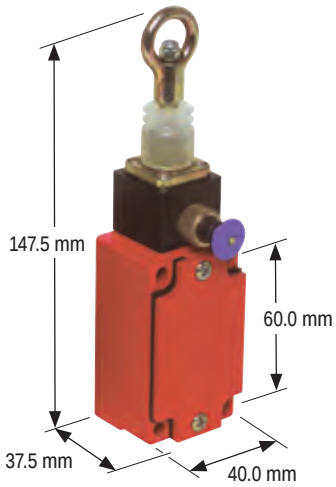
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



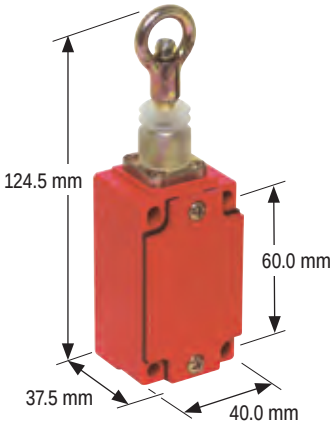
RP-QMT72 Models



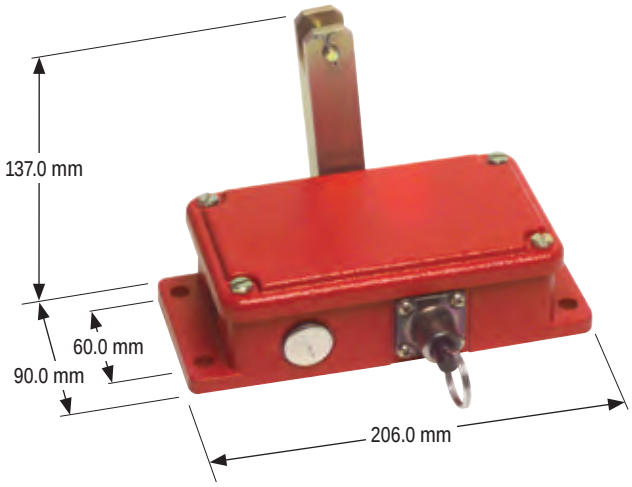
RP-QM72 Models



RP-LM40D-6L Model



RP-LM40D-6 Model



RP-QM90 Model

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Components for Wire Rope Assembly

	Models		Package Quantity	Description	Used With
Wire Ropes		RPA-C1-10	10 m	2 mm steel wire rope with 0.5 mm red PVC jacket (unterminated)	• RP-LM40 models
		RPA-C1-20	20 m		
		RPA-C1-100	100 m		
		RPA-C2-10	10 m	3 mm steel wire rope with 0.25 mm red PVC jacket (unterminated)	• RP-LS42 models • RP-QM72/QMT72 models • RP-RM83 models
		RPA-C2-20	20 m		
		RPA-C2-40	40 m		
		RPA-C2-50	50 m		
		RPA-C2-80	80 m		
		RPA-C3-20	20 m	4 mm steel wire rope with 0.5 mm red PVC jacket (unterminated)	• RP-QM90 models
		RPA-C3-100	100 m		
Thimbles		RPA-T1-4	4 pcs	Thimble for 2 mm wire rope	• RP-LM40 models
		RPA-T2-4	4 pcs	Thimble for 3 mm wire rope	• RP-LS42 models • RP-QM72/QMT72 models • RP-RM83 models
		RPA-T3-4	4 pcs	Thimble for 4 mm wire rope	• RP-QM90 models
Clamps		RPA-CC1-4	4 pcs	Clamp for 2 mm wire rope	• RP-LM40 models
		RPA-CC2-4	4 pcs	Clamp for 3 mm wire rope	• RP-LS42 models • RP-QM72/QMT72 models • RP-RM83 models
		RPA-CC3-4	4 pcs	Clamp for 4 mm wire rope	• RP-QM90 models
Turnbuckles		RPA-TA1-1	1 pc	#4 Turnbuckle	• RP-LM40 models • RP-LS42 models • RP-QM72/QMT72 models • RP-RM83 models
		RPA-TA2-1	1 pc	#5 Turnbuckle	• RP-QM90 models
Eye Bolts		RPA-EB1-1	1 pc	1/4" - 20 Eye bolt (3″ bolt shaft)	• RP-LM40 models • RP-LS42 models • RP-QM72/QMT72 models • RP-RM83 models
		RPA-EB2-1	1 pc	5/16" - 18 Eye bolt (3″ bolt shaft)	• RP-QM90 models
Pulleys	 RPA-P1-1  RPA-DP1-1		1 pc	RPA-P1-1 Pulley for in-line use RPA-DP1-1 Pulley for corner turns (< 180°)	• RP-LM40 models • RP-LS42 models • RP-QM72/QMT72 models • RP-RM83 models • RP-QM90 models
Tensioning Springs		RPA-S1-1	1 pc	Tensioning Spring #1	• RP-QM90 models
		RPA-S2-1	1 pc	Tensioning Spring #2	• RP-QM90 models
		RPA-S3-1	1 pc	Tensioning Spring #3	• RP-LS42 models (75 m) • RP-RM83 models (75 m)
		RPA-S5-1	1 pc	Tensioning Spring #5	• RP-RM83 models (38 m)
		RPA-S4-1	1 pc	Tensioning spring assembly with built-in eye bolt, cable thimble, clamp, tensioning and overload protection	• RP-LS42 models (75 m) • RP-RM83 models (75 m)
		RPA-S6-1	1 pc		• RP-RM83 models (38 m) • RP-LS42 models (25 & 38 m)
Terminal Cover	SI-LS42-COVER		Replacement terminal cover		• RP-LS42 models

Components for Wire Rope Assembly (cont'd)

	Models		Package Quantity	Description	Used With
EZ-LIGHT®		SI-K30LGRX7P	1 pc	Green/Red indication	• RP-LM40 • RP-LS42F • RP-QM90F • RP-QM(T)72 • RP-RM83F • SI-LS31 • SI-LS100 • SI-QS90 • SI-LM40 • SI-LS42SI-QM100
		SI-K30LYRX7P	1 pc	Yellow/Red indication (used with RP-RM83F-xxLTE/-xxLRE with tension alarm)	
		SI-K30LRXX7P	1 pc	Red indication	
Indicator Lamps		SI-PL3T-R	1 pc	Red with M20 x 1.5 (24 V ac/dc)	• RP-LS42 • RP-QM72/QMT72 • RP-RM83 • RP-QM90
		SI-PL3A-R	1 pc	Red with M20 x 1.5 (120 V ac)	
		SI-PL3T-G	1 pc	Green with M20 x 1.5 (24 V ac/dc)	
		SI-PL3A-G	1 pc	Green with M20 x 1.5 (120 V ac)	
Cable Gland		SI-QS-CGM20	1 pc	For 5 to 12 mm diameter cable	• SI-QS90 Safety Interlock Switches • SI-LS100 Safety Interlock Switches • SI-LS31 Safety Interlock Switches • SI-LS42 Safety Interlock Switches • RP-LS42 Rope Pull Switches
Conduit Adaptor		SI-QS-M20	1 pc	M20 x 1.5 to ½ in-14 NPT	• SI-QS90 Safety Interlock Switches • SI-LS100 Safety Interlock Switches • SI-LS31 Safety Interlock Switches • SI-LS42 Safety Interlock Switches • RP-LS42 Rope Pull Switches

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Wire Rope Assembly Kits (Tensioning Springs ordered separately)

3 mm Rope (Length)	Thimbles (Each)	Clamps (Each)	Eye Bolts (Each)	In-Line Pulleys (Each)	Turnbuckle (Each)	Kit Model
0.5 m	2	2	—	—	—	RPAK-C2SBP-1
10 m	4	4	3	—	—	RPAK-CH2-10
	4	4	3	3	—	RPAK-CHP2-10
	4	4	3	—	1	RPAK-CH2-10-TA
	4	4	3	3	1	RPAK-CHP2-10-TA
20 m	4	4	6	—	—	RPAK-CH2-20
	4	4	6	6	—	RPAK-CHP2-20
	4	4	6	—	1	RPAK-CH2-20-TA
	4	4	6	6	1	RPAK-CHP2-20-TA
40 m	4	4	11		—	RPAK-CH2-40
	4	4	11	11	—	RPAK-CHP2-40
	4	4	11	—	1	RPAK-CH2-40-TA
	4	4	11	11	1	RPAK-CHP2-40-TA
50 m	4	4	14	—	—	RPAK-CH2-50
	4	4	14	14	—	RPAK-CHP2-50
	4	4	14	—	1	RPAK-CH2-50-TA
	4	4	14	14	1	RPAK-CHP2-50-TA
80 m	4	4	21	—	—	RPAK-CH2-80
	4	4	21	21	—	RPAK-CHP2-80
	4	4	21	—	1	RPAK-CH2-80-TA
	4	4	21	21	1	RPAK-CHP2-80-TA

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Rope Pull Switches Specifications

Contact Rating	10A @ 24 V ac, 10A @ 110 V ac, 6A @ 230 V ac, 6A @ 24 V dc 2.5 kV max. transient tolerance NEMA A300 P300
Monitoring Solid-State Output Rating	**Rated operational voltage:** U_e= 10 to 30 V dc **Rated operational current:** I_e= 50 mA **Utilization category:** DC13 Protected against reverse polarity and short circuit.
European Rating	**Utilization categories:** AC15 and DC13 U_i= 500V ac, I_{th}= 10A **Rated Surge Capacity:** 2.5 kV (RP-RM83 only)

RP-RM83 models (40-60 Hz)

U_e V	I_e/AC-15 A	I_e/DC-13 A
120	6	0.55
240	3	0.27

All others (40-60 Hz)

U_e V	I_e/AC-15 A	I_e/DC-13 A
24	10	6
110	10	1
230	6	0.4

Contact Material	Silver-nickel alloy
Maximum Switching Speed	**RP-RM83 models:** 20 operations per minute **All others:** 50 operations per minute
Recommended Rope Size	**40 mm models:** 2 mm diameter steel rope **42 & 72 mm models:** 3 mm diameter steel rope **83 mm models:** 2-5 mm diameter steel rope (3 mm recommended) **90 mm models:** 4 mm diameter steel rope
Maximum Rope Pull Length	RP-LM40D-6/6L and RP-QM72D-6L: 6 m RP-LS42F-75L/75LE/75LF: 75 m RP-LS42F-38L/38LE/38LF: 37.5 m RP-LS42F-25L/25LE/25LF: 25 m RP-QM72D-12L: 12 m RP-QMT72D-20L: 20 m RP-QMT72E-12L and RP-QMT72F-12L: 12 m RP-RM83F-75LTE/LT/LRE/LR: 75 m RP-RM83F-38LTE/LT/LR/LRE: 38 m RP-QM90F-100L: 100 mm; equal lengths up to 50 m on either side of switch
Short Circuit Protection	10 amp Slow Blow, 15 amp Fast Blow. Recommended external fusing or overload protection.
Mechanical Life	**RP-RM83:** 100,000 operations **All others:** 1 million operations
Wire Connections	Screw terminals with pressure plates accept the following wire sizes – **Stranded and solid:** 20 AWG (0.5 mm^2) to 16 AWG (1.5 mm^2) for one wire **Stranded:** 20 AWG (0.5 mm^2) to 18 AWG (1.0 mm^2) for two wires
Cable Entry	M20 x 1.5 threaded entrance Adapter supplied to convert M20 x 1.5 to ½" - 14 NPT threaded entrance
Construction	**RP-LS42F-..L/..LE/..LF:** High-impact thermoplastic housing; zinc die-cast actuator **All others:** Aluminum alloy die cast
Environmental Rating	**RP-LS42F and RP-RM83F models:** NEMA 4; IEC IP67 **All other models:** NEMA 4; IP65
Operating Temperature	**RP-LS42F-..L/..LE/..LF:** -25° to +70° C **All other models:** -30° to +80° C
Weight	RP-LM40D-6: 0.22 Kg RP-LM40D-6L: 0.26 Kg RP-LS42F-..L: 0.48 Kg RP-LS42F-..LE and RP-LS42F-..LF: 0.65 Kg RP-QM72D-6L: 0.49 Kg RP-QM72D-12L: 0.52 Kg RP-QMT72D-20L, RP-QMT72E-12L and RP-QMT72F-12L: 0.64 Kg RP-QM90F-100L: 3.8 Kg RP-RM83F-75LT and RP-RM83F-75LTE: 1 Kg RP-RM83F-75LR and RP-RM83F-75LRE: 0.77 Kg RP-RM83F-38LT and RP83FLT8: 1 Kg RP-RM83F-38LR and RP-RM83F-38LRE: 0.77 Kg
Certifications	(RP-RM83 and RP-LS42 only)
Contact Configurations and Switching Diagrams	**RP-LM40 models:** SD13 & SD14 (p. page 752) **RP-LS42 models:** SD05, SD06 & SD07 (p. page 751) **RP-QM72/QMT72 models:** SD07, SD08, SD09, SD10 & SD11 (p. page 752) **RP-RM83 models:** SD01, SD02, SD03 & SD04 (p. page 751) **RP-QM90 models:** SD15 (p. page 752)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SD01 - RP-RM83F-75LTE/LRE Series

Contact Configuration	Switching Diagram
Run Position S1 S2 11 12 / 23 24 Cable Pull or Break S1 S2 11 12 / 23 24	S1 11-12 23-24 / S2 11-12 23-24 / Aux. 2-3 Break (156N) Latch Tension Set Point 228N Latch Pull (300N) -6 -4.8 -4 -3 +3 +4 +4.8 +6 mm Safety Monitor / Safety Monitor / Aux.
☐ Open ■ Closed	Page 740

SD02 - RP-RM83F-38LTE/LRE Series

Contact Configuration	Switching Diagram
Run Position S1 S2 11 12 / 23 24 Cable Pull or Break S1 S2 11 12 / 23 24	S1 11-12 23-24 / S2 11-12 23-24 / Aux. 2-3 Break (91N) Latch Tension Set Point 133N Latch Pull (175N) -6 -4.8 -4 -3 +3 +4 +4.8 +6 mm Safety Monitor / Safety Monitor / Aux.
☐ Open ■ Closed	Page 740

SD03 - RP-RM83-75LT/LR Series

Contact Configuration	Switching Diagram
Run Position S1 S2 11 12 / 23 24 Cable Pull or Break S1 S2 11 12 / 23 24	S1 11-12 23-24 / S2 11-12 23-24 Break (156N) Latch Tension Set Point 228N Latch Pull (300N) -6 -4.8 -4 -3 +3 +4 +4.8 +6 mm Safety Monitor / Safety Monitor
☐ Open ■ Closed	Page 740

SD04 - RP-RM83-38LT/LR Series

Contact Configuration	Switching Diagram
Run Position S1 S2 11 12 / 23 24 Cable Pull or Break S1 S2 11 12 / 23 24	S1 11-12 23-24 / S2 11-12 23-24 Break (91N) Latch Tension Set Point 133N Latch Pull (175N) -6 -4.8 -4 -3 +3 +4 +4.8 +6 mm Safety Monitor / Safety Monitor
☐ Open ■ Closed	Page 740

SD05 -

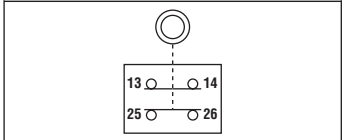
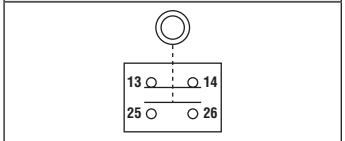
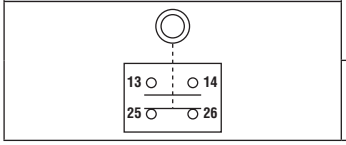
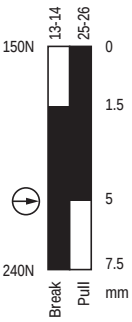
Contact Configuration	Switching Diagram
Run Position Run 13 14 21 22 33 34 41 42 Cable Pulled or Cable Break Pull / Break 13 14 21 22 33 34 41 42	13-14 21-22 33-34 41-42 +5 mm +4.3 mm +3.5 mm 0 mm -3.5 mm -4.3 mm -5 mm 100N / 175N / 300N Latch 80N / 140N / 240N Latch 60N / 105N / 180N Operating point ± 0.5 mm Actuating force ± 15% Monitoring Safety Monitoring Safety
☐ Open ■ Closed ▒ Transition	

SD06 - RP-QM72D-6L Series

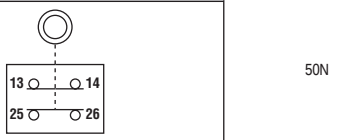
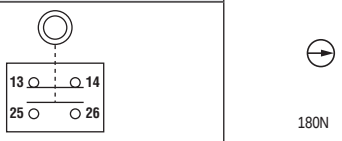
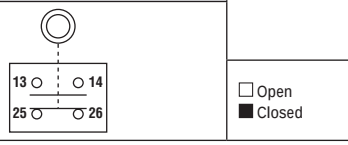
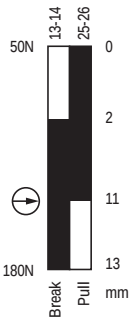
Cable Position	Switching Diagram
Run Position 13 14 / 25 26 Cable Pulled 13 14 / 25 26 Cable Break 13 14 / 25 26	13-14 25-26 90N 120N 0 2 4 6 mm Break Pull
☐ Open ■ Closed	Page 742

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

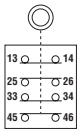
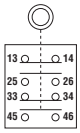
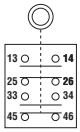
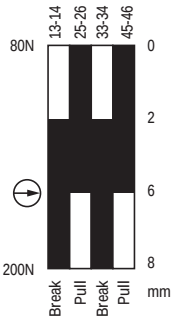
SD07 - RP-QM72D-12L Series

Cable Position	Switching Diagram
Run Position	
Cable Pulled	
Cable Break	
	
	☐ Open ■ Closed
	Page 742

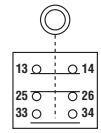
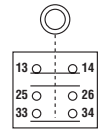
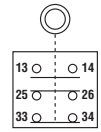
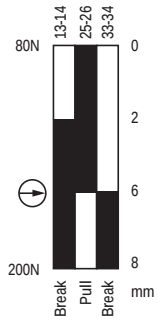
SD08 - RP-QMT72D-20L Series

Cable Position	Switching Diagram
Run Position	
Cable Pulled	
Cable Break	
	
	☐ Open ■ Closed
	Page 742

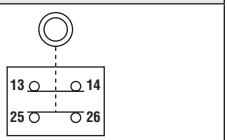
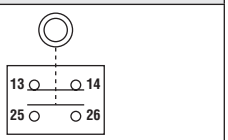
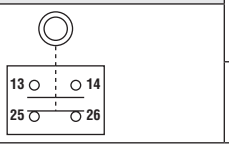
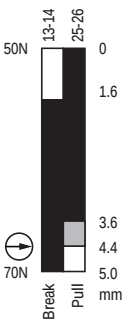
SD09 - RP-QMT72F-12L Series

Cable Position	Switching Diagram
Run Position	
Cable Pulled	
Cable Break	
	
	☐ Open ■ Closed
	Page 742

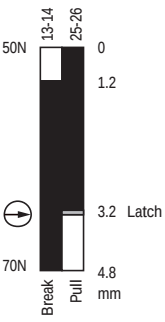
SD10 - RP-QMT72E-12L Series

Cable Position	Switching Diagram
Run Position	
Cable Pulled	
Cable Break	
	
	☐ Open ■ Closed
	Page 742

SD11 - RP-LM40D-6 Series

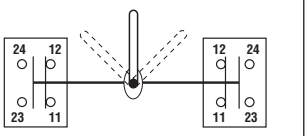
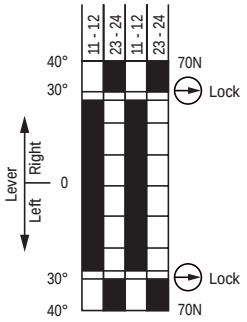
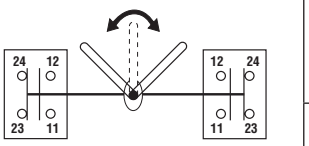
Cable Position	Switching Diagram
Run Position	
Cable Pulled	
Cable Break	
	
	☐ Open ■ Closed ■ Transition
	Page 743

SD12 - RP-LM40D-6L Series

Cable Position	Switching Diagram
Run Position	
Cable Pulled	
Cable Break	
	
	☐ Open ■ Closed ■ Transition
	Page 743

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SD13 - RP-QM90F-100L Series

Cable Position	Switching Diagram
Run Position 	
Cable Pulled or Break 	☐ Open ■ Closed

Page 744

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



ED1G
Enabling Devices

Handheld grip-style switch is typically used for manual control of machine functions, including visual observations, minor adjustments, troubleshooting, calibration and more.

- Provides the three-position functionality (OFF-ON-OFF) required for manual control of a machine, including enabling and hold-to-run applications
- Ergonomic design has a detented enable position (position 2)
- Design meets or exceeds: ANSI RIA R15.06 and ISO 10218 Robot safety standard, ANSI B11.19 Performance Criteria for Safeguards, and ANSI NFPA 79 (2007) and IEC 60204-1 (2000) Electrical Requirements for Industrial Machines

ED1G Series Enabling Devices, Stop Control Devices

Contact Configuration	Additional Push-Button Switch	Environmental Rating	Model
2 NO & 1 NC Aux	—	IP66	ED1G-L21SM-1N
1 NO & 1 NC Aux & 1 NO Momentary Push Button	Momentary Push Button	IP65	ED1G-L21SMB-1N
2 NO & 2 NO Momentary Push Button	Momentary Push Button	IP65	ED1G-L20MB-1N



ED1G-L21SM-1N Model



ED1G-L21SMB-1N Model

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

ED1G Enabling Device Specifications

Supply Voltage and Current	250 V ac/dc
Impulse Withstand Voltage	Three Position Switch: 2.5 kV Momentary pushbutton: 1.5 kV
Output Contact Ratings	Rated Insulation Voltage (UI): 3-position switch 250 V; momentary push button 125 V Rated Thermal Current (Ith): 2.5 A* *40°C ≤ operating temperature < 50° C: 2 A (4 contacts under load) *50°C ≤ operating temperature ≤ 60° C: 1.5 A (3 contacts under load

Rated Current (Ie) 3-Position Switch Terminals 1-2 and 3-4 (all models)

Rated Voltage Ue		30 V	125 V	250 V
AC	Resistive load (AC-12)	—	1 A	0.5 A
	Inductive load (AC-15)	—	0.7 A	0.5 A
DC	Resistive load (DC-12)	1 A	0.2 A	—
	Inductive load (DC-13)	0.7 A	0.1 A	—

Rated Current (Ie) Monitor Switch Terminals 5-6 (models..-L21SM.. and..-L21SMB..)

Rated Voltage Ue		30 V	125 V	250 V
AC	Resistive load (AC-12)	—	2 A	1 A
	Inductive load (AC-15)	—	1 A	0.5 A
DC	Resistive load (DC-12)	2 A	0.4 A	0.2 A
	Inductive load (DC-13)	1 A	0.22 A	0.1 A

Rated Current (Ie) Momentary Push Button Switch Terminals 7-8 (model ..-ED1G-L21SMB-1N..); 5-6 and 7-8 (model ED1G-L20MB-1N)

Rated Voltage Ue		30 V	125 V	250 V
AC	Resistive load (AC-12)	—	0.5 A	—
	Inductive load (DC-15)	—	0.3 A	—
DC	Resistive load (AC-12)	1 A	0.2 A	—
	Inductive load (DC-13)	0.7 A	0.1 A	—

Contact Resistance	100 mohm max.
Insulation Resistance	Live to dead metal parts: 100 Mohm min. Positive to negative live parts: 100 Mohm min.
Recommended Wire/Cable Size	Wire: 0.14 to 1.5 mm² (25 AWG to 16 AWG) Cable: ø 7 to 13 mm M20 conduit
Short Circuit Protection	250 V / 10A fast blow fuse (IEC 60127-1) Conditional short circuit current: 50 A (250 V)
Vibration Resistance	Operating extremes: 5 to 55 Hz, half amplitude 0.5 mm minimum Damage limits: 16.7 Hz, half amplitude 1.5 mm minimum
Shock Resistance	Operating extremes:150 m/s² (15 G) Damage limits: 1,000 m/s² (100 G)
Mechanical Life	Positions 1 & 2 only: 1,000,000 operations minimum Positions 1, 2 & 3: 100,000 operations minimum Operating frequency: 1,200 operations per hour maximum
Electrical Life	100,000 minimum at rated load
Pollution Degree	3
Terminal Pulling Strength	20 N minimum
Terminal Screw Torque	0.5 to 0.6 N
Operating Conditions (indoor use only)	Temperature: –10° to +60° C (no freezing) Humidity: 45 to 85% RH max. (no condensation) Storage Temperature: –40° to +80° C (no freezing)
Construction	Polyamide housing and cable gland, NBR/PVC polyblend rubber grip switch boot; model ED1G-L21SM-1N meets IP66; other models meet IP65
Design Standards	IEC 60947-5-1, EN 60947-5-1, JIS C8201-5-1, UL 508, CSA C22.2 No. 14, GS-ET-22
Certifications	CE cULus LISTED
Contact Configurations and Switching Diagrams	SD01, SD02 and SD03 (p. page 751) See wiring diagram WD067 (p. page 1050)

Brackets

ED1G

See page page 901

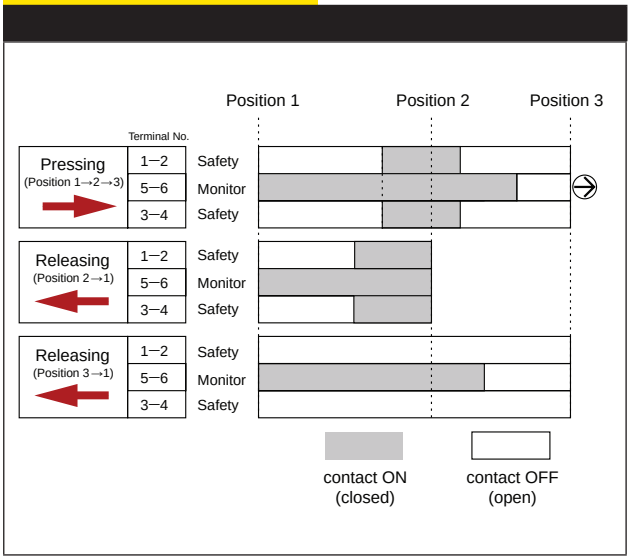
ED9Z-GH1



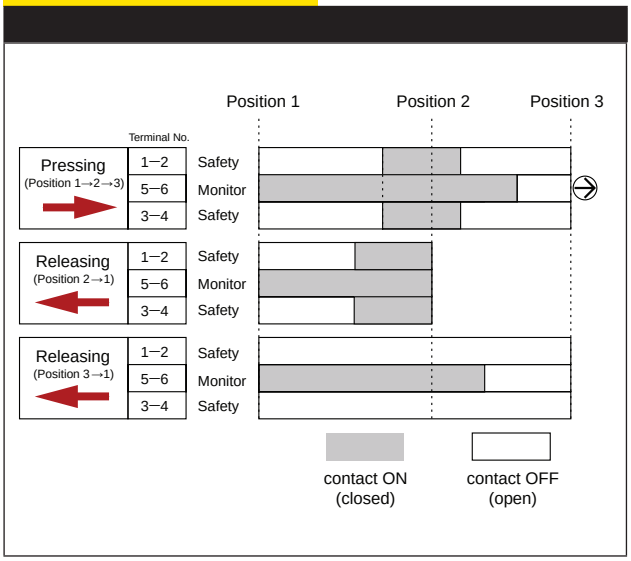
Additional brackets and information available. See page page 846.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

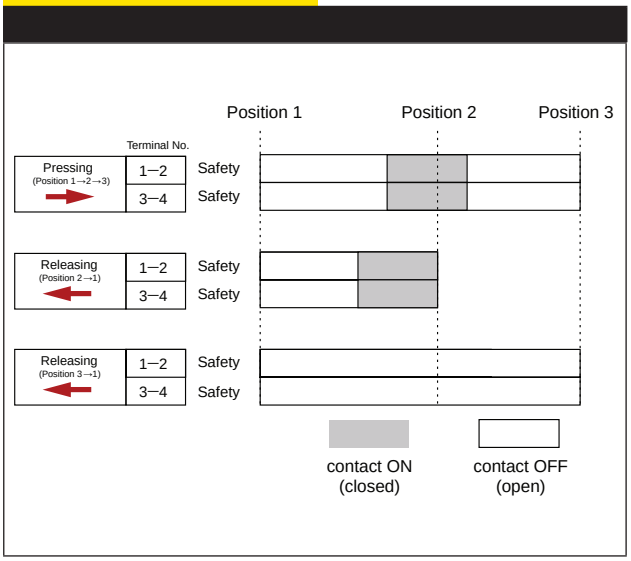
SD01 - ED1G-L21SM-1N Series



SD02 - ED1G-L21SMB-1N Series



SD03 - ED1G-L20MB-1N Series



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

The following standard products are still available from Banner.
Please go online to bannerengineering.com for full descriptions and technical references.



PICO-GUARD™ Grids & Points



PICO-GUARD™ Interlock Switches



PICO-GUARD™ E-Stop

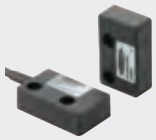
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Interlock Switches

Safety interlock switches respond when a guard opens. Interlock switches feature “positive opening” contacts for high reliability and withstand attempts to override the switch and defeat the system.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Style	Protection Rating	Housing Material
	Magnetic style page 760	Non-contact	IP67	Plastic
	Hinge style page 764	Load bearing and rotating	IP67	Plastic & Metal
	Two piece key actuator style page 772	Flat pack and limit switch	IP65	Plastic & Metal
	Locking style page 777	Spring or solenoid locking	IP67	Plastic & Metal

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Magnet Style
Non-Contact
Safety Interlock Switches

Magnet Style Safety Interlock Switches are accommodating to misalignment.

- Sealed components resist water and dirt
- Coded magnets minimize the risk of intentional defeat
- Three housing styles available for flat or 30 mm barrel mounting
- For safety applications, switch must be used with Gate Monitoring Module, Safety Controller or comparable control systems

SI-MAG Magnet Style Safety Switches

Description		Contacts	Sensor Cable	Switching Distance Min. ON	Switching Distance Max. OFF	Models
	Sensor	1 NO & 1 NC	3 m	—	—	SI-MAG1SM
	Sensor	1 NO & 1 NC	3 m	—	—	SI-MAG1SMCO†
	Coded Magnet	1 NO & 1 NC	—	0-3 mm	3-14 mm	SI-MAG1MM
	Coded Magnet	1 NO & 1 NC	—	0-3 mm	3-14 mm	SI-MAG1MM90*
	Coded Magnet	1 NO & 1 NC	—	2-8 mm	8-16 mm	SI-MAG1MMHF
	Sensor	1 NO & 1 NC	3 m	—	—	SI-MAG2SM
	Coded Magnet	1 NO & 1 NC	—	0-4 mm	4-8 mm	SI-MAG2MM
	Sensor	1 NO & 1 NC	3 m	—	—	SI-MAG3SM
	Coded Magnet	1 NO & 1 NC	—	0-3 mm	3-7 mm	SI-MAG3MM

NC = Normally Closed Output, NO = Normally Open Output

Connection options:

For 9 m cable, add suffix W/30 to the 3 m model number (example, SI-MAG1SM W/30).

* Difference is in direction of Approach. See page 764 for more information.

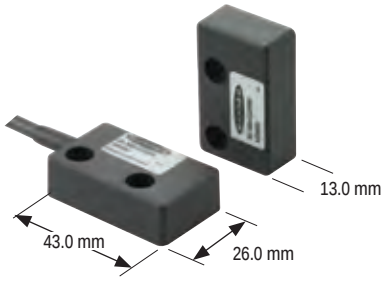
† Cable opposite

NOTE: The sensor and its magnet must be mounted at a minimum distance of 15 mm from any magnetized or ferrous material (example, steel) for proper operation. SFA-IMB1 or SFA-IMB2 can be used as spacers (see page 764). Depending on the installation, multiple brackets may be required.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



SI-MAG1SM.. and SI-MAG1MM.. Models



SI-MAG2SM and SI-MAG2MM Models



SI-MAG3SM and SI-MAG3MM Models

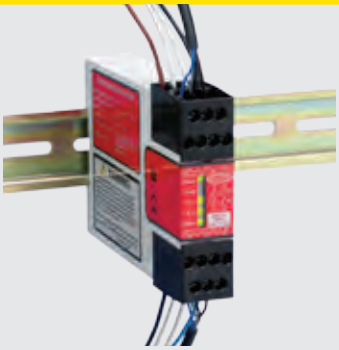
SI-MAG Safety Switches Specifications

Switching Elements	Three pole-stable reed switches
Repeat Switching Accuracy	± 0.1 mm
Construction	Epoxy-encapsulated circuit in polyamide housing
Environmental Rating	NEMA 4X; IP67
Switching Capacity	30 V dc max. @ 0.25 W
Operating Temperature	-5° to +70° C
Connections	Integral PVC-jacketed 3 m 4-wire cable. Cable O.D. is 5 mm. Wires are 24 AWG. (0.25 mm^2)
Wiring Diagrams	1-Channel Coded Magnet Switches: WD033 (p. 1027) 1-Channel (Multiple Guards): WD035 (p. 1029)

NOTE: See page 763 for direction of approach information.

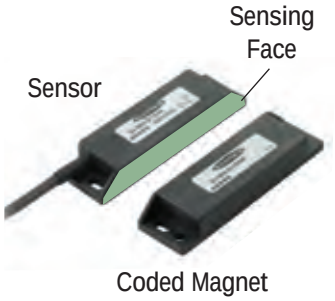
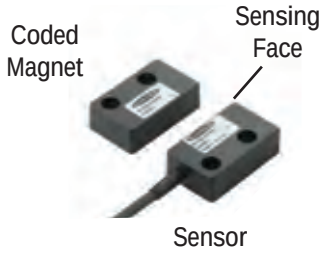
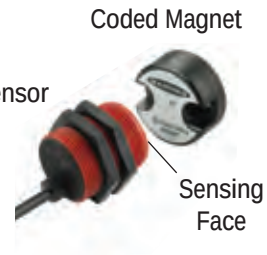
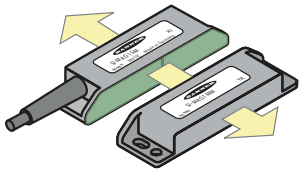
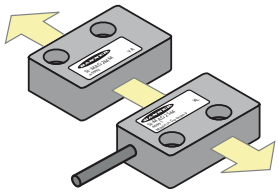
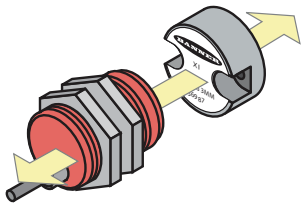
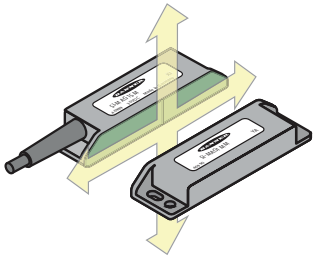
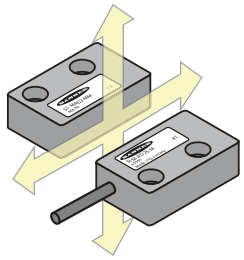
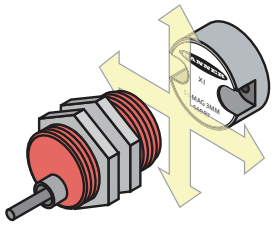
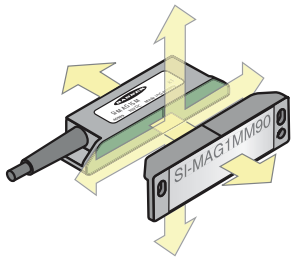
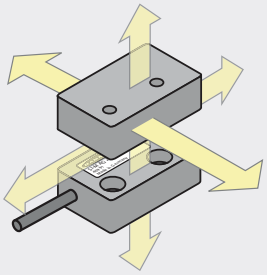
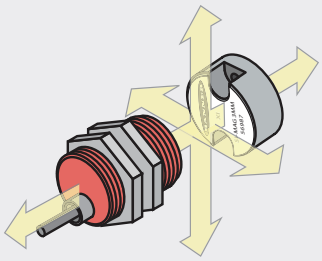
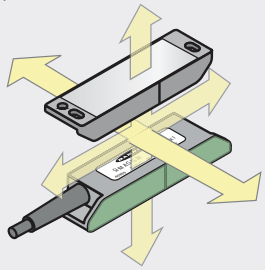
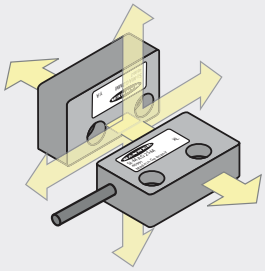
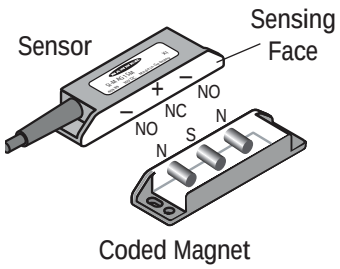
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Monitoring Control Module (required for a complete system)

	Description	Models	Product Information
	• The gate module monitors up to 20 Banner coded magnets for contact failure or wiring fault • Two-channel operation monitors redundant switches on a single guard; one-channel operation monitors single switches on two guards • Two redundant output switching channels connect to control-reliable power interrupt circuits and are rated for up to 250V ac at up to 6 A • The reset input can be used for external device monitoring (EDM) • The gate monitoring module uses 24 V ac/dc at less than 150 mA	GM-FA-10J	Page 812
	• Control system monitors a variety of input devices such as e-stop buttons, rope pulls, enabling devices, protective safety stops, interlocked guards or gates, optical sensors, two-hand controls and safety mats • Intuitive programming environment for easy implementation • Configure inputs, outputs and functionality of the controller for more usability • Base controller allows eight of the 26 inputs to be configured as outputs for efficient terminal utilization • Ethernet models available providing up to 64 virtual status outputs, fault diagnostic codes and messages	SC26-2 SC26-2D SC26-2E SC26-2DE	Page 800
	• One controller provides configurable monitoring of multiple safety devices • 22 input terminals can monitor both contact-based and PNP solid-state input devices • 3 pairs of independent solid-state safety outputs can be used with selectable one- or two-channel external device monitoring • Ten configurable non-safety status outputs track inputs, outputs, lockout, I/O status and other functions • All SC22-3 modules use 24 V dc • 10/100 Base TX Ethernet communication option using EtherNet/IP and Modbus TCP protocols (SC22-3E models)	SC22-3-S... SC22-3-C... SC22-3E-S... SC22-3E-C...	Page 804

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Magnet-Style Interlocks: Direction of Approach for Sensor/Magnet Pairs

Model SI-MAG1	Model SI-MAG2	Model SI-MAG3
		
Correct Movement is **perpendicular** to the sensing face. 	Correct Movement is **perpendicular** to the sensing face. 	Correct Movement is **perpendicular** to the sensing face. 
Correct Movement is **parallel** to the sensing face. 	Correct Movement is **parallel** to the sensing face. 	Correct Movement is **parallel** to the sensing face. 
Correct 90° approach of sensor and magnet is approved only for model SI-MAG1MM90. 	Incorrect Label to label approach of sensor and magnet is not possible. 	Incorrect Magnet orientation relative to magnet sensor cable is incorrect. 
Incorrect Label to label approach of sensor and magnet is not possible. 	Incorrect 90° approach of sensor and magnet is not possible. 	Detail of Interiors 

NOTE: With SI-MAG1C Controller, approach speed for all magnet-style switches must be greater than 0.2 ms.
With GM-FA-10J Controller, approach speed must be greater than 0.1 ms.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

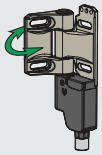
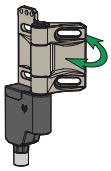
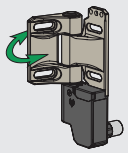
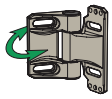


SI-HG63
Hinge Style Switches

SI-HG63 Hinge Style Switches are load bearing and operate to a full 270° range of motion with safety switching point.

- Safety switching point is adjustable and repositionable
- Housing is constructed of corrosion-resistant stainless steel or zinc die-cast
- Design meets positive opening requirements for safety interlocks (IEC 60947-5-1)
- Right-hinge QD, left-hinge QD, and right-angle QD hinge models available
- High degree of tamper-resistances

SI-HG63 Hinge Style Switches, 63 mm

Actuator Type		Contact(s)	Construction	Models
In-line QD Integral load bearing		2 NC & 1 NO	Stainless Steel Zinc Die-Cast	SI-HG63FQDR SI-HGZ63FQDR
In-line QD Integral load bearing		2 NC & 1 NO	Stainless Steel Zinc Die-Cast	SI-HG63FQDL SI-HGZ63FQDL
Right-angle QD Integral load bearing		2 NC & 1 NO	Stainless Steel Zinc Die-Cast	SI-HG63FQDRR SI-HGZ63FQDRR
Blank hinge		—	Stainless Steel Zinc Die-Cast	SI-HG63A SI-HGZ63A

Hinge 270°

NC = Normally closed contact, NO = Normally open contact

Connection options: A model with a QD requires a mating cordset. (see page 765).

For contact/switching diagrams see page 790.

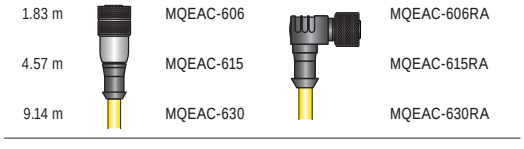
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Micro QD to Flying Leads

See page 927

Length	Threaded 6-Pin Straight	Threaded 6-Pin Right-Angle
1.83 m	MQEAC-606	MQEAC-606RA
4.57 m	MQEAC-615	MQEAC-615RA
9.14 m	MQEAC-630	MQEAC-630RA



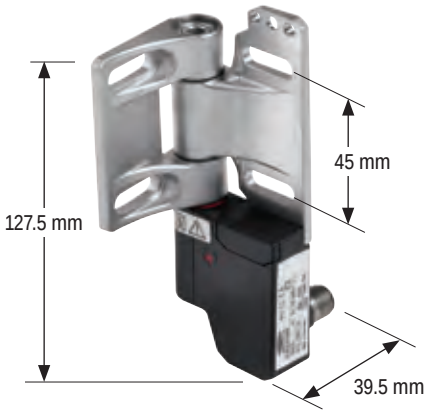


Additional cordset information available. See page 904.

* Dimensions for SI-...FQDL are mirror image.



SI-HG63FQDR*
SI-HG63ZFQDR*



SI-HG63FQDRR
SI-HGZ63FQDRR

SI-HG63 Hinge Style Switches Specifications

Contact Rating	3 A @ 230V ac max., 1.0 A @ 24V dc max. 2.5 kV max. transient tolerance
European Rating	Ui = 250 V, U_e = 230 V ac, 24 V dc, Ithe = 4A Utilization categories: AC-15: U_e/I_e 230 V / 3A; DC-13: U_e/I_e 24 V / 1A (IEC/EN 90497-5-1)
Switching Frequency	Max. 300 operations/h (5 operations per minute)
Switching Angle	NC contact: ±3º NO contact: ±9º Tolerance for all angles: 1.5º
Mechanical Life	1 million operations (Excessive loading (force) and/or vibration, as well as improper installation, can reduce the service life)
Short Circuit Protection	4 amp Slow Blow. Recommended external fusing or overload protection.
Operating Range	0° to 270°
Wire Connections	6-pin Micro-style quick-disconnect fitting (M12 Dual-Key-Way). Cordsets are ordered separately. See page 769.
Construction	SI-HG63.. Hinge: Cast Stainless (X22CrNi 17), Switch: PBT SI-HGZ63.. Hinge: Zinc Die Cast (Nickel Finish), Switch: PBT
Environmental Rating	IEC IP67 acc. IEC/EN60529
Operating Conditions	Temperature: –25° to +70° C (connecting cable permanently mounted; no freezing over/no condensation)
Weight	SI-HG63..≈ 0.45 kg, SI-HG63A ≈ 0.27 kg SI-HGZ63.. ≈ 0.5 kg, SI-GHZ63A ≈ 0.22 kg
Application Note	To avoid excessive radial stress in applications containing large doors, the hinge switch should be mounted either in pairs of two, or in conjunction with a blank hinge (see page 769).
Certifications	CE c SP® us
Contact configuration and Switching Diagram	SD001 (p. 790)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

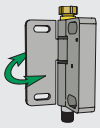
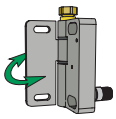
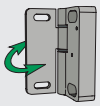


SI-HG80
Hinge Style Switches

SI-HG80 Hinge Style Switches are load bearing and operate to a full 180° range of motion.

- Housing is constructed of corrosion-resistant zinc die-cast
- One-piece switch eliminates need for alignment, engagement and risk of breakage of a separate actuator
- Design meets positive opening requirement s for safety interlocks (IEC 60947-5-1)
- High degree of tamper-resistances

SI-HG80 Hinge Style Switches, 80 mm

Actuator Type		Contact(s)	Connection	Models
In-line QD Integral load bearing		SPDT (Form C)	4-pin Micro QD	SI-HG80DQD
Right-angle QD Integral load bearing		SPDT (Form C)	4-pin Micro QD	SI-HG80DQDR
Blank hinge		—	—	SI-HG80A

Hinge 180° SPDT = Single-Pole, Double-Throw Contacts

Connection options: A model with a QD requires a mating cordset. (see page 767).

For contact/switching diagrams see page 790.

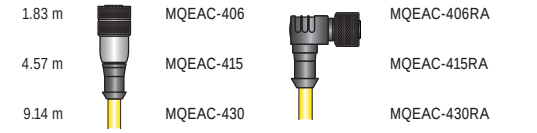
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

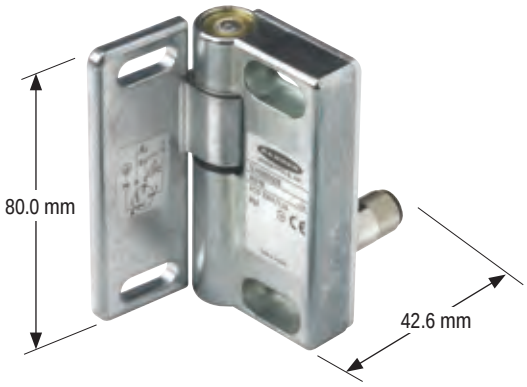
Micro QD to Flying Leads

See page 926

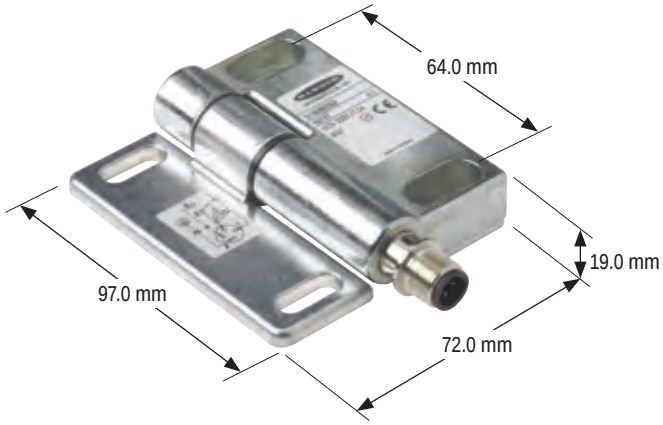
Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQEAC-406	MQEAC-406RA
4.57 m	MQEAC-415	MQEAC-415RA
9.14 m	MQEAC-430	MQEAC-430RA



Additional cordset information available. See page 904.



SI-HG80DQDR



SI-HG80DQD

SI-HG80 Hinge Style Switches Specifications

Contact Rating	3 A @ 250 V ac max., 0.5 A @ 60 V dc max. 2.5 kV max. transient tolerance NEMA A300 P300
European Rating	Utilization categories: AC15 and DC13 (IEC 90497-5-1) U_i = 250 V ac, I_{th} = 3A
Minimum Switching Speed	20 operations per minute
Mechanical Life	1 million operations
Short Circuit Protection	6 amp Slow Blow, 10 amp Fast Blow. Recommended external fusing or overload protection.
Force Exerted by Guard per Switch	Axial: 750 N max. Radial: 1000 N max.
Operating Range	0° to 180°
Wire Connections	4-pin Micro-style quick-disconnect (QD) fitting. Cordsets are ordered separately. See page 771.
Construction	Zinc Die-cast (GD-Zn)
Environmental Rating	NEMA 4; IP67
Operating Conditions	Temperature: -25° to +70° C
Weight	0.40 kg
Application Notes	To avoid excessive radial stress in applications containing large doors, the hinge switch should be mounted either in pairs of two, or in conjunction with a blank hinge.
Certifications	
Contact Configuration and Switching Diagrams	SD002 (p. 790)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

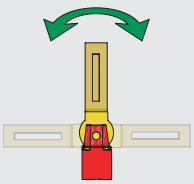
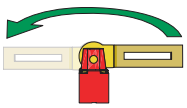
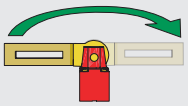


SI-LS32H
Hinge Style Switches

SI-LS31H Hinge Style Switches have a built-in hinged lever actuator that mounts to a hinged door or flap to detect its being opened.

- Actuator head rotates in 90° increments
- Built-in hinge lever attaches to doors or flaps, which open 90° in one direction
- Housing is constructed of glass reinforced thermoplastic with plated steel actuator
- One-piece switch eliminates need for alignment, engagement and risk of breakage of a separate actuator
- Design meets positive opening requirement s for safety interlocks (IEC 60947-5-1)

SI-LS31H Hinge Lever Style Switches, 31 mm

Actuator Type		Contact(s)	Models*
Vertical Hinged Lever ± 90°		1 NC & 1 NO	SI-LS31HGD
		2 NC	SI-LS31HGE
Right-Hand Hinged Lever 180°		1 NC & 1 NO	SI-LS31HGRD
		2 NC	SI-LS31HGRE
Left-Hand Hinged Lever 180°		1 NC & 1 NO	SI-LS31HGLD
		2 NC	SI-LS31HGLE

Hinge 90° | One-Directional 180° | One-Directional 180° | NC = Normally Closed Contact, NO = Normally Open Contact

* Contact factory for integral quick-disconnect (QD) and pigtail QD options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

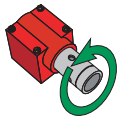


SI-LS31R
Hinge Style Switches

SI-LS31R Hinge Style Switches are a rotary hinge style where the actuator connects directly to door hinge.

- Actuator head rotates in 90° increments
- Rotating actuator connects directly to door hinge
- Housing is constructed of glass reinforced thermoplastic with plated steel actuator
- One-piece switch eliminates need for alignment, engagement and risk of breakage of a separate actuator
- Design meets positive opening requirements for safety interlocks (IEC 60947-5-1)

SI-LS31R Rotary Hinge Style Switches, 31 mm

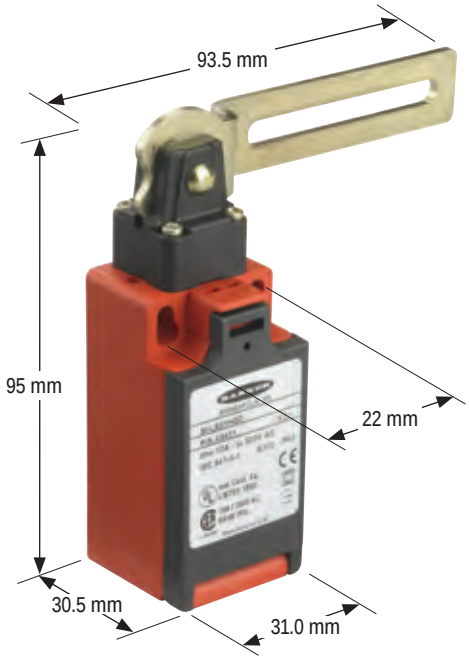
Actuator Type		Contact(s)	Models*
Rotary Shaft		1 NC & 1 NO	SI-LS31RTD
		2 NC	SI-LS31RTE

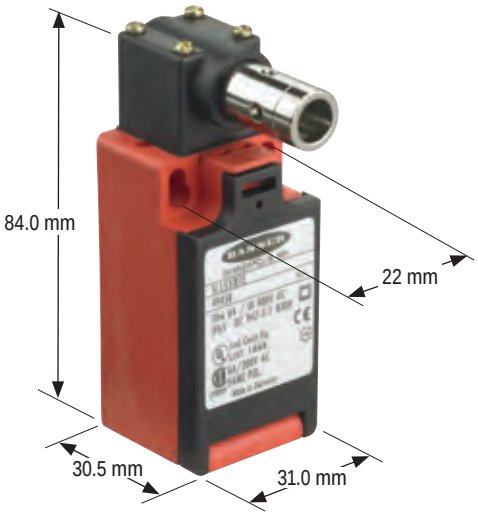
360° Rotary

NC = Normally Closed Contact, NO = Normally Open Contact

* Contact factory for integral quick-disconnect (QD) and pigtail QD options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es





Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SI-LS31 Hinge Style Switches Specifications

Contact Rating	10A @ 24 V ac, 10A @ 110 V ac, 6A @ 230 V ac, 6A @ 24 V dc 2.5 kV max. transient tolerance NEMA A300 P300
European Rating	Utilization categories: AC15 and DC13 U_i = 500V ac I_{th} = 10A
Contact Material	Silver-nickel alloy
Maximum Switching Speed	50 operations per minute
Mechanical Life	1 million operations
Required Actuation Force	SI-LS31R models: 10 N cm SI-LS31H models: 15 N cm
Short Circuit Protection	6 amp Slow Blow, 10 amp Fast Blow. Recommended external fusing or overload protection.
Wire Connections	Screw terminals with pressure plates accept the following wire sizes – Stranded and solid: 20 AWG (0.5 mm^2) to 16 AWG (1.5 mm^2) for one wire Stranded: 20 AWG (0.5 mm^2) to 18 AWG (1.0 mm^2) for two wires
Cable Entry	M20 x 1.5 threaded entrance Adapter supplied to convert from M20 x 1.5 to ½" - 14 NPT threaded entrance
Construction	Glass fiber-reinforced thermoplastic UL94-VO rating; plated steel actuator
Environmental Rating	IP65
Operating Conditions	Temperature: -30° to +80° C
Weight	0.09 Kg
Certifications	CE, CSA C US, UL AUXILIARY DEVICE LISTED
Contact Configuration and Switching Diagrams	SI-LS31R models: SD009 and SD010 (p. 791) SI-LS31H models: SD003, SD004, SD005, SD006, SD007 and SD008 (p. 790)

40-60 Hz		
U_i V	I_e/AC-15 A	I_e/DC-13 A
24	10	6
110	10	1
230	6	.4

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

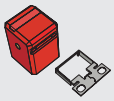
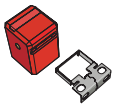
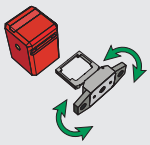


SI-LS100
Non-Locking Plastic Safety Interlock Switches

Mechanically coded actuators minimize intentional tampering or defeat.

- 100 mm plastic style switch
- Rotating head requires no tools
- Limit switch style
- Actuator engagement from four side or four top positions

SI-LS100 Plastic Style Switches(kits), 100 mm

Actuator Type		Interlock	Contact(s)	Kit Model*
SI-QS-SSA-2 Straight Rigid In-Line		SI-LS100F	2 NC & 1 NO	SI-LS100SF
SI-QS-SSA-3 Rigid In-Line		SI-LS100F	2 NC & 1 NO	SI-LS100SRAF
SI-QS-SSU Flexible In-Line		SI-LS100F	2 NC & 1 NO	SI-LS100MRFF

Multi-Directional NC = Normally Closed Contact, NO = Normally Open Contact

* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only. Contact factory for integral quick-disconnect (QD) and pigtail QD options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

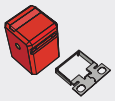
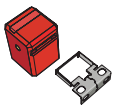
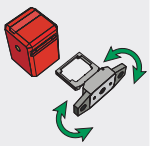
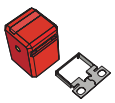
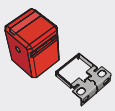
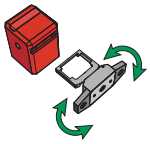


SI-LS83
Non-Locking Plastic Safety Interlock Switches

Mechanically coded actuators minimize intentional tampering or defeat.

- 83 mm plastic style switch
- Rotating head requires no tools
- Limit switch style
- Actuator engagement from four side or four top positions

SI-LS83 Plastic Style Switches (kits), 83 mm

Actuator Type		Interlock		Kit Model*
SI-QS-SSA-2 Straight Rigid In-Line		SI-LS83D	1 NC & 1 NO	SI-LS83SD
SI-QS-SSA-3 Rigid In-Line		SI-LS83D	1 NC & 1 NO	SI-LS83SRAD
 SI-QS-SSU Flexible In-Line		SI-LS83D	1 NC & 1 NO	SI-LS83MRFD
SI-QS-SSA-2 Straight Rigid In-Line		SI-LS83E	2 NC	SI-LS83SE
SI-QS-SSA-3 Rigid In-Line		SI-LS83E	2 NC	SI-LS83SRAE
 SI-QS-SSU Flexible In-Line		SI-LS83E	2 NC	SI-LS83MRFE

 Multi-Directional NC = Normally Closed Contact, NO = Normally Open Contact

* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only. Contact factory for integral quick-disconnect (QD) and pigtail QD options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



SI-QS90
Non-Locking Plastic Safety Interlock Switches

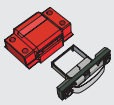
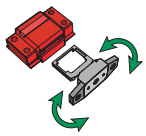
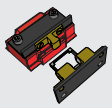
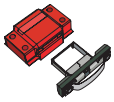
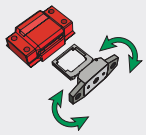
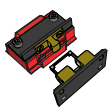
Mechanically coded actuators minimize intentional tampering or defeat.

- 90 mm flat-pack style switch
- Rotating head requires no tools
- Actuator engagement from four side or four top positions



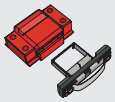
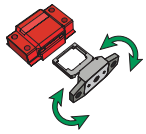
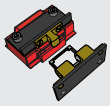
Replacement actuators for safety interlock switches (page 778)

SI-QS90 Flat-Pack Style Switches(kits), 90 mm

Actuator Type		Interlock	Contact(s)	Kit Model*
SI-QS-SSA-4 Rigid In-Line		SI-QS90D	1 NC & 1 NO	SI-QS90MD
 SI-QS-SSU Flexible In-Line		SI-QS90D	1 NC & 1 NO	SI-QS90MFD
SI-QS-SSA Rigid In-Line & SI-QS-100 High-force Accessory		SI-QS90D	1 NC & 1 NO	SI-QS90MD-100 (High-Force)
SI-QS-SSA-4 Rigid In-Line		SI-QS90E	2 NC	SI-QS90ME
 SI-QS-SSU Flexible In-Line		SI-QS90E	2 NC	SI-QS90MFE
SI-QS-SSA Rigid In-Line & SI-QS-100 High-force Accessory		SI-QS90E	2 NC	SI-QS90ME-100 (High-Force)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SI-QS90 Flat-Pack Style Switches(kits), 90 mm

Actuator Type		Interlock	Contact(s)	Kit Model*
SI-QS-SSA-4 Rigid In-Line		SI-QS90F	2 NC & 1 NO	SI-QS90MF
SI-QS-SSU Flexible In-Line		SI-QS90F	2 NC & 1 NO	SI-QS90MFF
SI-QS-SSA Rigid In-Line & SI-QS-100 High-force Accessory		SI-QS90F	2 NC & 1 NO	SI-QS90MF-100 (High-Force)

Multi-Directional NC = Normally Closed Contact, NO = Normally Open Contact

* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only. Contact factory for integral quick-disconnect (QD) and pigtail QD options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

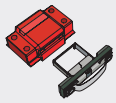
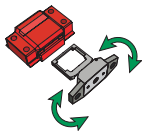
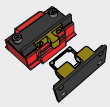


SI-QS75
Non-Locking Plastic Safety Interlock Switches

Mechanically coded actuators minimize intentional tampering or defeat.

- 75 mm flat-pack style switch
- Rotating head requires no tools
- Flat pack and limit switch styles
- Actuator engagement from four side or four top positions

SI-QS75 Flat-Pack Style Switches (kits), 75 mm

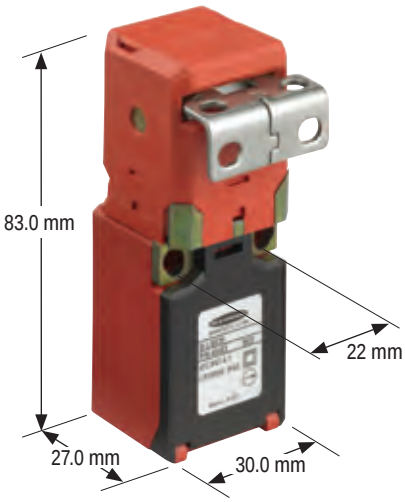
Actuator Type		Interlock	Contact(s)	Kit Model*
SI-QS-SSA-4 Rigid In-Line		SI-QS75C	1 NC	SI-QS75MC
 SI-QS-SSU Flexible In-Line		SI-QS75C	1 NC	SI-QS75MFC
SI-QS-SSA Rigid In-Line & SI-QS-100 High-force Accessory		SI-QS75C	1 NC	SI-QS75MC-100 (High-Force)

 Multi-Directional NC = Normally Closed Contact, NO = Normally Open Contact

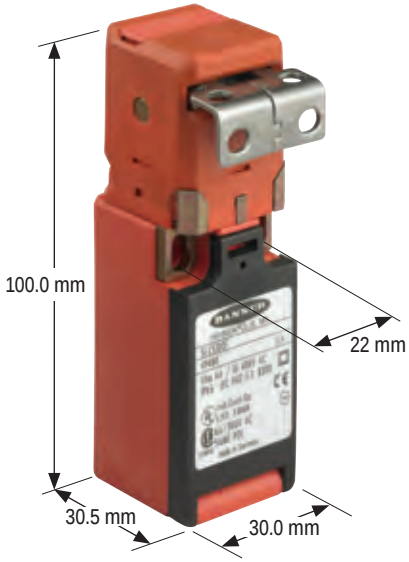
* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only. Contact factory for integral quick-disconnect (QD) and pigtail QD options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SI-LS83 and SI-LS100
Plastic Style Switches



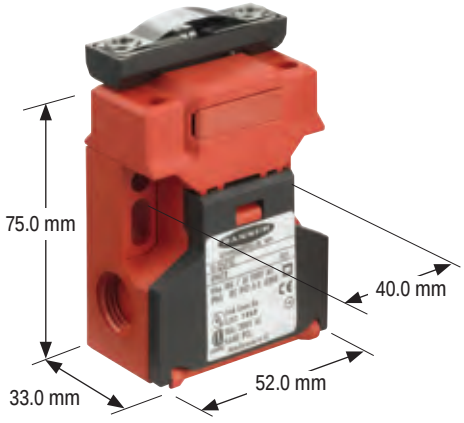
SI-LS83 Models



SI-LS100 Models

(both models shown with right-angle rigid in-line actuator)

SI-QS75 and SI-QS90
Flat-Pack Style Switches



SI-QS75 Models



SI-QS90 Models

(both models shown with rigid in-line actuator)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SI-LS83 and SI-LS100 Plastic Style Switches Specifications

Contact Rating	10A @ 24 V ac, 10A @ 110 V ac, 6A @ 230 V ac, 6A @ 24 V dc 2.5 kV max. transient tolerance NEMA A300 P300
European Rating	**Utilization categories**: AC15 and DC13 (IEC 60947-5-1) **Switches with 1 & 2 contact pairs:** U_i= 500V ac, I_{th}= 10A **Switches with 3 contact pairs:** U_i= 400V ac, I_{th}= 5A

40-60 Hz		
U_e V	I_e/AC-15 A	I_e/DC-13 A
24	10	6
110	10	1
230	6	.4

Contact Material	Silver-nickel alloy
Maximum Switching Speed	30 operations per minute
Maximum Actuator Speed	1 m/second
Mechanical Life	1 million operations
Minimum Actuator Engagement Radius	**In-line actuators:** 150 mm **Flexible actuators:** 50 mm in all directions
Actuation Extraction Force	12 N
Short Circuit Protection	6 amp Slow Blow, 10 amp Fast Blow. Recommended external fusing or overload protection.
Wire Connections	**Stranded and solid:** 20 AWG (0.5 mm^2) to 18 AWG (1.0 mm^2) for one wire **Stranded:** 20 AWG (0.5 mm^2) to 18 AWG (1.0 mm^2) for two wires
Cable Entry	M20 x 1.5 for SI-LS100 and M16 x 1.5 for SI-LS83 threaded entrance. Adapter supplied to convert to ½"- 14 NPT threaded entrance.
Construction	Glass fiber-reinforced thermoplastic UL94-VO rating
Environmental Rating	IP65 **Note:** Addition of a No. 3 x ¼" screw (max) to the wiring access door increases sealing to IP67; NEMA 4X
Operating Conditions	**Temperature:** -30° to +80° C
Weight	**SI-LS83 models:** 0.12 kg **SI-LS100 models:** 0.13 kg
Certifications	CE, C SA US, UL AUXILIARY DEVICE LISTED
Contact Configuration and Switching Diagrams	**SI-LS100 models:** SD011 (p. 791) **SI-LS83 models:** SD012 and SD013 (p. 791)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SI-QS75 and SI-QS90 Flat-Pack Style Switches Specifications

Contact Rating	10A @ 24V ac, 10A @ 110V ac, 6A @ 230V ac, 6A @ 24V dc 2.5 kV max. transient tolerance NEMA A300 P300
European Rating	**Utilization categories**: AC15 and DC13 (IEC 60947-5-1) **Switches with 1 & 2 contact pairs**: U_i= 500V ac, I_{th}= 10A **Switches with 3 contact pairs**: U_i= 400V ac, I_{th}= 5A
Contact Material	Silver-nickel alloy
Maximum Switching Speed	30 operations per minute
Maximum Actuator Speed	1 m/second
Mechanical Life	1 million operations
Minimum Actuator Engagement Radius	**In-line actuators:** 150 mm **Flexible actuators:** 50 mm in all directions
Actuation Extraction Force	**High-Force models:** 100 N **All others:** 10 N
Short Circuit Protection	6 amp Slow Blow, 10 amp Fast Blow. Recommended external fusing or overload protection.
Wire Connections	Screw terminals with pressure plates accept the following wire sizes – **For switches with one or two contacts:** **Stranded and solid:** 20 AWG (0.5 mm^2) to 16 AWG (1.5 mm^2) for one wire **Stranded:** 20 AWG (0.5 mm^2) to 18 AWG (1.0 mm^2) for two wires **For switches with three contacts:** **Stranded and solid:** 20 AWG (0.5 mm^2) to 18 AWG (1.0 mm^2) for one wire **Stranded:** 20 AWG (0.5 mm^2) to 18 AWG (1.0 mm^2) for two wires
Cable Entry	M20 x 1.5 for SI-QS90 and M16 x 1.5 for SI-QS75 threaded entrance. Adapter supplied to convert to ½" - 14 NPT threaded entrance.
Construction	Glass fiber-reinforced thermoplastic UL94-VO rating
Environmental Rating	IP65 **Note:** Addition of a No. 3 x ¼" screw (max) to the wiring access door increases sealing to IEC IP67; NEMA 4X
Operating Conditions	**Temperature:** -30° to +80° C
Weight	**SI-QS75 models:** 0.11 kg **SI-QS90 models:** 0.13 kg
Application Notes	Models with one and two contacts have three cable entry locations (bottom and two sides); models with three contacts have two cable entry locations (two sides). All entry locations are sealed with knockouts. To remove knockouts, thread the supplied M16 x 1.5 or M20 x 1.5 to ½" - 14 NPT conduit adapter or optional M16 x 1.5 or M20 x 1.5 cable gland into one of the threaded entry locations. The knockout will break open just before the adapter or cable gland bottoms out.
Certifications	CE, CSA C US, UL AUXILIARY DEVICE LISTED
Contact Configuration and Switching Diagrams	**SI-QS75 models:** SD014 (p. 792) **SI-QS90 models:** SD015, SD016 and SD017 (p. 792)

40-60 Hz		
U_e V	I_e/AC-15 A	I_e/DC-13 A
24	10	6
110	10	1
230	6	.4

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

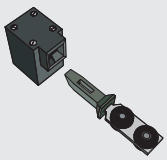
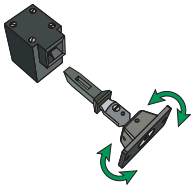
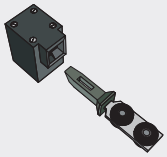
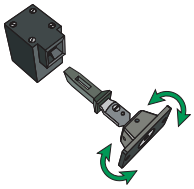


SI-LM40MKH
Non-Locking Metal Safety Interlock Switches

Mechanically coded actuators minimize intentional tampering or defeat.

- Rigid or flexible in-line actuators
- Actuator head rotates to four possible positions in 90° increments
- Rugged metal housing
- Design meets positive opening requirements for safety interlocks (IEC 60947-5-1)

SI-LM40MKH Limit Switch Style (kits), 40 mm

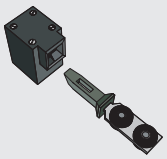
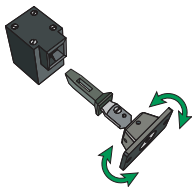
Actuator Type		Interlock	Contact(s)	Kit Model*
SI-QM-SSA Straight Rigid In-Line		SI-LM40KHD	1 NO & 1 NC	SI-LM40MKHD
SI-QM-SMFA Flexible In-Line		SI-LM40KHD	1 NO & 1 NC	SI-LM40MKHFD
SI-QM-SSA Straight Rigid In-Line		SI-LM40KHE	2 NC	SI-LM40MKHE
SI-QM-SMFA Flexible In-Line		SI-LM40KHE	2 NC	SI-LM40MKHFE

Multi-Directional NC = Normally Closed Contact, NO = Normally Open Contact

* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only. Contact factory for integral quick-disconnect (QD) and pigtail QD options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SI-LM40MKH Limit Switch Style (kits), 40 mm (cont'd)

Actuator Type		Interlock	Contact(s)	Kit Model*
SI-QM-SSA Straight Rigid In-Line		SI-LM40KHF	2 NC & 1 NO	SI-LM40MKHF
SI-QM-SMFA Flexible In-Line		SI-LM40KHF	2 NC & 1 NO	SI-LM40MKHFF

Multi-Directional NC = Normally Closed Contact, NO = Normally Open Contact

* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only. Contact factory for integral quick-disconnect (QD) and pigtail QD options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

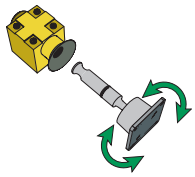


SI-LM40MKV
Non-Locking Metal Safety Interlock Switches

Mechanically coded actuators minimize intentional tampering or defeat.

- In-line Spring-loaded actuator; flexes in all directions
- Actuator head rotates to four possible positions in 90° increments
- Rugged metal housing
- Design meets positive opening requirements for safety interlocks (IEC 60947-5-1)

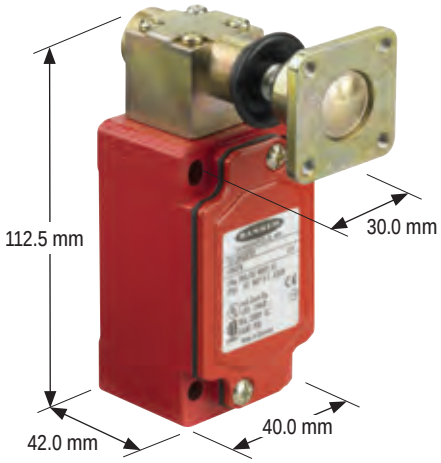
SI-LM40MKV Limit Switch Style (kits), 40 mm

Actuator Type		Interlock	Contact(s)	Kit Model*
SI-QM-90A Flexible In-Line		SI-LM40KVD	1 NO & 1 NC	SI-LM40MKVD
		SI-LM40KVE	2 NC	SI-LM40MKVE

Multi-Directional NC = Normally Closed Contact, NO = Normally Open Contact

* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only. Contact factory for integral quick-disconnect (QD) and pigtail QD options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



SI-LM40MKV Models
(with flexible in-line actuator)



SI-LM40MKH Models
(shown with rigid in-line actuator)

SI-LM40 Limit Style Switches Specifications

Contact Rating	10A @ 24 V ac, 10A @ 110 V ac, 6A @ 230 V ac, 6A @ 24 V dc 2.5 kV max. transient tolerance NEMA A300 P300
European Rating	Utilization categories: AC15 and DC13 U_i= 500V ac, I_{th}= 10A

40-60 Hz		
U_e V	I_e/AC-15 A	I_e/DC-13 A
24	10	6
110	10	1
230	6	.4

Contact Material	Silver-nickel alloy
Maximum Switching Speed	SI-LM40MKH models: 50 operations per minute SI-LM40MKV models: 10 operations per minute
Maximum Actuator Speed	SI-LM40MKH models: 1.5 m/second SI-LM40MKV models: 0.5 m/second
Mechanical Life	SI-LM40MKH models: 1 million operations SI-LM40MKV models: 25,000 operations
Minimum Actuator Engagement Radius	Rigid actuator: 400 mm Flexible actuator: 150 mm
Actuation Extraction Force	SI-LM40MKH models: 10 N SI-LM40MKV models: 20 N
Short Circuit Protection	6 amp Slow Blow, 10 amp Fast Blow. Recommended external fusing or overload protection.
Wire Connections	Screw terminals with pressure plates accept the following wire sizes – Stranded and solid: 20 AWG (0.5 mm^2) to 16 AWG (1.5 mm^2) for one wire Stranded: 20 AWG (0.5 mm^2) to 18 AWG (1.0 mm^2) for two wires
Cable Entry	M20 x 1.5 threaded entrance Adapter supplied to convert M20 x 1.5 to ½" - 14 NPT threaded entrance
Construction	Aluminum alloy die cast
Environmental Rating	IP65
Operating Conditions	Temperature: -30° to +80° C
Weight	SI-LM40MKH models: 0.34 kg SI-LM40MKV models: 0.31 kg
Certifications	CE, CSA C US, UL AUXILIARY DEVICE LISTED
Contact Configuration and Switching Diagrams	SI-LM40MKH..D models: SD018 (p. 792) SI-LM40MKH..E models: SD019 (p. 793) SI-LM40MKH..F models: SD020 (p. 793) SI-LM40MKV.. models: SD021 and SD022 (p. 793)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

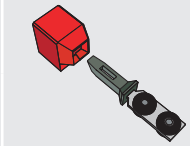
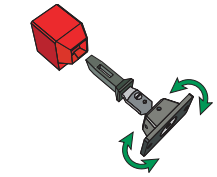


SI-LS42
Plastic Locking Style Safety Interlock Switches

Two locking mechanisms available including spring lock with energized solenoid release and energized solenoid lock with spring release.

- Actuator head can be rotated in 90° increments to eight possible actuator positions: four vertical and four horizontal
- Design meets positive opening requirements for safety interlocks (IEC 60947-5-1)
- AC and DC voltage available

SI-LS42 Safety Switches, 42 mm - Spring Lock and Solenoid Unlock

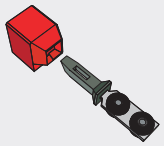
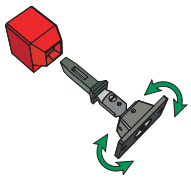
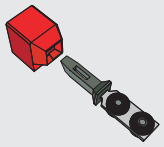
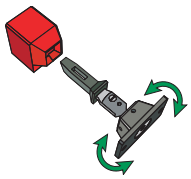
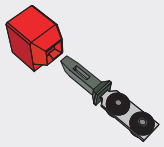
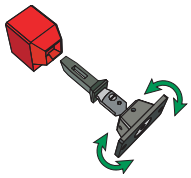
Actuator Type		Interlock	Contact(s)	Solenoid Voltage	Kit Model *
SI-QM-SSA Straight Rigid In-Line		SI-LS42DSG	Actuator Contacts: 1 NC & 1 NO	24 V ac/dc	SI-LS42DMSG
		SI-LS42WSG	Solenoid Monitor Contacts: 1 NC & 1 NO	110 V ac/ 230 V ac	SI-LS42WMSG
SI-QM-SMFA Flexible In-Line		SI-LS42DSG	Actuator Contacts: 1 NC & 1 NO	24 V ac/dc	SI-LS42DMSGF
		SI-LS42WSG	Solenoid Monitor Contacts: 1 NC & 1 NO	110 V ac/ 230 V ac	SI-LS42WMSGF

Multi-Directional NC = Normally Closed Contact, NO = Normally Open Contact

* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only. Contact factory for integral quick-disconnect (QD) and pigtail QD options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SI-LS42 Safety Switches, 42 mm - Spring Lock and Solenoid Unlock (cont'd)

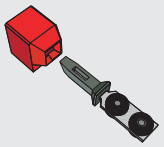
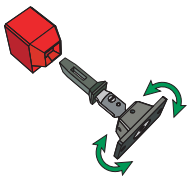
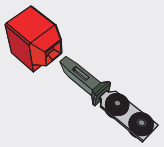
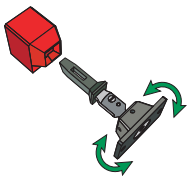
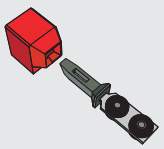
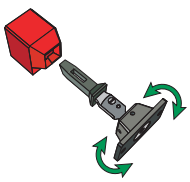
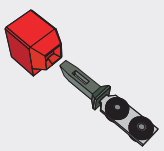
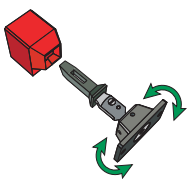
Actuator Type		Interlock	Contact(s)	Solenoid Voltage	Kit Model *
SI-QM-SSA Straight Rigid In-Line		SI-LS42DSH SI-LS42WSH	Actuator Contacts: 2 NC Solenoid Monitor Contacts: 1 NC & 1 NO	24 V ac/dc 110 V ac/ 230 V ac	SI-LS42DMSH SI-LS42WMSH
SI-QM-SMFA Flexible In-Line		SI-LS42DSH SI-LS42WSH	Actuator Contacts: 2 NC Solenoid Monitor Contacts: 1 NC & 1 NO	24 V ac/dc 110 V ac/ 230 V ac	SI-LS42DMSHF SI-LS42WMSHF
SI-QM-SSA Straight Rigid In-Line		SI-LS42DSI SI-LS42WSI	Actuator Contacts: 2 NC & 1 NO Solenoid Monitor Contact: 1 NC	24 V ac/dc 110 V ac/ 230 V ac	SI-LS42DMSI SI-LS42WMSI
SI-QM-SMFA Flexible In-Line		SI-LS42DSI SI-LS42WSI	Actuator Contacts: 2 NC Solenoid Monitor Contacts: 1 NC & 1 NO	24 V ac/dc 110 V ac/ 230 V ac	SI-LS42DMSIF SI-LS42WMSIF
SI-QM-SSA Straight Rigid In-Line		SI-LS42DSJ	Actuator Contacts: 3 NC Solenoid Monitor Contact: 1 NC	24 V ac/dc	SI-LS42DMSJ
SI-QM-SMFA Flexible In-Line		SI-LS42DSJ	Actuator Contacts: 3 NC Solenoid Monitor Contact: 1 NC	24 V ac/dc	SI-LS42DMSJF

Multi-Directional NC = Normally Closed Contact, NO = Normally Open Contact

* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only. Contact factory for integral quick-disconnect (QD) and pigtail QD options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SI-LS42 Safety Switches, 42 mm - Solenoid Lock and Spring Unlock (cont'd)

Actuator Type		Interlock	Contact(s)	Solenoid Voltage	Kit Model *
SI-QM-SSA Straight Rigid In-Line		SI-LS42DMG SI-LS42WMG	Actuator Contacts: 1 NC & 1 NO Solenoid Monitor Contacts: 1 NC & 1 NO	24 V ac/dc 110 V ac/ 230 V ac	SI-LS42DMMG SI-LS42WMMG
SI-QM-SMFA Flexible In-Line		SI-LS42DMG SI-LS42WMG	Actuator Contacts: 1 NC & 1 NO Solenoid Monitor Contacts: 1 NC & 1 NO	24 V ac/dc 110 V ac/ 230 V ac	SI-LS42DMMGF SI-LS42WMMGF
SI-QM-SSA Straight Rigid In-Line		SI-LS42DMH SI-LS42WMH	Actuator Contacts: 2 NC Solenoid Monitor Contacts: 1 NC & 1 NO	24 V ac/dc 110 V ac/ 230 V ac	SI-LS42DMMH SI-LS42WMMH
SI-QM-SMFA Flexible In-Line		SI-LS42DMH SI-LS42WMH	Actuator Contacts: 2 NC Solenoid Monitor Contacts: 1 NC & 1 NO	24 V ac/dc 110 V ac/ 230 V ac	SI-LS42DMMHF SI-LS42WMMHF
SI-QM-SSA Straight Rigid In-Line		SI-LS42DMI SI-LS42WMI	Actuator Contacts: 2 NC & 1 NO Solenoid Monitor Contact: 1 NC	24 V ac/dc 110 V ac/ 230 V ac	SI-LS42DMMI SI-LS42WMMI
SI-QM-SMFA Flexible In-Line		SI-LS42DMI SI-LS42WMI	Actuator Contacts: 2 NC & 1 NO Solenoid Monitor Contact: 1 NC	24 V ac/dc 110 V ac/ 230 V ac	SI-LS42DMMIF SI-LS42WMMIF
SI-QM-SSA Straight Rigid In-Line		SI-LS42DMJ	Actuator Contacts: 3 NC Solenoid Monitor Contact: 1 NC	24 V ac/dc	SI-LS42DMMJ
SI-QM-SMFA Flexible In-Line		SI-LS42DMJ	Actuator Contacts: 3 NC Solenoid Monitor Contact: 1 NC	24 V ac/dc	SI-LS42DMMJF

Multi-Directional NC = Normally Closed Contact, NO = Normally Open Contact

* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only. Contact factory for integral quick-disconnect (QD) and pigtail QD options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

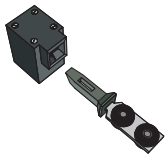


SI-QM100
Metal Locking Style Safety Interlock Swtiches

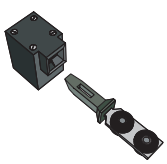
Two locking mechanisms available including spring lock with energized solenoid release and energized solenoid lock with spring release.

- Actuator head can be rotated in 90° increments to eight possible actuator positions: four vertical and four horizontal
- Design meets positive opening requirements for safety interlocks (IEC 60947-5-1)
- AC and DC voltage available

SI-QM100 Safety Switches, 100 mm - Spring Lock and Solenoid Unlock

Actuator Type		Interlock	Contact(s)	Solenoid Voltage	Kit Model*
SI-QM-SSA Straight Rigid In-Line		SI-QM100DSG	Switching Contacts: 1 NC & 1 NO	24 V dc	SI-QM100DMSG
		SI-QM100ASG	Solenoid Monitor Contacts: 1 NC & 1 NO	120 V ac	SI-QM100AMSG
		SI-QM100DSH	Switching Contacts: 2 NC Solenoid Monitor Contacts: 1 NC & 1 NO	24 V dc	SI-QM100DMSH

SI-QM100 Safety Switches, 100 mm - Solenoid Lock and Spring Unlock

Actuator Type		Interlock	Contact(s)	Solenoid Voltage	Kit Model*
SI-QM-SSA Straight Rigid In-Line		SI-QM100DMG	Switching Contacts: 1 NC & 1 NO	24 V dc	SI-QM100DMMG
		SI-QM100AMG	Solenoid Monitor Contacts: 1 NC & 1 NO	120 V ac	SI-QM100AMMG

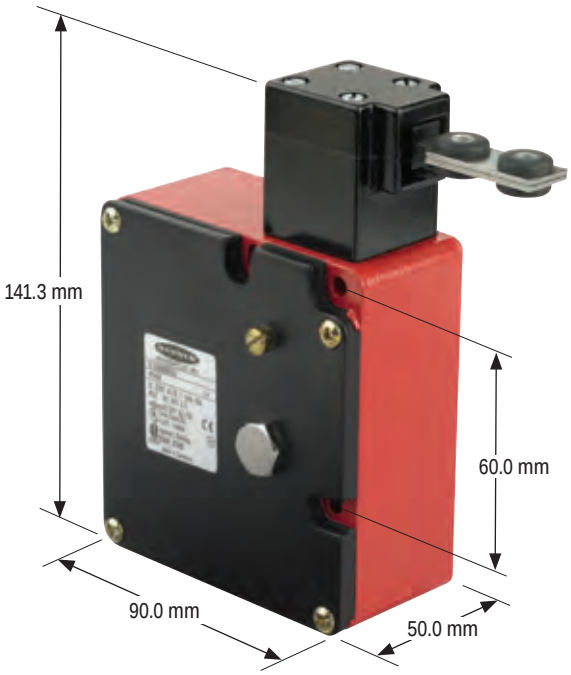
Multi-Directional NC = Normally Closed Contact, NO = Normally Open Contact

* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only. Contact factory for integral quick-disconnect (QD) and pigtail QD options.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



SI-LS42 Models
(shown with
rigid in-line actuator)



SI-QM100 Models
(shown with rigid in-line actuator)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Locking Style Switches Specifications

Contact Rating	4A @ 250 V ac max. 2.5 kV max. transient tolerance NEMA A300 P300
European Rating	Utilization categories: AC15 and DC13 (IEC 60947-5-1) Switches with 1 & 2 contact pairs: U_i= 250V ac SI-LS42 models: I_{th}= 2.5 A SI-QM100 models: I_{th}= 10 A

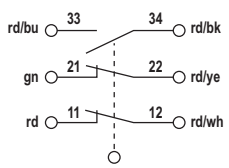
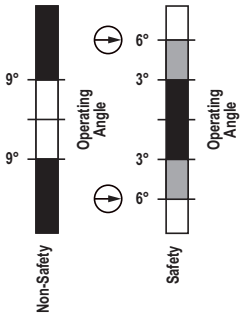
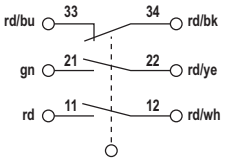
40-60 Hz		
U_e V	I_e/AC-15 A	I_e/DC-13 A
24	4	3
110	4	0.7
230	4	0.3

Contact Material	Silver-nickel alloy
Solenoid Power Consumption	SI-LS42 models: 1.1 VA / Inrush 12 VA (0.2 sec) SI-QM100 models: 5.2 W
Maximum Actuator Speed	1.5 m/second
Mechanical Life	1 million operations
Minimum Actuator Engagement Radius	Rigid actuator: 400 mm Flexible actuator: 150 mm
Actuation Extraction Force	SI-LS42 models: 2000 N when locked SI-QM100 models: 1000 N when locked
Short Circuit Protection	6 amp Slow Blow, 10 amp Fast Blow. Recommended external fusing or overload protection.
Wire Connections	SI-LS42 models: 10 cage clamp elements 1.5 mm stranded max. / 16 AWG SI-QM100 models: Screw terminals with pressure plates accept the following wire sizes – 16 AWG (1.5 mm^2) max. solid; 14 AWG (2.5 mm^2) max. stranded, 18 AWG (1 mm^2) when using all 11 terminals
Cable Entry	M20 x 1.5 threaded entrance Adapter supplied to convert M20 x 1.5 to ½" - 14 NPT threaded entrance
Construction	SI-LS42 models: Glass fiber-reinforced polyamide thermoplastic housing; UL 94-V0 rating SI-QM100 models: Aluminum die cast
Environmental Rating	IP67
Operating Conditions	Temperature: SI-LS42 models: -30° to +70° C SI-QM100 models: -30° to +60° C
Weight	SI-LS42 models: 0.3 kg SI-QM100 models: 0.81 kg
Application Notes	When rotating the actuator head, the actuator MUST BE FULLY ENGAGED. When using a model with solenoid locking, the lock mechanism will disengage upon solenoid power failure.
Certifications	CE c SA us
Contact Configuration and Switching Diagrams	SI-LS42 models: SD023, SD024, SD025 & SD026 (p. 793) SI-QM100 models: SD027 and SD028 (p. 794)

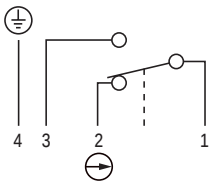
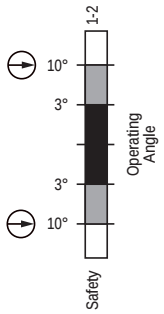
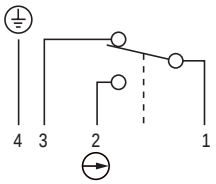
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Contact/Switching Diagrams

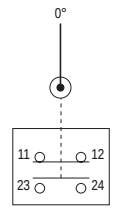
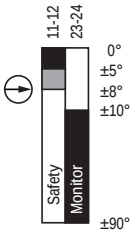
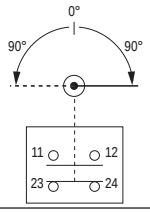
SD001 - SI-HG63 Series

Contact Configuration	Switching Diagram
Guard Closed	
	
Guard Open	
	
☐ Open ■ Closed ▒ Transition	Page 794

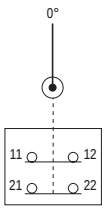
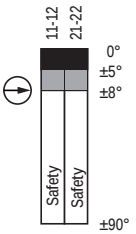
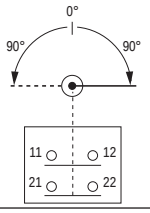
SD002 - SI-HG80 Series

Contact Configuration	Switching Diagram
Guard Closed	
	
Guard Open	
	
☐ Open ■ Closed ▒ Transition	Page 794

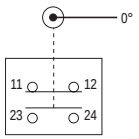
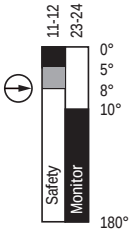
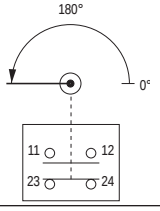
SD003 - SI-LS31HGD Series

Contact Configuration	Switching Diagram
Lever in Normal Position	
	
Lever Rotated	
	
☐ Open ■ Closed ▒ Transition	Page 794

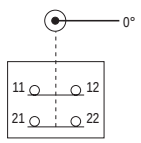
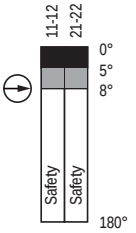
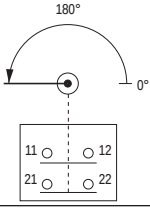
SD004 - SI-LS31HGE Series

Contact Configuration	Switching Diagram
Lever in Normal Position	
	
Lever Rotated	
	
☐ Open ■ Closed ▒ Transition	Page 794

SD005 - SI-LS31HGRD Series

Contact Configuration	Switching Diagram
Lever in Normal Position	
	
Lever Rotated	
	
☐ Open ■ Closed ▒ Transition	Page 794

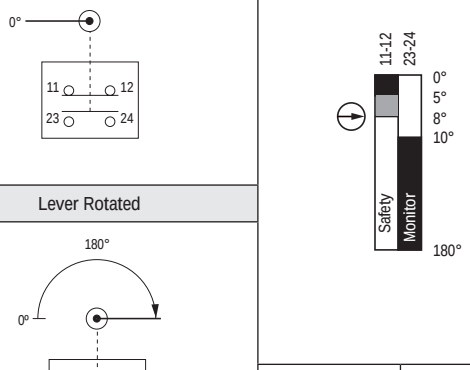
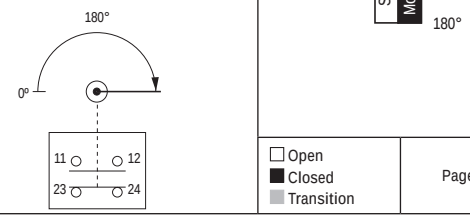
SD006 - SI-LS31HGRE Series

Contact Configuration	Switching Diagram
Lever in Normal Position	
	
Lever Rotated	
	
☐ Open ■ Closed ▒ Transition	Page 794

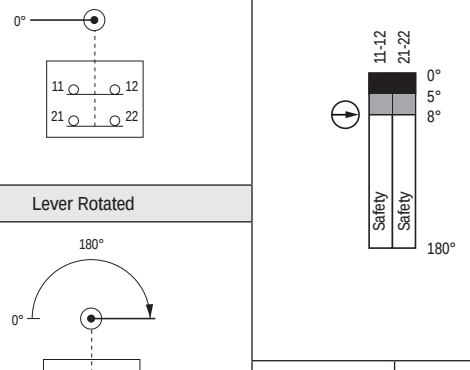
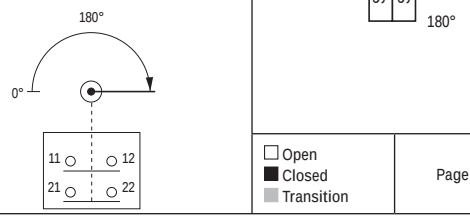
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Contact/Switching Diagrams

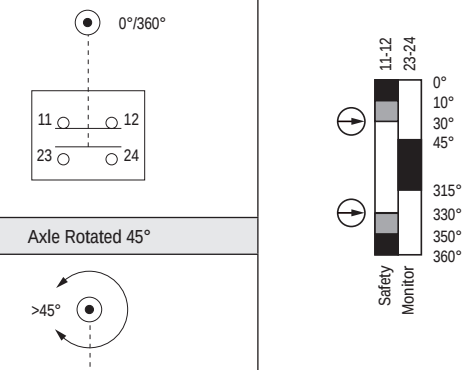
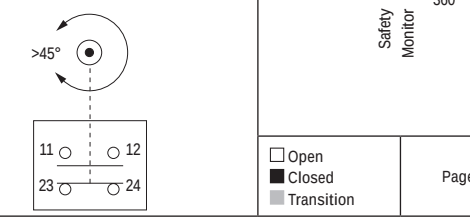
SD007 - SI-LS31HGLD Series

Contact Configuration	Switching Diagram
Lever in Normal Position	
Lever Rotated	
☐ Open ■ Closed ▒ Transition	Page 795

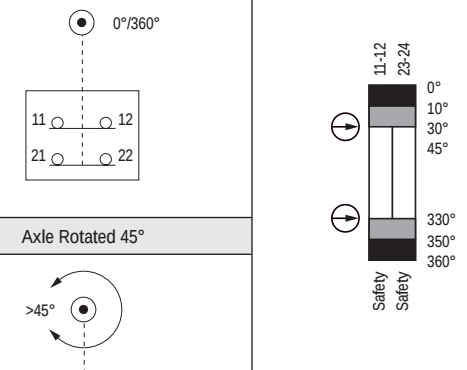
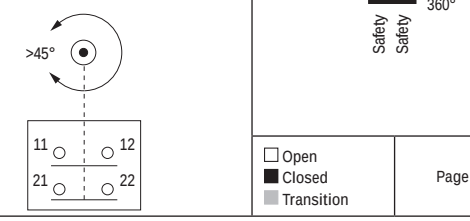
SD008 - SI-LS31HGLE Series

Contact Configuration	Switching Diagram
Lever in Normal Position	
Lever Rotated	
☐ Open ■ Closed ▒ Transition	Page 795

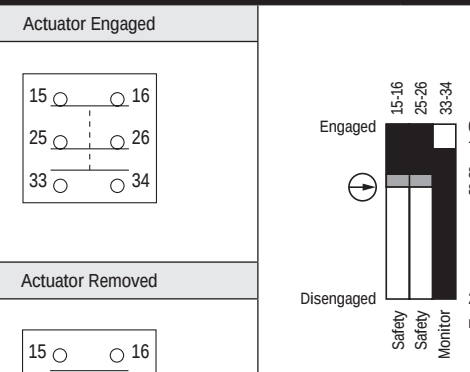
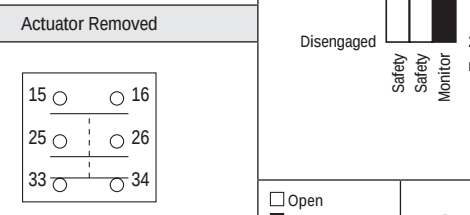
SD009 - SI-LS31RTD Series

Contact Configuration	Switching Diagram
Axle in Home Position 0°	
Axle Rotated 45°	
☐ Open ■ Closed ▒ Transition	Page 795

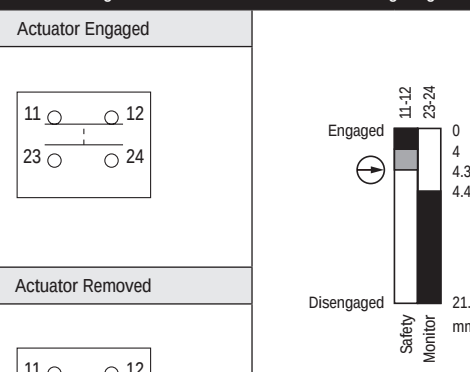
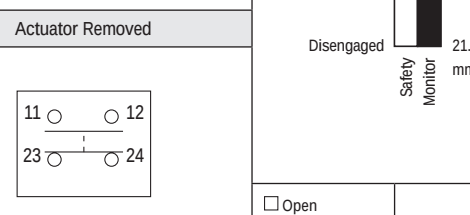
SD010 - SI-LS31RTE Series

Contact Configuration	Switching Diagram
Axle in Home Position 0°	
Axle Rotated 45°	
☐ Open ■ Closed ▒ Transition	Page 795

SD011 - SI-LS100 Series

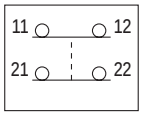
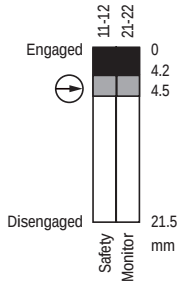
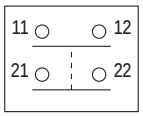
Contact Configuration	Switching Diagram
Actuator Engaged	
Actuator Removed	
☐ Open ■ Closed ▒ Transition	Page 795

SD012 - SI-LS83..D Series

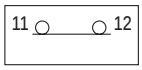
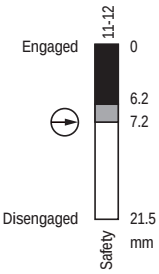
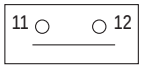
Contact Configuration	Switching Diagram
Actuator Engaged	
Actuator Removed	
☐ Open ■ Closed ▒ Transition	Page 795

Contact/Switching Diagrams

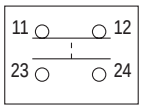
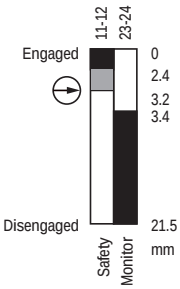
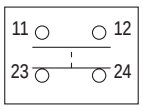
SD013 - SI-LS83..E Series

Contact Configuration	Switching Diagram
Actuator Engaged	
	
Actuator Removed	
	
☐ Open ■ Closed ▒ Transition	Page 796

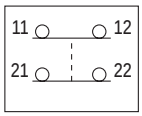
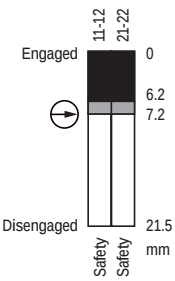
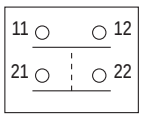
SD014 - SI-QS75 Series

Contact Configuration	Switching Diagram
Actuator Engaged	
	
Actuator Removed	
	
☐ Open ■ Closed ▒ Transition	Page 796

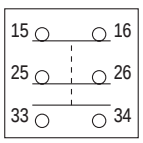
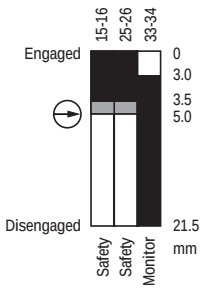
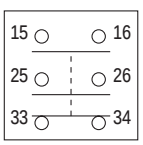
SD015 - SI-QS90MD Series

Contact Configuration	Switching Diagram
Actuator Engaged	
	
Actuator Removed	
	
☐ Open ■ Closed ▒ Transition	Page 796

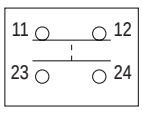
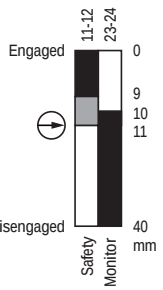
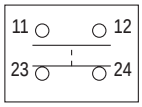
SD016 - SI-QS90ME Series

Contact Configuration	Switching Diagram
Actuator Engaged	
	
Actuator Removed	
	
☐ Open ■ Closed ▒ Transition	Page 796

SD017 - SI-QS90MF Series

Contact Configuration	Switching Diagram
Actuator Engaged	
	
Actuator Removed	
	
☐ Open ■ Closed ▒ Transition	Page 796

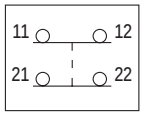
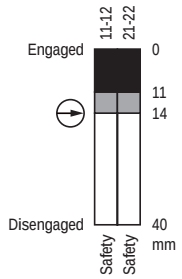
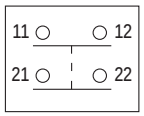
SD018 - SI-LM40MKHD Series

Contact Configuration	Switching Diagram
Actuator Engaged	
	
Actuator Removed	
	
☐ Open ■ Closed ▒ Transition	Page 796

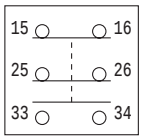
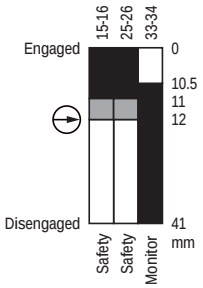
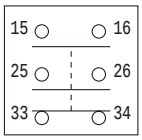
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Contact/Switching Diagrams

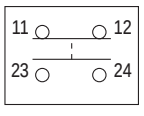
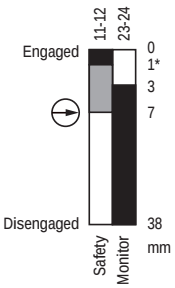
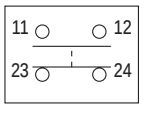
SD019 - SI-LM40MKHE Series

Contact Configuration	Switching Diagram
Actuator Engaged	
	
Actuator Removed	
	☐ Open ■ Closed ■ Transition Page 797

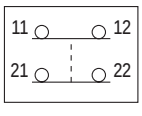
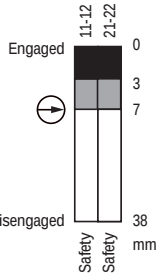
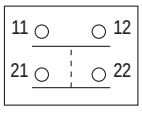
SD020 - SI-LM40MKHF Series

Contact Configuration	Switching Diagram
Actuator Engaged	
	
Actuator Removed	* 1 mm of movement will open contact
	☐ Open ■ Closed ■ Transition Page 797

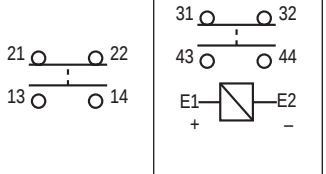
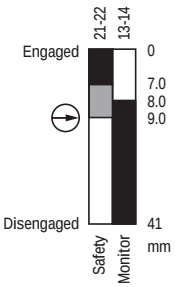
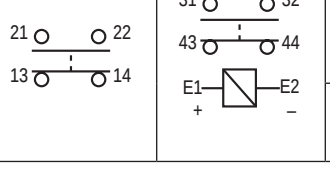
SD021 - SI-LM40MKVD Series

Contact Configuration	Switching Diagram
Actuator Engaged	
	
Actuator Removed	
	☐ Open ■ Closed ■ Transition Page 797

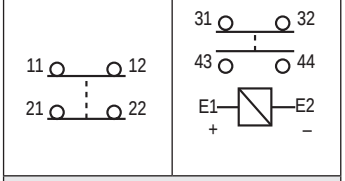
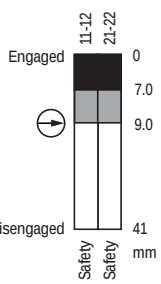
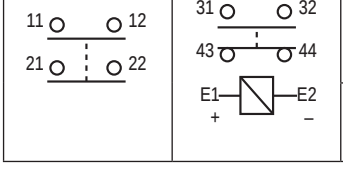
SD022 - SI-LM40MKVE Series

Contact Configuration	Switching Diagram
Actuator Engaged	
	
Actuator Removed	
	☐ Open ■ Closed ■ Transition Page 797

SD023 - SI-LS42..MSG/MMG Series

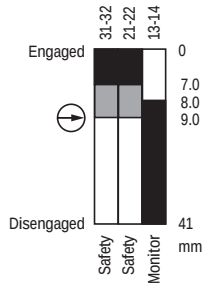
Contact Configuration	Switching Diagram
Actuator Engaged & Locked	
Actuator Contacts / Solenoid Monitor Contacts	
	
Actuator Removed & Unlocked	
Actuator Contacts / Solenoid Monitor Contacts	
	☐ Open ■ Closed ■ Transition Page 797

SD024 - SI-LS42..MSH/MMH Series

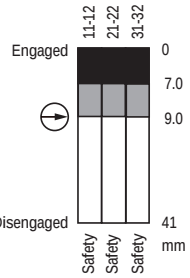
Contact Configuration	Switching Diagram
Actuator Engaged & Locked	
Actuator Contacts / Solenoid Monitor Contacts	
	
Actuator Removed & Unlocked	
Actuator Contacts / Solenoid Monitor Contacts	
	☐ Open ■ Closed ■ Transition Page 797

Contact/Switching Diagrams

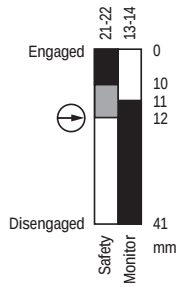
SD025 - SI-LS42..MSI/MMI Series

Contact Configuration	Switching Diagram
Actuator Engaged & Locked Actuator Contacts: 31–32, 21–22, 13–14 Solenoid Monitor Contacts: 41–42, E1(+)–E2(–)	
Actuator Removed & Unlocked Actuator Contacts: 31–32, 21–22, 13–14 Solenoid Monitor Contacts: 41–42, E1(+)–E2(–)	☐ Open ■ Closed ■ Transition Page 798

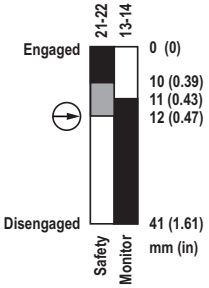
SD026 - SI-LS42..MSJ/MMJ Series

Contact Configuration	Switching Diagram
Actuator Engaged & Locked Actuator Contacts: 11–12, 21–22, 31–32 Solenoid Monitor Contacts: 41–42, E1(+)–E2(–)	
Actuator Removed & Unlocked Actuator Contacts: 11–12, 21–22, 31–32 Solenoid Monitor Contacts: 41–42, E1(+)–E2(–)	☐ Open ■ Closed ■ Transition Page 798

SD027 - SI-QM100..MSG/MMG Series

Contact Configuration	Switching Diagram
Actuator Engaged & Locked Actuator Contacts: 21–22, 13–14 Solenoid Monitor Contacts: 31–32, 43–44	
Actuator Removed & Unlocked Actuator Contacts: 21–22, 13–14 Solenoid Monitor Contacts: 31–32, 43–44	☐ Open ■ Closed ■ Transition Page 798

SD028 - SI-QM100..DMSH Series

Contact Configuration	Switching Diagram
Actuator Engaged & Locked Actuator Contacts: 21–22, 11–12 Solenoid Monitor Contacts: 31–32, 43–44	
Actuator Removed & Unlocked Actuator Contacts: 21–22, 11–12 Solenoid Monitor Contacts: 31–32, 43–44	☐ Open ■ Closed ■ Transition Page 798

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

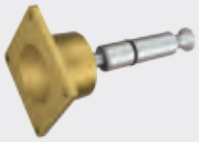
Safety Interlock Switches Replacement Parts

Used In	Description	Model*
SI-LM40MKH..D kits	Individual Interlock (without actuator)	SI-LM40KHD
SI-LM40MKH..E kits		SI-LM40KHE
SI-LM40MKH..F kits		SI-LM40KHF
SI-LM40MKVD kit		SI-LM40KVD
SI-LM40MKVE kit		SI-LM40KVE
SI-LS42DMSG.. kits		SI-LS42DSG
SI-LS42WMSG.. kits		SI-LS42WSG
SI-LS42DMSH.. kits		SI-LS42DSH
SI-LS42WMSH.. kits		SI-LS42WSH
SI-LS42DMSI.. kits		SI-LS42DSI
SI-LS42WMSI.. kits		SI-LS42WSI
SI-LS42DMSJ.. kits		SI-LS42DSJ
SI-LS42DMMG.. kits		SI-LS42DMG
SI-LS42WMMG.. kits		SI-LS42WMG
SI-LS42DMMH.. kits		SI-LS42DMH
SI-LS42WMMH.. kits		SI-LS42WMH
SI-LS42DMMI.. kits		SI-LS42DMI
SI-LS42WMMI.. kits		SI-LS42WMI
SI-LS42DMMJ.. kits		SI-LS42DMJ
SI-LS100..F kits		SI-LS100F
SI-LS83..D kits		SI-LS83D
SI-LS83..E kits		SI-LS83E
SI-QM100DMSG kit		SI-QM100DSG
SI-QM100AMSG kit		SI-QM100ASG
SI-QM100DMMG kit		SI-QM100DMG
SI-QM100AMMG kit		SI-QM100AMG
SI-QS75..C kits		SI-QS75C
SI-QS90..D kits		SI-QS90D
SI-QS90..E kits		SI-QS90E
SI-QS90..F kits		SI-QS90F

* Kits with one safety interlock switch and an actuator are available (see pp. 578-590).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Replacement Actuator Parts for Safety Interlock Switches

	Description	Used With	Model
	Flexible in-line, trumpet-style, metal actuator used for doors or covers where alignment is difficult to maintain. Flexes in all directions. Minimum engagement radius for hinged closures is 150 mm.	• SI-LM40MKV	SI-QM-90A
	Rigid in-line metal actuator used for doors or covers. Slide-bolt design for use in heavy-duty applications where alignment is difficult to maintain.	• SI-LM40MKH • SI-LS42 • SI-QM100	SI-QM-SB
	Flexible in-line metal actuator used for doors or covers where alignment is difficult to maintain. Flexes in all directions. Minimum engagement radius for hinged closures is 150 mm.	• SI-LM40MKH • SI-LS42 • SI-QM100	SI-QM-SMFA
	Rigid in-line metal actuator used for doors or covers with accurate alignment, such as sliding doors. Minimum engagement radius for hinged closures is 400 mm.	• SI-LM40MKH • SI-LS42 • SI-QM100	SI-QM-SSA
	High-extraction-force adapter for particularly heavy or large doors. Adjustable from 50 to 100 Newtons (force). Used only for switches with in-line actuator SI-QS-SSA.	• SI-QS75 • SI-QS90	SI-QS-100

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Replacement Actuator Parts for Safety Interlock Switches (cont'd)

	Description	Used With	Model
	Rigid in-line metal (die-cast steel) actuator for doors or covers with a radius of 150 mm or greater.	• SI-QS75 (high-force) • SI-QS90 (high-force)	SI-QS-SSA
	Rigid in-line metal (stamped stainless steel) actuator used for doors or covers with accurate alignment, such as sliding doors. Minimum engagement radius for hinged closures is 150 mm.	• SI-LS83 • SI-LS100	SI-QS-SSA-2
	Rigid in-line metal (stamped stainless steel) actuator used for doors or covers with accurate alignment, such as sliding doors. Right-angle mounting flange. Minimum engagement radius for hinged closures is 150 mm.	• SI-LS83 • SI-LS100	SI-QS-SSA-3
	Rigid in-line metal (stamped stainless steel) actuator for doors or covers with a radius of 150 mm or greater.	• SI-QS75 • SI-QS90	SI-QS-SSA-4
	Flexible in-line metal (die-cast steel) actuator for hinged doors with a radius of 50 mm or greater. Flexes in all directions. Minimum engagement radius for hinged closures is 150 mm.	• SI-LS83 • SI-LS100 • SI-QS75 • SI-QS90	SI-QS-SSU
Replacement terminal cover		• SI-LS42	SI-LS42-COVER
Tamper Proof Screw (One way)		• SI-LS42	SI-LS42-SCREW OW

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Safety Controllers

Industrial safety controllers and modules provide an interface between safety devices and the machines; monitoring those devices for an easy-to-use safety control solution.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Inputs	Outputs	Dimensions H x W x D	Features	Power Supply
	SC26-2 Easy to program, install and allows for more flexibility of how the controller is used and configured. page 800	26	2 pair (4 PNP)	110 x 45 x 128.4 mm	Logic Ethernet Optional LCD screen	24 V dc
	SC22-3 Completely configurable and flexible safety controller that can easily replace multiple dedicated safety modules. page 804	22	3 pair (6 PNP)	112 x 131 x 64 mm	Ethernet Dedicated status outputs LCD screen	24 V dc

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



SC26-2
Safety Controller

The SC26-2 Controller is easy to program, install and allows for more flexibility of how the safety controller is used and configured. The SC26-2 Controller is a lower cost option for smaller jobs and applications.

- Safety Controller system monitors a variety of input devices such as E-stop buttons, rope pulls, enabling devices, protective safety stops, interlocked guards or gates, optical sensors, two-hand controls and safety mats
- Intuitive programming environment for easy implementation
- Configure inputs, outputs and functionality of the controller for more usability
- Base controller allows eight of the 26 inputs to be configured as outputs for efficient terminal utilization
- Ethernet models available providing up to 64 virtual status outputs, fault diagnostic codes and messages
- Accessories see page 802

SC26-2 Safety Controller, 24 V DC

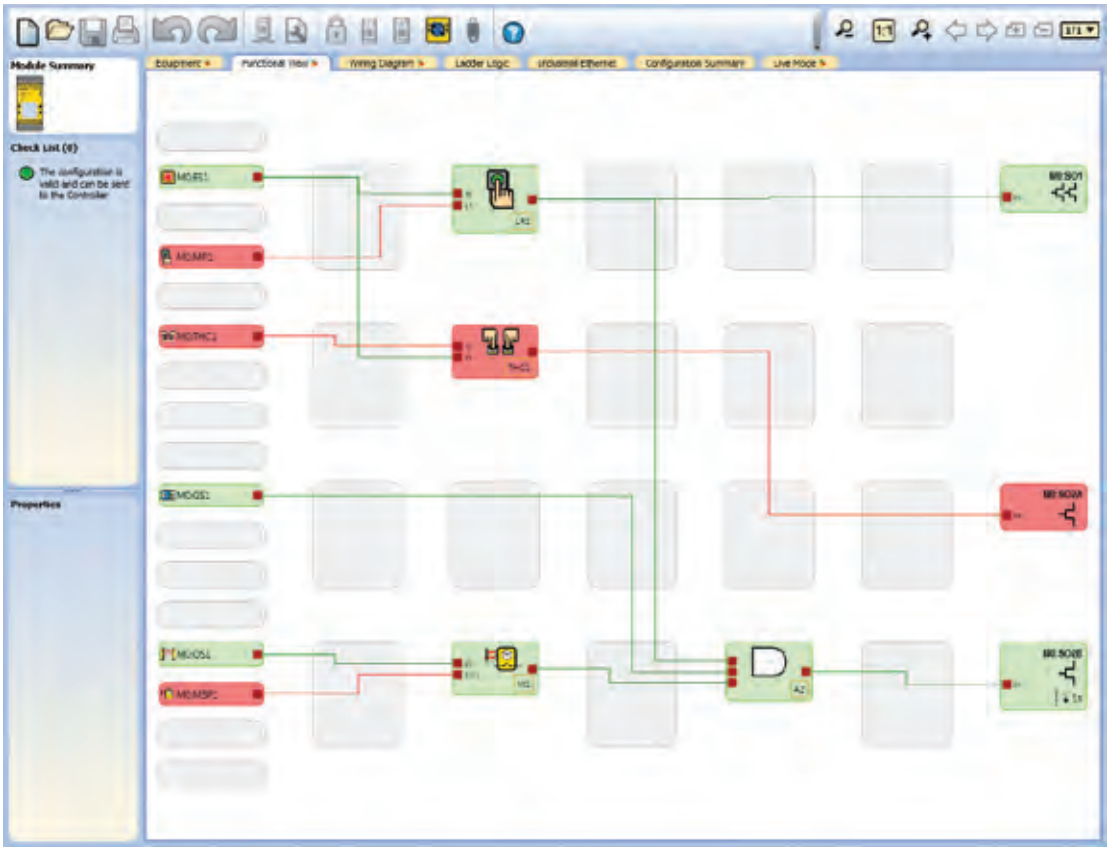
Display	Ethernet	Model	
No	No	SC26-2	NEW
Yes	No	SC26-2D	NEW
No	Yes	SC26-2E	NEW
Yes	Yes	SC26-2DE	NEW

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Start using the software today

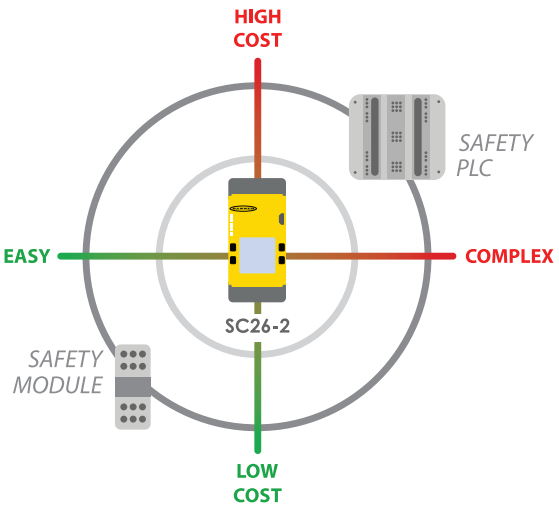
bannerengineering.com/SC26-2

The next level in machine safety control...

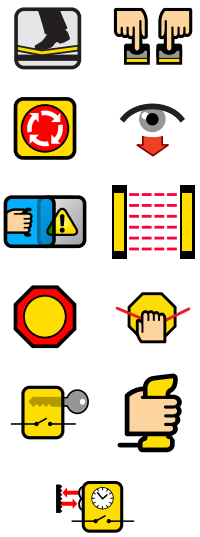


Target Equipment

- Welding stations
- Assembly machines
- Robotic automation
- End-of-line packaging equipment
- Safety retrofits



Safety Input Devices



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Accessories



SC-XM2
Memory Card



SC-XMP2
Programming Tool



SC-USB2
USB Cable



SC-TC2
Spring Terminal Block Set

Additional Interfacing Products see page 807



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SC26-2 Safety Controller Specifications

Power	24 V dc, ± 20% Ethernet models: add 40 mA Display models: add 20 mA
Safety Inputs (and Convertible I/O when used as inputs)	Input On threshold: > 15 V dc (guaranteed on), 30 V dc max. Input Off threshold: < 5 V dc and < 2 mA, –3 V dc min. Input On current: 5 mA typical at 24 V dc, 50 mA peak contact cleaning current at 24 V dc Input lead resistance: 300 Ω max. (150 Ω per lead) Input requirements for a 4-wire Safety Mat: • Max. capacity between plates: 0.22µF • Max. capacity between bottom plate and ground: 0.22µF • Max. resistance between the 2 input terminals of one plate: 20 Ω
Solid State Safety Outputs	0.5 A max. at 24 V dc (1.0 V dc max. drop) Output OFF threshold: 1.7 V dc typical (2.0 V dc max.) Output leakage current: 50 µ A max. with open 0V Load: 0.1 µ F max., 1 H max., 10 Ω max. per lead
Response and Recovery Times	See Configuration Summary in the data sheet
Environmental Rating	NEMA 1 (IEC IP20), for use inside NEMA 3 (IEC IP54) or better enclosure
Operating Conditions	Temperature range: 0° to +55° C
Mechanical Stress	Shock: 15g for 11 milliseconds, half sine, 18 shocks total (per IEC 61131-2) Vibration: 3.5 mm occasional / 1.75 mm continuous @ 5Hz to 9Hz, 1.0g occasional and 0.5g continuous @ 9Hz to 150Hz: all at 10 sweep cycles per axis (per IEC 61131-2)
Removable Terminals	Important: Clamp terminals are designed for 1 wire only. If more than 1 wire is connected to a terminal, a wire could loosen or become completely disconnected from the terminal, causing a short. Wire size: 24 to 16 AWG (0.20 to 1.31 mm^2) Wire strip length: 8.00 mm (0.315 in)
Design Standards	• SIL CL 3 per IEC 62061 Safety of Machinery – Functional Safety of Safety-Related Electrical, Electronic and Programmable Electronic Control Systems • SIL 3 per IEC 61508 Functional Safety of Electrical/Electronic/Programmable Electronic Safety-Related Systems • Category 4 per ISO 13849-1 • Category 4 Performance Level (PL) e per ISO 13849-1 • Complies with Machinery Directive 2006/42/EC • IEC 61131-2 Programmable Controllers, Part 2: Equipment Requirements and Tests • UL 508 Industrial Control Equipment • ANSI NFPA 79 Electrical Standards for Industrial Machinery • IEC 60204-1 Electrical Equipment of Machines: General Requirements • ISO 13851 (EN574) Safety of Machinery – Two-Hand Control Devices – Functional Aspects and Design Principles • ISO 13850 (EN418) Emergency Stop Devices
Certifications	Approvals pending
Wiring Diagrams	WD068 (p. 1051)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



SC22-3/-3E
Safety Controller

The SC22-3 Safety Controller is a completely configurable and flexible safety controller that can easily replace multiple dedicated safety modules.

- Input terminals can monitor both contact-based or PNP solid-state outputs
- Ten configurable auxiliary status outputs track inputs, outputs, lockout, I/O status and other functions
- Three pairs of solid-state safety outputs with ON-Delay, OFF-Delay and cancel OFF-Delay
- SC22-3E models provide diagnostic information using EtherNet/IP, Modbus TCP and PCCC
- Safety Controller is designed to meet stringent standards including Safety Integrity Level (SIL) 3 per IEC 61508, SIL CL 3 per IEC 62061 and Category 4 Performance Level (PL e) per EN ISO 13849-1
- Accessories see page page 806

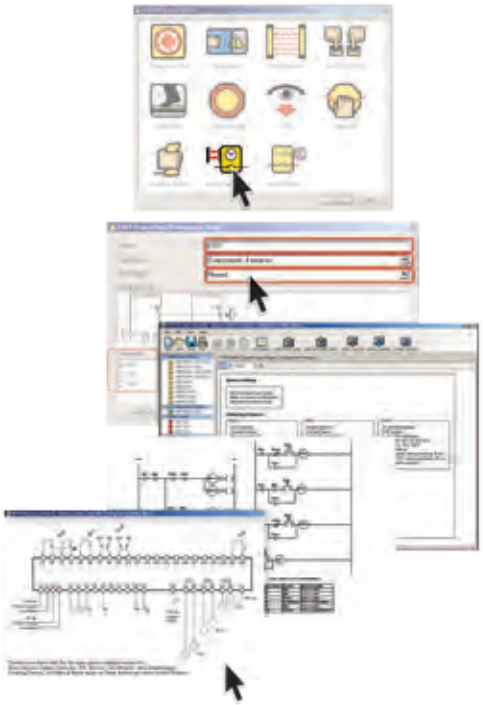
Intuitive free software for point-and-click configuration

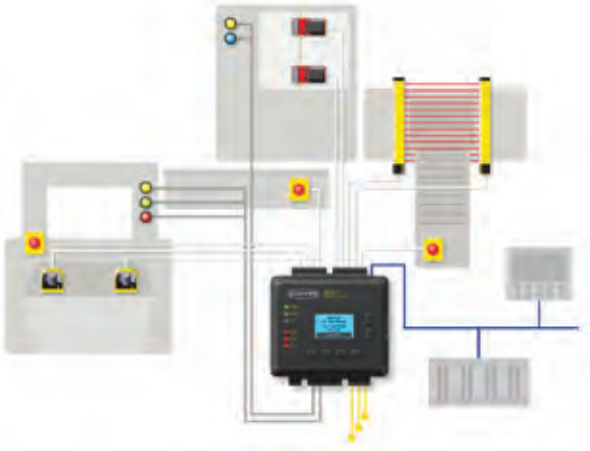
1. Select the type of safety input device
2. Map functions and properties from a pull down list
3. Wiring and ladder logic diagrams autopopulate along with configuration summary
   - View and track status using front panel display or PC “Live Display”
   - Includes fault history with time/date stamp
   - Use INFO button to link to software and manual for quick reference to devices and safety category 2, 3 or 4 hookup

22 input terminals for monitoring safety and non-safety devices

Versatile input circuitry accommodates a wide range of inputs from Banner devices or any other manufacturer, including:

- E-stop Buttons
- Two-Hand Controls
- Safety Light Screens
- Rope Pulls
- Safety Mats and Edges
- Enabling Devices
- Muting Sensors
- Bypass Switches
- Interlocking Switches
- Laser Scanners
- Value monitoring





Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SC22-3/-3E Safety Controller, 24 V DC

Terminal Type	Safety Outputs	USB Cable	Output Rating	Aux. Outputs	XM Card	XM Programming Tool	Communication Protocol	Model
Screw	3 pairs (6 PNP)	1.8 m	0.75 amps each output	10 status (I/O, mute, lockout, fault and reset)	Yes	Yes	—	SC22-3-SU1
Clamp								SC22-3-CU1
Screw		—				—	—	SC22-3-S
Clamp								SC22-3-C
Screw		1.8 m	0.5 amps each output	10 status (I/O, mute, lockout, fault and reset) plus 32 virtual status		Yes	EtherNet/IP & Modbus TCP	SC22-3E-SU1
Clamp								SC22-3E-CU1
Screw		—				—	EtherNet/IP & Modbus TCP	SC22-3E-S
Clamp								SC22-3E-C



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Ethernet Communication

See page 933

Length		Shielded	Shielded Crossover
2.13 m		STP07	STPX07
7.62 m		STP25	STPX25
15.2 m		STP50	STPX50
22.9 m		STP75	STPX75

Additional cordset information available. See page 904.

Brackets

SC22-3

See page 854

DIN-35..



Additional brackets and information available. See page 846.

Miscellaneous

Description	Model
SC22-3 replacement controller (without terminals)	SC-SC22-3
SC22-3E replacement controller (without terminals), Ethernet compatible	SC-SC22-3E
External memory card (XM card)	SC-XM1
Bulk pack of 5 XM Cards	SC-XM1-5
Screw terminal replacement set	SC-TS1
Clamp terminal replacement set	SC-TC1
USB A/B cable, 1.8 m	SC-USB1
XM card USB programming tool	SC-XMP

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SC22-3/-3E Interface Modules

Description	Supply Voltage	Inputs (Safety Controller Outputs)	Safety Outputs	Output Rating	EDM Contacts	Model
For use with 1-dual channel SC22-3 safety output	24 V dc (Controller supplied)	1 Pair (SO1)	3 NO	10 amps	1 NC pair per output	SC-IM9A
For use with 2-dual channel SC22-3 safety outputs		2 Pair (SO1 and SO2)	Total of 6 (3 NO per output)			SC-IM9B
For use with 3-dual channel SC22-3 safety outputs		3 Pair (SO1, SO2 and SO3)	Total of 9 (3 NO per output)			SC-IM9C

NOTE: External device monitoring (EDM) is required to be wired separately to the NC contacts to comply with ISO 13849-1 categories and ANSI/OSHA control reliability.

Additional Interfacing Products

		Description	Models	Product Information
Interface Modules		• Interface modules provide two or three normally open force-guided relay outputs rated at 6 A • Convenient plug-in terminal blocks on a 22.5 mm DIN-rail mountable housing are included	IM-T-9A (3 NO) IM-T-11A (2 NO/1 NC)	Page 828
Mechanically Linked Contactors		• Contactors add 10 or 18 amp current carrying capability to any safety system • Suppressors extend the life of an actuating device that uses a contactor • Modular design simplifies assembly and installation	11-BG00-31-D-024 BF1801L-024	Page 972

NC = Normally closed, NO = Normally open

NOTE: External device monitoring (EDM) is required to be wired separately to the NC contacts to comply with ISO 13849-1 categories and ANSI/OSHA control reliability.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SC22-3/-3E Safety Controller Specifications

Power	24 V dc, ± 20% SC22-3 models: 0.4 A (controller only), 5.9 A (all outputs ON @ full rated load) SC22-3E models: 0.4 A (controller only), 4.9 A (all outputs ON @ full rated load) The Controller should be connected only to a SELV (safety extra-low voltage, for circuits without earth ground) or a PELV (protected extra-low voltage, for circuits with earth ground) power supply
Safety and Non-Safety Inputs (22 terminals)	Input ON threshold: > 15 V dc (guaranteed on), 30 V dc max. Input OFF threshold: < 5 V dc (guaranteed off with any 1 fault), –3 V dc min. Input ON current: 8 mA typical @ 24 V dc, > 2 mA (guaranteed with 1 fault) 50 mA peak contact cleaning current @ 24 V dc Sourcing current: 30 mA minimum continuous (3 V dc max. drop) Input lead resistance: 300 Ω max. (150 Ω per lead) Input requirements for a 4-wire safety mat: Max. capacity between plates: 0.5 µF Max. capacity between bottom plate and ground: 0.5 µF Max. resistance between the 2 input terminals of one plate: 20 Ω
Safety Outputs (6 terminals, 3 redundant outputs)	Rated output current: SC22-3 models: 0.75 A max. each output (1.0 V dc max drop) SC22-3E models: 0.5 A max. each output (1.0 V dc max drop) Output OFF threshold: 0.6 V dc typical (1.2 V dc max. guaranteed with 1 fault) Output leakage current: 50 µA max. with open 0 V Load: 0.1 µF max., 1 H max., 10 Ω max. per lead
Status Outputs (10 terminals)	Rated output current: 0.5A @ 24 V dc (individual), 1.0 A @ 24 V dc (total of all outputs) O1 to O8 (General Purpose) — Output OFF voltage: < 0.5 V dc (no load), 22 KΩ pull down to 0 V O9 and O10 (General Purpose or Monitored Mute Lamp) — Output OFF voltage: Internal 94 KΩ pull up to 24 V dc supply Output ON/OFF threshold: 15 V dc +/−4 V dc @ 24 V dc supply NOTE: For O9 and O10 (if configured as monitored mute lamp output only), if a short circuit or other fault condition causes the output to drop below this threshold while the output is ON, a lockout will occur. If an open circuit or other fault condition causes the output to rise above this threshold while the output is OFF, a lockout will occur.
Network Interface (SC22-3E only)	Ethernet 10/100 Base-T/TX, RJ45 modular connector Selectable auto negotiate or manual rate and duplex Auto MDI/MDIX (Auto cross) Protocols: EtherNet/IP (with PCCC), Modbus TCP Data: 32 configurable virtual status outputs; fault diagnostic codes and messages; access to fault log
Response and Recovery Times	Response time (ON to OFF): 10 milliseconds max. (with standard 6 milliseconds debounce; this can increase if debounce time increases. Refer to the configuration summary for actual response time.) Recovery time (OFF to ON): 400 milliseconds max. (with manual reset option) Recovery time (OFF to ON): 400 milliseconds max. plus input debounce time (auto reset)
Onboard LCD Information Display—Password Requirements	Password is not required: Run mode (I/O status) Fault (I/O fault detection and remedial steps) Review configuration parameters (I/O properties and erminals) Password is required: Configuration mode (create/modify/confirm/download configurations)
Environmental Rating	NEMA 1 (IEC IP20), for use inside NEMA 3 (IEC IP54) or better enclosure
Operating Conditions	Temperature range: 0° to +55° C
Mechanical Stress	Shock: 15g for 11 milliseconds, half sine, 18 shocks total (per IEC 61131-2) Bump: 10g for 16 milliseconds, 6000 cycles total (per IEC 61496-1) Vibration: 3.5 mm occasional / 1.75 mm continuous @ 5Hz to 9Hz, 1.0g occasional and 0.5g continuous @ 9Hz to 150Hz: (per IEC 61131-2) and 0.35 mm single amplitude / 0.70 mm peak-to-peak @ 10 to 55Hz (per IEC 61496-1), all @ 10 sweep cycles per axis
EMC	Meets or exceeds all EMC requirements in IEC 61131-2, IEC 61496-1 (Type 4), and IEC 62061 Annex E, Table E.1 (increased immunity levels)
Removable Terminals	Screw terminals Wire sizes: 16, 18, 20, 22 or 24 AWG (0.20 – 1.31 mm^2) — Wire strip length: 5.00 mm Tightening torque: 0.23 Nm (2 in. lbs) nominal — Tightening torque: 0.34 Nm (3.0 in. lbs) maximum Clamp terminals Wire size: 16, 18, 20, 22, or 24 AWG (0.20 – 1.31 mm^2) — Wire strip length: 9.00 mm Important: Clamp terminals are designed for 1 wire only. If more than 1 wire is connected to a terminal, a wire could loosen or become completely disconnected from the terminal, causing a short.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SC22-3/-3E Safety Controller Specifications (cont'd)

Design Standards	• SIL CL 3 per IEC 62061 Safety of Machinery – Functional Safety of Safety-Related Electrical, Electronic and Programmable Electronic Control Systems • SIL 3 per IEC 61508 Functional Safety of Electrical/Electronic/Programmable Electronic Safety-Related Systems • Category 4 per ISO 13849-1 • Category 4 Performance Level (PL) e per ISO 13849-1 • Complies with Machinery Directive 2006/42/EC • IEC 61131-2 Programmable Controllers, Part 2: Equipment Requirements and Tests • UL 508 Industrial Control Equipment • UL 1998 Software in Programmable Components • ANSI NFPA 79 Electrical Standards for Industrial Machinery • IEC 60204-1 Electrical Equipment of Machines: General Requirements • ISO 13851 (EN574) Safety of Machinery – Two-Hand Control Devices – Functional Aspects and Design Principles • ISO 13850 (EN418) Emergency Stop Devices
Certifications	CE, UL LISTED, c UL LISTED Auxiliary Device US
Wiring Diagrams	WD023, WD024, WD025, WD026 (p. 1020).

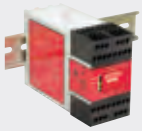
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Safety Modules

Industrial safety controllers and modules provide an interface between safety devices and the machines; monitoring those devices for an easy-to-use safety control solution.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Safety Rating	Safety Outputs	Aux Outputs	Power Supply
	E-Stop & Guard Modules monitor contacts of E-stop switches, guard interlock switches or the outputs of other safety modules. page 812	Category 2 or 4, depending on model	2 NO, 3 NO, 4 NO	1 NC, 1 NC & 2 PNP	24 V ac/dc, 115 V ac & 12-24 V dc, 230 V ac & 12-24 V dc or 24 V dc
	Universal Input Modules monitor one or two solid-state PNP or relay contact outputs from safety or non-safety devices, such as sensors or safety light screens. page 818	Category 2, 3 or 4	3 NO or 2 NO	1 NC	24 V ac/dc,
	Safety Mat Monitoring Modules monitor one 4-wire safety mat (or multiple connected in series). page 820	Category 3 (with mat)	4 NO	1 NC & 2 PNP	115 V ac & 12-24 V dc or 230 V ac & 12-24 V dc
	Muting Modules suspend safeguarding during non-hazardous time in the machine's cycle. page 822	Category 2, 3 or 4 PLe	2 PNP OSSD or 2 NO	1 PNP or 1 NC	24 V ac/dc,
	Safe Speed Modules monitor two sensors with PNP outputs for rotation and linear movements. page 826	Category 3 PLe	2 NO	1 NC	24 V ac/dc,
	Interface Relay Dual input accepts the safety output of a safety device with solid-state or contact outputs and external device monitoring. page 828	Category 2, 3 or 4 (Depends on hookup)	3 NO or 2 NO	—	24 V ac/dc,
	Extension Relay Contact expansion for safety modules with contact outputs and external device monitoring. page 830	Category 2, 3 or 4 (Depends on hookup)	4 NO or 4 NO(w/delay)	1 NC, depending on model	24 V dc or 24 V ac/dc, depending on model

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



E-Stop & Interlocked Guard Safety Modules

Modules monitor positive-opening E-Stop and interlocking switches for proper operation, contact failure or wiring faults.

- AC and DC models available
- Module goes into lockout mode if fault is detected
- Housing are rugged polycarbonate and mount to standard 35 mm DIN rail
- Functional Stop Category 0 per NFPA79 and IEC 60204-1
- Relay outputs are capable of reliably switching low or high current applications (depending on model)

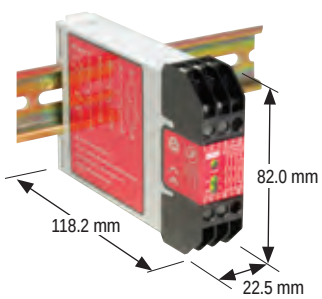
E-Stop & Guard Safety Modules

Supply Voltage	Inputs	Safety Outputs	Aux. Outputs	Output Rating	Output Response Time	Model
24 V ac/dc	1 NC & 1 NO (single or dual)	2 NO	—	6 amps	35 ms	GM-FA-10J
24 V ac/dc	1 NC (single) or 2 NC (dual)	3 NO	—	6 amps	25 ms	ES-FA-9AA
24 V ac/dc	1 NC (single) or 2 NC (dual)	2 NO	1 NC	7 amps	25 ms	ES-FA-11AA
24 V ac/dc	1 NC (single)	3 NO	1 NC	6 amps	35 ms	ES-FA-6G
115 V ac & 12-24 V dc	1 NC (single) or 2 NC (dual)	4 NO	1 NC & 2 PNP	6 amps	25 ms	ES-UA-5A
230 V ac & 12-24 V dc	1 NC (single) or 2 NC (dual)	4 NO	1 NC & 2 PNP	6 amps	25 ms	ES-VA-5A

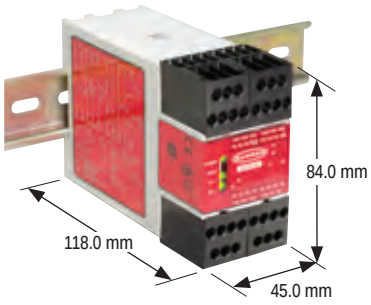
NC = Normally Closed Relay, NO = Normally Open Relay



ES-FA-..AA & GM-FA-10J Models



ES-FA-6G Models



ES-..A-5A Models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

GM-FA-10J Guard Monitoring Module Specifications

Supply Voltage and Current	24 V dc ±15% @ 150 mA (SELV-rated supply according to EN IEC 60950, NEC Class 2) 24 V ac ±15% @ 150 mA, 50-60 Hz +/- 5% (NEC Class 2-rated transformer) **Power consumption:** approx. 3 VA / 3 W To comply with UL and CSA standards, the isolated secondary power supply circuit in the installation must incorporate a method to limit the overvoltage to 0.8 kV
Supply Protection Circuitry	Protected against transient voltages and reverse polarity
Overvoltage Category	**Output relay contact voltage of 1 V to 150 V ac/dc:** Category III **Output relay contact voltage of 151 V to 250 V ac/dc:** Category II (Category III, if appropriate overvoltage reduction is provided, as described in data sheet.)
Pollution Degree	2
Output Configuration	Each normally open output channel is a series connection of contacts from two forced-guided (mechanically linked) relays, K1-K2 **Contacts:** AgNi, 5 µm gold-plated Low Current Rating: The 5 µm gold-plated contacts allow the switching of low current/low voltage. In these low-power applications, multiple contacts can also be switched in series (e.g., "dry switching") **To preserve the gold plating on the contacts, do not exceed the following max. values at any time:** **Min. voltage:** 1 V ac/dc — **Max. voltage:** 60 V **Min. current:** 5 mA ac/dc — **Max. current:** 300 mA **Min power:** 5 mW (5 mVA) — **Max. power:** 7 W (7 VA) High Current Rating: If higher loads must be switched through one or more of the contacts, the minimum and maximum values of the contact(s) changes to: UL LISTED EMERGENCY STOP DEVICE 29YL — **Minimum:** Voltage: 15 V ac/dc; Current: 30 mA ac/dc; Power: 0.45 W (0.45 VA) — **Maximum:** 250 V ac/24 V dc, 6A resistive; B300, R300 per UL508 CE — **Minimum:** Voltage: 15 V ac/dc; Current: 30 mA ac/dc; Power: 0.45 W (0.45 VA) — **Maximum:** 250 V ac/24 V dc, 6A resistive; IEC 60947-5-1: AC15: 230 V ac. 3 A; DC-13: 24 V dc, 2A **Mechanical life:** ≥ 50,000,000 operations **Electrical life (switching cycles of the output contacts, resistive load):** 150,000 cycles @ 900 VA; 1,000,000 cycles @ 250 VA; 2,000,000 cycles @ 150 VA; 5,000,000 cycles @ 100 VA NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts.
Output Response Time	35 milliseconds max.
Input Requirements	Each switch or sensor must have a normally closed contact and a normally open contact capable of switching 20 to 50 mA @ 15 to 30 V dc **Reset switch:** 20 mA @ 12 V dc, hard contact only **Max. external resistance between terminals S11/S12, S11/S13, S21/S22 and S21/S23:** 270 ohms each.
Simultaneity Monitoring	**2-Channel operation:** 3 seconds — **1-Channel operation:** infinite
Status Indicators	4 green LEDs: **Power:** power is supplied to Safety Module **Channel 1:** inputs satisfied (guard closed) **Channel 2:** inputs satisfied (guard closed) **Output:** K1 and K2 energized, safety outputs closed 1 red LED: Fault
Construction	Polycarbonate housing
Environmental Rating	IEC IP20
Mounting	Mounts to standard 35 mm DIN rail track. Safety Module must be installed inside an enclosure rated NEMA 3 (IP54), or better.
Vibration Resistance	10 to 55 Hz @ 0.35 mm displacement per IEC 60068-2-6
Operating Conditions	**Temperature:** 0° to +50° C — **Relative humidity:** 90% @ +50° C (non-condensing)
Design Standards	CE: Cat. 4 PL e, per EN ISO 13849-1; SIL 3 per IEC 61508 and IEC 62061
Certifications	CE, UL LISTED EMERGENCY STOP DEVICE 29YL
Wiring Diagrams	**1-Channel Coded Magnet Switches:** WD027 (p. 1023) **2-Channel Positive Opening Switches:** WD028 (p. 1023) **1-Channel (Multiple Guards):** WD029 (p. 1024) **2-Channel (Multiple Guards):** WD030 (p. 1024) **Guarded Machine:** WD031 (p. 1025)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

ES-FA-..AA Safety Module Specifications

Supply Voltage and Current	24 V dc ±10% (SELV-rated supply according to EN IEC 60950, NEC Class 2) 24 V ac ±10%, 50/60Hz (NEC Class 2-rated transformer) Power consumption: approx. 2 W/2 VA
Supply Protection Circuitry	Protected against transient voltages and reverse polarity
Overvoltage Category	Output relay contact voltage of 1 V to 150 V ac/dc: Category III Output relay contact voltage of 151 V to 250 V ac/dc: Category III, if appropriate overvoltage reduction is provided, as described in data sheet
Pollution Degree	2
Output Configuration	ES-FA-9AA: 3 normally open (NO) output channels ES-FA-11AA: 2 normally open (NO) output channels and 1 normally closed (NC) auxiliary output Each normally open output channel is a series connection of contacts from two forced-guided (mechanically linked) relays, K1-K2. The normally closed Aux. output channel of the ES-FA-11AA is a parallel connection of contacts from two forced-guided relays, K1-K2. Contacts: AgNi, 5 µm gold-plated Low Current Rating: The 5 µm gold-plated contacts allow the switching of low current/low voltage. In these low-power applications, multiple contacts can also be switched in series (e.g., "dry switching") To preserve the gold plating on the contacts, do not exceed the following max. values at any time: Minimum: Voltage: 1 V ac/dc; Current: 5 mA ac/dc; Power: 5 mW (5 mVA) Maximum: Voltage: 60 V; Current: 300 mA; Power: 7 W (7 VA) High Current Rating: If higher loads must be switched through one or more of the contacts, the minimum and maximum values of the contact(s) change to: Minimum: Voltage: 15 V ac/dc; Current: 30 mA ac/dc; Power: 0.45 W (0.45 VA) Maximum: Voltage: 250 V ac/dc; Current: ES-FA-9AA: 6A, ES-FA-11AA: 7 A; Power: ES-FA-9AA: 200 W (1,500 VA), ES-FA-11AA: 200 W (1,750 VA) Mechanical life: > 20,000,000 operations Electrical life (switching cycles of the output contacts, resistive load): 150,000 cycles @ 1,500 VA; 1,000,000 cycles @ 450 VA; 2,000,000 cycles @ 250 VA; 5,000,000 cycles @ 125 VA NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts.
Output Response Time	25 milliseconds typical
Input Requirements	Safety input switch: Dual-Channel (contacts) hookup – 10 to 20 mA steady state @ 12 V dc NOTE: Inputs are designed with a brief contact-cleaning current of 100 mA when initially closed. Single-Channel hookup – 40 to 100 mA @ 24 V ac/dc +/- 10%; 50/60 Hz Reset switch: 20 mA @ 12 V dc, hard contact only
Minimum OFF-State Recovery Time	250 milliseconds
Status Indicators	3 green LEDs: Power ON K1 energized K2 energized
Construction	Polycarbonate housing
Environmental Rating	Rated NEMA 1; IP40, Terminals IP20
Mounting	Mounts to standard 35 mm DIN rail track. Safety Module must be installed inside an enclosure rated NEMA 3 (IP54), or better.
Vibration Resistance	10 to 55Hz @ 0.35 mm displacement per IEC 60068-2-6
Operating Conditions	Temperature: 0° to +50° C Relative humidity: 90% @ +50° C (non-condensing)
Design Standards	Cat. 4 PL e per EN ISO 13849-1; SIL 3 per IEC 61508 and IEC 62061
Certifications	CE, UL LISTED, EMERGENCY STOP DEVICE 29YL
Wiring Diagrams	1-Channel: WD032 (p. 1026) 2-Channel: WD033 (p. 1027)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

ES-..A-5A Safety Module Specifications

Supply Voltage and Current	AI-A2: 115 V ac (model ES-UA-5A) or 230 V ac (model ES-VA-5A) ±15% , 50/60Hz BI-B2: 11 V dc – 27.6 V dc Power consumption: approx. 4 W/7 VA The Safety Module should be connected only to a SELV (safety extra-low voltage, for circuits without earth ground) or a PELV (protected extra-low voltage, for circuits with earth ground) power supply.
Supply Protection Circuitry	Protected against transient voltages and reverse polarity
Overvoltage Category	Output relay contact voltage of 1 V to 150 V ac/dc: Category III Output relay contact voltage of 151 V to 250 V ac/dc: Category III, if appropriate overvoltage reduction is provided, as described in data sheet
Pollution Degree	2
Output Configuration	4 normally open (NO) output channels; 1 normally closed (NC) and 2 solid-state auxiliary outputs Each normally open output channel is a series connection of contacts from two forced-guided (mechanically linked) relays, K1-K2. The normally closed Aux. output channel is a parallel connection of contacts from two forced-guided relays, K1-K2. Contacts: AgNi, 5 µm gold-plated Low Current Rating: The 5 µm gold-plated contacts allow the switching of low current/low voltage. In these low-power applications, multiple contacts can also be switched in series (e.g., "dry switching") To preserve the gold plating on the contacts, do not exceed the following max. values at any time: Minimum: Voltage: 1 V ac/dc; Current: 5 mA ac/dc; Power: 5 mW (5 mVA) Maximum: Voltage: 60 V; Current: 300 mA; Power: 7 W (7 VA) High Current Rating: If higher loads must be switched through one or more of the contacts, the minimum and maximum values of the contact(s) changes to:

UL LISTED EMERGENCY STOP DEVICE 29YL; c UL LISTED IND. CONT. EQ. 447Y	Minimum: Voltage: 15 V ac/dc Current: 250 mA ac/dc Power: 5 W (5 VA)	Maximum: NO Safety Contacts (13-14, 23-24, 33-34, 43-44): 250 V ac/ 24 V dc, 6A resistive B300, Q300 (UL508) NC Auxiliary Contact (51-52): 250 V ac/ 24 V dc, 5A resistive B300, Q300 (UL508)
CE	Minimum: Voltage: 15 V ac/dc Current: 250 mA ac/dc Power: 5 W (5 VA)	Maximum—IEC60947-5-1 NO Safety Contact: AC-1: 250 V ac, 6A; DC-1: 24 V dc, 6A AC-15: 230 V ac, 3A; DC-13: 24 V dc, 4A NC Auxiliary Contact: AC-1: 250 V ac, 5A; DC-1: 24 V dc, 5A AC-15: 230 V ac, 2A; DC-13: 24 V dc, 4A

Mechanical life: > 20,000,000 operations
Electrical life (switching cycles of the output contacts, resistive load): 150,000 cycles @ 1,500 VA; 1,000,000 cycles @ 450 VA; 2,000,000 cycles @ 250 VA; 5,000,000 cycles @ 125 VA
NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts.

Solid-State Monitor Outputs:
- Two non-safety solid-state dc outputs
- Output at Y32 monitors state of outputs – conducts (output high) when both K1 and K2 are energized
- Output at Y35 conducts (output high) when in normal operation (no lockout)
- Output circuits require application of +12-24 V dc ±15% at terminal Y31; dc common at Y30
- Maximum switching current: 100 mA at 12-24 V dc
- Both outputs are protected against short circuits

Output Response Time	35 milliseconds max. (25 milliseconds typical)
Input Requirements	E-stop switch must have normally closed contacts each capable of switching 20 to 50 mA @ 12 to 30 V dc; and must be open ≥15 milliseconds for a valid stop command Maximum input resistance 250 ohms per channel @ 24 V dc supply voltage Maximum input resistance 25 ohms per channel @ 12 V dc supply voltage Reset switch must have one normally open contact capable of switching 20 to 50 mA @ 12 to 30 V ac/dc
OFF-State Recovery Time	350 milliseconds
Status Indicators	3 green LEDs: Power ON, Channel 1, Channel 2 1 red LED: Fault Condition
Construction	Polycarbonate housing

Continued on next page

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

ES-..A-5A Safety Module Specifications (cont'd)

Environmental Rating	Rated NEMA 1; IEC IP20
Mounting	Mounts to standard 35 mm DIN rail track. Safety Module must be installed inside an enclosure rated NEMA 3 (IP54), or better.
Vibration Resistance	10 to 60Hz @ 0.35 mm displacement per UL 991 60 to 150 Hz @ 5 g max.
Operating Conditions	**Temperature:** 0° to +50° C (surrounding air) **Relative humidity:** 90% @ +50° C (non-condensing)
Design Standards	Cat. 4 PL e per EN ISO 13849-1; SIL 3 per IEC 61508 and IEC 62061
Certifications	CE, UL LISTED EMERGENCY STOP DEVICE 29YL, c UL LISTED IND. CONT. EQ. 447Y
Wiring Diagrams	1-Channel: WD034 (p. 1028) 2-Channel: WD035 (p. 1029)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

ES-FA-6G Safety Module Specifications

Supply Voltage and Current	24 V ac/dc, +/- 10%; 50/60Hz **Power consumption:** approx. 2 W/0.75 VA
Supply Protection Circuitry	Protected against transient voltages and reverse polarity
Output Configuration	**Outputs (K1 & K2):** three redundant (total of six) safety relay (forced-guided) contacts – $AgSnO_2$ one auxiliary non-safety monitor output (open when both K1 and K2 are energized; closed when either K1 or K2 are de-energized) **Contact ratings:** **Max. voltage:** 250 V ac or 250 V dc **Max. current:** 6 A ac or dc **Min. current:** 30 mA @ 10 V dc **Max. power:** 1500 VA, 150 W **Mechanical life:** 10,000,000 operations **Electrical life:** 100,000 at full resistive load NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts.
Output Response Time	35 milliseconds typical
Input Requirements	**Input switch** must have a normally closed contact capable of switching 40 to 100 mA @ 13 to 27 V ac/dc **Reset switch** must have one normally open contact capable of switching 20 to 30 mA @ 13 to 27 V ac/dc
Status Indicators	3 green LEDs: Power ON K1 energized K2 energized
Construction	Polycarbonate
Environmental Rating	Rated NEMA 1; IP40, Terminals IP20
Mounting	Mounts to standard 35 mm DIN rail track. Safety Module must be installed inside an enclosure rated NEMA 3 (IP54), or better.
Vibration Resistance	10 to 55Hz @ 0.35 mm displacement per IEC 60068-2-6
Operating Conditions	**Temperature:** 0° to +50° C **Relative humidity:** 90% @ +50° C (non-condensing)
Certifications	UL LISTED EMERGENCY STOP DEVICE 29YL CSA® Important Notice: European Community Machinery Directive 2006/42/EC The ES-FA-6G Safety Module complies with Machinery Directive 98/37/EC, but not with Machinery Directive 2006/42/EC. Therefore, this Safety Module can only be installed as replacement component within the European Union (EU). For more information, please see www.bannerengineering.com/144763 or call 1-888-373-6767.
Wiring Diagrams	1-Channel: WD036 (p. 1030)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Universal Input Safety Modules

Modules monitor one or two solid-state PNP outputs or relay contact outputs from safety or non-safety devices such as sensors, safety light screens or one or two electromechanical contacts.

- Modules are an ideal choice for monitoring safety devices without external device (EDM) function
- Modules have single or dual channel inputs to monitor outputs from safety or non-safety devices
- Can be configured to monitor devices with solid-state PNP outputs or hard/relay contact outputs using DIP switches under removable terminals
- Housings are rugged polycarbonate and mount to standard 35 mm DIN rail
- Relay outputs are capable of reliably switching low or high current applications

Universal Safety Input Modules

Supply Voltage	Inputs	Safety Outputs	Aux. Output	Output Rating	Output Response Time	Model
24 V ac/dc	1 NC (single) or 2 NC (dual)	3 NO	–	6 amps	25 ms	UM-FA-9A
24 V ac/dc	1 NC (single) or 2 NC (dual)	2 NO	1 NC	7 amps	25 ms	UM-FA-11A

NC = Normally Closed Relay, NO = Normally Open Relay



UM-FA-..A Models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Universal Safety Input Module Specifications

Supply Voltage and Current	24 V dc ±10% (SELV-rated supply according to EN IEC 60950, NEC Class 2) 24 V ac ±10% 50-60 Hz (NEC Class 2-rated transformer) Power consumption: approx. 2 VA / 3 W
Supply Protection Circuitry	Protected against transient voltages and reverse polarity
Overvoltage Category	Output relay contact voltage of 1 V to 150 V ac/dc: Category III Output relay contact voltage of 151 V to 250 V ac/dc: Category II (Category III if appropriate overvoltage reduction is provided, as described in data sheet.)
Pollution Degree	2
Output Configuration	UM-FA-9A: 3 normally open (NO) output channels UM-FA-11A: 2 normally open (NO) output channels and 1 normally closed (NC) auxiliary output channel Each normally open output channel is a series connection of contacts from two forced-guided (mechanically linked) relays, K1-K2. The normally closed Aux. output channel of the UM-FA-11A is a parallel connection of contacts from two forced-guided relays, K1-K2. Contacts: AgNi, 5 µm gold-plated Low Current Rating: The 5 µm gold-plated contacts allow the switching of low current/low voltage. In these low-power applications, multiple contacts can also be switched in series (e.g., "dry switching"). To preserve the gold plating on the contacts, do not exceed the following max. values at any time: Min. voltage: 1 V ac/dc Max. voltage: 60 V Min. current: 5 mA ac/dc Max. current: 300 mA Min. power: 5 mW (5 mVA) Max. power: 7 W (7 VA) High Current Rating: If higher loads must be switched through one or more of the contacts, the minimum and maximum values of the contact(s) changes to: Min. voltage: 15 V ac/dc Max. voltage: 250 V ac/dc Min. current: 30 mA ac/dc Max. current: UM-FA-9A: 6 A UM-FA-11A: 7 A Min. power: 0.45 W (0.45 VA) Max. power: UM-FA-9A: 200 W (1,500 VA) UM-FA-11A: 200 W (1,750 VA) Mechanical life: > 20,000,000 operations Electrical life (switching cycles of the output contacts, resistive load): 150,000 cycles @ 1,500 VA; 1,000,000 cycles @ 450 VA; 2,000,000 cycles @ 250 VA; 5,000,000 cycles @ 125 VA NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts.
Output Response Time	25 milliseconds typical
Input Requirements	Safety input switch: 2-Channel (contacts) hookup: 10 to 20 mA steady state @ 12 V dc NOTE: Inputs are designed with a brief contact-cleaning current of 100 mA when initially closed. Solid-state Dual Channel hookup: 5 to 20 mA steady state @ 18 to 28 V dc sourcing (PNP), < 2 mA leakage current Single-Channel hookup: 40 to 100 mA @ 24 V ac/dc ± 10%; 50/60 Hz Reset Switch: 20 mA @ 12 V dc, hard contact only
Minimum OFF-State Recovery Time	250 milliseconds (When used with the AG4 Safety Laser Scanner; the "Restart delay time after PF release" must be configured 280 milliseconds or greater.)
Indicators	3 green LEDs: Power ON K1 energized K2 energized
Construction	Polycarbonate housing
Environmental Rating	Rated NEMA 1; IEC IP40, Terminals IP20
Mounting	Mounts to standard 35 mm DIN rail track. Safety Module must be installed inside an enclosure rated NEMA 3 (IP54), or better.
Vibration Resistance	10 to 55 Hz @ 0.35 mm displacement per IEC 60068-2-6
Operating Conditions	Temperature: 0° to +50° C Max. Relative Humidity: 90% @ +50°C (non-condensing)
Design Standards	Cat. 4 PL e per EN ISO 13849-1; SIL 3 per IEC 61508 and IEC 62061
Certification	CE UL LISTED EMERGENCY STOP DEVICE 29YL
Wiring Diagrams	WD039, WD040, WD041, WD042 (p. 1031)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Safety Mat Monitoring
Safety Modules

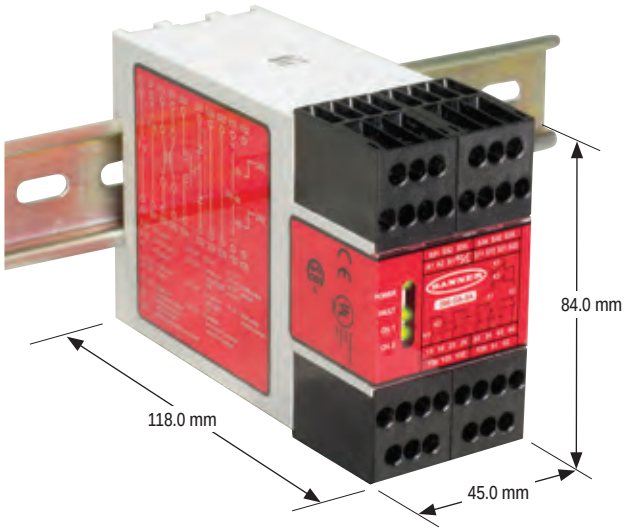
Module monitors a single or series connection of 4-wire safety mats or safety edge devices.

- AC and DC models available
- LED indicators show power on, output and fault
- Housings are rugged polycarbonate and mount to standard 35 mm DIN rail
- Relay outputs are capable of reliably switching low or high current applications

Safety Mat Monitoring Modules

Supply Voltage	Inputs	Safety Outputs	Aux. Outputs	Output Rating	Output Response Time	Model
115 V ac & 12-24 V dc	1 (or multiple in series) 4-wire Safety Mat	4 NO	1 NC & 2 PNP	6 amps	50 ms	SM-GA-5A
230 V ac & 12-24 V dc	1 (or multiple in series) 4-wire Safety Mat	4 NO	1 NC & 2 PNP	6 amps	50 ms	SM-HA-5A

NC = Normally Closed Relay, NO = Normally Open Relay



SM-..A-5A Models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Safety Mat Monitoring Module Specifications

Supply Voltage and Current	AI-A2: 115 V ac (model SM-GA-SA) or 230 V ac (model SM-HA-5A) ±15% , 50/60Hz BI-B2: 11 V dc – 27.6 V dc Power consumption: approx. 4 W/7 VA The Safety Module should be connected only to a SELV (safety extra-low voltage, for circuits without earth ground) or a PELV (protected extra-low voltage, for circuits with earth ground) power supply, according to EN IEC 60950, NEC Class 2
Supply Protection Circuitry	Protected against transient voltages and reverse polarity
Overvoltage Category	Output relay contact voltage of 1 V to 150 V ac/dc: Category III Output relay contact voltage of 151 V to 250 V ac/dc: Category III, if appropriate overvoltage reduction is provided, as described in data sheet
Pollution Degree	2
Output Configuration	4 normally open (NO) output channels; 1 normally closed (NC) and 2 solid-state auxiliary outputs Each normally open output channel is a series connection of contacts from two forced-guided (mechanically linked) relays, K1-K2. The normally closed Aux. output channel is a parallel connection of contacts from two forced-guided relays, K1-K2. Contacts: AgNi, 5 µm gold-plated Low Current Rating: The 5 µm gold-plated contacts allow the switching of low current/low voltage. In these low-power applications, multiple contacts can also be switched in series (e.g., "dry switching"). To preserve the gold plating on the contacts, the following max. values should not be exceeded at any time: Minimum: Voltage: 1 V ac/dc; Current: 5 mA ac/dc; Power: 5 mW (5 mVA) Maximum: Voltage: 60 V; Current: 300 mA; Power: 7 W (7 VA) High Current Rating: If higher loads must be switched through one or more of the contacts, the minimum and maximum values of the contact(s) change to:

UL LISTED EMERGENCY STOP DEVICE 29YL; c UL LISTED IND. CONT. EQ. 447Y	Minimum: Voltage: 15 V ac/dc Current: 250 mA ac/dc Power: 5 W (5 VA)	Maximum: NO Safety Contacts (13-14, 23-24, 33-34, 43-44): 250 V ac/ 24 V dc, 6A resistive B300, Q300 (UL508) NC Auxiliary Contact (51-52): 250 V ac/ 24 V dc, 5A resistive B300, Q300 (UL508)
CE	Minimum: Voltage: 15 V ac/dc Current: 250 mA ac/dc Power: 5 W (5 VA)	Maximum—IEC60947-5-1 NO Safety Contact: AC-1: 250 V ac, 6A; DC-1: 24 V dc, 6A AC-15: 230 V ac, 3A; DC-13: 24 V dc, 4A NC Auxiliary Contact: AC-1: 250 V ac, 5A; DC-1: 24 V dc, 5A AC-15: 230 V ac, 2A; DC-13: 24 V dc, 4A

Mechanical life: >20,000,000 operations
Electrical life: 150,000 cycles @ 1500 VA; 1,000,000 cycles @ 450 VA; 2,000,000 cycles @ 250 VA; 5,000,000 cycles @ 125 VA
NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load.
Never install suppressors across output contacts.
Solid-State Monitor Outputs:

- Two non-safety solid-state dc outputs
- Output at Y32 monitors state of outputs – conducts (output high) when both K1 and K2 are energized
- Output at Y35 conducts (output high) when in normal operation (no lockout)
- Output circuits require application of +12-24 V dc ±15% at terminal Y31; dc common at Y30
- Maximum switching current: 100 mA at +12-24 V dc
- Both outputs are protected against short circuits

Output Response Time	35 milliseconds max, 25 milliseconds typical
Input Requirements	Safety mat normally open contact must be capable of switching 20 to 100 mA @ 12 to 30 V dc; and must be closed ≥ 25 ms for a valid stop command 115/230 V ac or 24 V dc: Maximum input resistance 250 ohms per lead; maximum contact resistance: 150 ohms 12 V dc Supply: Maximum input resistance 25 ohms; maximum contact resistance: 10 ohms Reset switch: must have one normally open contact capable of switching 20 to 50 mA @ 12 to 30 V dc
OFF-State Recovery Time	350 ms max.
Status Indicators	3 green LED indicators: Power ON, Channel 1 (high side), Channel 2 (low side) 1 red LED indicator: indicates a fault condition
Construction	Polycarbonate housing
Environmental Rating	Rated NEMA 1; IEC IP20
Mounting	Mounts to standard 35 mm DIN rail track. Safety Module must be installed inside an enclosure rated NEMA 3 (IP54) or better.
Vibration Resistance	10 to 60 Hz @ 0.35 mm displacement per UL 991 60 to 150 Hz @ 5 g max.
Operating Conditions	Temperature: 0° to +50° C Relative humidity: 90% @ +50° C (non-condensing)
Design Standards	Cat. 4, PL e per EN ISO 13849-1; SIL 3 per IEC 61508 and IEC 62061 (Cat 3 with Safety Mat)
Certifications	CE, UL LISTED EMERGENCY STOP DEVICE 29YL, c UL LISTED IND. CONT. EQ. 447Y
Wiring Diagrams	4-Wire Safety Mat: WD043 (p. 1035)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Muting Module
Safety Modules

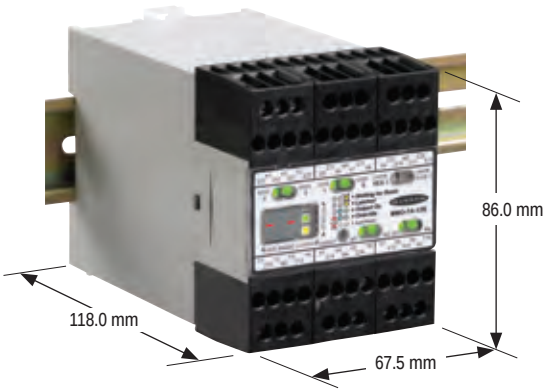
Muting Modules suspend safeguarding during non-hazardous times in the machine's cycle, allowing material to move into or from the process without tripping the muted safeguard.

- Monitors hard-relay contact or PNP output safety devices
- Available in models for Type 4 (Category 4) applications
- Connects to supplemental safeguarding devices or E-Stops
- Can be used as a Dual Controller for safety devices, such as two Safety Light Screens, regardless of whether or not the muting function is used
- Housings are rugged polycarbonate and mount to standard 35 mm DIN rail
- Relay outputs are capable of reliably switching low or high current applications

Muting Modules

Input Device	Supply Voltage	Inputs	Safety Outputs	Aux. Outputs	Output Rating	Output Response Time	Model
Electromechanical & Solid State	24 V dc	2 NC Muteable (dual) & 2 NC SSI (dual)	2 PNP OSSD	1 PNP	0.5 amps	10 ms	MMD-TA-12B
Electromechanical & Solid State	24 V dc	2 NC Muteable (dual) & 2 NC SSI (dual)	2 NO	1 NC	6 amps	20 ms	MMD-TA-11B

NC = Normally Closed Relay, NO = Normally Open Relay



MMD-TA-11B & MMD-TA-12B Muting Modules
(MMD-TA-12B shown)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

MMD-TA-12B & MMD-TA-11B Muting Modules Specifications

System Power Requirements	MMD-TA-11B: +24 V dc ±15% @ 300 mA max (SELV/PELV) MMD-TA-12B: +24 V dc ±15% @ 250 mA max (SELV/PELV) (not including draw of the MSSI power, AUX, ML, M1-M4 and OSSD connections) The external voltage supply must be capable of buffering brief mains interruptions of 20 milliseconds, as specified in IEC/EN 60204-1
Overvoltage Category	III (IEC 60664-1)
Pollution Degree	2
Supply Protection Circuitry	All inputs and outputs are protected from short circuit to +24 V dc or dc common
Response Time (MSSI and SSI)	MMD-TA-12B: (solid-state output) 20 milliseconds max. MMD-TA-11B: (relay output) 10 milliseconds max.
Safety Outputs	MMD-TA-11B: 2 normally open contact output channels and 1 normally closed auxiliary contact output channel: Each normally open output channel is a series connection of contacts from two forced-guided (positive-guided) relays, K1-K2. The normally closed AUX contact (non-safety) 31-32 is a parallel connection of contacts from K1-K2. Contacts: AgNi, 5 µm gold-plated Low Current Rating: Caution: The 5 µm gold-plated contacts allow the switching of low current/low voltage. In these low-power applications, multiple contacts can also be switched in series (e.g., "dry switching "). To preserve the gold plating on the contacts and also guarantee reliable switching, the following values should be kept within the min. and max. ranges shown below. Min. voltage: 1 V ac/dc — Max. voltage: 60 V Min. current: 5 mA ac/dc — Max. current: 300 mA Min. power: 5 mW (5 mVA) — Max. power: 7 W (7 VA) High Current Rating: If higher loads must be switched through one or more of the contacts, the minimum and maximum values of the contact(s) changes to: Min. voltage: 15 V ac/dc — Max. voltage: 120 V ac/dc Min. current: 30 mA ac/dc — Max. current: 6 A Min. power: 0.45 W (0.45 VA) — Max. power: 160 W (720 VA) Mechanical life: 50,000,000 operations Electrical life: 120,000 operations (typical at 144 W/[1380 VA] switched power, resistive load) NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts MMD-TA-12B: Two diverse-redundant solid-state safety outputs: 24 V dc, 0.5 A sourcing OSSD (output signal switching device) ON-State voltage: ≥V in-1.5 V dc OFF-State voltage: 1.2 V dc max. (0-1 2 V dc) Max. load capacitance: 0.1 µF Max. load inductance: 10 H Leakage current: 0.50 mA max. Cable resistance: 10 Ω max. OSSD test pulse width: < 100 microseconds OSSD test pulse period: > 100 milliseconds Switching current: 0-0.5 A

Continued on next page

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

MMD-TA-12B & MMD-TA-11B Muting Modules Specifications (cont'd)

Non-Safety Outputs	Model MMD-TA-11B: Aux. output 31–32 is a parallel connection of two N.C. contacts from internal relays K1 and K2 Contact: AgNi, 5 µm gold-plated Low Current Rating: Caution: The 5 µm gold-plated contacts allow the switching of low current/low voltage. To preserve the gold plating on the contacts and also guarantee reliable switching, the following values should be kept within the min. and max. ranges shown below: Min. Voltage: 1 V ac/dc — Max. Voltage: 24 V ac/dc Min. Current: 5 mA ac/dc — Max. Current: 250 mA ac/dc Min. Power: 5 mW (5 mVA) — Max. Power: 6 W (6 VA) High Current Rating: For higher loads, the min. and max. values of the contact(s) changes to: Min. Voltage: 15 V ac/dc — Max. Voltage: 120 V ac/dc Min. Current: 30 mA ac/dc — Max. Current: 6 A Min. Power: 0.45 W (0.45 VA) — Max. Power: 160 W/720 VA Mechanical Life: 50,000,000 operations Electrical Life: >10 x 10^6 cycles Model MMD-TA-12B: Z4–Z3 = Aux. 24 V / 250 mA PNP output follows the two OSSD safety outputs
Status Indicators	3 Status LEDs (Red, Green and Yellow): indicate waiting for Reset, Lockout, Override, and OSSD status Yellow and Green LEDs adjacent to individual inputs/interfaces indicate status (ON = active/closed)
Diagnostic Code Display	Diagnostic Display is a two-digit numeric display that indicates the cause of lockout conditions and the amount of time remaining for the backdoor timer
Muting Lamp Output	A monitored or non-monitored (selectable) sinking output. If monitoring has been selected, the current draw must be 10 to 360 mA. Interconnect wire resistance < 30 Ω. Max. switching voltage: 30 V dc Max. switching current: 360 mA Min. switching current: 10 mA Saturation voltage: ≤ 1.5 V dc @ 10 mA; ≤ 5 V dc @ 360 mA
Controls and Adjustments	All configured on two redundant banks of DIP switches: Manual/auto reset One-way/two-way muting Monitored/non-monitored mute lamp output One-channel/two-channel/no EDM Backdoor timer Mute on power-up enable
Inputs	The MSSI and the SSI can be interfaced with external safety devices that have either hard contact outputs or solid-state sourcing outputs When connecting the MSSI (S11-S12, S21-S22) or SSI (X5-X6, X7-X8) inputs to safety relay outputs or hard contacts, these contacts must be capable of switching 15 to 30 V dc at 10-50 mA Operating Range for MSSI and SSI Inputs OFF State: -3 V to +5 V, 0 to 2 mA ON State: 15-30 V, 10-50 mA Muteable Safety Stop Interface (MSSI) This input consists of two channels (MSSI-A and MSSI-B), and can be muted when the requirements for a mute cycle have been met. When muted, the OSSDs remain ON, independent of the MSSI status. If not muted, when either or both channels open, the OSSD outputs will go OFF. *Maximum external resistance per channel must not exceed 400 Ω.* Safety Stop Interface (SSI) This input consists of two channels (SSI-A and SSI-B), and is always active. When one or both channels open, the OSSD Outputs will go OFF. *Maximum external resistance per channel must not exceed 400 Ω.*
External Device Monitoring (EDM)	Two pairs of terminals are provided to monitor the state of external devices controlled by the OSSD outputs. Each device must be capable of switching 15-30 V dc at 10-50 mA.
Muting Device Inputs	The muting devices work in pairs (M1 and M2, M3 and M4) and are required to be "closed" within 3 seconds of each other (simultaneity requirement/synchronous actuation) to initiate a mute (assuming all other conditions are met). Each muting device must be capable of switching 15-30 V dc at 10-50 mA.
Mute Enable Input	The mute enable input must have +24 V dc applied in order to start a mute; opening this input after mute has begun has no effect. The switching device must be capable of switching 15-30 V dc at 10-50 mA.
Override Inputs	The two-channel inputs must be closed within 3 seconds of each other (simultaneity/synchronous action requirement) and held closed during the 30-second Override. To initiate a subsequent Override, open both channels, wait 3 seconds, and then re-close both channels (within 3 seconds). The switching devices must be capable of switching 15-30 V dc at 10-50 mA.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

MMD-TA-12B & MMD-TA-11B Muting Modules Specifications (cont'd)

Reset Input	Terminals must be closed for a minimum of 0.25 seconds and not more than 2.0 seconds in order to guarantee a reset. The switching device must be capable of switching 15-30 V dc at 10-50 mA.
Mounting	Mounts to standard 35 mm DIN rail track. Safety Module must be installed inside an enclosure rated NEMA 3 (IP54), or better.
Vibration Resistance	10 to 55 Hz @ 0.35 mm displacement per IEC 60068-2-6
Construction	Polycarbonate housing
Connections	Removable terminal blocks
Environmental Rating	NEMA 1; IP20
Operating Conditions	**Temperature range:** 0° to +50° C **Relative humidity:** 95% (non-condensing)
Design Standards	Designed to comply with Safety Category 4 per SIL 3 (IEC 61508); SIL CL3 (IEC 62061); Category 4, Performance Level (PL) e (ISO 13849-1)
Certifications	CE cULus LISTED
Wiring Diagrams	MMD-TA-12B: WD045, WD048, WD049 (p. 1039) MMD-TA-11B: WD047 (p. 1038)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Safe Speed Monitoring
Safety Modules

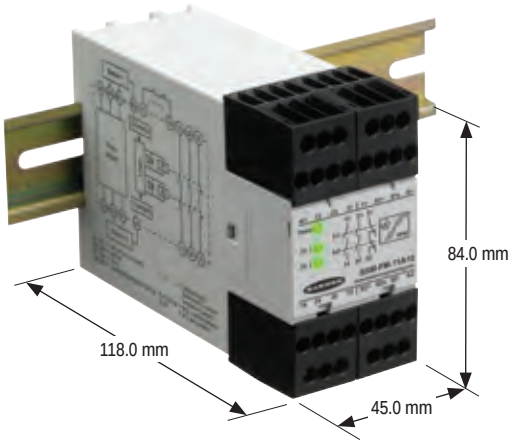
Safe Speed Safety Modules monitor redundant devices, such as two sensors with PNP outputs for rotation and linear movements allowing locked gates or guards to be opened when speed drops below or above the dangerous level.

- Each module has four adjustable RPM ranges
- Provides two normally open safety contacts and one normally closed auxiliary contact, each rated at 4 amps
- Housings are rugged polycarbonate and mount to standard 35 mm DIN rail

SSM Safe Speed Monitoring Modules

Supply Voltage	Inputs	Safety Outputs	Aux. Outputs	Ranges (lpm)	Output Rating	Model
24 V ac/dc	2 PNP	2 NO	1 NC	5 - 40, 35 - 340, 300 - 2700, 1200 - 10500	4 amps	SSM-FM-11A10
24 V ac/dc	2 PNP	2 NO	1 NC	10 - 80, 80 - 650, 600 - 5300, 2400 - 20000	4 amps	SSM-FM-11A20

NC = Normally Closed Relay, NO = Normally Open Relay



SSM-FM-11A... Models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SSM Safe Speed Monitoring Module Specifications

Supply Voltage and Current	24 V ac/dc, 50-60 Hz, no polarity AC: 24 V +10% / -15% DC: 24 V ±10% Power consumption: approx. 4 VA/2.5 W
Start-up Reset Time	1.5 second
Hysteresis	6% typical
Input Requirements	PNP-Input sensors: 24 V dc (terminals S1s and S2s) Input current min.: 3 mA Input current max.: 25 mA Min. pulse time: 1 millisecond ON; 1 millisecond OFF
Max. IPM at Inputs S1s and S2s	30,000
Adjustable Setting Ranges (Impulses per Minute)	SSM-FM-11A10: 5…40 ipm, 35…340 ipm, 300…2,700 ipm or 1,200…10,500 ipm SSM-FM-11A20: 10…80 ipm, 80…650 ipm, 600…5,300 ipm or 2,400…20,000 ipm
Output Response Time	Standstill / Under-speed detection: (60 seconds/adjusted IPM value) + 2.5 seconds = tDS tDS = output ON-delay after detection of standstill Over-speed detection: SSM-FM-11A10: Range 5…10,500: tR = 700 milliseconds typical SSM-FM-11A20: Range 10…20,000: tR = 350 milliseconds typical
Output Configuration	Outputs K1 & K2: two redundant (total of four) safety relay NO (forced-guided) contacts—AgNi, gold flashed; one auxiliary NC contact—AgNi, gold flashed Contact ratings (all NO and NC output contacts): 2 normally open (NO) output channels and 1 normally closed (NC) auxiliary output Current Rating: Thermal Current Ith: 4 A Switching Capacity to AC 15: 3 A / 230 V ac for NO contacts (per IEC/EN 60947-5-1) 2 A / 230 V ac for NC contact (per IEC/EN 60947-5-1) Min. voltage: 15 V ac/dc Max. voltage: 230 V ac/dc Min. current: 30 mA ac/dc Max. current: 4 A Min. power: 0.45 W (0.45 VA) Max. power: 100 W (920 VA) Mechanical Life: ≥50,000,000 operations Electrical life (switching cycles of the output contacts, resistive load): 350,000 cycles @ 920 VA; 1,000,000 cycles @ 440 VA; 2,000,000 cycles @ 250 VA; 5,000,000 cycles @ 125 VA NOTE: Transient suppression is recommended when switching inductive loads. Install suppressor across load. Never install suppressor across output contacts.
Indicators	3 green LED indicators: Power On, Channel 1 active, and Channel 2 active
Construction	Polycarbonate housing
Environmental Rating	Rated NEMA 1; IEC IP20 (IEC/EN 60529)
Mounting	Mounts to standard 35 mm DIN rail track. Safety Module must be installed inside an enclosure rated NEMA 3 (IEC IP54) or better.
Vibration Resistance	10 to 55 Hz @ 0.35 mm displacement per IEC 60068-2-6
Operating Conditions	Temperature: 0° to 50° C Max. Rel. Humidity: 90% @ +50° C (non-condensing)
Design Standards	Cat. 3 PL e per DIN EN ISO 13849-1; SIL CL 3 per IEC 62061
Certifications	Approvals are pending This module was evaluated by UL to UL508 Industrial Control Equipment, which is not a certification relating to the safety performance of the module
Wiring Diagrams	WD050 (p. 1040)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Interface Relay Modules
Safety Modules

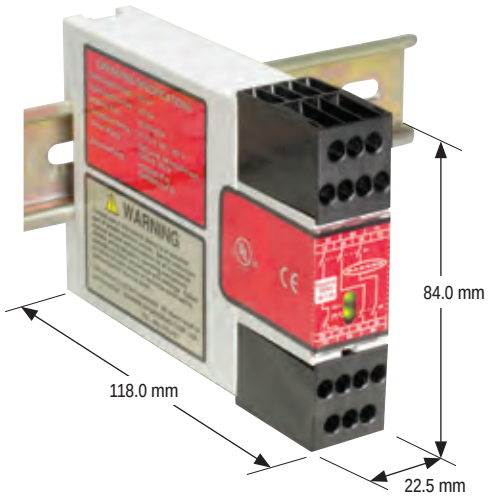
Interface relay modules serve as a relay for safety devices with OSSD solid-state or hard contact outputs and external device monitoring, such as the EZ-SCREEN®.

- Increases the switching current capacity of low-voltage safety devices up to 6 amps
- Requires no adjustment
- Housings are rugged polycarbonate and mount to standard 35 mm DIN rail
- Relay outputs are capable of reliably switching low or high current applications

Interface Modules

Supply Voltage	Inputs	Safety Outputs	Aux. Outputs	Output Rating	Output Response Time	Models
24 V dc	2 NC (dual)	3 NO	—	6 amps	20 ms	IM-T-9A
24 V dc	2 NC (dual)	2 NO	1 NC	6 amps	20 ms	IM-T-11A

NC = Normally Closed Relay, NO = Normally Open Relay



Interface Models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Interface Modules Specifications

Input Voltage and Current	24 V dc, +/-15% no polarity, 10% max. ripple; 50 mA per input channel **Power consumption:** approx. 2.4 W
Supply Protection Circuitry	Protected against transient voltages
Overvoltage Category	**Output relay contact voltage of 1 V to 150 V ac/dc:** Category III **Output relay contact voltage of 151 V to 250 V ac/dc:** Category II (Category III, if appropriate overvoltage reduction is provided, as described in data sheet.)
Pollution Degree	2
Output Configuration	**IM-T-9A:** 3 normally open output channels **IM-T-11A:** 2 normally open output channels and 1 normally closed auxiliary output channel Each normally open output channel is a series connection of contacts from two forced-guided (mechanically linked) relays, K1-K2. The normally closed contact 31-32 is a parallel connection of contacts from K1-K2. **Contacts:** AgNi, 5 µm gold-plated **Low Current Rating:** The 5 µm gold-plated contacts allow the switching of low current/low voltage. In these low-power applications, multiple contacts can also be switched in series (e.g., "dry switching"). To preserve the gold plating on the contacts, do not exceed the following max. values at any time: **Min. voltage:** 1 V ac/dc — **Max. voltage:** 60 V **Min. current:** 5 mA ac/dc — **Max. current:** 300 mA **Min. power:** 5 mW (5 mVA) — **Max. power:** 7 W (7 VA) **High Current Rating:** If higher loads must be switched through one or more of the contacts, the minimum and maximum values of the contact(s) changes to: **Min. voltage:** 15 V ac/dc — **Max. voltage:** 250 V ac/dc, 6A resistive **Min. current:** 30 mA ac/dc — **Max. power:** 150 W (1,500 VA) **Min. power:** 0.45 W (0.45 VA) — IEC 60947-5-1: AC-15: 230 V ac, 3A: DC-13: 24 V dc, 4 A **Mechanical life:** 20,000,000 operations **Electrical life:** 150,000 cycles @ 1500 VA; 1,000,000 cycles @ 450 VA; 2,000,000 cycles @ 250 VA; 5,000,000 VA @ 125 VA **Feedback contact rating** (Y1-Y2, Y3-Y4): **Min. voltage:** 1 V ac/dc — **Max. voltage:** 60 V **Min. current:** 5 mA ac/dc — **Max. current:** 300 mA **Min. power:** 5 mW (5 mVA) — **Max. power:** 7 W (7 VA) NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts.
Output Response Time	20 milliseconds max.
Status Indicators	**2 green LED indicators:** K1 energized K2 energized
Construction	Polycarbonate housing
Environmental Rating	Rated NEMA 1; IEC IP20
Mounting	Mounts to standard 35 mm DIN rail track. Interface Module must be installed inside an enclosure rated NEMA 3 (IP54), or better.
Vibration Resistance	10 to 55Hz @ 0.35 mm displacement per IEC 60068-2-6
Operating Conditions	**Temperature:** 0° to +50° C — **Relative humidity:** 90% @ 50° C (non-condensing)
Design Standards	EN 60204-1, IEC 61810-1, EN 60255-1, EN 50205
Application Notes	There are no adjustments or user-serviceable parts.
Certifications	CE c UL us
Wiring Diagrams	2-Channel, 2 OSSDs, 2-Channel EDM: WD055 (p. 1043) 2-Channel, 2 OSSDs, 1-Channel EDM: WD056 (p. 1043) 2-Channel, 2 FSDs, 2-Channel EDM: WD057 (p. 1044) 2-Channel, 2 OSSDs, 1-Channel EDM: WD057 (p. 1044)) 1-Channel, 1 Relay, 1 EDM: WD058 (p. 1045)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Extension Relay Modules
Safety Modules

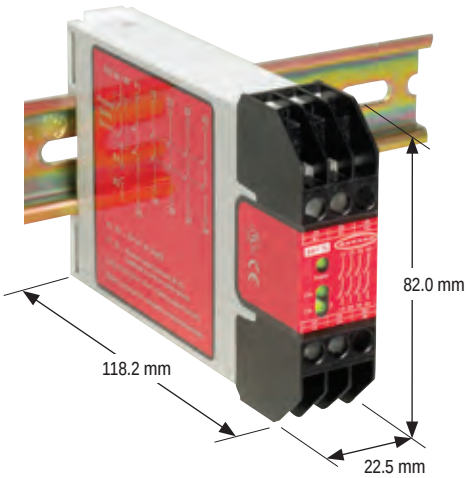
Extension Relay Modules provide additional safety outputs for a safety modules with relay contact outputs and external device monitoring.

- Provides delayed or immediate outputs, depending on model
- Requires no adjustment
- Housings are rugged polycarbonate and mount to standard 35 mm DIN rail

Extension Modules

Supply Voltage	Inputs	Safety Outputs	Output Rating	Aux. Outputs	Output Response Time	Delay	Model
24 V dc	1 NC (single) or 2 NC (dual)	4 NO	6 amps	—	20 ms	—	EM-T-7A
24 V ac/dc	1 NC (single)	4 NO	6 amps	—	35 ms	—	EM-F-7G
24 V ac/dc	1 NC (single)	4 NO w/delay	6 amps	—	—	0.5 sec.	EM-FD-7G2
24 V ac/dc	1 NC (single)	4 NO w/delay	6 amps	—	—	1.0 sec.	EM-FD-7G3
24 V ac/dc	1 NC (single)	4 NO w/delay	6 amps	—	—	2.0 sec.	EM-FD-7G4

NC = Normally Closed Relay, NO = Normally Open Relay



EM-F..-7G Models



EM-T-7A Models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Extension Module Specifications

Supply Voltage and Current	EM-T-7A model: A1-A2: 24 V dc, +/-15%, 10% max. ripple EM-F/FD-7G.. models: A1-A2: 24 V ac/dc, +/-10%, 10% max. ripple on dc
Supply Protection Circuitry	Protected against transient voltages and reverse polarity
Output Configuration	Four output channels: EM-T-7A: Each channel is a series connection of two forced-guided (positive-guided) relay contacts – AgNi, gold flashed EM-F/FD-7G.. : Each channel is a series connection of two forced-guided (positive-guided) relay contacts – $AgSnO_2$ Contact ratings: Max. voltage: 250 V ac/dc — Max. current: 6 A ac/dc Min. current: 30 mA @ 24 V dc — Max. power: 1500 VA, 200 W Mechanical life: EM-T-7A model: 50,000,000 operations EM-F/FD-7G.. models: 10,000,000 operations Electrical life: 100,000 at full resistive load Feedback contact rating (Y1-Y2):EM-T-7A: 24 V dc @ 0.5A EM-F/FD-7G..: 250 V ac/dc @ 3A NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts.
Output Response Time	EM-T-7A: 20 milliseconds max. (if channel u-k fails, maximum response time is 200 milliseconds) EM-F-7G: 35 milliseconds typical EM-FD-7G..: Delay OFF: 0.5 seconds ±30% for EM-FD-7G2, 1 seconds ±30% for EM-FD-7G3, 2 seconds ±30% for EM-FD-7G4, as measured from the time when the supply voltage to A1 is interrupted Delay ON: 30 milliseconds for all models
Input Requirements	EM-T-7A: Inputs from Safety Device must each be capable of switching 30 to 250 mA @ 13 to 28 V dc EM-F/FD-7G..: Input from Safety Device must be capable of switching 40 to 100 mA @ 13 to 27 V ac/dc
Status Indicators	3 green LEDs: Power ON K1 energized K2 energized
Construction	Polycarbonate housing
Environmental Rating	Rated NEMA 1; IP20
Mounting	Mounts to standard 35 mm DIN rail track. Extension Module must be installed inside an enclosure rated NEMA 3 (IP54), or better.
Vibration Resistance	10 to 55Hz @ 0.35 mm displacement per IEC 60068-2-6
Operating Conditions	Temperature: 0° to +50° C — Relative humidity: 90% @ +50° C (non-condensing)
Design standards	Designed to comply with EN 292-1, ISO 12100-1, EN 292-2, ISO 12100-2, EN 954-1, EN 20604-1, EN 60335-1
Certifications	UL LISTED EMERGENCY STOP DEVICE 29YL
Wiring Diagrams	EM-T-7A 1-Channel EDM: WD051 (p. 1041) — EM-T-7A 2-Channel EDM: WD052 (p. 1041) EM-F-7G: WD053 (p. 1042) — EM-FD-7G: WD054 (p. 1042)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Two-Hand Control

Modules monitor the output of each Banner STB self-checking touch button or electromechanical button and deenergizes when the machine operator removes one or both hands from the buttons, providing protection for the worker actuating the hand controls.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Series	Description	Protection Rating	Power Supply
	Two Hand-Control Module page 834	Category 4 (module); Type IIIC	24 V ac/dc, 115 V ac/24 V dc or 230 V ac/24 V dc, depending on model
	STB Buttons page 838	Category 4 (module); Type IIIC	10 - 30 V dc or 20-30 V ac/dc depending on model
	Run Bar page 842	Dependent on controller/module	10 to 30 V dc

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



DUO-TOUCH® SG Two-Hand Control Modules

Two-Hand Control

Modules work with existing electromechanical palm buttons or with Banner's STB Self-Checking Touch Buttons to create a complete, ergonomic two-hand control system.

- Anti-tiedown logic requires both touch buttons to be activated within one-half second or less of each other
- Modules easily interface with DUO-TOUCH® Run Bars with STBs for an economical, convenient means for actuation
- Designed to meet OSHA/ANSI Control Reliability requirements and Category 4 per ISO 13849-1 (EN 954-1) and functional Type IIIC Two-Hand Control per ISO 13851 (EN 574)
- Relay outputs are capable of reliably switching low or high current applications (depending on model)

DUO-TOUCH® SG Two-Hand Control Modules

Supply Voltage	Inputs	Safety Outputs	Output Rating	Auxiliary Outputs	Muting	Terminals	Model
24 V ac/dc	2 STB*	2 NO	6 amps	—	—	Removable	AT-FM-10K
115 V ac/24 V dc	2 STB*	4 NO	6 amps	1 NPN, 1 PNP & 1 NC	—	Removable	AT-GM-13A
230 V ac/24 V dc	2 STB*	4 NO	6 amps	1 NPN, 1 PNP & 1 NC	—	Removable	AT-HM-13A

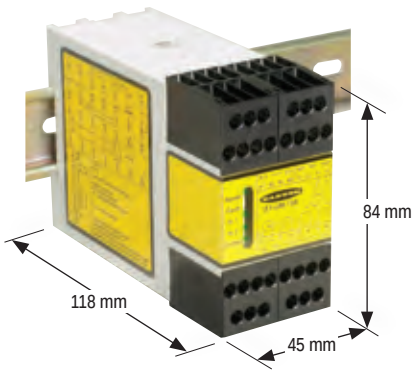
NC = Normally Closed, NO = Normally Open

* May also use two electromechanical push buttons, each with one normally open (NO) and one normally closed (NC) contact (Form C). See data sheets for details.

NOTE: Kits are available which include one DUO-TOUCH SG Safety Module and two STB Touch Buttons. STB Touch Buttons are also available separately. See page 838.



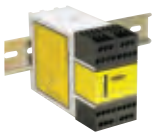
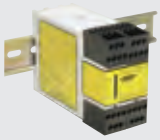
AT-FM-10K Model



AT-GM-13A & AT-HM-13A Models
(AT-GM-13A shown)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DUO-TOUCH® SG Kits — Solid-State STB Touch Buttons (Meets Category IIIC)

Kit Components†						Kit
DUO-TOUCH® SG Safety Module	STB Touch Buttons (see page 838)	Supply Voltage	Safety Outputs	Auxiliary Outputs	Connection	Includes 2 STB Touch Buttons & a DUO-TOUCH® SG Safety Module
 AT-FM-10K	STBVP6	24 V ac/dc	2 NO	–	2 m	ATK-VP6
	STBVP6Q				4-Pin Mini QD	ATK-VP6Q
	STBVP6Q5				4-Pin Euro QD	ATK-VP6Q5
 AT-GM-13A	STBVP6	115 V ac/ 24 V dc	4 NO	1 NPN, 1 PNP & 1 NC	2 m	ATGMK-VP6
	STBVP6Q				4-Pin Mini QD	ATGMK-VP6Q
	STBVP6Q5				4-Pin Euro QD	ATGMK-VP6Q5
 AT-HM-13A	STBVP6	230 V ac/ 24 V dc	4 NO	1 NPN, 1 PNP & 1 NC	2 m	ATHMK-VP6
	STBVP6Q				4-Pin Mini QD	ATHMK-VP6Q
	STBVP6Q5				4-Pin Euro QD	ATHMK-VP6Q5

NC = Normally Closed, NO = Normally Open

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DUO-TOUCH® SG AT-FM-10K Modules Specifications

Supply Voltage and Current	24 V dc ±15% @ 150 mA (use a SELV-rated supply according to EN IEC 60950, NEC Class 2) 24 V ac ±15% @ 150 mA, 50-60 Hz +/- 5% (use an NEC Class 2-rated transformer) To comply with UL and CSA standards, the installation's isolated secondary power supply circuit must incorporate a method to limit the overvoltage to 0.8 kV.
Supply Protection Circuitry	Protected against transient voltages and reverse polarity
Overvoltage Category	Output relay contact voltage of 1 V to 150 V ac/dc: Category III Output relay contact voltage of 151 V to 250 V ac/dc: Category II (Category III, if appropriate overvoltage reduction is provided, as described in data sheet.)
Pollution Degree	2
Safety Outputs	Each normally open output channel is a series connection of contacts from two forced-guided (mechanically linked) relays, K1-K2. Contacts: AgNi, 5 µm gold-plated Low Current Rating: The 5 µm gold-plated contacts allow the switching of low current/low voltage. In these low-power applications, multiple contacts can also be switched in series (e.g., "dry switching"). To preserve the gold plating on the contacts, do not exceed the following max. values at any time Min. voltage: 1V ac/dc — Max. voltage: 60 V Min. current: 5 mA ac/dc — Max. current: 300 mA Min. power: 5 mW (5 mVA) — Max. power: 7 W (7 VA) High Current Rating: If higher loads must be switched through one or more of the contacts, the minimum and maximum values of the contact(s) changes to:

c UL us LISTED PRESS CONTROL 8N35	Minimum Voltage: 15 V ac/dc Current: 30 mA ac/dc Power: 0.45 W (0.45 VA)	Maximum 250 V ac/dc / 24 V dc, 6 A resistive B300, R300 per UL508
CE	Minimum Voltage: 15 V ac/dc Current: 30 mA ac/dc Power: 0.45 W (0.45 VA)	Maximum 250 V ac/dc / 24 V dc, 6 A resistive IEC 60947-5-1 AC15 230 V ac, 3A; DC-13: 24 V dc, 2A

Mechanical life: 20,000,000 operations
Electrical life (switching cycles of the output contacts, resistive load): 150,000 cycles @ 900 VA; 1,000,000 cycles @ 250 VA; 2,000,000 cycles @ 150 VA; 5,000,000 cycles @ 100 VA
NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts.

Output Response Time	35 milliseconds maximum
Input Requirements	Outputs from actuating devices must each be capable of switching 25 mA @ 24 V dc (nominal).
Simultaneity Monitoring Period	≤ 500 milliseconds
Status Indicators	4 green LEDs: Power ON, Input 1 energized, Input 2 energized, Output 1 red LED: Fault
Construction	Polycarbonate housing
Environmental Rating	IEC IP20
Mounting	Mounts to standard 35 mm DIN rail track. Safety Module must be installed inside an enclosure rated NEMA 3 (IP54), or better.
Vibration Resistance	10 to 55 Hz @ 0.35 mm displacement per IEC 60068-2-6
Operating Conditions	Temperature: 0° to +50° C Relative humidity: 90% @ +50° C (non-condensing)
Design Standards	CE : Cat. 4 PL e, per EN ISO 13849-1; SIL 3 per IEC 61508 and IEC 62061; Type IIIC per ISO 13851 (EN574) (when used with STBs or hard contacts)
Certifications	CE c UL us LISTED PRESS CONTROL 8N35
Wiring Diagrams	WD059 (p. 1045)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DUO-TOUCH® SG AT-..M-13A Modules Specifications

Supply Voltage and Current	AT-GM-13A: 115 V ac, ±15%; 50/60 Hz & 24 V dc, ±15%, 10% max. ripple AT-HM-13A: 230 V ac, ±15%; 50/60 Hz & 24 V dc, ±15%, 10% max. ripple
Power Consumption	Appox. 4 W/7 VA
Supply Protection Circuitry	Protected against transient voltages and reverse polarity
Safety Outputs (including Auxiliary NC output 51/52)	Outputs (K1 and K2): four redundant (total of eight) forced-guided safety relay contacts Contact ratings: Min. voltage: 15V ac/dc — Max. voltage: 250 V ac or 250 V dc Min. current: 30 mA — Max. current: 6A ac or dc (resistive load) Min. power: 0.45 VA (0.45 W) — Max. power: 1500 VA (200 W) Mechanical life: 50,000,000 operations Electrical life: 150,000 cycles (typically @ 1.5 kVA switching power) NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts.
Auxiliary Supply Voltage (for Solid-State outputs)	24 V dc @ 1A (between Y30 & Y33)
Auxiliary Solid-State Output Current	500 mA max., short circuit protected (Y32 or Y33)
Output Response Time	35 milliseconds max. ON/OFF
Input Requirements	Outputs from actuating devices (1 NO and 1 NC) must each be capable of switching 20 mA @ 12 V dc.
Simultaneity Monitoring Period	≤ 500 milliseconds
Z1/Z2 Courtesy Voltage	24 V dc @ 150 mA (for STB button power)
External Device Monitoring (EDM)	One pair of terminals (Y1 and Y2) are provided to monitor the state of external devices controlled by the safety outputs. Each device must be capable of switching 15 to 30V dc at 10-50 mA.
Status Indicators	4 green LEDs: Power ON, Input 1 energized, Input 2 energized, Output 1 red LED: Fault
Environmental Rating	Polycarbonate. Rated NEMA 1; IP20
Mounting	Mounts to standard 35 mm DIN rail track. Safety Module must be installed inside an enclosure rated NEMA 3 (IP54), or better.
Vibration Resistance	10 to 55 Hz @ 0.35 mm displacement per IEC 60068-2-6
Operating Conditions	Temperature: 0° to +50° C — Relative humidity: 90% @ +50° C (non-condensing)
Design Standards	Designed to comply with Category 4 per ISO 13849-1 (EN 954-1); Type IIIC per ISO 13851 (EN 574)
Certifications	CE Important Notice: European Community Machinery Directive 2006/42/EC The DUO-TOUCH SG AT-..M-13A Two-Hand Control Modules comply with Machinery Directive 98/37/EC, but not with Machinery Directive 2006/42/EC. Therefore, these modules can only be installed as a replacement component within the European Union (EU). For more information, please see www.bannerengineering.com/144763 or call 1-888-373-6767.
Wiring Diagrams	AT-..M-13A models: WD054 (p. 1042) AT-..M-13A to STB Buttons: WD056 (p. 1043)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



Self-Checking Touch Buttons (STB)

Two-Hand Control

STB Self-Checking Touch Buttons provide the highest level of safety for two-hand control input devices via redundant microprocessor and optical path.

- Features ergonomic design to prevent repetitive motion stress by responding to a finger blocking light rather than to pressure
- Includes yellow field cover to prevent unintended switching
- For safety applications, STB buttons must be used with DUO-TOUCH® SG Two-Hand control modules, Safety Controller or comparable control Type IIIC Two-Hand system

STB Self-Checking Buttons – Solid-State Outputs, 10-30 V dc

Connection	Upper Housing	Solid-State Outputs	Models
2 m	Polyetherimide	2 Complementary PNP (1 ON, 1 OFF)	STBVP6
4-Pin Mini QD			STBVP6Q
4-Pin Euro QD			STBVP6Q5

STB Self-Checking Buttons – e/m Relay Outputs, 20-30 V ac/dc

Connection	Upper Housing	Relay Outputs	Models
2 m	Polyetherimide	2 Complementary SPST (1 NC, 1 NO)	STBVR81
5-Pin Mini QD			STBVR81Q
5-Pin Euro QD			STBVR81Q6

For more specifications see page 841.

Connection options: A model with a QD requires a mating cordset (see page 839).

For 9 m cable, add suffix W/30 to the 2 m model number (example, STBVP6 W/30).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Euro QD to Flying Leads

See page 908

Length	Straight 4-Pin	Straight 5-Pin	Right-Angle 4-Pin	Right-Angle 5-Pin
1.83 m	MQDC-406	MQDC1-506	MQDC-406RA	MQDC1-506RA
4.57 m	MQDC-415	MQDC1-515	MQDC-415RA	MQDC1-515RA
9.14 m	MQDC-430	MQDC1-530	MQDC-430RA	MQDC1-530RA
15.2 m	MQDC-450	—	MQDC-450RA	—





Additional cordset information available. See page 904.

Mini QD to Flying Leads

See page 928

Length	Straight 4-Pin	Straight 5-Pin
1.83 m	MBCC-406	MBCC-506
3.66 m	MBCC-412	MBCC-512
9.14 m	MBCC-430	MBCC-530



Brackets

STB

See page 869	See page 869	See page 870	See page 870	See page 871
SMB30A	SMB30MM	SMB30SC	SMBAMS30P	SMBAMS30RA











Additional brackets and information available. See page 846.

Field Covers

OTB/LTB

Black	OTC-1-BK	OTCL-1-BK	
Green	OTC-1-GN	OTCL-1-GN	
Red	OTC-1-RD	OTCL-1-RD	
Yellow	OTC-1-YW	OTCL-1-YW	



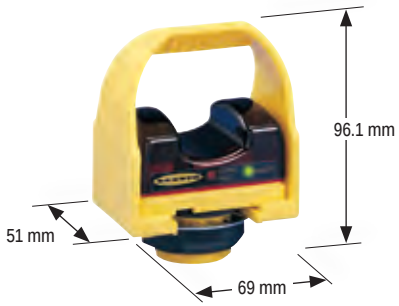


Field covers are designed to prevent inadvertent activation of buttons due to objects (loose clothing, debris, etc.) which might accidentally block their sensing beams. Field covers are constructed of rugged polypropylene and are highly resistant to abrasion and to damage by most chemicals. Standard STB model numbers are shipped with a yellow cover.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



STB models



STB models with cover

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

STB Self-Checking Buttons Specifications

Supply Voltage and Current	STBVP6 Models: 10 to 30 V dc @ 75 mA, typical STBVR81 Models: 20 to 30 V ac/dc or 20 V to 30 V ac (peak-to-peak value), (50/60 Hz ± 5%) @ 75 mA
Supply Protection Circuitry	Protected against transient voltages and reverse polarity
Output Configuration	STBVP6 Models: Complementary PNP (sourcing) open-collector transistors STBVR81 Models: Complementary electromechanical relay
Output Rating	STBVP6 Models (solid-state outputs): Max. load: 150 mA ON-state saturation voltage: $+V_{(supply)}$ -1.5V OFF-state leakage current: less than 1 µA STBVR81 Models (electromechanical relay): Max. switching voltage: 125 V dc/150 V ac Max. switching current: 1A @ 24 V dc; 0.4A @ 125V ac (resistive loads) Max. resistive load power: 24 W dc; 50 VA ac Mechanical life of relay: 10^9 cycles Electrical life of relay: 1.5 x 10^5 cycles at 1 amp 24 V resistive
Output Protection	All models protected against false pulse on power-up. Models with solid-state outputs have overload and short-circuit protection.
Output Response Time	20 milliseconds ON/OFF
Indicators	2 green LED indicators: Power: ON –power applied OFF –power off Output/fault: ON –button is activated OFF –button is deactivated Flashing –internal fault or blocked button on power-up detected
Construction	Totally encapsulated, non-metallic enclosure. Black Polyetherimide (PEI) upper housing; fiber-reinforced PBT polyester base. Electronics fully epoxy-encapsulated. Supplied with polypropylene (TP) field cover.
Environmental Rating	Meets NEMA standards 1, 3, 4, 4X, 12 and 13; IP66
Connections	PVC-jacketed 2 m cables standard on integral-cable kits; QD fitting, depending on model. Accessory QD mating cordsets required for QD models. QD cordsets are ordered separately. See page 843. STBVP6: 4-wire (4-pin Mini-style QD, add suffix Q or 4-pin Euro-style QD, add suffix Q5) STBVR81: 5-wire (5-pin Mini-style QD, add suffix Q or 5-pin Euro-style QD, add suffix Q6) Integral 9 m cables are also available by adding suffix W/30 to the 2 m model number.
Ambient Light Immunity	Up to 100,000 lux
Applicable Agency Standards	(Used with an AT-FM-10K module or an SC22-3 Safety Controller) Analysis of measures for fault avoidance and fault control according to SIL3 (IEC 61508 and IEC 62061) and Category 4 (EN ISO 13849-1) passes EMI/RFI test levels as specified in IEC61496 and IEC62061.
Operating Conditions	Temperature: 0° to +50° C Relative humidity: 90% @ +50° C (non-condensing)
Application Notes	Environmental considerations for models with Polyetherimide (PEI) upper housings: The Polyetherimide upper housing will become brittle with prolonged exposure to outdoor sunlight. Window glass effectively filters ultraviolet light and provides excellent protection from sunlight. Avoid contact with strong alkalis, hydrocarbons and fuels. Clean periodically using mild soap solution and a soft cloth.
Two-Hand Control System Note	When the STBVP6 is used with Banner's SC22-3 Safety Controller in a two-hand control system, the power supply to the STBVP6 must be of the same voltage that is used to power the Safety Controller and they must have a common supply ground.
Certifications	CE c UL us LISTED
Hookup Diagrams	STB Solid State (PNP): DC03 (p. 974) STB e/m Relay: UN01 (p. 984)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



DUO-TOUCH® Run Bar with STBs

Two-Hand Control

DUO-TOUCH® Run Bars provide a convenient and economical means for safeguarding when interfaced with DUO-TOUCH® Two-Hand Control Modules or comparable control systems.

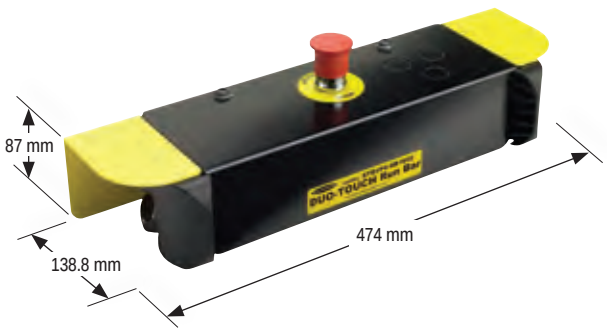
- Minimizes risk of defeat and accidental machine actuation
- Offers ergonomic design for reduced hand, wrist and arm stress
- Constructed of robust, 13-gauge cold-rolled steel
- Provides knockouts for wiring flexibility and installation of accessories such as EZ-LIGHT™ indicators
- Meets ANSI B11.19 and ISO 13851 (EN 574) standards when monitored by Type IIIC Two-Hand Control logic device (e.g., AT series Two-Hand Control modules, see page 834)

DUO-TOUCH® Run Bars with STB Self-Checking Touch Buttons

Connection	STB Touch Buttons Model	STB Touch Buttons Output	Environmental Rating	E-Stop Button	Models*
Terminal Strip	STBVP6	Solid-State Complementary PNP	IP20	Not included	STBVP6-RB1
8-pin Mini QD**				Not included	STBVP6-RB1Q8
Terminal Strip	STBVP6	Solid-State Complementary PNP	IP20	Model SSA-EBM-02L E-stop button (two NC safety contacts)	STBVP6-RB1E02
Terminal Strip	STBVP6	Solid-State Complementary PNP	IP65	Not included	STBVP6-RB2
8-pin Mini QD**				Not included	STBVP6-RB2Q8
Terminal Strip	STBVP6	Solid-State Complementary PNP	IP65	Model SSA-EBM-02L E-stop button (two NC safety contacts)	STBVP6-RB2E02

* DUO-TOUCH Run Bar kits available with two-hand control module. Contact factory for combinations.

** Order QDS-8..C cordsets separately, see page 846.



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cordsets

Mini QD to Flying Leads

See page 930

Length	Straight 8-Pin
4.51 m	QDS-815C
7.62 m	QDS-825C
15.2 m	QDS-850C
22.9 m	QDS-875C



Additional cordset information See page 904.

Brackets

Run Bar

See page 900	See page 900	See page 900
STBA-RB1-MB1*	STBA-RB1-MB2*	STBA-RB1-MB3*



* When used with STBVP6-RB2 models change ..-RB1-.. to ..-RB2-..

Additional brackets and information available. See page 846.

Indicators

Run Bar

See page 973	See page 973
T30GRYB11P	K50LGRYB11P



Stands

Telescoping

See page 953	See page 953
STBA-RB1-S1	STBA-RB1-S2



* When used with STBVP6-RB2 models change ..-RB1-.. to ..-RB2-..

NOTE: DUO-TOUCH SG Run Bars are sold separately.

DUO-TOUCH® Run Bars with STB Self-Checking Touch Buttons

Supply Voltage and Current	10 to 30V dc @ 75 mA (each button) **Power consumption:** approx. 1.8W @ 24V dc (with no output load), for each STB
Supply Protection Circuitry	Protected against transient voltages and reverse polarity
Output Configuration	Complementary PNP (sourcing) open-collector transistors
Output Rating	**Maximum load:** 150 mA **ON-state saturation voltage:** $+V_{(supply)}$-1.5V **OFF-state leakage current:** < 1 µA
Output Protection Circuitry	Protected against false pulse on power-up; overload and short-circuit protection.
Output Response Time	20 milliseconds ON/OFF
STB Indicators	2 green LEDs: **Power:** ON–power applied **Output/fault:** ON–button is activated OFF–button is deactivated Flashing internal fault or blocked button on power-up detected
Construction	**STB Buttons:** Totally encapsulated, non-metallic enclosure; black polyetherimide yoke housing; fiber-reinforced polyester base; electronics fully epoxy-encapsulated. **E-Stop Button:** Polyamide red button with metal base. **Run Bar Housing:** 13 ga. cold rolled steel with powder coat paint; polypropylene copolymer STB mount.
Environmental Rating	STBVP6-RB1 Run Bar models meet IP20 STBVP6-RB2 Run Bar models meet IP65
Connections	**Models STBVP6-RB1/RB2 and -RB1E02/RB2E02:** Terminal strip connections inside run bar housing (STBs are pre-wired). E-stop button and EZ-LIGHT indicator (if used) are wired separately. **Models STBVP6-RB1Q8/RB2Q8:** 8-pin Mini-style quick-disconnect fitting. Accessory QD mating cordsets required for QD models. QD cordsets are ordered separately.
Ambient Light Immunity	Up to 100,000 lux
EMI/RFI Immunity	Immune to EMI and RFI noise sources, per IEC 60947-5-2
Operating Conditions	**Temperature:** 0º to +50º C **Relative humidity:** 90% @ +50º C (non-condensing)
Certification	STB Buttons: CE c UL us LISTED
Wiring Diagrams	WD060, WD061 (p. 1046)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

ACCESSORIES

BRACKETS page 846

CORDSETS page 904

RETROREFLECTORS page 940

MISCELLANEOUS page 952

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Banner Bracket Selection Chart

SENSORS							
QS18 page 30 	SMB18A page 859	SMB18AFA.. page 860	SMB18ATFA page 860	SMB18FM page 860	SMB18Q page 860	SMB18SF page 861	SMB18UR page 861
	SMB30SUS page 862	SMB312S page 863	SMB46A page 863	SMB46L page 863	SMB46S page 864	SMB46U page 864	SMBAMS18P page 864
	SMB3018SC page 861	SMB30SK page 862	SMB312PD page 862	SMBQS18RA page 865	SMBQS18Y page 866	SMB4050YL page 863	SMB18FVK
	SMBAMS18RA page 864	SMBQS18A page 865	SMBQS18DIN page 865	SMH241F page 866	SMB18S	SMB18C	SMBQS18VP6LPQ
	SMB18RAVK						
QS30 page 52 	SMB30MM page 869	SMB30Q page 869	SMB30RAVK page 870	SMB30SC page 870	SMB46L page 863	SMB46S page 864	SMBAMS30P page 870
	SMBAMS30RA page 871	SMBAMSRAB page 870	SMBQS30L page 871	SMBQS30LT page 871	SMBQS30Y page 871	SMBQS30YL page 872	SMB30A page 869
	SMB30FA page 869	SMB30S	SMB30C	SMB30FVK	SMB30SM		
Q12 page 68 	SMBQ12A page 858	SMBQ12T page 858	SMBQ12S				
Q20 page 74 	SMBQ20H page 867	SMBQ20L page 867	SMBQ20LV page 867	SMBQ20U page 868			
Q45/Q45U page 80 	SMB30A page 869	SMB30FA.. page 869	SMB30MM page 869	SMB30Q page 869	SMB30RAVK page 870	SMB30SC page 870	SMB30UR page 872
	SMBAMS30P page 870	SMBAMS30RA page 871	SMB30C	SMB30FVK	SMB30S	SMB30SM	
Q60 page 104 	SMBAMSQ60IP page 873	SMBAMSQ60P page 873	SMBQ60 page 874	SMBQ60IP			
MINI-BEAM page 112 	SMB18A page 859	SMB18FA.. page 860	SMB18Q page 860	SMB18SF page 861	SMB18UR page 861	SMB3018SC page 861	SMB30SK page 862
	SMB30SUS page 862	SMB312B page 862	SMB312PD page 862	SMB312S page 863	SMB46L page 863	SMB46S page 864	SMB46U page 864
	SMBAMS18P page 864	SMBAMS18RA page 864	SMH241F page 866	SMB18FM page 860	SMB18S	SMB18C	SMBQS18VLP6LPQ
Q25 page 134 	SMB18A page 859	SMB18FA.. page 860	SMB18Q page 860	SMB18SF page 861	SMB18UR page 861	SMB3018SC page 861	SMB30SK page 862
	SMB312PD page 862						
Q40 page 140 	SMB30A page 869	SMB30FA.. page 869	SMB30MM page 869	SMB30Q page 869	SMB30RAVK page 870	SMB30SC page 870	SMBAMS30P page 870
	SMBAMS30RA page 871	SMB30C	SMB30FVK	SMB30S	SMB30SM		
Pico Dot page 146 	SMB46A page 863	SMB46L page 863	SMB46S page 864	SMB46U page 864			
QM42/QMT42 page 150 	SMB3018SC page 861	SMB30SK page 862	SMB30SUS page 862	SMB42F page 872	SMB42L page 872	SMB42T page 873	SMB42U page 873
	SMB46L page 863	SMB46S page 864	SMB46U page 864	SMH241F page 866			

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Banner Bracket Selection Chart

SENSORS								
T8 page 160		SMB8MM page 858	SMBF page 854					
T18/T18U page 164		SMB1815SF page 866	SMB18A page 859	SMB18AFA.. page 860	SMB18FA.. page 860	SMB18FM page 860	SMB18Q page 860	SMB18SF page 861
		SMB18UR page 861	SMB3018SC page 861	SMB30SK page 862	SMBC18 page 889	SMBAMS18P page 864	SMBAMS18RA page 864	SMBT18Y page 867
		SMB18S	SMB18C	SMB312P	SMBQS18VP6LPQ			
TM18 page 172		SMB18A page 859	SMB18AFA.. page 860	SMB18FA.. page 860	SMB18FM page 860	SMB18Q page 860	SMB18SF page 861	SMB18UR page 861
		SMB3018SC page 861	SMB30SK page 862	SMB312PD page 862	SMBAMS18P page 864	SMBAMS18RA page 864	SMBT18Y page 867	SMBC18 page 889
		SMB18C	SMB18A	SMBQS18VP6LPQ				
T30/T30U page 178		SMB1815SF page 866	SMB30A page 869	SMB30FA.. page 869	SMB30MM page 869	SMB30Q page 869	SMB30RAVK page 870	SMB30SC page 870
		SMBAMS30P page 870	SMBAMS30RA page 871	SMB30C	SMB30S	SMB30SM	SMBFVK	
M12 page 186		SMB12FA.. page 859	SMB12MM page 859	SMBQS12PD page 859	SMB1812SF page 861			
S12-2 page 193		SMB12FA.. page 859	SMB12MM page 859	SMBQS12PD page 859	SMB1812SF page 861			
SB12/SB12T page 196		SMB12MM page 859	SMBQS12PD page 859	SMB1812SF page 861				
S18/S18-2/S18U page 200		SMB18A page 859	SMB18FA.. page 860	SMB18FM page 860	SMB18Q page 860	SMB18SF page 861	SMB18UR page 861	SMB3018SC page 861
		SMB30SK page 862	SMB312PD page 862	SMB46A page 863	SMBAMS18P page 864	SMBC18 page 889	SMBQS18VP6LPQ	SMB18C
		SMB18S						
M18 page 204		SMB18A page 859	SMB18FA.. page 860	SMB18FM page 860	SMB18Q page 860	SMB18SF page 861	SMB18UR page 861	SMB3018SC page 861
		SMB30SK page 862	SMB312PD page 862	SMB46A page 863	SMBAMS18P page 864	SMBC18 page 889	SMBQS18VP6LPQ	SMB18C
		SMB18S						
S30/SM30 page 212		SMB30A page 869	SMB30FA.. page 869	SMB30MM page 869	SMB30Q page 869	SMB30RAVK page 870	SMB30SC page 870	SMBAMS30P page 870
		SMBAMS30RA page 871	SMB30C	SMB30S	SMB30SM	SMB30FVK		
SL10 & SL30 page 229		SMBSL page 874						
LX page 232		SMBLX page 874	SMBLXR page 874					

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Banner Bracket Selection Chart

SENSORS								
VS1 page 244		SMBVS1S page 855	SMBVS1SC page 855	SMBVS1T page 856	SMBVS1TC page 856			
VS2 page 248		SMBVS2RA page 856						
VS3 page 252		SMBVS3S page 856	SMBVS3T page 857					
DF-G1 page 260		DIN-35.. page 854	SA-DIN-.. page 854	SMBR55F01 page 855	SMBR55F02	SMBR55RA		
D10 page 268		DIN-35.. page 854	SMBR55F01 page 855	SMBR55FRA page 855	SA-DIN-.. page 854	SMBR55F02		
D12 page 278		DIN-35.. page 854	SMBR55F01 page 855	SMBR55FRA page 855	SMBR55F02			
R55F page 284		DIN-35.. page 854	SMBR55F01 page 855	SMBR55FRA page 855	SMBR55F02			
LH page 320		SMBLH1 page 875	SMBLH.. page 875					
LT3 page 326		SMBLT3IP page 876	SMBLT32 page 876	SMBLT31 page 876	SMBAMSLT3IP	SMBAMSLT3P		
LT7 page 330		SMBLT7 page 877	SMBLT7F page 877					
QT50U page 336		SMB30A page 869	SMB30FA.. page 869	SMB30MM page 869	SMB30RAVK page 870	SMB30SC page 870	SMBAMS30P page 870	SMBAMS30RA page 871
		SMB30C	SMB30S	SMB30FVK	SMB30SM			
M25U 354		SMBM25A page 877	SMBM25B page 877					
QT50R page 373		SMB30A page 869	SMB30FA.. page 869	SMB30MM page 869	SMB30SC page 870	SMBAMS30P page 870	SMBAMS30RA page 871	
		SMB30C	SMB30S	SMB30FVK	SMB30SM			

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Banner Bracket Selection Chart

SENSORS								
EZ-ARRAY page 382		EZA-MBK-11 page 894	EZA-MBK-12 page 894	EZA-MBK-20 page 895	SMBLBCZB page 878			
MINI-ARRAY page 386		MSMB-3 page 878						
R58 page 416		SMB55A page 878	SMB55F page 878	SMB55RA page 879	SMB55S page 879			
QC50 page 424		SMBQC50 page 879						
QL56 page 426		SMB55A page 878	SMB55F page 878	SMB55RA page 879	SMB55S page 879			
QM26 page 430		SMBLSTDLQ26 page 868	SMBLSTQ26 page 868					
QMH26 page 434		SMBQMH26-SS-150 page 868						
Q26 page 458		SMBLSTDLQ26 page 868	SMBLSTQ26 page 868					
T-GAGE page 470		SMB18A page 859	SMB18FA.. page 860	SMB18FM page 860	SMB18Q page 860	SMB18SF page 861	SMB18UR page 861	SMB3018SC page 861
		SMB30SK page 862	SMB312PD page 862	SMB46A page 863	SMBAMS18P page 864	SMBC18 page 889	SMBQS18VP6LPQ	SMB18C

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Banner Bracket Selection Chart

VISION							
iVu page 490		SMBIVUB page 879	SMBIVURAL page 880	SMBIVURAR page 880	SMBIVUU page 880			
*Presence*PLUS® PRO page 499		SMBPPDE page 882	SMBPPDH page 883	SMBPPLU page 850	SMBPPRA page 881	SMBPPROMRA page 882	SMBPPSU page 882	SMBPPU page 882
*Presence*PLUS® P4 page 502		SMBP4RAB page 880	SMBP4RAS page 881	SMBP4SRAF page 881				
Ring Lights page 514		SMBPMPRHI page 884	SMBPPRHI page 885					
Area Lights page 516		SMBABM page 885	SMBACM page 886	SMBAMS70A page 886	SMBAMS70AS page 886	SMBASCM page 885	SMBP42ASM page 883	SMBP4ASM page 883
		SMBAMS30PL52	SMBVLA62X62RA page 888					
Backlights page 518		SMBABM page 885	SMBACM page 886	SMBBSSM page 885				
Linear Array Backlights page 519		SMBLAXRA page 887	SMBLAXU page 887					
Linear Array page 520		SMBLASRA page 887	SMBLAXRA page 887	SMBLAXU page 887				
On-Axis Lights page 521		SMBP4OAL100 page 883	SMBP4OAL50 page 884	SMBPPOAL100 page 884	SMBPPOAL50 page 884			
Spot Lights page 522		SMBP42ASM page 883	SMBPPLK					
Spot Lights page 522		SMB30A page 869	SMB30FA.. page 869	SMB30SC page 870	SMBAMS30P page 870	SMBAMS30RA page 871		
Tubular Fluorescent page 525		SMBWFTLR page 887	SMBWFTLS page 886					

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Banner Bracket Selection Chart

LIGHTING & INDICATORS

WLA page 544		SMBBSSM page 885	SMBSRA	SMBWLAMAG				
WL50S page 546		SMB30A page 869	SMB30SC page 870	SMB30FA.. page 869	SMBAMS30RA page 871	SMB30MM page 869	SMBAMS30P page 870	
WL50-2 page 548		SMB30A page 869	SMB30SC page 870	SMB30MM page 869				
Tower Lights page 558		SMB30A page 869	SMB30FA.. page 869	SMB30MM page 869	SMB30RAVK page 870	SMB30SC page 870	SMBAMS30P page 870	SMBAMS30RA page 871
		SMBAMS30RLJ page 888	SMB30Q page 869	SMBAMS30RLS page 888	SMBAMS30R52	SMBAMS30RL52R	SMB30FVK	SMB30C
		SMB30S	SMB30SM					
K50 Housing page 568		SMB30A page 869	SMB30FA.. page 869	SMB30MM page 869	SMB30RAVK page 870	SMB30SC page 870	SMBAMS30P page 870	SMB30Q page 869
		SMBAMS30PL52R	SMBAMS30PL52	SMBAMS30RA page 871	SMBAMS30RLJ page 888	SMBAMS30RLS page 888	SMB30C	SA-K50A18 page 889
		SMBARP…30 page 889	SMBAMS30P page 870	SMB30FVK	SMB30S	SMB30SM		
K30 Housing page 568		SMB22A	SMBAMS22RA	SMBAMS22P	SMB22FVK	SMB30RAVK		
S18L/M18 page 582		SMB18A page 859	SMB18FA.. page 860	SMB18FM page 860	SMB18Q page 860	SMB18SF page 861	SMB18UR page 861	SMB3018SC page 861
		SMB30SK page 862	SMB312PD page 862	SMB46A page 863	SMBAMS18P page 864	SMBC18 page 889	SMBQS18VP6LPQ	SMB18C
		SMB18S						
S22L page 582		SMB22A	SMB22FVK	SMB22RAVK	SMBAMS22P	SMBAMS22RA		
T30 page 588		SMB1815SF page 866	SMB30A page 869	SMB30FA.. page 869	SMB30MM page 869	SMB30Q page 869	SMB30RAVK page 870	SMB30SC page 870
		SMBAMS30P page 870	SMBAMS30RA page 871	SMBAMS30RLJ page 888	SMBAMS30RLS page 888	SMBAMS30PL52R	SMBAMS30PL52	SMB30C
		SMB30S	SMB30SM	SMB30FVK				
T18 page 588		SMB1815SF page 866	SMB18Q page 860	SMB18SF page 861	SMB18UR page 861	SMB3018SC page 861	SMB30SK page 862	SMB312PD page 862
		SMBAMS18P page 864	SMBAMS18RA page 864	SMBT18Y page 867	SMB18C	SMB18S	SMBQS18VP6LPQ	
T8 page 588		SMB8MM page 858	SMBF page 854					
K80 Housing page 568		SMBDX80DIN page 854	SMBAMS80PL52R	SMBAMS80PL52				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Banner Bracket Selection Chart

LIGHTING & INDICATORS								
OTB/LTB/VTB page 528		SMB30A page 869	SMB30FA.. page 869	SMB30MM page 869	SMB30Q page 869	SMB30RAVK page 870	SMB30SC page 870	SMBAMS30P page 870
		SMBAMS30RA page 871	SMBAMS30RLJ page 888	SMBAMS30RLS page 888	SMBAMS30PL52	SMBAMS30PL52R	K50-SA-K50	SMB30C
		SMB30S	SMB30SM	SMBFVR				
PVD page 630		SMBPVA1 page 889	SMBPVA11 page 890	SMBPVA2 page 890	SMBPVA..C page 891	SMBPVA6 page 891	SMBPVA7 page 891	SMBPVA8 page 891
		SMBPVA9 page 892	SMBPVA..A page 890	SMBPVA..AB page 890				
PVL page 632		SMBPVL1 page 892	SMBPVL2 page 893	SMBPVL3 page 893	SMBPVL4 page 892	SMBPVL5 page 892		
PVA page 634		SMBPVA1 page 889	SMBPVA2 page 890	SMBPVA.. page 890	SMBPVA..A page 890	SMBPVA..AB page 890	SMBPVA..C page 891	SMBPVA6 page 891
		SMBPVA7 page 891	SMBPVA8 page 891	SMBPVA9 page 892				

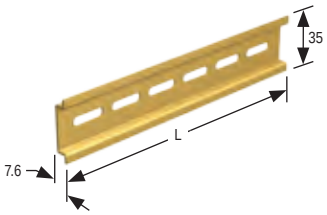
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Banner Bracket Selection Chart

SAFETY							
EZ-SCREEN® 14 & 30 mm Resolution page 686		EZA-MBK-11 page 894	EZA-MBK-12 page 894	EZA-MBK-21 page 895				
EZ-SCREEN® LP 14 & 25 m Resolution page 692		LPA-MBK-11 page 894	LPA-MBK-12 page 894	LPA-MBK-20 page 895	LPA-MBK-135 page 897	LPA-MBK-180 page 897	LPA-MBK-PXXX page 898	LPA-MBK-21 page 895
		LPA-MBK-22 page 898	LPA-MBK-90 page 898					
EZ-SCREEN® Grid page 700		EZA-MBK-1 page 894	EZA-MBK-2 page 894	EZA-MBK-3 page 895	EZA-MBK-9 page 896			
EZ-SCREEN® Point page 701		EZA-MBK-1 page 894	EZA-MBK-2 page 894	EZA-MBK-3 page 895	EZA-MBK-4 page 895	EZA-MBK-5 page 896	EZA-MBK-9 page 896	
EZ-SCREEN® Type 2 30 mm Resolution page 706		USCMB-.. page 900	USMB-1 page 901	USMB-6 page 901	USMB-8 page 901			
AG4 page 710		AG4-MBK1 page 899						
SC26 page 800		DIN-35-.. page 854						
SC22-3 page 804		DIN-35-.. page 854						
Safety Modules page 810		DIN-35-.. page 854						
DUO-TOUCH® SG Run Bars page 832		STBA-RB1-MB1 page 900	STBA-RB1-MB2 page 901	STBA-RB1-MB3 page 901	STBA-RB2-MB1 page 901	STBA-RB2-MB2 page 901	STBA-RB2-MB3 page 901	
30 mm Mount E-Stops page 716		SSA-MBK-EEC1 page 899	SSA-MBK-EEC2 page 899	SSA-MBK-EEC3 page 899				
ED1G Enabling Devices page 754		ED9Z-GH1 page 901						

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DIN-35...



All measurements in mm

Model	Length (L)
DIN-35-70	70
DIN-35-105	105
DIN-35-140	140

Hole center spacing: 35.1
Hole size: 25.4 x 5.3

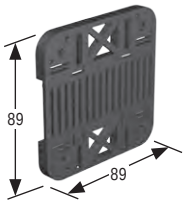
• Available in 70, 105 & 140 mm lengths



Used with

DF-G1
D10
D12
R55F
MINI-ARRAY Controller
High-Res MINI-ARRAY Controller
SC22-3 Controllers
GM Modules
ES Modules
SM Modules
MMD Modules
IM Modules
EM Modules
SSM Modules
UM Modules
Two-Hand Control Modules

SMBDX80DIN



All measurements in mm

NA

• Black reinforced thermoplastic
• Bracket for mounting on 35 mm DIN rail

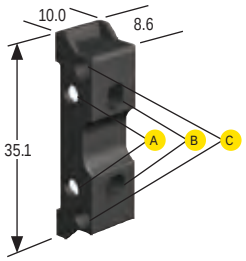


Used with

K80	DX85
EZ-LIGHT K80L	DX81
EZ-LIGHT K80CLR	DX90
EZ-LIGHT SP150	DX91
DX80	

(DIN-35 not included)

SA-DIN-BRACKET*



All measurements in mm

Hole center spacing: A = 16, B = 25.4, C = 15.2
Hole size: A = ø 3.2, B = ø 3.3, C = ø 4.4

• Plastic bracket with mounting screws

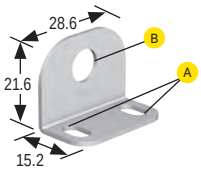
* SA-DIN-BRACKET-10
(Kit of 10 brackets and mounting screws)



Used with

DF-G1
D10

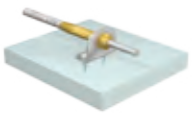
SMBF



All measurements in mm

Hole center spacing: A = 19.1
Hole size: A = 8 x 4.6, B = ø 8.3

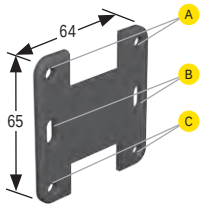
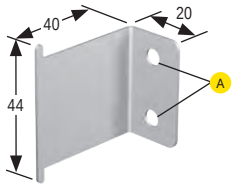
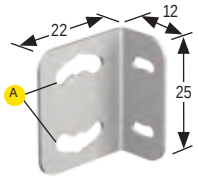
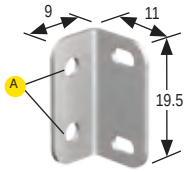
• Right-angle bracket for glass fiber optic with 5/16"-24 threaded tip
• 18-ga. stainless steel



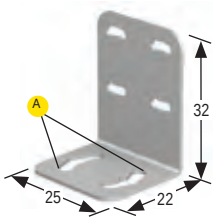
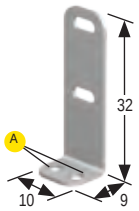
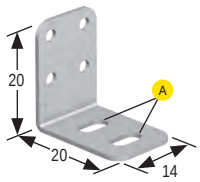
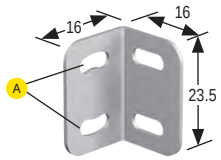
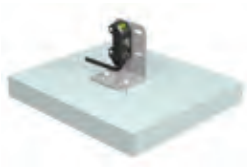
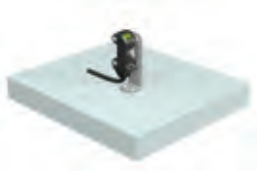
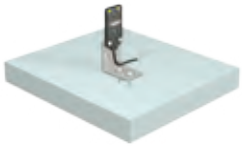
Used with

Glass fiber with
5/16" - 24 threaded tip

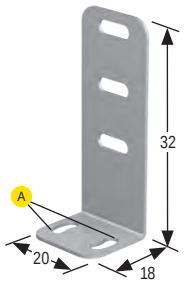
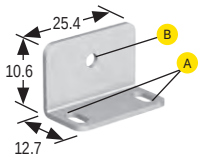
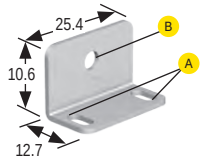
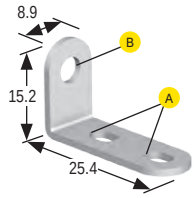
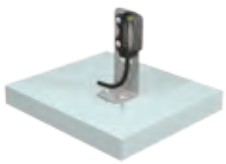
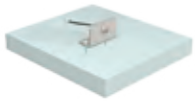
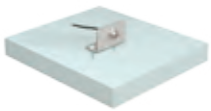
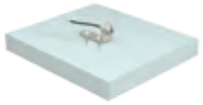
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBR55F01	SMBR55FRA	SMBVS1S	SMBVS1SC
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A, B, C = 50.8, A to B, B to C = 25.3 Hole size: A, C = ø 5.6, B = 11 x 5	Hole center spacing: A = 20 Hole size: A = ø 5.4	Hole center spacing: A = 16.8 Hole size: A = 3.5 x 12.3	Hole center spacing: A = 10.0 Hole size: A = ø 2.8
• Flat-mounting bracket • Eliminates need for DIN rail • Molded PBT polyester • Black reinforced thermoplastic polyester	• Side-mounting bracket • Eliminates need for DIN rail • 19-ga. stainless steel	• Short right-angle bracket • 18-ga. stainless steel	• Short right-angle bracket • 18-ga. stainless steel
			
Used with	Used with	Used with	Used with
R55F DF-G1 D10 D12	R55F DF-G1 D10 D12	VS1	VS1

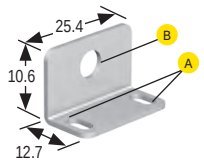
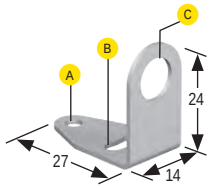
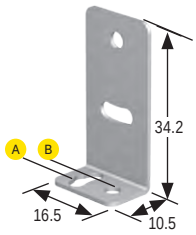
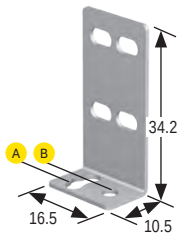
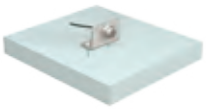
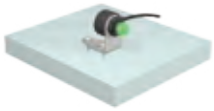
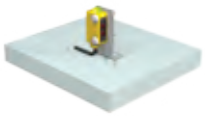
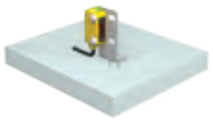
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBVS1T	SMBVS1TC	SMBVS2RA	SMBVS3S
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 16.8 Hole size: A = 3.5 x 12.3	Hole center spacing: A = 5.5 Hole size: A = ø 2.8	Hole center spacing: A = 80. Hole size: A = 3.2 x 6	Hole center spacing: A = 13.5 Hole size: A = 3.2 x 7.7
• Tall right-angle bracket • Stainless steel	• Tall right-angle compact bracket • 300 stainless steel	• Right-angle bracket • Stainless steel	• Right-angle bracket • 300 stainless steel
			
Used with	Used with	Used with	Used with
VS1	VS1	VS2	VS3

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

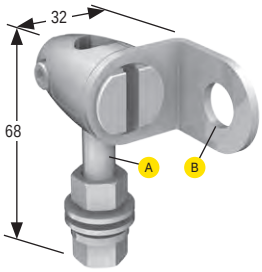
SMBVS3T	SMBFP3	SMBFP4	SMBFP4N
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 13.5 Hole size: A = 3.2 x 7.7	Hole center spacing: A = 19.1 Hole size: A = 6.5 x 3.6, B = ø 3.2	Hole center spacing: A = 19.1 Hole size: A = 6.5 x 3.6, B = ø 4.2	Hole center spacing: A = 12 Hole size: A = 4.8 x 5, B = ø 4.2
• Tall right-angle bracket • 300 stainless steel	• Right-angle bracket for glass fiber optic with 3 mm threaded tip • 18-ga. stainless steel	• Right-angle bracket for plastic fiber optic with 4 mm threaded tip • 18-ga. stainless steel	• Low-profile right-angle bracket for plastic fiber optics with 4 mm threaded tip • 18-ga. stainless steel
			
Used with	Used with	Used with	Used with
VS3	Plastic fiber with M3 tip	Plastic fiber with M4 tip	Plastic fiber with M4 tip

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBFP6	SMB8MM	SMBQ12A	SMBQ12T
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 19.1 Hole size: A = 6.5 x 3.6, B = ø 6.2	Hole center spacing: A to B = 14 Hole size: A = ø 3.5, B = 8.3 x 3.5, C = ø 8.4	Hole center spacing: A to B = 7.6 Hole size: A = 3.5 x 8.1, B = ø 3.2	Hole center spacing: A to B = 7.6 Hole size: A = 3.5 x 8.1, B = ø 3.2
• Right-angle bracket for plastic fiber optics with 6 mm threaded tip • 18-ga. stainless steel	• Right-angle bracket • 300 series stainless steel	• Adjustable right-angle bracket • 20-ga. 300 series stainless steel	• Right-angle bracket • 20-ga. 300 series stainless steel
			
Used with	Used with	Used with	Used with
Plastic fiber with M6 tip	T8 EZ-LIGHT T8L Glass fiber with 5/16" - 24 threaded tip	Q12	Q12

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMB12FA..

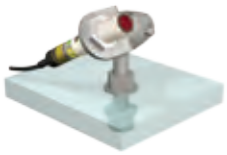


All measurements in mm

Model	Bolt Thread (A)
SMB12FA	3/8 - 16 x 2"
SMB12FAM10	M10 - 1.5 x 50

Hole size: B = ø 12.1

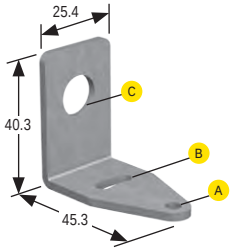
- Swivel bracket with tilt and pan movement for precision adjustment
- Easy sensor mounting to extruded rail T-slots
- Metric and inch size bolts available
- 12 mm sensor mounting hole



Used with

M12
S12

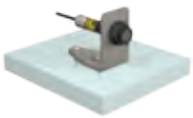
SMB12MM



All measurements in mm

Hole center spacing: A to B = 26
Hole size: A = ø 4.6, B = 12.8 x 4.6, C = ø 12.3

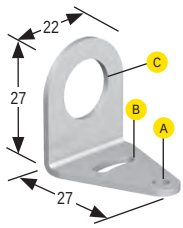
- ±10° of lateral movement
- 12-ga. stainless steel
- Mounting holes for M4 (#6) hardware
- 12 mm sensor mounting hole



Used with

M12
S12

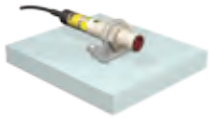
SMBQS12PD



All measurements in mm

Hole center spacing: A to B = 14
Hole size: A = ø 3.5, B = 3.5 x 10.6, C = ø 13

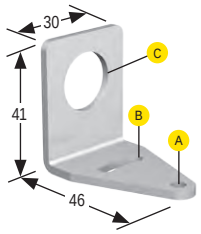
- Right-angle, nose-mount bracket
- 16-ga. 300 series stainless steel



Used with

M12
S12

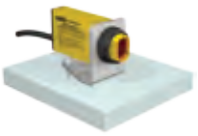
SMB18A



All measurements in mm

Hole center spacing: A to B = 24.2
Hole size: A = ø 4.6, B = 17 x 4.6, C = ø 18.5

- Right-angle mounting bracket with a curved slot for versatile orientation
- 12-ga. stainless steel, 18 mm sensor mounting hole
- Clearance for M4 (#8) hardware



Used with

QS18 MINI-BEAM M18 S18 T18 TM18 S18U	QS18U Q45UR M18C2 Q45UR S18C2 T18U EZ-LIGHT T18 EZ-LIGHT M18

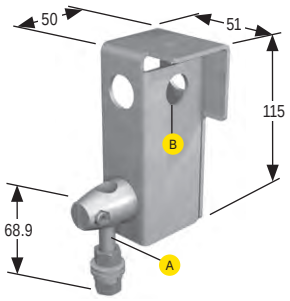


Used with

Q25

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMB18ATFA..



All measurements in mm

Model	Bolt Thread (A)
SMB18AFA	3/8 - 16 x 2″
SMB18AFAM10	M10 - 1.5 x 50

Hole size: B = ø 18.1

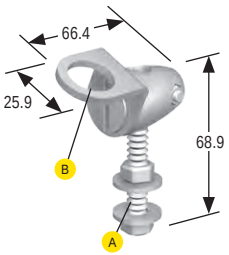
- Protective, swivel bracket with tilt and pan movement for precision adjustment
- Easy sensor mounting to extruded rail T-slots
- Metric and inch size bolts available
- Mounting hole for 18 mm sensors



Used with

QS18 (AC/DC models)
TM18
T18

SMB18FA..

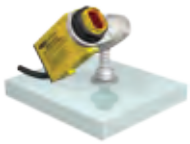


All measurements in mm

Model	Bolt Thread (A)
SMB18AFA	3/8 - 16 x 2″
SMB18AFAM10	M10 - 1.5 x 50

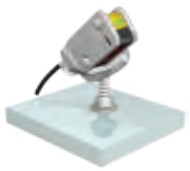
Hole size: B = ø 18.1

- Swivel bracket with tilt and pan movement for precision adjustment
- Easy sensor mounting to extruded rail T-slots
- Metric and inch size bolts available
- 18 mm sensor mounting hole



Used with

QS18 MINI-BEAM S18/M18/T18 S18U TM18 QS18U	Q45UR M18C2 Q45UR S18C2 T18U EZ-LIGHT M18 EZ-LIGHT T18



Used with

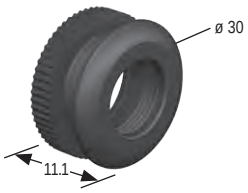
SMBQS18A SMBQS18Y	SMBQS18YL SMB4050YL



Used with

Q25
QS18 (AC/DC models)

SMB18FM



All measurements in mm

N/A

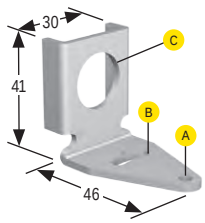
- Two-piece thermoplastic through-mount bracket
- Mounting nut (M22 x 1.5) and outer flange (M22 x 1.5 external, M18 x 1 internal)



Used with

QS18 M18 S18 T18	TM18 S18-2 S18U QS18U

SMB18Q



All measurements in mm

Hole center spacing: A to B = 24.2
Hole size: A = ø 4.6, B = 17 x 4.6, C = ø 19

- Right-angle flanged bracket
- 18 mm sensor mounting hole
- 12-ga. stainless steel



Used with

QS18 MINI-BEAM S18 M18 T18 TM18 S18U	QS18U Q45UR S18C2 Q45UR M18C2 T18U EZ-LIGHT T18 EZ-LIGHT M18

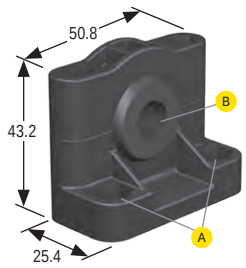


Used with

Q25

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMB1812SF



All measurements in mm

Hole center spacing: A = 36.1
Hole size: A = ø 5, B = ø 12

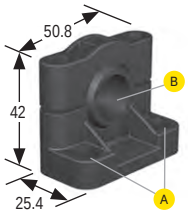
- Swivel bracket with 12 mm mounting hole
- Black reinforced thermoplastic polyester
- Stainless steel mounting and swivel locking hardware included



Used with

M12
S12

SMB18SF



All measurements in mm

Hole center spacing: A = 36
Hole size: A = ø 5.3, B = ø 18

- 18 mm swivel bracket with M18 x 1 internal thread
- Black thermoplastic polyester
- Stainless steel swivel locking hardware included



Used with

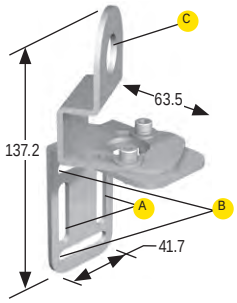
QS18 MINI-BEAM S18 M18 T18 S18U	QS18U Q45UR S18C2 Q45UR M18C2 T18U EZ-LIGHT T18 EZ-LIGHT M18



Used with

Q25

SMB18UR



All measurements in mm

Hole center spacing: A = 25.4, B = 46.7
Hole size: A, B = 6.9 x 32, C = ø 18.3

- 2-piece universal swivel bracket
- 300 series stainless steel
- Stainless steel swivel locking hardware included
- Mounting hole for 18 mm sensor



Used with

QS18* MINI-BEAM S18 M18 T18 TM18 S18U	QS18U* Q45UR S18C2 Q45UR M18C2 T18U EZ-LIGHT T18 EZ-LIGHT M18

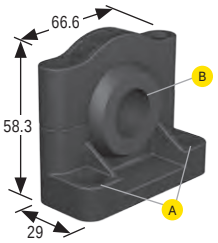


Used with

Q25

* Contact factory to verify compatibility with integral QD models.

SMB3018SC



All measurements in mm

Hole center spacing: A = 50.8
Hole size: A = ø 7, B = ø 18

- 18 mm swivel side or barrel-mount bracket
- Black reinforced thermoplastic polyester
- Stainless steel swivel locking hardware included



Used with

M18/S18/T18 S18U Q45UR S18C2	Q45UR M18C2 T18U EZ-LIGHT T18



Used with

QS18 MINI-BEAM	QM42/QMT42 QS18U

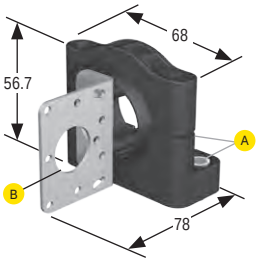


Used with

Q25

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMB30SK



All measurements in mm

Hole center spacing: A = 50.8
Hole size: A = ø 7, B = ø 18

- Flat-mount swivel bracket with extended range of motion
- Black reinforced thermoplastic polyester and 316 stainless steel
- Stainless steel swivel locking hardware included



Used with

QS18 MINI-BEAM S18/M18/T18 T18U S18U	QS18U Q45UR S18C2 Q45UR M18C2 EZ-LIGHT T18 EZ-LIGHT M18



Used with

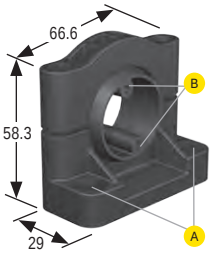
Q25



Used with

QM42/QMT42

SMB30SUS



All measurements in mm

Hole center spacing: A = 50.8, B = 24.1
Hole size: A = ø 7, B = ø 7.6

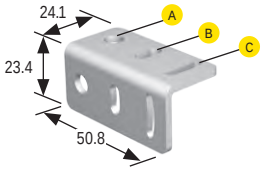
- Side-mount swivel bracket with extended range of motion
- Black reinforced thermoplastic polyester
- Stainless steel swivel locking hardware included



Used with

QS18
MINI-BEAM
QM42/QMT42
QS18U

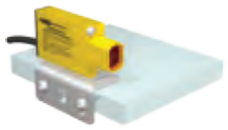
SMB312B



All measurements in mm

Hole center spacing: A to B = 17.3, B to C = 17.7, A to C = 35
Hole size: A = ø 6.9, B = 4.3 x 10.5, C = 3.1 x 15.2

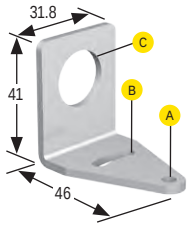
- Right-angle
- Stainless steel base mounting bracket
- Includes mounting foot



Used with

MINI-BEAM

SMB312PD

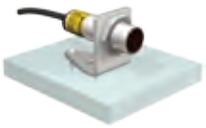


All measurements in mm

Hole center spacing: A to B = 24.2
Hole size: A = ø 4.6, B = 17 x 4.6, C = ø 18.5

- Right-angle mounting bracket with a curved slot for versatile orientation
- 12-ga. stainless steel, 18 mm sensor mounting hole
- Clearance for M4 (#8) hardware

NOTE: Not for use with plastic fiber optic sensors



Used with

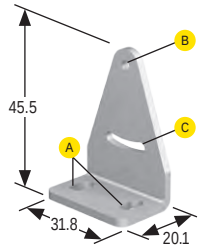
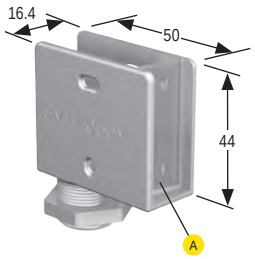
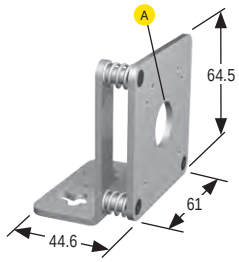
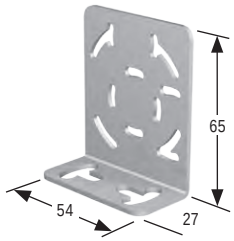
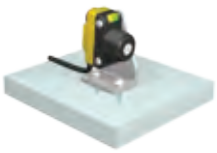
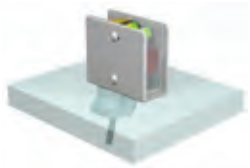
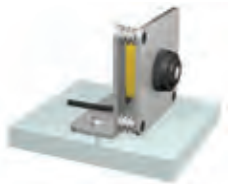
QS18 MINI-BEAM S18 M18 T18 TM18 S18U	QS18U Q45UR S18C2 Q45UR M18C2 T18U EZ-LIGHT T18 EZ-LIGHT M18



Used with

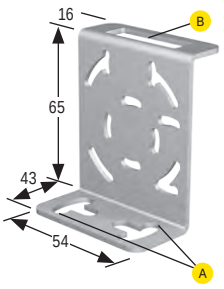
Q25

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMB312S	SMB4050YL	SMB46A	SMB46L
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 20.3, B to C = 5.1 Hole size: A = 4.3 x 7.5, B = ø 3, C = 3 x 15.3	A = ø 15.3	A = ø 18.3	
• Stainless steel 2-axis side-mounting bracket	• Heavy-duty die-cast bracket for industrial protection • Replaceable window for use with some sensor models • M18 vertical mounting option • Nut and lock washer included	• Stainless steel • Adjustable mounting	• 14-ga. 316 stainless steel
			
Used with	Used with	Used with	Used with
QS18 MINI-BEAM QS18U	QS18 DC Models (except AF)	QS18 S18 PICODOT	QS18 S18 QS30 QM42/QM42T MINI-BEAM PICODOT

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMB46S



All measurements in mm

Hole center spacing: A = 16
Hole size: A = 16.5 x 18.7, B = 34 x 10

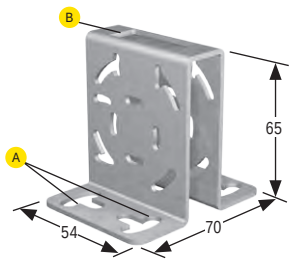
- Right-angle
- S bracket
- 14-ga. 316 stainless steel



Used with

QS18 MINI-BEAM QS30	PicoDot QM42/QMT42 QS18U

SMB46U



All measurements in mm

Hole center spacing: A = 16
Hole size: A = 16.5 x 18.7, B = 34 x 13

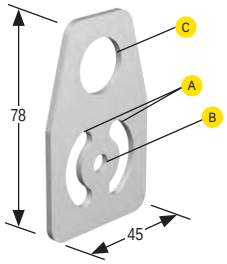
- Right-angle
- U bracket for sensor protection
- 14-ga. 316 stainless steel



Used with

QS18 MINI-BEAM PicoDot	QM42/QMT42 QS18U

SMBAMS18P



All measurements in mm

Hole center spacing: A = 26, A to B = 13
Hole size: A = 26.8 x 7, B = ø 6.5, C = ø 19

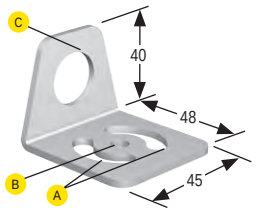
- Flat SMBAMS series bracket with 18 mm hole for mounting sensors
- Articulation slots for 90+° rotation
- 12-ga. (2.6 mm) cold-rolled steel



Used with

QS18 MINI-BEAM S18 M18 T18 TM18 S18U	T18U Q45UR S18C2 Q45UR M18C2 QS18U EZ-LIGHT T18 EZ-LIGHT M18

SMBAMS18RA



All measurements in mm

Hole center spacing: A = 26, A to B = 13
Hole size: A = 26.8 x 7, B = ø 6.5, C = ø 19

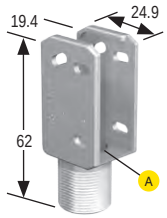
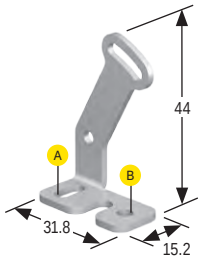
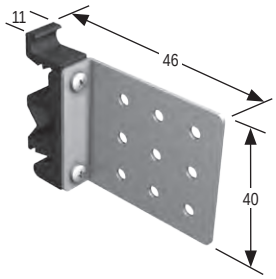
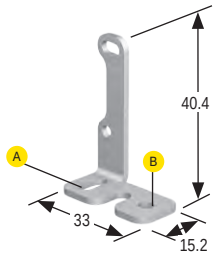
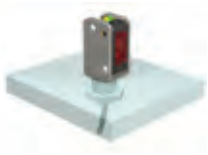
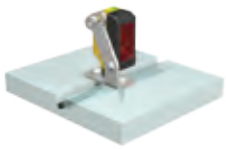
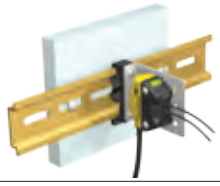
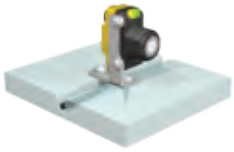
- Right-angle SMBAMS series bracket with 18 mm hole for mounting sensors
- Articulation slots for 90+° rotation
- 12-ga. (2.6 mm) cold-rolled steel



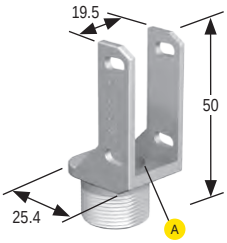
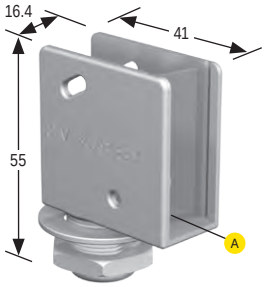
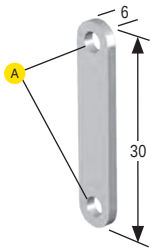
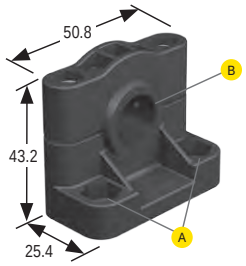
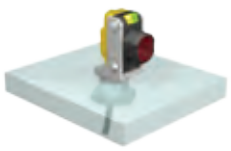
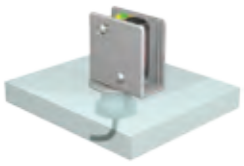
Used with

QS18 MINI-BEAM S18 M18 T18 TM18 S18U	T18U QS18U Q45UR S18C2 Q45UR M18C2 EZ-LIGHT T18 EZ-LIGHT M18

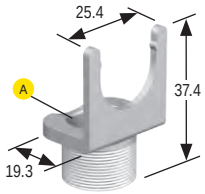
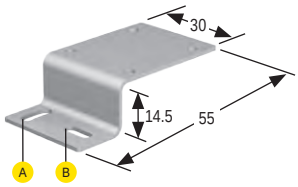
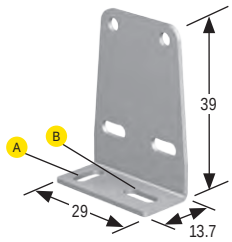
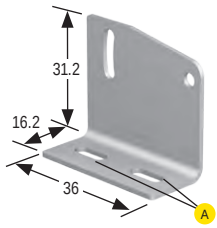
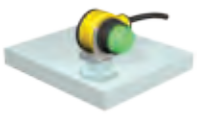
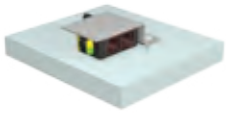
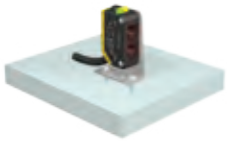
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBQS18A	SMBQS18AF	SMBQS18DIN	SMBQS18RA
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole size: A = ø 15.3	Hole center spacing: A to B = 20.3 Hole size: A = 4.3 x 9.4, B = ø 4.3	N/A	Hole center spacing: A to B = 20.3 Hole size: A = 4.3 x 9.4, B = ø 4.3
• Wrap-around protection bracket • Base fits 18 mm threaded hole • Metal hex nut, lock washer and grommet included • Mounting holes specially designed for QS18AF sensors	• Right-angle mounting bracket • 14-ga. 304 stainless steel	• Right-angle bracket assembly for mounting on 35 mm DIN rail • 300 series stainless steel and glass filled nylon; zinc-plated screws	• Right-angle mounting bracket • 14-ga. 304 stainless steel
			
Used with	Used with	Used with	Used with
QS18 (DC only) QS18U QS18AF	QS18AF (Only)	QS18 (shown with DIN-35..)	QS18 (except QS18AF) QS18U

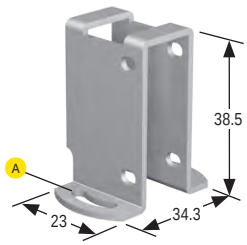
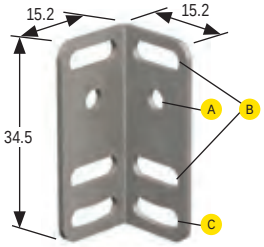
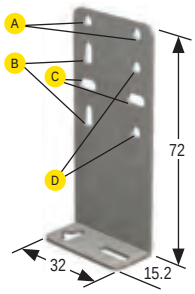
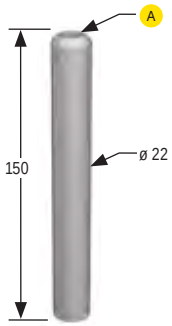
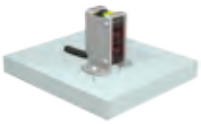
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBQS18Y	SMBQS18YL	SMH241F	SMB1815SF
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole size: A = ø 15.3	Hole size: A = ø 15.3	Hole center spacing: A = 24 Hole size: A = ø 2.5	Hole center spacing: A = 36 Hole size: A = ø 5, B = ø 15
• Die-cast bracket for 18 mm holes • Includes metal hex nut and lock washer • Allows ± 8° for cabled sensors	• Heavy-duty die-cast bracket for industrial protection • Replaceable window • M18 vertical mount-option • Nut and lock washer included	• Nut strap replaces two M3 mounting nuts and washers • 16-ga. stainless steel	• Swivel with set screws for mounting sensors by the cable hub • Black reinforced thermoplastic polyester • Stainless steel swivel locking hardware and hex wrench included
			
Used with	Used with	Used with	Used with
QS18 (DC only) QS18U	QS18AF (Class 2 Laser Only)	QS18 MINI-BEAM QM42/QMT42 QS18U	T18 T18U T30 T30U EZ-LIGHT T18 EZ-LIGHT T30

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

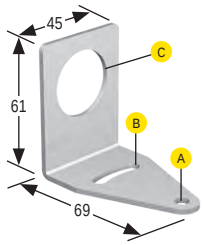
SMBT18Y	SMBQ20H	SMBQ20L	SMBQ20LV
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole size: A = ø 15.3	Hole center spacing: A to B = 20 Hole size: A = 2.8 x 9.3, B = 8.4 x 4.5	Hole center spacing: A to B = 20 Hole size: A = 2.8 x 9.3, B = 8.4 x 4.5	Hole center spacing: A = 12 Hole size: A = 3 x 9.4
• Die-cast bracket for 18 mm holes • Includes metal hex nut • For use with Euro-style QD connectors and cabled versions	• Sensor horizontal flange mount • ± 10° swivel • Stainless steel	• Right-angle bracket • ± 5° tip, ± 5° swivel • Stainless steel	• Right-angle bracket • ±10° tip • Stainless steel
			
Used with	Used with	Used with	Used with
T18 TM18 T18U EZ-LIGHT T18	Q20	Q20	Q20

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBQ20U	SMBLSTDLQ26	SMBLSTQ26	SMBQMH26-SS-150
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 26.5 Hole size: A = 3 x 12.6	Hole center spacing: B = 10 Hole size: A = ø 3.5, B = 10.5 x 3.5, C = 10.5 x 3.5	Hole center spacing: A, B, C, D = 20 Hole size: A, D = ø 3.5, B, C = ø 3.5	Hole center spacing: NA Hole size: A = ø 12
• Protective bracket • ±22.5° swivel • Stainless steel	• Adjustable right-angle metal bracket • 304 stainless steel	• Right-angle bracket • 304 stainless steel	• Smooth surface for easy cleaning • Setscrew adjustment of sensor • 316L stainless steel
			
Used with	Used with	Used with	Used with
Q20	Q26 & QM26	Q26 & QM26	QMH26

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

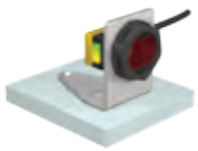
SMB30A



All measurements in mm

Hole center spacing: A to B = 40
Hole size: A = ø 6.3, B = 27.1 x 6.3, C = ø 30.5

- Right-angle bracket with curved slot for versatile orientation
- Clearance for M6 (¼") hardware
- Mounting hole for 30 mm sensor
- 12-ga. stainless steel



Used with

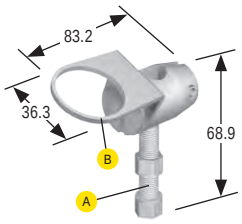
QS30 SM30/SMI30 S30	T30 T30U EZ-LIGHT T30



Used with

Q40 Q45 OMNI-BEAM OTB/LTB VTB STB Q45U	Q45UR QT50U QT50R EZ-LIGHT K50L EZ-LIGHT TL50 EZ-LIGHT CL50 WL50 Work Lights

SMB30FA..

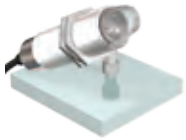


All measurements in mm

Model	Bolt Thread (A)
SMB18AFA	3/8 - 16 x 2"
SMB18AFAM10	M10 - 1.5 x 50

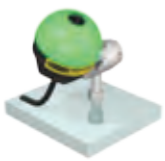
Hole size: B = ø 30.1

- Swivel bracket with tilt and pan movement for precision adjustment
- Mounting hole for 30 mm sensor
- Metric and inch size bolt available
- Easy sensor mounting to extruded rail T-slot



Used with

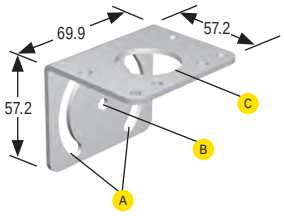
QS30 SM30/SMI30 S30	T30 T30U EZ-LIGHT T30



Used with

Q40 Q45 Q45U Q45UR QT50U OMNI-BEAM OTB/LTB	VTB STB QT50R EZ-LIGHT K50L EZ-LIGHT TL50 EZ-LIGHT CL50 WL50 Work Lights

SMB30MM



All measurements in mm

Hole center spacing: A = 51, A to B = 25.4
Hole size: A = 42.6 x 7, B = ø 6.4, C = ø 30.1

- 12-ga. stainless steel bracket with curved mounting slots for versatility and orientation
- Clearance for M6 (¼") hardware
- Mounting hole for 30 mm sensor



Used with

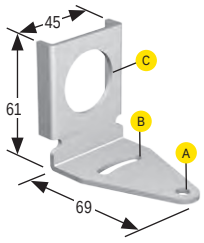
QS30 S30 SM30/SMI30	EZ-LIGHT T30 T30 T30U



Used with

Q40 Q45 OMNI-BEAM OTB/LTB VTB STB QT50U	Q45U Q45UR QT50R EZ-LIGHT K50L EZ-LIGHT TL50 EZ-LIGHT CL50 WL50 Work Lights

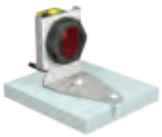
SMB30Q



All measurements in mm

Hole center spacing: A to B = 40
Hole size: A = ø 6.3, B = 27.1 x 6.3, C = ø 30.7

- Right-angle flanged mounting bracket with curved slot for versatile orientation
- 12-ga. stainless steel
- Mounting hole for 30 mm sensor



Used with

QS30 SM30/SMI30 S30	T30 EZ-LIGHT T30

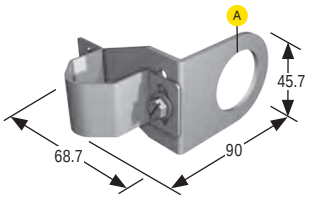


Used with

Q40 Q45 OMNI-BEAM OTB/LTB VTB	STB Q45U Q45UR EZ-LIGHT K50L WL50 Work Lights

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMB30RAVK



All measurements in mm

Hole size: A = ø 30.5

- V-clamp, right-angle bracket and fasteners for mounting sensors to pipe or extrusions
- Clamp accommodates 28 mm dia. tubing or 1" square extrusions
- 30 mm hole for mounting sensors



Used with

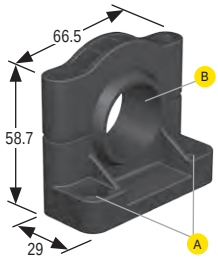
QS30 SM30/SMI30 S30	T30 T30U EZ-LIGHT T30



Used with

Q40 Q45 Q45U Q45UR QT50U OMNI-BEAM OTB/LTB	VTB STB K50 EZ-LIGHT K50L EZ-LIGHT TL50 EZ-LIGHT CL50 WL50 Work Lights

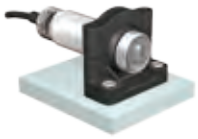
SMB30SC



All measurements in mm

Hole center spacing: A = 50.8
Hole size: A = ø 7, B = ø 30

- Swivel bracket with 30 mm mounting hole for sensor
- Black reinforced thermoplastic polyester
- Stainless steel mounting and swivel locking hardware included



Used with

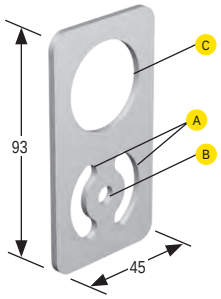
QS30 SM30/SMI30 S30	T30 T30U EZ-LIGHT T30



Used with

Q40 Q45 OMNI-BEAM OTB/LTB VTB STB QT50U	Q45U Q45UR QT50R K50 EZ-LIGHT K50 EZ-LIGHT TL50 EZ-LIGHT CL50 WL50 Work Lights

SMBAMS30P



All measurements in mm

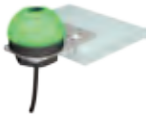
Hole center spacing: A = 26, A to B = 13
Hole size: A = 26.8 x 7, B = ø 6.5, C = ø 31

- Flat SMBAMS series bracket with 30 mm hole for mounting sensors
- Articulation slots for 90+° rotation
- 12-ga. (2.6 mm) cold-rolled steel



Used with

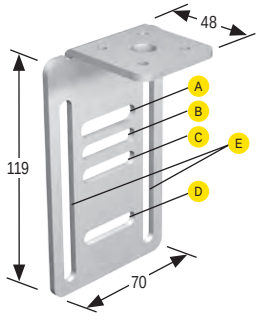
QS30 S30 SM30/SMI30	T30 T30U EZ-LIGHT T30



Used with

Q40 Q45 OMNI-BEAM OTB/LTB VTB STB QT50R	QT50U Q45U Q45UR EZ-LIGHT K50L EZ-LIGHT TL50 EZ-LIGHT CL50 WL50 Work Lights

SMBAMSRAB



All measurements in mm

Hole center spacing: A to B = 12, B to C = 11, A to C = 23, A to D = 55, E to E = 50.8
Hole size: A, B, C, D = 6.9 x 32, E = 6.9 x 89.4

- 10-ga. (3.4 mm) cold-rolled steel with zinc finish
- Retrofit WORLD-BEAM QS30 in place of MULTI-BEAM, MAXI-BEAM, Q45, OMNI-BEAM and VALU-BEAM sensors



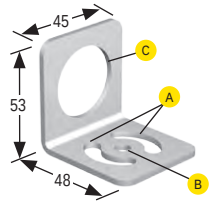
Used with

QS30*

* Requires a SMBAMS30RA bracket (sold separately)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

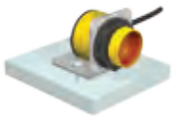
SMBAMS30RA



All measurements in mm

Hole center spacing: A = 26, A to B = 13
Hole size: A = 26.8 x 7, B = ø 6.5, C = ø 31

- Right-angle SMBAMS series bracket with 30 mm hole for mounting sensors
- Articulation slots for 90+° rotation
- 12-ga. (2.6 mm) cold-rolled steel



Used with

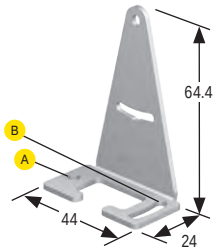
QS30 S30 SM30/SMI30	T30 T30U EZ-LIGHT T30



Used with

Q40 Q45 OMNI-BEAM OTB/LTB VTB STB Q45U	Q45UR QT50U QT50R K50 EZ-LIGHT K50L EZ-LIGHT TL50 EZ-LIGHT CL50 WL50 Work Lights

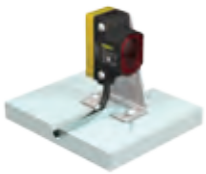
SMBQS30L



All measurements in mm

Hole center spacing: A to B = 35
Hole size: A = ø 4.3, B = 4.25 x 16.3

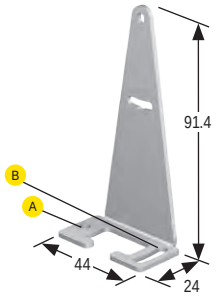
- Right-angle bracket for cable sensor models
- Clearance for M4 (#8) hardware
- ± 12° tilt adjustment
- 14-ga. stainless steel



Used with

QS30

SMBQS30LT



All measurements in mm

Hole center spacing: A to B = 35
Hole size: A = ø 4.3, B = 4.25 x 16.3

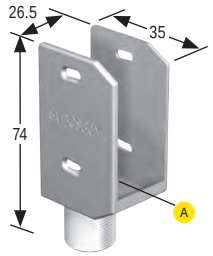
- Tall right-angle bracket for QD models
- ± 8° tilt adjustment
- 14-ga. stainless steel



Used with

QS30 with integral QDs

SMBQS30Y



All measurements in mm

Hole size: A = ø 15.3

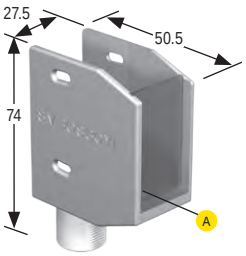
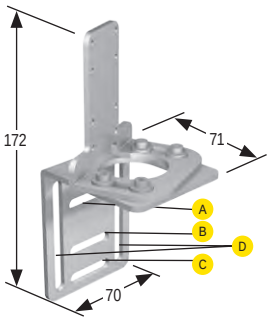
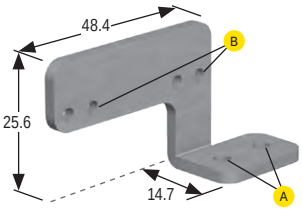
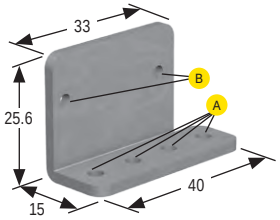
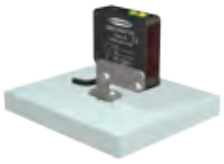
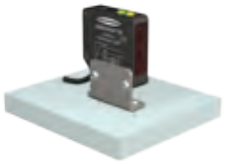
- Heavy-duty die-cast bracket
- M18 vertical mount option
- ± 8° tilt adjustment with cabled units
- Includes nuts and lock washer



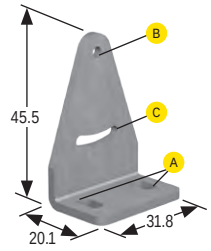
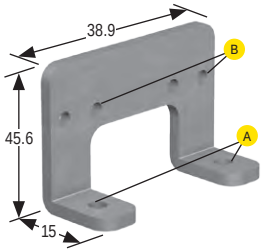
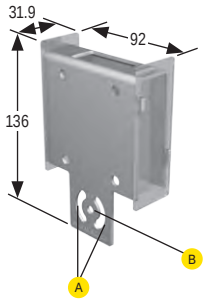
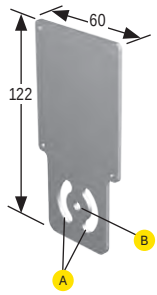
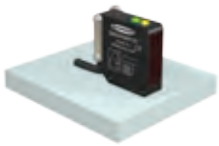
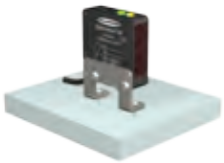
Used with

QS30 (DC only)

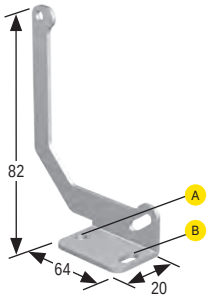
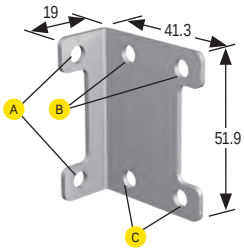
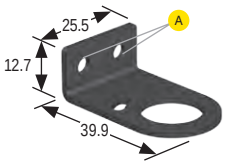
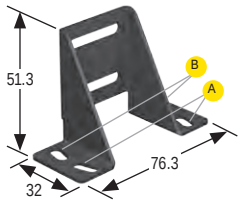
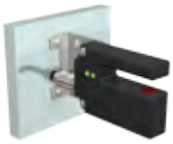
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBQS30YL	SMB30UR	SMB42F	SMB42L
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole size: A = ø 15.3	Hole center spacing: A to B = 31.8, B to C = 19, A to C = 50.8, D = 50.8 Hole size: A, B, C = 6.9 x 32, D = 73 x 6.9	Hole center spacing: A = 10, B = 25.4 Hole size: A = ø 3.4, B = ø 2.5	Hole center spacing: A = 10, B = 25.4 Hole size: A = ø 3.4, B = ø 2.5
• Heavy-duty die-cast bracket designed for industrial protection • Replaceable window • M18 vertical mount option • Includes nuts and lock washer	• 2-piece universal swivel bracket for limit-switch style sensors • 300 series stainless steel • Stainless steel swivel locking hardware included	• 13-ga. stainless steel • Hardware included	• 13-ga. stainless steel • Hardware included
			
Used with	Used with	Used with	Used with
QS30 (DC only)	Q45 OMNI-BEAM Q45U Q45UR	QM42/QMT42	QM42/QMT42

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

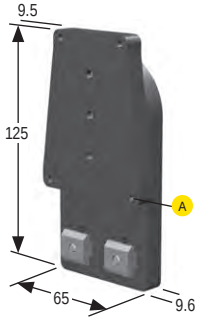
SMB42T	SMB42U	SMBAMSQ60IP	SMBAMSQ60P
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 20.3, B to C = 5.1 Hole size: A = 4.3 x 7.5, B = ø 3, C = 3 x 15.3	Hole center spacing: A = 30, B = 25.4 Hole size: A = ø 3.4, B = ø 2.5	Hole center spacing: A = 26, A to B = 13 Hole size: A = 26.8 x 7, B = ø 6.5	Hole center spacing: A = 26, B = 13 Hole size: A = 26.8 x 7, B = ø 6.5
• Stainless steel 2-axis side-mounting bracket • Nut strap included for replacing two M3 mounting nuts	• 13-ga. stainless steel • Hardware included	• Industrial protection SMBAMS series bracket for Q60 with replaceable window • Articulation slots for 90+° rotation • 12-ga. (2.6 mm) 300 series stainless steel	• Flat SMBAMS series bracket for mounting Q60 • Articulation slots for 90+° rotation • 12-ga. 300 series stainless steel
			
Used with	Used with	Used with	Used with
QM42/QMT42	QM42/QMT42	Q60	Q60

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBQ60	SMBSL	SMBLX	SMBLXR
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A to B = 24.1 Hole size: A = ø 4.5, B = 8.4 x 4.5	Hole center spacing: A = 40, B, C = 21.6, B to C = 39.9 Hole size: A, B, C = ø 5.5	Hole center spacing: A = 12.7 Hole size: A = ø 4.3	Hole center spacing: A, B = 63.5, A to B = 10.2 Hole size: A, B = 5.2 x 11.6
• Right-angle bracket • 14-ga. 304 stainless steel	• Right-angle bracket • 304 stainless steel • Hardware included	• End-cap brackets; set of 2 • Zinc-plated cold-rolled steel	• Back-mount bracket for secure one-end mounting • Zinc-plated cold-rolled steel
			
Used with	Used with	Used with	Used with
Q60	SL10 SL30	LX	LX

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBLH1



All measurements in mm

Hole size: A = M4

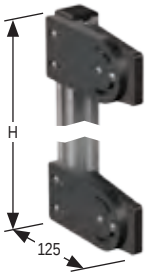
- Main mounting bracket for LH sensor
- T-slot or "bolt-on" bracket for mounting one sensor
- Anodized Aluminum



Used with

LH

SMBLH..



All measurements in mm

Model	Height (H)	Used with
SMBLH30	208	LH30
SMBLH80	358	LH80
SMBLH150	608	LH150

Hole size: A = M4

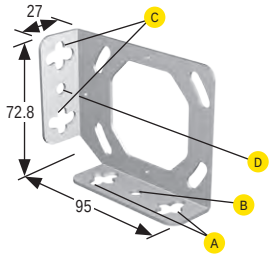
- LH series adjustable bracket
- Brackets for thickness and displacement measurement
- Anodized Aluminum



Used with

LH

SMBLG



All measurements in mm

Hole center spacing: A = 56, A to B = 20, C = 44.5, C to D = 14
Hole size: A = 19.1 x 14.2, B = ø 6.3, C = 19.3 x 15.3, D = ø 6.3

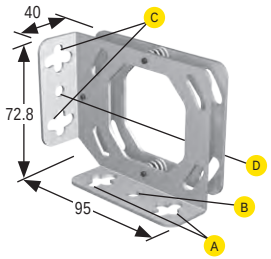
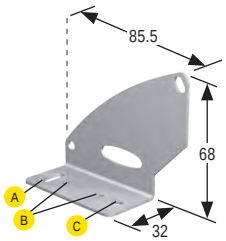
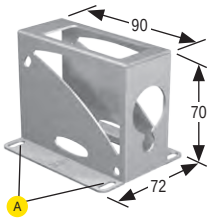
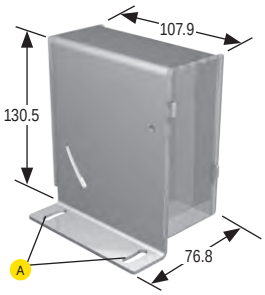
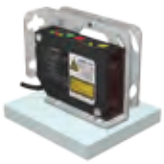
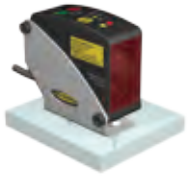
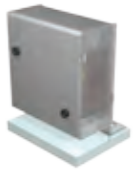
- LG series sensor mounting bracket
- 304 stainless steel



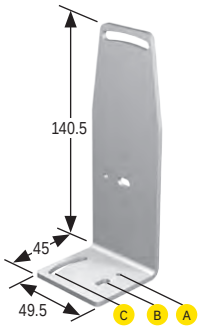
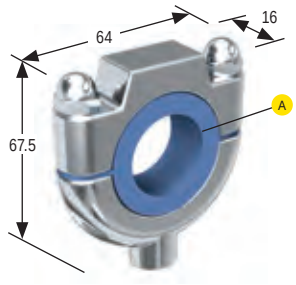
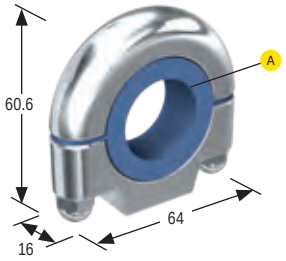
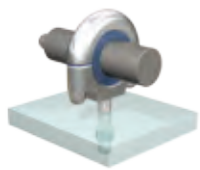
Used with

LG5
LG10

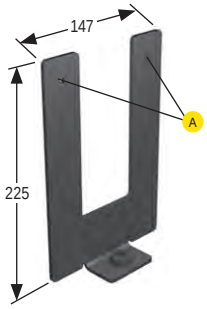
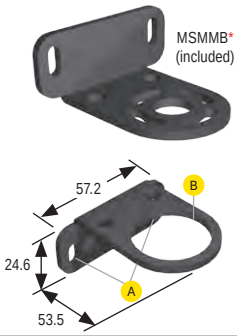
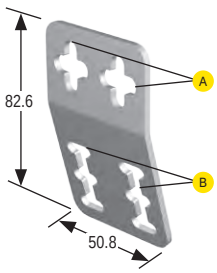
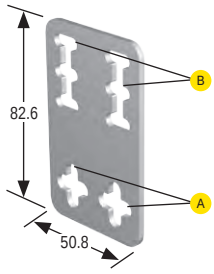
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBLGA	SMBLT31	SMBLT32	SMBLT3IP
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 56, A to B = 20, C = 44.5, C to D = 14 Hole size: A = 19.1 x 14.2, B = ø 6.3, C = 19.3 x 15.3, D = ø 6.3	Hole center spacing: A to C = 47.5, B to B = 24.1 Hole size: A = 13.2 x 5, B = ø 4, C = ø 5	Hole center spacing: A = 80 Hole size: A = 5 x 12	Hole center spacing: A = 82.5 Hole size: A = 6 x 20.5
• LG series adjustable bracket assembly • Precision adjustment screws • 304 stainless steel	• Right-angle bracket • 300 stainless steel	• Full protection bracket • 300 stainless steel • Mounting hardware included	• Protective bracket with replaceable window • Stainless steel construction • Includes replacement windows
			
Used with	Used with	Used with	Used with
LG5 LG10	LT3	LT3	LT3

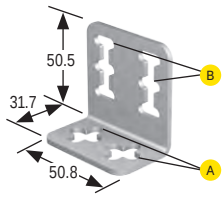
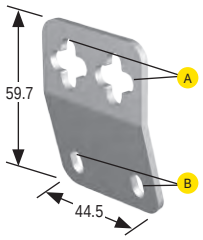
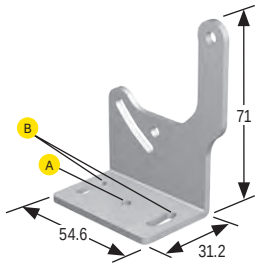
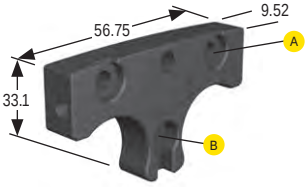
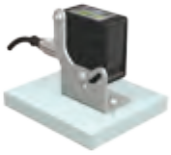
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBLT7	SMBLT7F	SMBM25A	SMBM25B
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A to C = 31.8 Hole size: A = ø 3.1, B = 5 x 9, C = 5.2 x 28	N/A	Hole size: A = ø 25.4	Hole size: A = ø 25.4
• Right-angle bracket • 300 stainless steel • Fine-adjust accessory available (model SMBLT7F)	• Fine-adjust accessory for bracket SMBLT7 • Mounting hardware included • SMBLT7 required (sold separately) • Cold-rolled steel	• Top mount swivel bracket • Stainless steel with rounded edges for cleanliness in demanding environments • Non-metallic FDA compliant bushing for acoustically isolating M25U sensors • M10 x 1.5 mount on opposite side of clamping nuts	• Bottom mount swivel bracket • Stainless steel with rounded edges for cleanliness in demanding environments • Non-metallic FDA compliant bushing for acoustically isolating M25U sensors • M10 x 1.5 mount on same side as clamping nuts
			
Used with	Used with	Used with	Used with
LT7	LT7* * Shown mounted on SMBLT7 (sold separately)	M25U	M25U

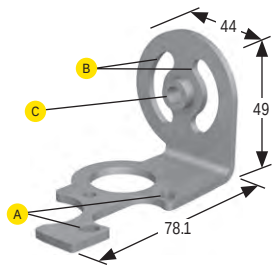
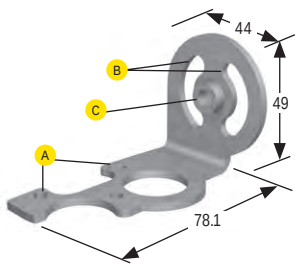
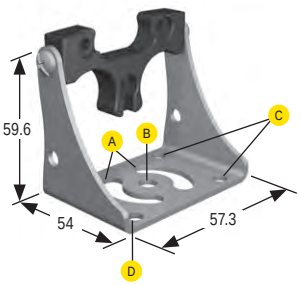
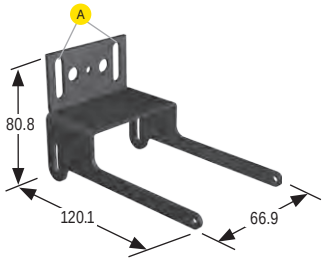
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBLBCZB	MSMB-3	SMB55A	SMB55F
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 107 Hole size: A = ø 5.2	Hole center spacing: A = 44.5 Hole size: A = 10.2 x 4.8, B = ø 30.5	Hole center spacing: A = 24.1, B = 27.9 Hole size: A = 12.7 x 11.4, B = 24.8 x 7.6	Hole center spacing: A = 24.1, B = 27.9 Hole size: A = 12.7 x 11.4, B = 24.8 x 7.6
• U-shaped bracket for mounting EZ-ARRAY emitter/receiver 67 mm apart • 8-ga. (4 mm) cold-rolled steel, black zinc plated	• Two-bracket replacement kit for emitter/receiver • 11-ga. cold-rolled steel with black corrosion-resistant zinc chromate finish * Includes 1 bracket from model MSMMB (see page 903 for dimensions).	• 15° offset bracket • 12-ga. stainless steel	• Flat-mount bracket • 12-ga. stainless steel
			
Used with	Used with	Used with	Used with
EZ-ARRAY	High-Resolution MINI-ARRAY MINI-ARRAY	R58E/R58A QL56	R58E/R58A QL56

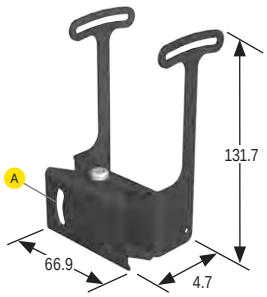
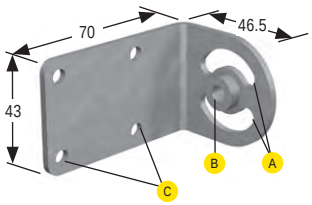
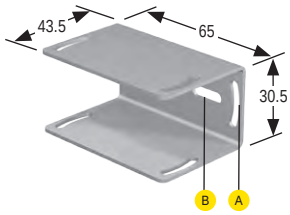
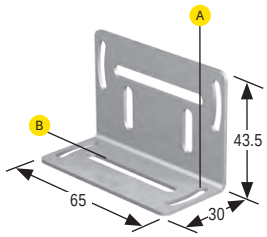
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMB55RA	SMB55S	SMBQC50	SMBIVUB
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 24.1, B = 27.9 Hole size: A = 12.7 x 11.4, B = 24.8 x 7.6	Hole center spacing: A = 30.5, B = 28 Hole size: A = 12.7 x 11.4, B = 5.2 x 8.9	Hole center spacing: A to B = 18, B to B = 36 Hole size: A = ø 4, B = 4 x 13.3	Hole center spacing: A = 35, A to B = 18 Hole size: A, B = ø 4.4
• Right-angle bracket • 12-ga. stainless steel	• 15° offset bracket • 12-ga. stainless steel	• Multidirectional stainless steel right-angle bracket • Variety of mounting options	• Bottom mounting bracket • Black anodized aluminum • Hardware included
			
Used with	Used with	Used with	Used with
R58E/R58A QL56	R58E/R58A QL56	QC50 QCX50	iVu TG
			NOTE: Shown with optional SMBPPK6 mounting kit (see page 954).

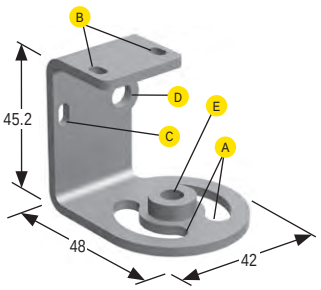
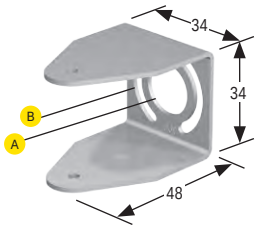
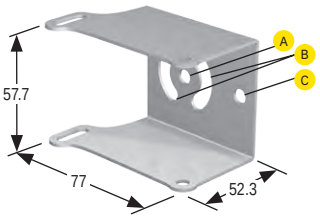
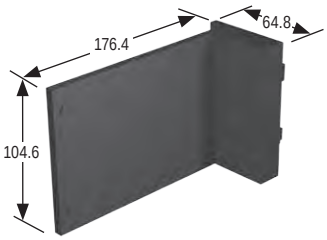
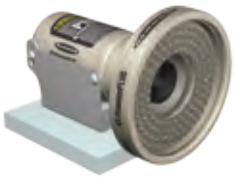
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBIVURAL	SMBIVURAR	SMBIVUU	SMBP4RAB
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 36.4, B = 26 Hole size: A = 4.4 x 6.4, B = 7 x 26, C = 1/4-20	Hole center spacing: A = 36.4, B = 26 Hole size: A = 4.4 x 6.4, B = 7 x 26, C = 1/4-20	Hole center spacing: A = 26, C = 30, C to D = 42 Hole size: A = 6.5 x 3.6, B = ø 6.6, C, D = 5.4	Hole center spacing: A = 47 Hole size: A = 3.3 x 19.1
• Right-angle bracket for mounting sensor from the left • 12-ga. stainless steel • Hardware included	• Right-angle bracket for mounting sensor from right • 12-ga. stainless steel • Hardware included	• U-shaped swivel bracket kit • 14-ga. stainless steel • Hardware included	• Heavy-duty, black corrosion-resistant zinc finish • 8° of rotation on image-axis • Hardware included
			
Used with	Used with	Used with	Used with
iVu iVu Plus	iVu iVu Plus	iVu iVu Plus	*P4* (right-angle)

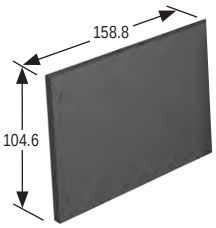
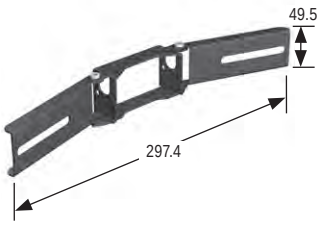
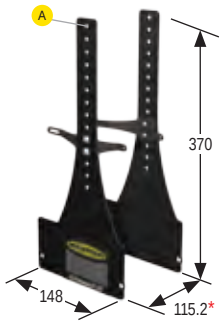
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBP4RAS	SMBP4SRAF	SMBPPLU	SMBPPRA
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 43.5 Hole size: A = 6.8 x 2.5	Hole center spacing: A to B = 12.5, C = 36 Hole size: A = 7 x 26, B = ø 8 (1/4-20), C = ø 5.5	Hole center spacing: A = 58.5, B = 30 Hole Size: A = 18.7 x 3.4, B = 14.3 x 4.4	Hole center spacing: A = 58.5 Hole Size: A = 18.7 x 3.4, B = 44.5 x 4.4
• Right-angle swivel bracket • 70° rotation on image's x-axis and 20° on the y-axis • Black corrosion-resistant zinc finish • Hardware included	• Right-angle, stainless steel bracket • Stainless steel hardware included	• Highly stable U-Shaped bracket • Bright corrosion-resistant finish • Hardware included	• Right-angle bracket with single-side mounting for difficult-to-access sites • Bright corrosion-resistant finish • Hardware included
			
Used with	Used with	Used with	Used with
P4 (right-angle)	*P4* (sealed)	*Presence*PLUS *Pro* Camera	*Presence*PLUS *Pro* Camera

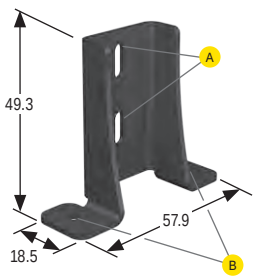
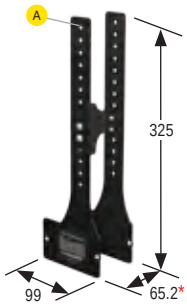
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBPPROMRA	SMBPPU	SMBPPSU	SMBPPDE
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 26, B = 20, C to D = 20 Hole Size: A = 7 x 26, B = 3.6 x 5.6, C = 3.6 x 6.6, D = ø 6.8, E = ø 8 (1/4-20)	Hole center spacing: B = 25 Hole size: A = ø 16, B = 3.3 x 25	Hole center spacing: A to C = 31.8, B = 25 Hole size: A = ø 6.5, B = 20.2 x 7, C = ø 6.5	N/A
• Right-angle bracket • 316 stainless steel • Hardware included	• U-Shaped swivel bracket for variable rotation • Bright corrosion-resistant finish • Hardware included	• 316 stainless steel • 10° of rotation on image's y-axis • Hardware included	• DIN-rail edge mounting bracket to save linear track space • Black ABS plastic • Hardware included
			
Used with	Used with	Used with	Used with
*Presence*PLUS *Pro* Mini Camera	*Presence*PLUS *Pro* Camera	Sealed *Presence*PLUS *Pro* Camera	*Presence*PLUS *Pro* Controller

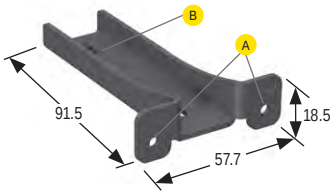
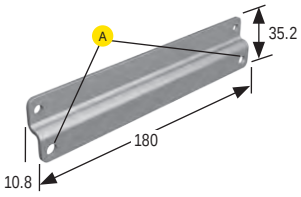
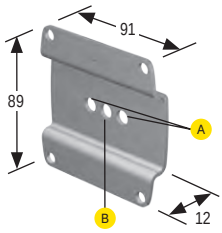
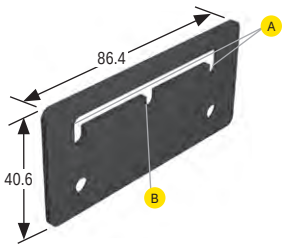
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBPPDH	SMBP42ASM	SMBP4ASM*	SMBP4OAL100
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
N/A	N/A	N/A	Hole center spacing: A = 15 Hole size: A = ø 5.3
• DIN-rail flat mounting for easy viewing of LED's • Black ABS plastic • Hardware included	• For mounting two lights to *P4* sensor housing • Black corrosion-resistant zinc finish • Hardware included	• For mounting light to *P4* sensor housing • Black corrosion-resistant zinc finish • Hardware included	• For mounting On-Axis light to *P4* housing • Centers lens on light opening • Black zinc-plated steel • Hardware included
			
Used with	Used with	Used with	Used with
*Presence*PLUS *Pro* Controller	Area Light (80 x 80 mm)* Area Light (62 x 62 mm) Spot Light	Area Light (80 x 80 mm) Area Light (62 x 62 mm) Spot Light	On-Axis Lights (100 mm)
	* Requires one SMBACM bracket with each light (see page 886)	* Requires one SMBACM bracket with each light (see page 886)	* Dimensions include 100 mm light (sold separately)

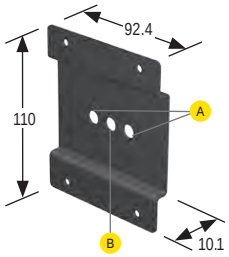
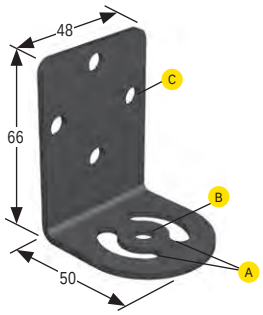
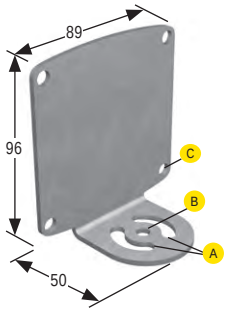
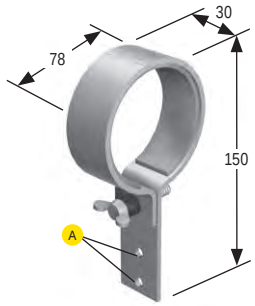
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBP4OAL50	SMBPMPRHI	SMBPPOAL100	SMBPPOAL50
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 15 Hole size: A = ø 5.3	Hole center spacing: A = 20.1, B = 44.8 Hole size: A = 3.5 x 9.9, B = 3.8	Hole center spacing: A = 15 Hole size: A = ø 5.3	Hole center spacing: A = 15 Hole size: A = ø 5.3
• For mounting On-Axis light to *P4* housing • Centers lens on light opening • Black zinc-plated steel • Hardware included	• Black zinc plated steel • For mounting light to *Pro* Mini Camera • Black zinc plated finish • Hardware included	• For mounting On-Axis light to *Pro* housing • Centers lens on light opening • Black zinc-plated steel • Hardware included	• For mounting On-Axis light to *Pro* housing • Centers lens on light opening • Black zinc-plated steel • Hardware included
			
Used with	Used with	Used with	Used with
On-Axis Lights (50 mm)	Ring Light (70 mm)	On-Axis Lights (100 mm)	On-Axis Lights (50 mm)
* Dimensions include 50 mm light (sold separately)		* Dimensions include 100 mm light (sold separately)	* Dimensions include 50 mm light (sold separately)

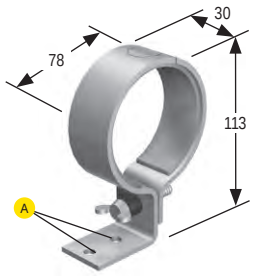
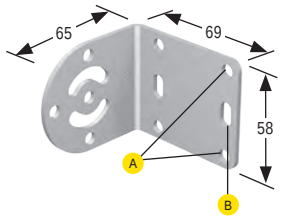
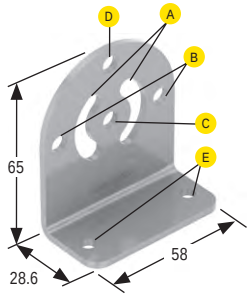
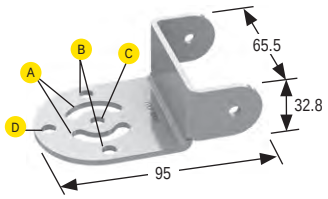
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBPPRHI	SMBBSSM	SMBASCM	SMBABM
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 44.5, B = 52.3 Hole size: A = ø 3.8, B = 3.6 x 6.4	Hole center spacing: A = 167.8 Hole size: A = ø 5.5	Hole center spacing: A = 25.4, A to B = 12.7 Hole size: A = ø 5 (M16), B = ø 5 (1/4-20)	Hole center spacing: A = 61, A to B = 30.5 Hole size: A, B = 9.1 x 2.3
• Black anodized aluminum bracket • For mounting light to *Pro* camera • Hardware included	• Surface-mount bracket • 316 stainless steel • Stainless steel hardware included • Set of two brackets	• Column-mount bracket • 316 stainless steel • Stainless steel hardware included	• Surface-mount bracket for mounting light from front • Black corrosion-resistant zinc finish • Hardware included
			
Used with	Used with	Used with	Used with
Ring Light (70 mm)	Backlights (75 x 150 mm) Backlights (150 x 150 mm) Backlights (150 x 225 mm) Backlights (150 x 300 mm) WLA Work Lights	NOTE: Shown with optional SMBPPK6 mounting kit (see page 954).	Area Lights (80 x 80 mm) Backlights (70 x 70 mm)

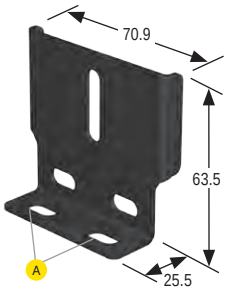
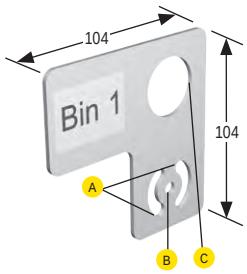
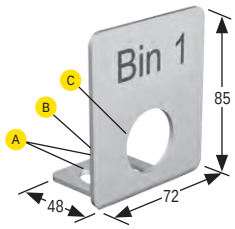
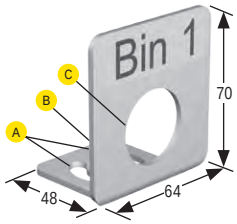
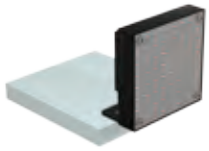
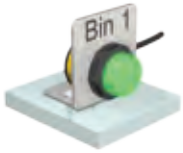
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBACM	SMBAMS70A	SMBAMS70AS	SMBWFTLS
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 30, A to B = 15 Hole size: A = ø 5 (M16), B = ø 5 (1/4 - 20)	Hole center spacing: A = 26, A to B = 13 Hole size: A = 26.8 x 7, B = ø 6.5, C = ø 7	Hole center spacing: A = 26, A to B = 13 Hole size: A = 26.8 x 7, B = ø 6.5, C = ø 7	Hole center spacing: A = 27 Hole size: A = ø 6.5
• Column-mount bracket • Black corrosion-resistant zinc finish • Hardware included	• Right-angle zinc-plated cold-rolled steel • Articulated slots for 90+° rotation • Two 1/4-20 screws included	• Right-angle, 12-ga. 316 stainless steel • Articulated slots for 90+° rotation • Four 1/4-20 stainless steel screws included	• In-line bracket • Mounts around light • Bright zinc-coated steel construction
			
Used with	Used with	Used with	Used with
Area Lights (80 x 80 mm) Backlights (70 x 70 mm)	Area Light (70 mm)	Sealed Area Light (70 mm)	Tubular Fluorescent Lights
NOTE: Shown with optional SMBPPK6 mounting kit (see page 954).			

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

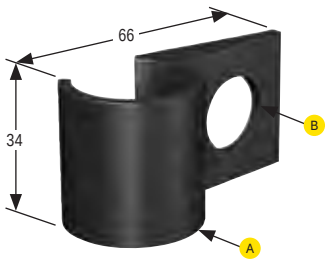
SMBWFTLR	SMBLASRA	SMBLAXRA	SMBLAXU
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 27 Hole size: A = ø 6.5	Hole center spacing: A, B = 45, A to B = 22.5 Hole size: A = ø 6.6, B = 6.6 x 12.4	Hole center spacing: A = 26, B = 45, C to D & B to C = 22.5, E = 4.5 Hole size: A = 7 x 26, B, C, D = ø 6.6, E = ø 5.4	Hole center spacing: A = 25, B = 45, C to D & B to C = 22.5 Hole size: A = 7 x 26, B, C, D = ø 6.6
• Right-angle bracket • Mounts around light • Bright zinc-coated steel construction	• Right-angle metal bracket • May be used individually or two used in combination • 316 stainless steel bracket and hardware • Set of two brackets	• Right-angle metal bracket • May be used individually or with SMBLAXU to provide swivel adjustment • 316 stainless steel bracket and hardware • Set of two brackets	• U-shaped metal bracket • Used with SMBLAXRA to provide swivel adjustment • 316 stainless steel bracket and hardware • Set of two brackets
			
Used with	Used with	Used with	Used with
Tubular Fluorescent Lights	Sealed Linear Array Lights (IP68)	Linear Array Lights (IP50)	Linear Array Lights (IP50)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBVLA62X62RA	SMBAMS30PL52R	SMBAMS30RLJ	SMBAMS30RLS
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 36.4 Hole size: A = 13.1 x 6.6	Hole center spacing: A = 26, A to B = 13 Hole size: A = 26.8 x 7, B = ø 6.5, C = ø 31	Hole center spacing: A = 26, A to B = 13 Hole size: A = 26.8 x 7, B = ø 6.5, C = ø 31	Hole center spacing: A = 26, A to B = 13 Hole size: A = 26.8 x 7, B = ø 6.5, C = ø 31
• For mounting a light at a right angle • 14-ga. steel, black zinc-plated	• Flat SMBAMS series bracket with space for 60 x 58 mm label • 30 mm hole for mounting sensors • Articulation slots for 90+° rotation • 12-ga. (2.6 mm) cold-rolled steel	• Right-angle SMBAMS series bracket with 70 x 40 mm space for label • 30 mm hole for mounting sensor • Articulation slots for 90+° rotation • 12-ga. (2.6 mm) cold-rolled steel	• Right-angle SMBAMS series bracket with 62 x 26 mm space for label • 30 mm hole for mounting sensor • Articulation slots for 90+° rotation • 12-ga. (2.6 mm) cold-rolled steel
			
Used with	Used with	Used with	Used with
Area Lights (62 x 62 mm)	EZ-LIGHT T30	EZ-LIGHT T30	EZ-LIGHT T30L
			
	Used with	Used with	Used with
	VTB EZ-LIGHT K50L	VTB EZ-LIGHT K50L EZ-LIGHT CL50	VTB EZ-LIGHT K50L EZ-LIGHT CL50

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBC18



All measurements in mm

Hole center spacing: N/A
Hole size: A = ø 26.9, B = ø 18.4

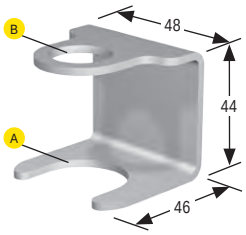
- Snaps onto 28 mm diameter structural framing



Used with

S18L

SA-K50A18



All measurements in mm

Hole center spacing:

Hole size: A = ø 30.5, A = ø 20

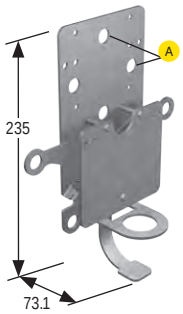
- Protective mounting bracket for EZ-LIGHT K50 sensors
- 12-ga. cold-rolled steel



Used with

K50

SMBARP..30



All measurements in mm

Hole center spacing: A = 69.9
Hole size: A = ø 12.8

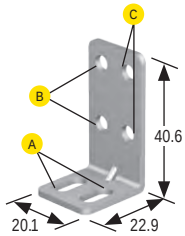
Model	Rope Pull
SMBARPL30	Left
SMBARPR30	Right
SMBARPB30	Both



Used with

K50

SMBPVA1



All measurements in mm

Hole center spacing: A = 10.2, B to B = 18, B to C = 10.2
Hole size: A = 10 x 4.8, B, C = ø 4.6

- Right-angle bracket
- 303 stainless steel
- Replacement brackets for brackets included with sensors

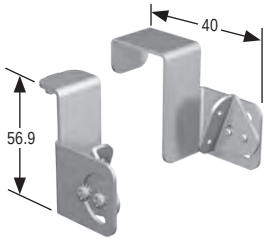


Used with

PVA
PVD
EZ-LIGHT TL30F

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

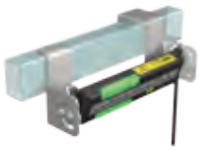
SMBPVA11



All measurements in mm

NA

- Pair of two-piece swivel brackets for mounting sensor to 5/16" metal rack system
- Articulation slot for ±90° rotation
- May be used with SMBPVA..C bracket



Used with

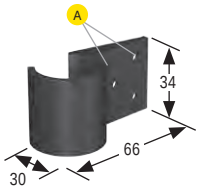
PVD
EZ-LIGHT TL30F



Used with

SMBPVD..A
SMBPVD..AB

SMBPVA2



All measurements in mm

Hole center spacing: A = 18.8
Hole size: A = ø 4.4

- Set of 4 molded brackets
- Snaps onto standard 28 mm diameter pipe
- 2 required per sensor



Used with

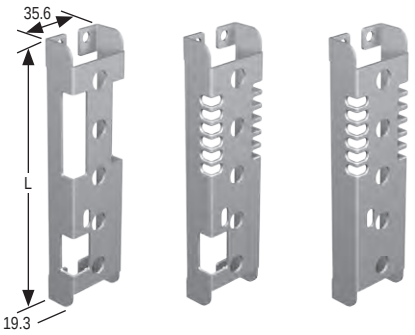
PVA
PVD
EZ-LIGHT TL30F



Used with

SMBPVA.. SMBPVA..A SMBPVA..AB	SMBPVD..A SMBPVD..AB

SMBPVA.., SMBPVA..A, SMBPVA..AB



All measurements in mm

Models	DIP Switch Access	Light Protected	Length (L)	Used With
SMBPVA5	Yes	No		
SMBPVA5A	Yes	Yes	139.7	PVA100
SMBPVA5AB	No	Yes		
SMBPVA10	Yes	No		
SMBPVA10A	Yes	Yes	268.2	PVA225
SMBPVA10AB	No	Yes		
SMBPVA13	Yes	No		
SMBPVA13A	Yes	Yes	343.3	PVA300
SMBPVA13AB	No	Yes		
SMBPVA16	Yes	No		
SMBPVA16A	Yes	Yes	418.2	PVA375
SMBPVA16AB	No	Yes		

- Pair of brackets protects sensor from impact; provides DIP-switch and/or indicator light exposure (depending on model)
- Heavy-duty cold-rolled steel-zinc finish
- May be used with SMBPVA..C for mounting to SMBPVA7 or SMBPVA8 brackets



Used with

PVA (see chart)



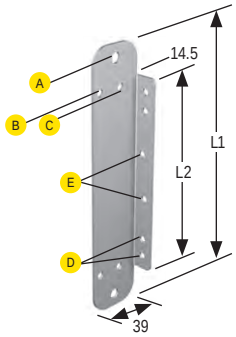
Used with

SMBPVA..2 SMBPVA..7*	SMBPVA..8* SMBPVA..C bracket

* Protective bracket must be mounted to a SMBPVA..C bracket.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBPVA..C



All measurements in mm

Models	L1	L2
SMBPVA5C	188.7	139.5
SMBPVA10C	317.2	268.0

Hole center spacing: A to C = 20, B to C = 18, D = 13, E = 32
Hole size: A = ø 7.3, B, C, D, E = ø 5.2

- Back-mounted bracket for mounting to SMBPVA7 or SMBPVA8 brackets
- Cold-rolled steel with zinc finish



Used with

PVA
PVD

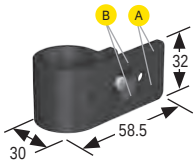


Used with

SMBPVA7*	SMBPVA...AB
SMBPVA8*	SMBPVD...A
SMBPVA...	SMBPVD...AB
SMBPVA...A	

* Sensor must be mounted to a SMBPVA..C bracket.

SMBPVA6



All measurements in mm

Hole center spacing: A, B, A to B = 18
Hole size: A = ø 3.2

- Set of 4 molded brackets
- Brackets clamp onto 28 mm pipe
- Request data sheet p/n 64900 for more information



Used with

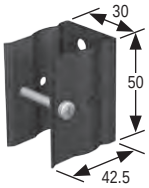
PVA
PVD
EZ-LIGHT TL30F



Used with

SMBPVA..	SMBPVD..A
SMBPVA..A	SMBPVD..AB
SMBPVA..AB	

SMBPVA7



All measurements in mm

N/A

- One-piece bracket for mounting to 28 mm diamiter pipe
- Black-painted steel
- Requires SMBPVA..C for mounting at an angle ±90°

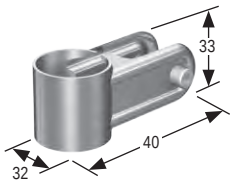


Used with

PVA*	SMBPVA5C
PVD*	SMBPVA10C

* Sensor must be mounted to SMBPVA..C bracket. (sold separately)

SMBPVA8



All measurements in mm

N/A

- Heavy-duty 2-part bracket mounts to 28 mm diamiter pipe
- Cold-rolled steel with zinc finish
- Requires SMBPVA..C for mounting

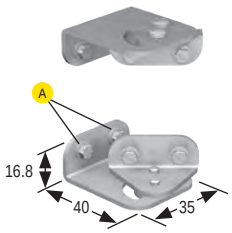
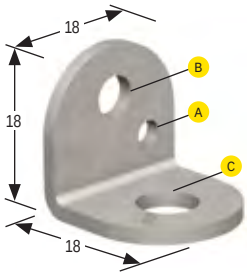
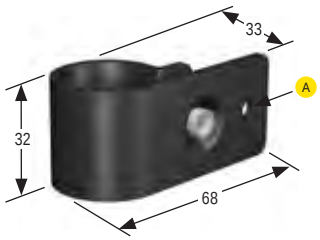
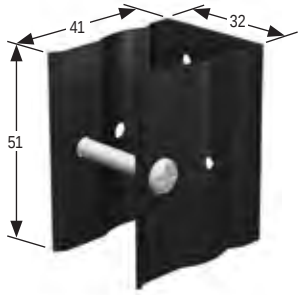
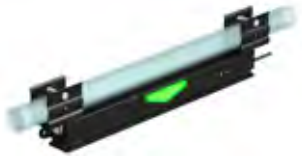


Used with

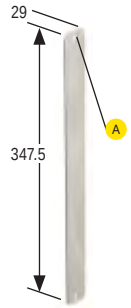
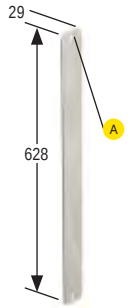
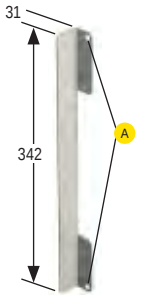
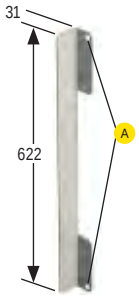
PVA*	SMBPVA5C
PVD*	SMBPVA10C

* Sensor must be mounted to SMBPVA..C bracket. (sold separately)

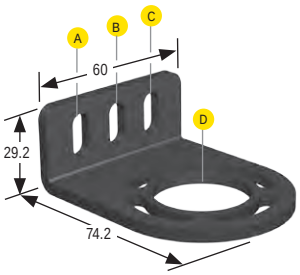
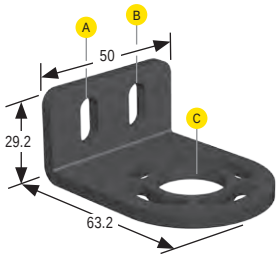
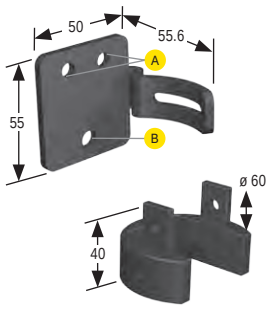
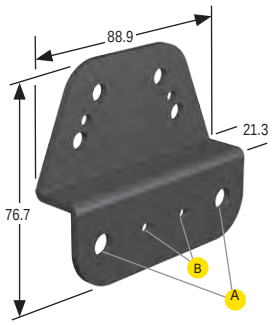
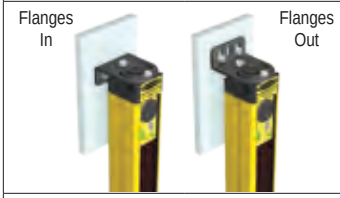
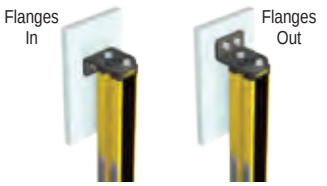
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBPVA9	SMBPVL1	SMBPVL4	SMBPVL5
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 18 Hole size: A = ø 5	Hole center spacing: NA Hole size: A = ø 3, B = ø 4.8, B = ø 7	Hole center spacing: NA Hole size: A = ø M6 x 1	Hole center spacing: NA Hole size: NA
• Pair of 2-piece swivel brackets • Mount directly to sensor or to PVD/PVA protective brackets • Designed for mounting sensor to "look down"	•14 gauge cold rolled steel • Right-angle bracket for mounting the pick-to-light array	• Painted cold rolled steel • 28 mm tubular mount bracket for mounting outside bin • Clearance for M6 (1/4 in) hardware	• Painted cold rolled steel • 28 mm tubular mount bracket for mounting inside bin • Clearance for M6 (1/4 in) hardware
			
Used with	Used with	Used with	Used with
PVA PVD EZ-LIGHT TL30F	PVL225 PLV500	PVL225 PLV500	PVL225 PLV500
			
Used with			
SMBPVA... SMBPVA..A SMBPVA...AB / SMBPVD...A SMBPVD...AB			

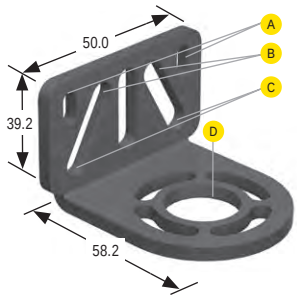
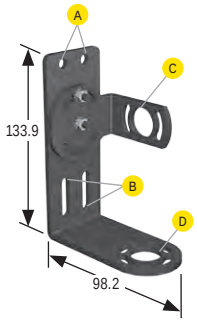
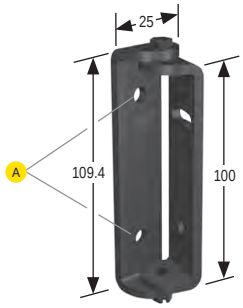
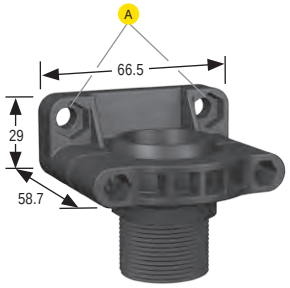
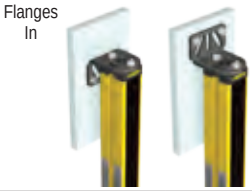
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBPVL2-225	SMBPVL2-500	SMBPVL3-225	SMBPVL3-500
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 331.5 Hole size: A = ø 7	Hole size: A = ø 7	Hole size: A = ø 7	Hole size: A = ø 7
•14 gauge cold rolled steel • Flat bracket for mounting reflector inside bin • Includes retroreflective tape	•14 gauge cold rolled steel • Flat bracket for mounting reflector inside bin • Includes retroreflective tape	•14 gauge cold rolled steel • Right-angle bracket for mounting reflector outside bin • Includes retroreflective tape	•14 gauge cold rolled steel • Right-angle bracket for mounting reflector outside bin • Includes retroreflective tape
			
Used with	Used with	Used with	Used with
PVL225	PLV500	PVL225	PLV500

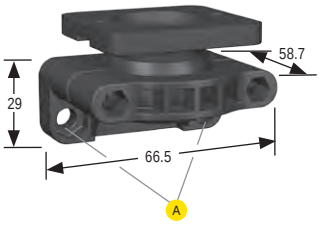
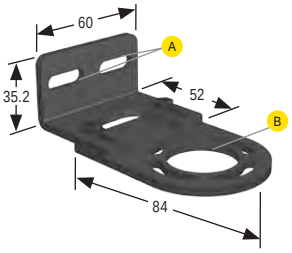
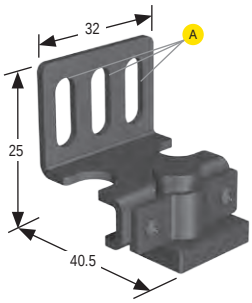
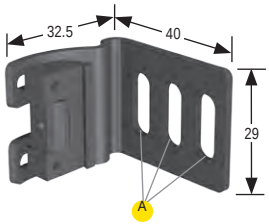
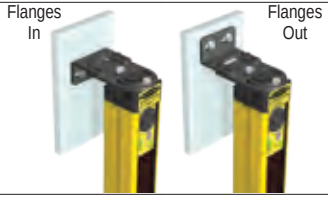
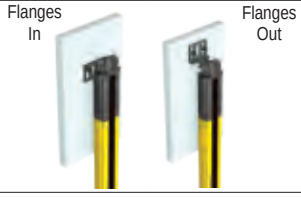
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZA-MBK-1	EZA-MBK-11	EZA-MBK-12	EZA-MBK-2
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A to B = 15.8, A to C = 31.5 Hole size: A, B, C = 15 x 7, D = ø 32	Hole center spacing: A to B = 20 Hole size: A, B = 15 x 7, C = ø 21.5	Hole center spacing: A = 20, A to B = 36 Hole size: A = ø 7, B = ø 8.3	Hole center spacing: A = 63.9, B = 19.9, A to B = 22 Hole size: A = ø 8.3, B = ø 4.8
• Two end-cap replacement brackets for one emitter/receiver • 8-ga. cold-rolled steel with black corrosion-resistant zinc chromate finish • M5 and M6 mounting hardware	• Two end-cap replacement brackets for one emitter/receiver • 8-ga. cold-rolled steel with black corrosion-resistant zinc chromate finish • M5 and M6 mounting hardware	• Two-piece center bracket for one emitter/receiver • 8-ga. cold-rolled steel with black corrosion-resistant zinc chromate finish • M5 and M6 mounting hardware	• Bracket adapter (Qty 2) for attaching EZA-MBK-1 to any MSA series stand
			
Used with	Used with	Used with	Used with
EZ-SCREEN Point & Grid	EZ-ARRAY EZ-SCREEN Standard 14 & 30 mm	EZ-ARRAY EZ-SCREEN Standard 14 & 30 mm	EZ-SCREEN Point & Grid MSA Stands

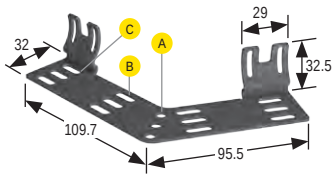
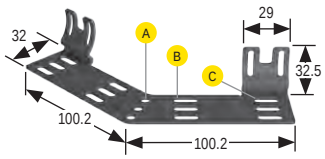
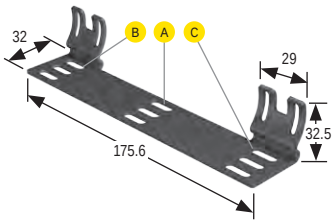
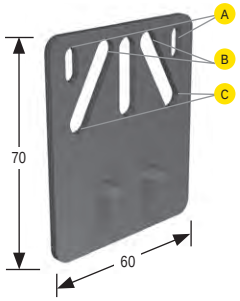
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZA-MBK-20	EZA-MBK-21	EZA-MBK-3	EZA-MBK-4
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 44.4, B = 20, C = 40 Hole size: A = 10.2 x 4.8, B, C = 25 x 7, D = ø 21.5	Hole center spacing: A = 20, B = 20, A to B = 101.4 Hole size: A = ø 7, B = 30 x 7.2, C, D = ø 21.5	Hole center spacing: A = 65 Hole size: A = ø 7	Hole center spacing: A = 50.8 Hole size: ø 7
• Two-bracket kit for one sensor • Adapter brackets for mounting to engineered/slotted aluminum framing such as 80/20™ and Unistrut™ • Order EZA-MBK-20U for bracket and M5 and M6 mounting hardware	• Mounting bracket system for L configuration of two cascaded EZ-SCREEN light screens • 8-ga. cold-rolled steel with black corrosion-resistant zinc chromate finish • M5 and M6 mounting hardware	• Two-piece side-swivel bracket kit • 180° range of motion • 8-ga. cold-rolled steel with black corrosion-resistant zinc chromate finish	• Top-mounting kit with SMB30SC swivel bracket and threaded adapter • 45° rotation in any direction • Black reinforced thermoplastic polyester
			
Used with	Used with	Used with	Used with
EZ-ARRAY EZ-SCREEN Standard 14 & 30 mm EZ-SCREEN Cascade 14 & 30 mm	EZ-SCREEN Cascade 14 & 30 mm	EZ-SCREEN Point & Grid	EZ-SCREEN Point

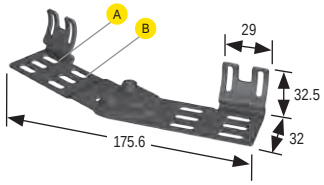
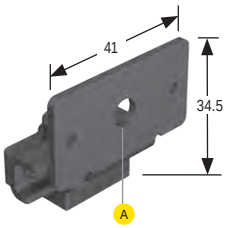
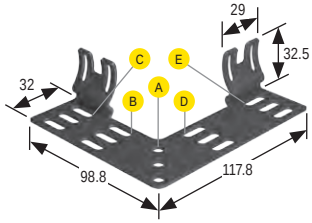
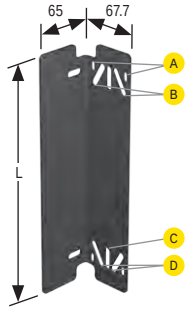
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZA-MBK-5	EZA-MBK-9	LPA-MBK-11	LPA-MBK-12
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 50.8 Hole size: ø 7	Hole center spacing: A = 30.8 Hole size: A = 21 x 7, B = ø 32	Hole center spacing: A = 10 Hole size: A = 5.5 x 15.5	Hole center spacing: A = 10 Hole size: A = 15.5 x 5.5
• Bottom-mounting kit with SMB30SC swivel bracket and threaded adapter plate • 45° rotation in any direction • Black reinforced thermoplastic polyester	• Two-bracket kit with 30 mm range of motion for mounting sensor • 8-ga. cold-rolled steel with black corrosion-resistant zinc chromate finish • M5 and M6 mounting hardware	• End-cap bracket kit • 360° sensor rotation • 14-ga. (1.9 mm) steel, black zinc plated; die-cast metal clamp • Includes 2 brackets and hardware	• Side-mount bracket kit • +10°/-30° sensor rotation • 14-ga. (1.9 mm) steel, black zinc plated; die-cast zinc clamp • Includes 1 bracket and hardware
			
Used with	Used with	Used with	Used with
EZ-SCREEN Point	EZ-SCREEN Grid & Point	EZ-SCREEN LP 14 & 25 mm	EZ-SCREEN LP 14 & 25 mm

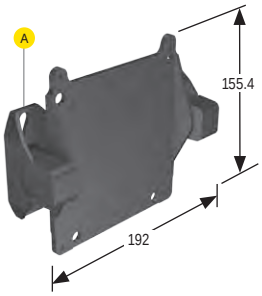
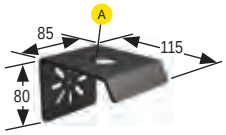
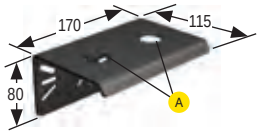
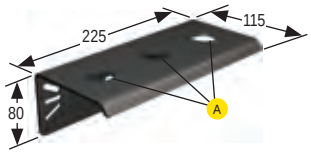
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

LPA-MBK-120	LPA-MBK-135	LPA-MBK-180	LPA-MBK-20
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A, B, C = 10, B to C = 50 Hole size: A = ø 5.8, B, C = 15.5 x 5.5	Hole center spacing: A, B, C = 10, B to C = 50 Hole size: A = ø 5.8, B, C = 15.5 x 5.5	Hole center spacing: A, B, C = 10, A to B = 73.3, A to C = 73.3 Hole size: A, B, C = 15.5 x 5.5	Hole center spacing: A = 44.5, B = 20, C = 40 Hole size: A = 4.8 x 10.2, B, C = 7 x 26.8
• Pair of angled L brackets for two cascaded emitter/receiver pairs • Fixed 120° orientation • +10°/-30° sensor rotation • 14-ga. (1.9 mm) steel, black zinc plated	• Pair of angled L brackets for two cascaded emitter/receiver pairs • Fixed 135° orientation • +10°/-30° sensor rotation • 14-ga. (1.9 mm) steel, black zinc plated	• Pair of inline (straight) brackets for two cascaded emitter/receiver pairs • Fixed 180° orientation • +10°/-30° sensor rotation • 14-ga. (1.9 mm) steel, black zinc plated	• Universal adapter bracket for mounting to engineered/slotted aluminum framing (example, 80/20™, Bosch) • Use with LPA-MBK-11, -12 or -13 • 12-ga. (2.66 mm) steel; black zinc plated • Includes 1 bracket and hardware
			
Used with	Used with	Used with	Used with
EZ-SCREEN LP Cascade 14 & 25 mm	EZ-SCREEN LP Cascade 14 & 25 mm	EZ-SCREEN LP Cascade 14 & 25 mm	EZ-SCREEN LP 14 & 25 mm

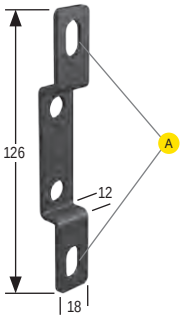
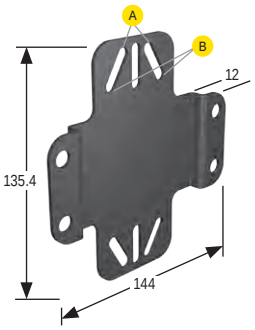
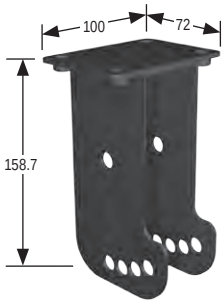
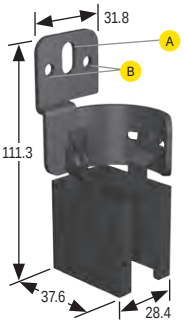
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

LPA-MBK-21	LPA-MBK-22	LPA-MBK-90	LPA-MBK-PXXX
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A, B = 10, A to B = 30 Hole size: A, B = 15.5 x 5.5	Hole size: A = ø 6.6	Hole center spacing: A, B, C, D, E = 10, B to C = 30, D to E = 50 Hole size: A = ø 5.8, B, C, D, E = 15.5 x 5.5	Hole center spacing: A = 44.5, B = 40, D = 18 Hole size: A = 4.8 x 10.2, B = 7 x 26.8, C = 7 x 25
• Pivoting "L" bracket system for two cascaded emitters/receivers; uses clamps from side-mount bracket LPA-MBK-12 • Adjustable 90° to 180° orientation • +10°/-30° sensor rotation • 14-ga. (1.9 mm) steel, black zinc plated	• End-cap bracket for mounting inside Unistrut® metal framing • Fits Unistrut® P1000 size (1 5/8"), with M6 or 1/4" channel nuts • 14-ga. (1.9 mm) steel, black zinc, plated; die-cast zinc clamp • Used with LPA-MBK-11 • Includes 2 brackets and hardware (does not include Unistrut® channel nuts)	• Pair of angled L brackets for two cascaded emitter/receiver pairs • Fixed 90° orientation • +10°/-30° sensor rotation • 14-ga. (1.9 mm) steel, black zinc plated	• L-shaped protective bracket for one emitter/receiver • Sized to match emitter/receiver length; replace XXX in model number with emitter/receiver size (example, LPA-MBK-P270 for use with SLP..-270) • +10°/-30° sensor rotation • 12-ga. (2.66 mm) steel, black zinc plated or painted
			
Used with	Used with	Used with	Used with
EZ-SCREEN LP Cascade 14 & 25 mm	EZ-SCREEN LP 14 & 25 mm	EZ-SCREEN LP Cascade 14 & 25 mm	EZ-SCREEN LP 14 & 25 mm

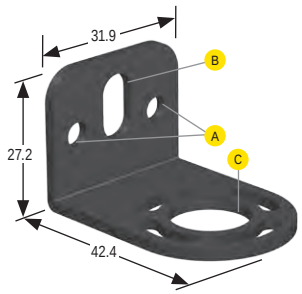
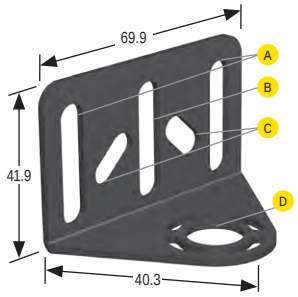
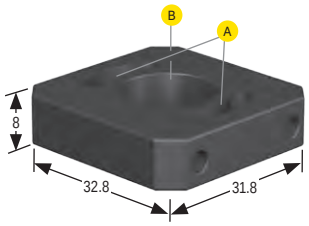
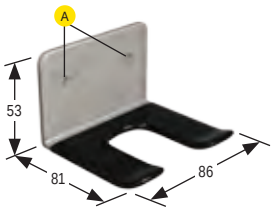
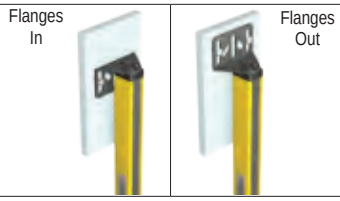
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

AG4-MBK1	SSA-MBK-EEC1	SSA-MBK-EEC2	SSA-MBK-EEC3
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 63 Hole size: 9 x 20.4	Hole center spacing: NA Hole size: A = ø 30.5	Hole center spacing: A = 85 Hole size: A = ø 30.5	Hole center spacing: A = 85 Hole size: A = ø 30.5
• Metal swivel bracket for mounting and aligning	• Allows for horizontal and vertical (post) mounting • 8 gauge steel, black finish (zinc-plated)	• Allows for horizontal and vertical (post) mounting • 8 gauge steel, black finish (zinc-plated)	• Allows for horizontal and vertical (post) mounting • 8 gauge steel, black finish (zinc-plated)
			
Used with	Used with	Used with	Used with
AG4 Laser Scanner	E-Stop Buttons	E-Stop Buttons	E-Stop Buttons

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

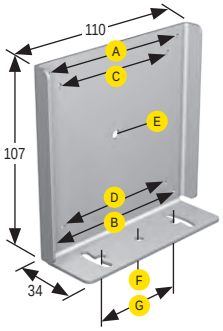
STBA-RB1-MB1	STBA-RB1-MB2	STBA-RB1-MB3	USCMB-..
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 106 Hole size: A = 9 x 15	Hole center spacing: A = 20, B = 40, A to B = 20 Hole size: A, B = 27 x 7	NA	Hole center spacing: B = 19.9, A to B = 10 Hole size: A = 12.2 x 7.1, B = ø 4.8
• Pair of wall-mount brackets; run bar "hangs" on vertical surface • Slotted holes for vertical adjustment • 12-ga. cold-rolled steel with black powdercoat paint	• Universal-mount bracket; allows run bar to mount to vertical stand or surface • Slotted holes for adjustment • 12-ga. cold-rolled steel with black powdercoat paint	• Swivel-mount bracket; mounts to telescoping stand • Holes for radial adjustment, 0° to 30° in 10° increments • 12-ga. cold-rolled steel with black powdercoat paint	• Two-piece center mounting replacement kit for bracket that comes with emitter/receiver • 13-ga. cold-rolled steel with black power coat paint • Bracket hardware included
			
Used with	Used with	Used with	Used with
DUO-TOUCH Run Bar	DUO-TOUCH Run Bar	DUO-TOUCH Run Bar	EZ-SCREEN Type 2
		NOTE: Included with telescoping stands STBA-RB1-S1 and STBA-RB1-S2	NOTE: USCMB-1 fits emitters/receivers 600 to 900 mm long USCMB-2 fits emitters/receivers 1050 mm and longer

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

USMB-1	USMB-6	USMB-8	ED9Z-GH1
			
All measurements in mm	All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 20, A to B = 10 Hole size: A = ø 4.8, B = 12.7 x 7, C = ø 15.2	Hole center spacing: A = 52.1, A to B = 26, C = 30.6 Hole size: A, B = 25.4 x 7.1, C = 15.5 x 7, D = ø 15.2	Hole center spacing: A = 22.7 Hole size: A = 15 x 3.5, B = ø 14.8	Hole center spacing: A = 50 Hole size: A = ø 5.3
• Two-bracket replacement kit for brackets that come with emitter/receiver • 13-ga. cold-rolled steel with black corrosion-resistant zinc chromate finish • Bracket hardware included	• Two-bracket universal-mounting surface kit • 13-ga. cold-rolled steel with black corrosion-resistant zinc chromate finish • Bracket hardware included	• Two-bracket kit for one emitter/receiver • Mounting plate for 90° sensor direction • Black anodized aluminum	• Right-angle bracket for mounting switch to upright surface • Stainless steel
			
Used with	Used with	Used with	Used with
EZ-SCREEN Type 2	EZ-SCREEN Type 2	EZ-SCREEN Type 2	ED1G Enabling Devices

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

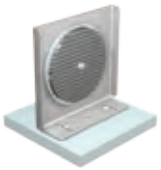
RMB100



All measurements in mm

Hole center spacing:
A, B, A to B = 92,
C, D, C to D = 77, G = 56
Hole size: A, B, C, D = ø 0.5,
E = ø 4.8, F = ø 4.5, G = 21.5 x 4.5

- Protective mounting bracket for retroreflective targets
- 14-ga. 316 stainless steel
- Stainless steel M3 x 0.5 hardware included



Used with

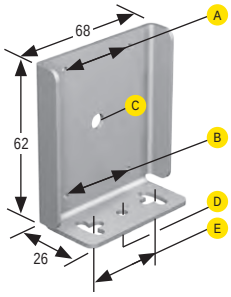
BRT-3
BRT-84



Used with

BRT-77X77C
BRT-92X92C
BRT-92X92CB

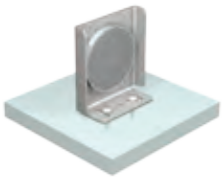
RMB50



All measurements in mm

Hole center spacing: A, B = 34,
A to B = 52, E = 26
Hole size: A, B = ø 0.5, C = ø 6.3,
D = ø 4.5, E = 13.8 X 4.5

- Protective mounting bracket for retroreflective targets
- 14-ga. 316 stainless steel
- Stainless steel M3 x 0.5 hardware included



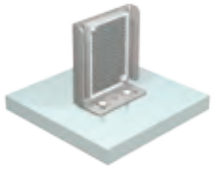
Used with

BRT-50D
BRT-50R



Used with

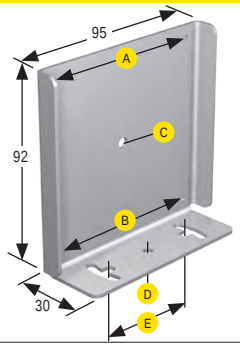
BRT-2X2
BRT-51X51BM



Used with

BRT-60X40AF
BRT-60X40C
BRT-60X40IP69K

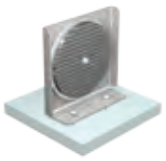
RMB85



All measurements in mm

Hole center spacing:
A, B, A to B = 77, E = 46
Hole size: A, B = ø 0.5, C = ø 4.8,
D = ø 4.5, E = 19 x 4.5

- Protective mounting bracket for retroreflective targets
- 14-ga. 316 stainless steel
- Stainless steel M3 x 0.5 hardware included



Used with

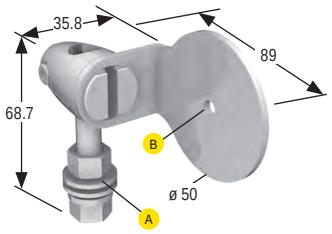
BRT-3



Used with

BRT-77X77C

SMB50RFA..



All measurements in mm

Model	Bolt Thread (A)
SMB50RFA	3/8 - 16 x 2"
SMB50RFAM10	M10 - 1.5 x 50

Hole size: B = 5.4

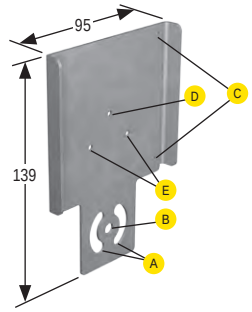
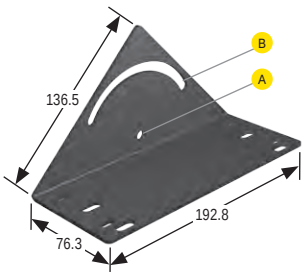
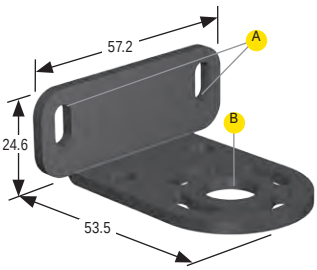
- Swivel bracket with tilt and pan movement for precision adjustment
- Easy sensor mounting to extruded rail T-slots
- Metric and inch size bolt available
- 50 mm diameter plate for mounting a reflector



Used with

BRT-35DM
BRT-50D
BRT-42D
BRT-34T

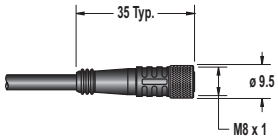
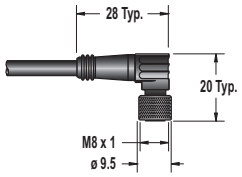
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SMBAMSR85P	MSMB-MSM-45	MSMMB
		
All measurements in mm	All measurements in mm	All measurements in mm
Hole center spacing: A = 26, B = 13, C = 77, E = 30 Hole size: A = 26.8 x 7, B = ø 6.5, C = 2.3, D = 3.2, E = 3.2	Hole center spacing: A to B = 50.8 Hole size: A = ø 7, B = 87.7 x 7	Hole center spacing: A = 44.5 Hole size: A = 10.2 x 4.8, B = ø 13.2
• Flat SMBAMS series bracket for mounting reflectors • Articulation slots for 90+° rotation • 14-ga. 300 series stainless steel	• Bracket for 45° mounting of mirror • 11-ga. cold-rolled steel with black corrosion-resistant zinc chromate finish • Bracket hardware included	• Replacement (pair) for brackets that come with MSM mirrors • 11-ga. cold-rolled steel with black corrosion-resistant zinc chromate finish • Bracket hardware included
		Flanges In   Flanges Out
Used with	Used with	Used with
BRT-3 BRT-84	MSM4A Mirror	MSM Mirror
	NOTE: For a kit containing a bracket and MSM4A mirror, order model number MSA-MBM-K45	
Used with		
BRT-77X77C BRT-51X51BM		

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

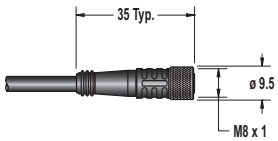
3-Pin Threaded M8/Pico-Style Cordsets

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 24 AWG, gold-plated contacts
Voltage/Current Rating: 125 V ac/dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	2.00 m	PKG3M-2	4.40 mm		Female  1 = Brown 3 = Blue 4 = Black	• Q12 • T8 • SB12 • VSM • VS1 • VS2 • VS3 • SLM • IP68 Sealed Ring Lights (nickel-plated) • On-Axis Lights
	5.00 m	PKG3M-5				
	7.00 m	PKG3M-7				
	9.00 m	PKG3M-9				
	10.0 m	PKG3M-10				
Right-Angle	2.00 m	PKW3M-2	4.40 mm			
	5.00 m	PKW3M-5				
	9.00 m	PKW3M-9				

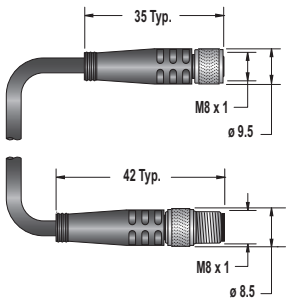
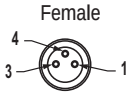
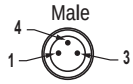
3-Pin Threaded M8/Pico-Style Cordsets

Cable: PVC jacket and connector body, stainless steel coupling nut
Conductors: 24 AWG, gold-plated contacts
Voltage/Current Rating: 125 V ac/dc, 4.0 A
Temperature: -40° to +90° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	4.00 m	PKGV3M-4	4.40 mm		Female  1 = Brown 3 = Blue 4 = Black	• IP68 Sealed Ring Lights (stainless steel)
	7.00 m	PKGV3M-7				
	10.0 m	PKGV3M-10				

3-Pin Threaded/Snap M8/Pico-Style Cordsets—Double Ended

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass (female) and nylon/nickel-plated brass (male) coupling nuts
Conductors: 24 AWG, gold-plated contacts
Voltage/Current Rating: 125 V ac/dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	0.35 m	PKG3M-.35-PSG3M	4.40 mm		Female  Male  1 = Brown 3 = Blue 4 = Black	• IP68 Sealed *P4* (connect IP68 Sealed Ring Light to *P4*)
	2.00 m	PKG3M-2-PSG3M				

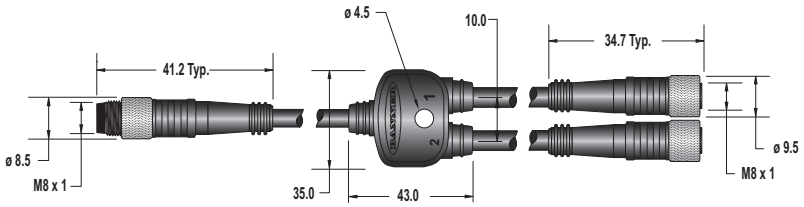
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

3-Pin Threaded M8/Pico-Style Splitter Cordset—Flat Junction

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass (female) and nylon/nickel-plated brass (male) coupling nuts
Conductors: 24 AWG, gold-plated contacts
Voltage/Current Rating: 125 V ac/dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP67
Wiring: Parallel wired Y-cords

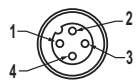
Model	Connections: Branches	Connections: Trunk	Connections: Cable Diameter	Pinout	Used With
CSB-M831M831	3-Pin Pico QD 2 x 0.20 m Female	0.20 m Male	4.40 mm	Female  Male  1 = Brown 3 = Blue 4 = Black	• Connect *P4* to two lights • Spot Lights • Area Lights • Backlights

Dimensions (mm)

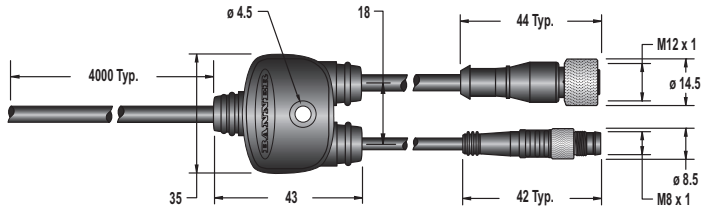


3-Pin M8/Pico-Style and 4-Pin M12/Euro-Style to Flying Leads Splitter Cordset—Flat Junction

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 24 AWG (3-pin) or 22 AWG (4-pin), gold-plated contacts
Voltage/Current Rating: 250 V ac/300 V dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Model	Connections: Branches	Connections: Trunk	Connections: Cable Diameter	Pinout	Used With
CSB-UNT213M831F1241	3-Pin Pico QD 0.3 m Male 4-pin Euro QD 0.3 m Female	Flying Leads 4 m	4.40 mm (branches) 5.50 mm (trunk)	Female  1=Brown 2=White 3=Blue 4=Black Male  1 = NC 3 = Blue 4 = Black	• *P4* to High Intensity Area Lights (to strobe from *P4*)

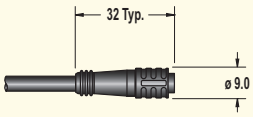
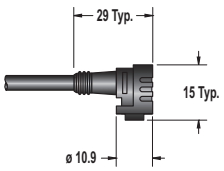
Dimensions (mm)



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

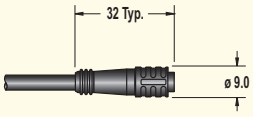
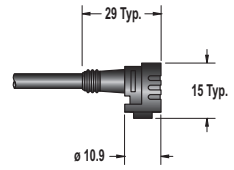
4-Pin Snap-on M8/Pico-Style Cordsets

Cable: PVC jacket, PUR (polyurethane) connector body, nylon coupling nut
Conductors: 26 AWG, gold-plated contacts
Voltage/Current Rating: 125 V ac/dc, 2.0 A
Temperature: -40° to +90° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	2.00 m	PKG4-2	3.20 mm		Female  1 = Brown 2 = White 3 = Blue 4 = Black	• QS18 (Integral or Pigtail) • Q20 (Integral or Pigtail) • D12 • D10A • DF-G1 • S12
Right-Angle	2.00 m	PKW4Z-2	3.20 mm			

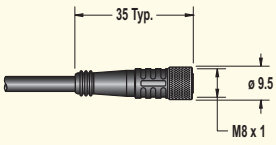
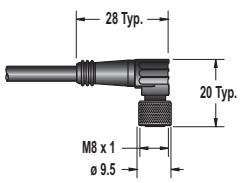
4-Pin Snap-On M8/Pico-Style Cordsets with Shield

Cable: PVC jacket, PUR (polyurethane) connector body, nylon or PUR coupling nut
Conductors: 26 AWG (shielded), gold-plated contacts
Voltage/Current Rating: 125 V ac/dc, 2.0 A
Temperature: -40° to +90° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	2.00 m	PKG4S-2	4.40 mm		Female  1 = Brown 2 = White 3 = Blue 4 = Black	• QS18U
Right-Angle	2.00 m	PKW4ZS-2	4.40 mm			

4-Pin Threaded M8/Pico-Style Cordsets

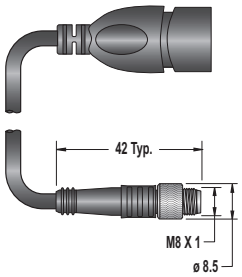
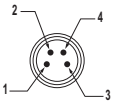
Cable: PVC jacket, PUR (polyurethane) body, nylon-plated brass coupling nut
Conductors: 26 AWG, gold-plated contacts
Voltage/Current Rating: 125 V ac/dc, 2.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	2.00 m	PKG4M-2	3.80 mm		Female  1 = Brown 2 = White 3 = Blue 4 = Black	• Q12 • QS18 (Pigtail) • Q20 (Pigtail) • S12 • QMH26 • Q26 • D12 • DF-G1
	5.00 m	PKG4M-5				
	9.00 m	PKG4M-9				
Right-Angle	2.00 m	PKW4M-2	4.30 mm			
	5.00 m	PKW4M-5				
	9.00 m	PKW4M-9				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

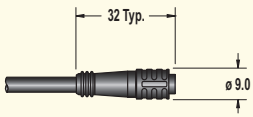
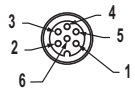
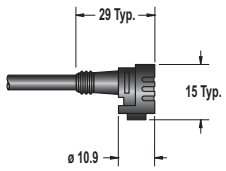
4-Pin Threaded M8/Pico-Style to USB Cordsets with Shield—Double Ended

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut on Pico QD end
Conductors: 28 AWG and 24 AWG, gold-plated contacts
Voltage/Current Rating: 60V ac/75V dc, 2.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight Pico QD/ USB	0.15 m	PSG-4M-4005-USB	4.80 mm		USB  1 = Red 3 = Green 2 = White 4 = Black Male  1 = Red 3 = Black 2 = White 4 = Green	• iVu TG & BCR — Remote Touch Screen models • iVu Plus
	0.30 m	PSG-4M-401-USB				
	0.91 m	PSG-4M-403-USB				
	3.05 m	PSG-4M-410-USB				
	4.88 m	PSG-4M-416-USB				

6-Pin Snap-On M8/Pico-Style Cordsets

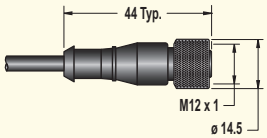
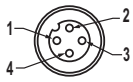
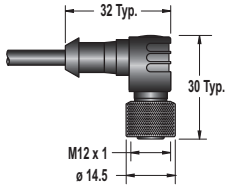
Cable: PVC jacket, PUR (polyurethane) connector body, nylon or PUR coupling nut
Conductors: 26 AWG (shielded), gold-plated contacts
Voltage/Current Rating: 125V ac/dc, 2.0 A
Temperature: -40° to +90° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	2.00 m	PKG6Z-2	4.70 mm		Female  1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray 6 = Pink	• D10
	9.00 m	PKG6Z-9				
Right-Angle	2.00 m	PKW6Z-2	4.70 mm			
	9.00 m	PKW6Z-9				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

4-Pin Threaded M12/Euro-Style Cordsets

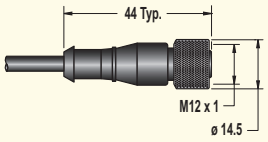
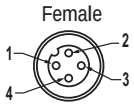
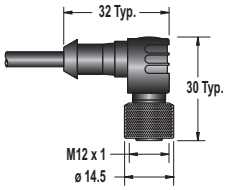
Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 250V ac/dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP67/IP69K

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQDC-406	5.20 mm		Female  1 = Brown 2 = White 3 = Blue 4 = Black	• Q12 • M12 • QS18 • Q20 • OMNI-BEAM (QDH suffix) • Q45 dc sensors (Q5 suffix) • MINI-BEAM dc SM312 sensors • S18, M18, T18, Q25, S30, T30, Q40 • TM18/TM18 *Expert* • QM42/QMT42 • QL50/QL51 • SLM • R58A • T18U • TL50/TL30F • K50 • K80 • PVA/PVL • VTB • STB with solid-state relay • EZ-LIGHT • WL50 • WLS28-2 • QM26 • Q26 • DF-G1 • WLA • WLC60/WLC90 • E-Stops w/ Q4 suffix
	4.57 m	MQDC-415				
	9.14 m	MQDC-430				
	15.2 m	MQDC-450				
Right-Angle	1.83 m	MQDC-406RA	5.20 mm			
	4.57 m	MQDC-415RA				
	9.14 m	MQDC-430RA				
	15.2 m	MQDC-450RA				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

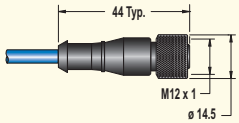
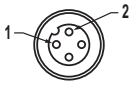
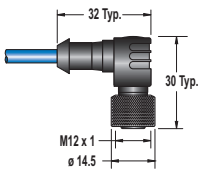
4-Pin Threaded M12/Euro-Style Cordsets with Shield

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG (shielded), gold-plated contacts
Voltage/Current Rating: 250 V ac/dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQDEC2-406	5.20 mm		 1 = Brown 2 = White 3 = Blue 4 = Black	• QS18U • T30UX
	4.57 m	MQDEC2-415				
	9.14 m	MQDEC2-430				
Right-Angle	1.83 m	MQDEC2-406RA	5.20 mm			
	4.57 m	MQDEC2-415RA				
	9.14 m	MQDEC2-430RA				

4-Pin Threaded M12/Euro-Style Cordsets (for use with NAMUR sensors)

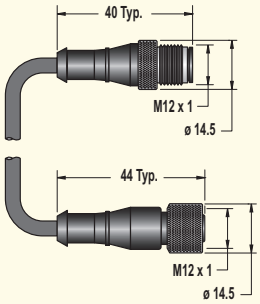
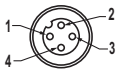
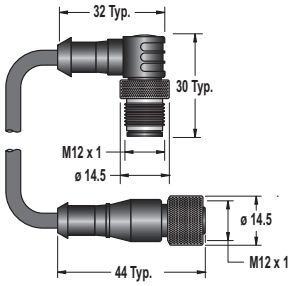
Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 20 AWG, gold-plated contacts
Voltage/Current Rating: 250 V ac/dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQD9-406	5.20 mm		 1 = Brown 2 = Blue	• MINI-BEAM & Q45 NAMUR sensors
	4.57 m	MQD9-415				
	9.14 m	MQD9-430				
Right-Angle	1.83 m	MQD9-406RA	5.20 mm			
	4.57 m	MQD9-415RA				
	9.14 m	MQD9-430RA				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

4-Pin Threaded M12/Euro-Style Cordsets—Double Ended

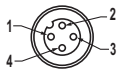
Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 250 V ac/dc, 4.0 A
Temperature: -40° to +105° C **Environmental Rating:** IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Male Straight/ Female Straight	0.31 m	MQDEC-401SS	5.90 mm		Female  Male  1 = Brown 2 = White 3 = Blue 4 = Black	• M12 • QS18 • Q20 • OMNI-BEAM (QDH suffix) • Q45 dc sensors (Q5 suffix) • MINI-BEAM dc SM312 sensors • S18, M18, T18, Q25, S30, T30, Q40 • QM42/QMT42 • SLM • R58A • T30UX • T18U • TL50 • TL30F • K50 • K80 • PVA/PVL • VTB and STB • EZ-LIGHT • WL50 • WLS28-2 • QM26 • Q26 • DF-G1 • WLA • WLC60/WLC90 • QL50
	0.91 m	MQDEC-403SS				
	1.83 m	MQDEC-406SS				
	3.66 m	MQDEC-412SS				
	6.10 m	MQDEC-420SS				
	9.14 m	MQDEC-430SS				
	15.2 m	MQDEC-450SS				
Male Right-Angle/ Female Straight	0.91 m	MQDEC-403RS	5.90 mm			
	1.83 m	MQDEC-406RS				
	3.66 m	MQDEC-412RS				
	6.10 m	MQDEC-420RS				
	9.14 m	MQDEC-430RS				
	15.2 m	MQDEC-450RS				

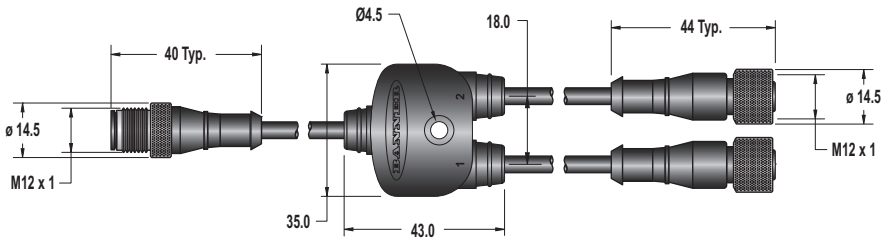
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

4-Pin Threaded M12/Euro-Style Splitter Cordsets—Flat Junction

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 250 V ac/300 V dc, 4.0A
Temperature: -40° to +105° C Environmental Rating: IP67
Wiring: Parallel wired Y-cord

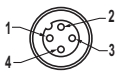
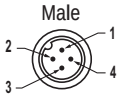
Model	Connections: Branches (Female)	Connections: Trunk (Male)	Cable Diameter	Pinout	Used With
CSB-M1240M1240	No branch	No trunk	5.50 mm	Female  Male  1 = Brown 2 = White 3 = Blue 4 = Black	• Sensors w/4-Pin Euro QD • EZ-LIGHT • DX80 (10 to 30 V dc) • DX85 • WLS28-2 • WL50 • WLA • WLC60/WLC90
CSB-M1240M1241	2 x 0.30 m	No trunk			
CSB-M1241M1241		0.30 m			
CSB-M1248M1241		2.50 m			
CSB-M12415M1241		4.60 m			
CSB-M12425M1241		7.60 m			
CSB-UNT425M1241		7.60 m Unterminated			

Dimensions (mm)

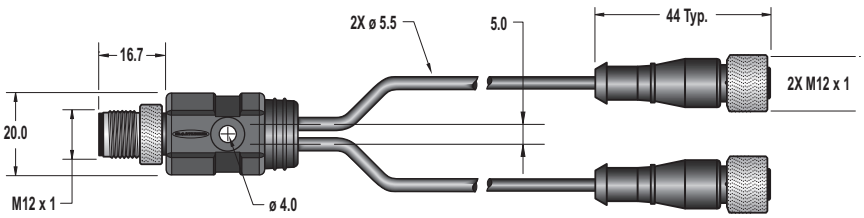


4-Pin Threaded M12/Euro-Style Splitter Cordsets—Rounded Junction

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 60 V ac/75 V dc, 2.0A
Temperature: -40° to +105° C Environmental Rating: IP67
Wiring: Parallel wired Y-cord

Model	Connections: Branches (Female)	Connections: Trunk (Male)	Cable Diameter	Pinout	Used With
CSRB-M1240M1241	0.31 m	No Trunk	5.50 mm	Female  Male  1 = Brown 2 = White 3 = Blue 4 = Black	• Sensors w/4-Pin Euro QD • EZ-LIGHT • DX80 (10 to 30 V dc) • DX85 • WLS28-2 • WL50 • WLA • WLC60/WLC90
CSRB-M1240M1242	0.61 m				
CSRB-M1240M1243	0.91 m				
CSRB-M1240M1244	1.22 m				

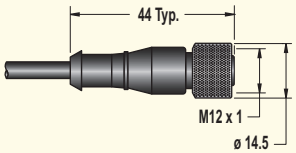
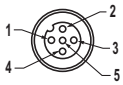
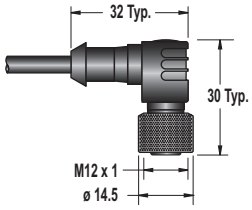
Dimensions (mm)



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

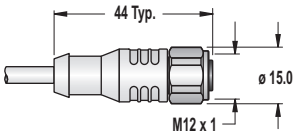
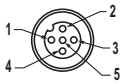
5-Pin Threaded M12/Euro-Style Cordsets

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 250 V ac/dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	0.50 m	MQDC1-501.5	5.60 mm		Female  1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray	• MINI-BEAM *Expert* • QS30 • PicoDot • Q45 Laser Retro • R55F • SL30 & SL30E • SL10 & SL10E • VTB (2-color) • QL56 • Q60 • PVD • STB • K50 • K80 • DX80 • DX81 • DX85 • EZ-LIGHT • STB w/em relay • High-Intensity Area Lights • High-Intensity Ring Lights • Sealed Backlights • R58 *Expert* • QL56
	1.83 m	MQDC1-506				
	4.57 m	MQDC1-515				
	9.14 m	MQDC1-530				
Right-Angle	1.83 m	MQDC1-506RA	5.60 mm			
	4.57 m	MQDC1-515RA				
	9.14 m	MQDC1-530RA				

5-Pin Threaded M12/Euro-Style Cordsets—Washdown

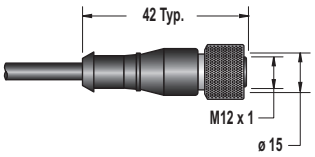
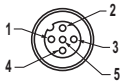
Cable: Polypropylene jacket and connector body, stainless steel coupling nut
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 250 V ac/dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP68

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQDCWD-506	4.50 mm		Female  1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray	• M25U • QM26
	9.14 m	MQDCWD-530				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

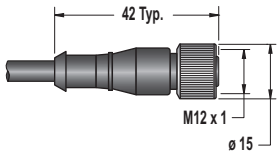
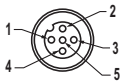
5-Pin Threaded M12/Euro-Style Cordsets

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 20 AWG, gold-plated contacts
Voltage/Current Rating: 250 V ac/dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQDC20-506	6.00 mm		Female  1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray	• High Intensity Area Lights • High Intensity Ring Lights • Sealed Linear Array Lights • Sealed Backlights NOTE: Except stainless steel models
	4.57 m	MQDC20-515				
	9.14 m	MQDC20-530				

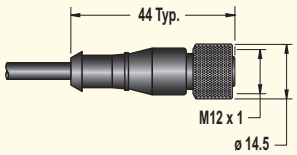
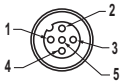
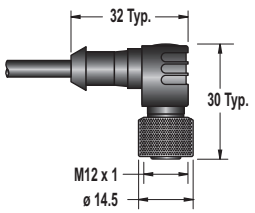
5-Pin Threaded M12/Euro-Style Cordsets

Cable: PVC jacket, PUR (polyurethane) connector body, 316 stainless steel coupling nut
Conductors: 20 AWG, gold-plated contacts
Voltage/Current Rating: 250 V ac/dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQDC20SS-506	6.00 mm		Female  1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray	• Sealed High Intensity Area Lights (Stainless Steel) • Sealed Linear Array Lights (Stainless Steel) • Sealed Backlights
	4.57 m	MQDC20SS-515				
	9.14 m	MQDC20SS-530				

5-Pin Threaded M12/Euro-Style Cordsets with Shield

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG (shielded), gold-plated contacts
Voltage/Current Rating: 250 V ac/dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQDEC2-506	5.60 mm		Female  1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray	• R58E • QT50U dc sensors • S18U • T30U • M25U • Q45U • Q45UR • LX • QT50R • Q120RA
	4.57 m	MQDEC2-515				
	9.14 m	MQDEC2-530				
	15.2 m	MQDEC2-550				
Right-Angle	1.83 m	MQDEC2-506RA	5.60 mm			
	4.57 m	MQDEC2-515RA				
	9.14 m	MQDEC2-530RA				
	15.2 m	MQDEC2-550RA				

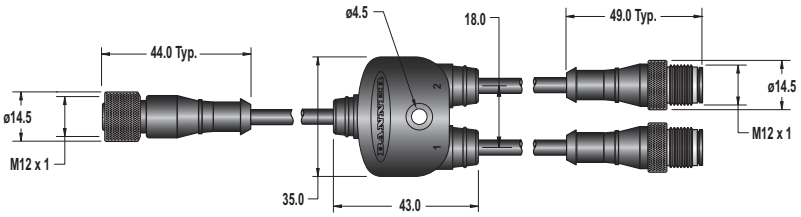
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

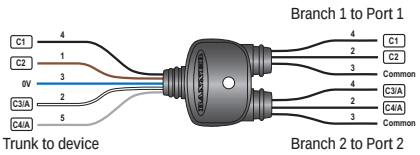
5-Pin Threaded M12/Euro-Style to 4-Pin Threaded M12/Euro Style Splitter Cordset—Flat Junction

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nuts
Conductor: 22 AWG, gold-plated contacts
Voltage/Current Rating: 250 V ac/300 V dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP67
Wiring: Combiner Y-cord

Model	Connections: Branches (Male)	Connections: Trunk (Female)	Cable Diameter	Pinout	Used With
CSF-M12F51M12M41	4-pin Euro QD 2 x 0.31 m	5-pin Euro QD 0.31 m	5.50 mm	Female Male	• 3 or 4 Segmented EZ-LIGHT • 3 or 4 function TL50 Tower Lights NOTE: Use to connect device to a "2-output" I/O block

Dimensions (mm)





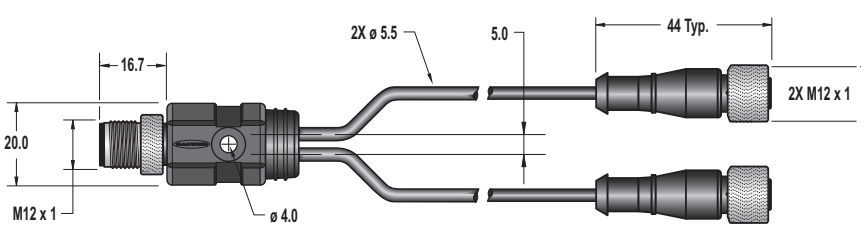
Trunk	Branch 1	Branch 2
1 = Brown	1 = NC	1 = NC
2 = White	2 = Brown	2 = Gray
3 = Blue	3 = Blue	3 = Blue
4 = Black	4 = Black	4 = White
5 = Gray		

5-Pin Threaded M12/Euro-Style Splitter Cordset—Rounded Junction

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductor: 22 AWG, gold-plated contacts
Voltage/Current Rating: 60 V ac/75 V dc, 2.0 A
Temperature: -40° to +105° C Environmental Rating: IP67
Wiring: Parallel wired Y-cord

Model	Connections: Branches (Female)	Connections: Trunk (Male)	Cable Diameter	Pinout	Used With
CSRB-M1250M125.47M125.73	Branch 1 0.14 m Branch 2 0.22 m	No trunk	5.60 mm	Female Male	• EZ-LIGHTs w/5-Pin Euro QD • DX80 (*Flex*Power) • LX

Dimensions (mm)

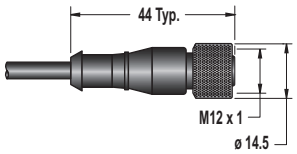
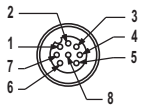


1 = Brown
2 = White
3 = Blue
4 = Black
5 = Green/Yellow

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

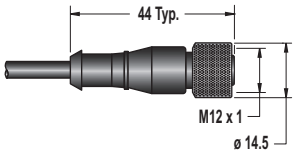
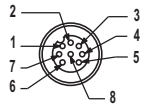
8-Pin Threaded M12/Euro-Style Cordsets with Shield

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 24 AWG (shielded), gold-plated contacts
Voltage/Current Rating: 75 V ac/dc, 2.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQDC-806	5.60 mm		Female  1 = White 5 = Gray 2 = Brown 6 = Pink 3 = Green 7 = Blue 4 = Yellow 8 = Shield	• LT3 • LG5 • LG10
	4.58 m	MQDC-815				
	9.14 m	MQDC-830				

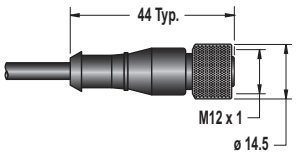
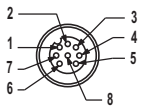
8-Pin Threaded M12/Euro-Style Cordsets with Shield

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 24 AWG (shielded), gold-plated contacts
Voltage/Current Rating: 75 V ac/dc, 2.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MAQDC-806	5.60 mm		Female  1 = White 5 = Gray 2 = Brown 6 = Pink 3 = Green 7 = Blue 4 = Yellow 8 = Red	• EZ-ARRAY Emitters/Receivers
	4.58 m	MAQDC-815				
	9.14 m	MAQDC-830				
	15.2 m	MAQDC-850				

8-Pin Threaded M12/Euro-Style Cordsets with Shield

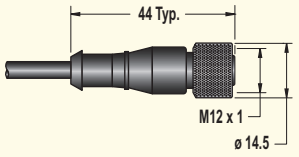
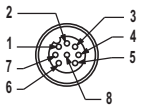
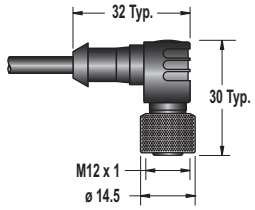
Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 24 AWG (shielded), gold-plated contacts
Voltage/Current Rating: 60 V ac/75 V dc, 2.0 A
Temperature: -40° to +80° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQLH-806-F	6.00 mm		Female  1 = White 5 = Gray 2 = Brown 6 = Green 3 = Shield 7 = Blue 4 = Yellow 8 = Shield	• LH
	4.58 m	MQLH-815-F				
	9.14 m	MQLH-830-F				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

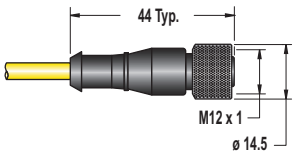
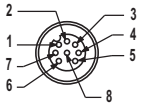
8-Pin Threaded M12/Euro-Style Cordsets with Open-Shield

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 24 AWG (shielded), gold-plated contacts
Voltage/Current Rating: 75 V ac/dc, 2.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQDC2S-806	5.60 mm		Female  1 = White 2 = Brown 3 = Green 4 = Yellow 5 = Gray 6 = Pink 7 = Blue 8 = Red	• QC50 • QCX50 • EZ-LIGHT • iVu TG—Integrated Touch Screen models • E-Stops w/Q8 suffix
	4.57 m	MQDC2S-815				
	9.14 m	MQDC2S-830				
	15.2 m	MQDC2S-850				
Right-Angle	1.83 m	MQDC2S-806RA	5.60 mm			
	4.57 m	MQDC2S-815RA				
	9.14 m	MQDC2S-830RA				
	15.2 m	MQDC2S-850RA				

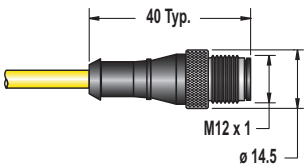
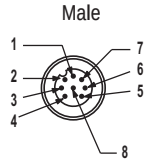
8-Pin Threaded M12/Euro-Style Cordsets

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 75 V ac/dc, 2.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model*	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	4.57 m	QDE-815D	6.00 mm		Female  1 = Brown 5 = Black 2 = Or/Bl 6 = Blue 3 = Orange 7 = Gn/Ye 4 = White 8 = Violet	• EZ-SCREEN w/8-pin QD (14 & 30 mm Resolution) • EZ-SCREEN LP w/8-pin QD (14 & 25 mm Resolution) • EZ-SCREEN w/8-pin QD (Point & Grid) • EZ-SCREEN Type 2
	7.62 m	QDE-825D				
	15.3 m	QDE-850D				
	22.9 m	QDE-875D				
	30.5 m	QDE-8100D				

8-Pin Threaded M12/Euro-Style Cordsets

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 60 V ac/75 V dc, 2.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

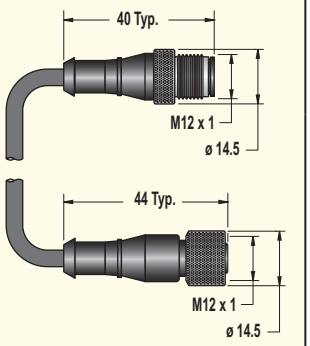
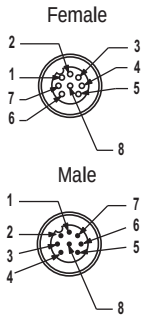
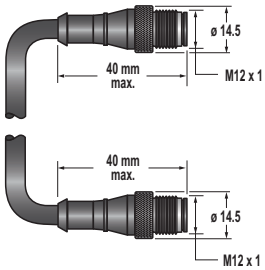
Style	Length	Model*	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	4.57 m	QDE2R4-815D	5.50 mm		Male  1 = Brown 5 = Blue 2 = Not Used 6 = Not Used 3 = Not Used 7 = Not Used 4 = Black 8 = White	• EZ-SCREEN Receiver (Cascade) CSSI QD (14 & 30 mm) • EZ-SCREEN LP Receiver (Cascade) CSSI QD and a DELPEF-810 (14 & 25 mm) NOTE: For connection of E-Stop or other hard/relay contacts.
	7.62 m	QDE2R4-825D				
	15.2 m	QDE2R4-850D				

* Standard cordsets are yellow PVC with black overmold. For black PVC and overmold, add suffix B to model number (example, DEE2R-81DB)

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

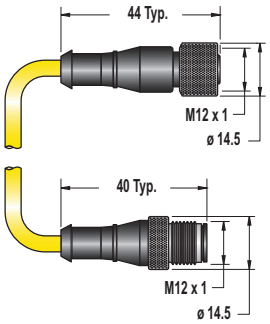
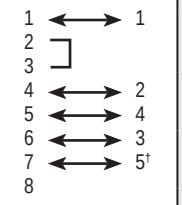
8-Pin Threaded M12/Euro-Style Cordsets with Shield—Double Ended

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 24 AWG (shielded), gold-plated contacts
Voltage/Current Rating: 60 V ac/75 V dc, 2.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Male Straight/ Female Straight	1.83 m	MQLH-806-MF	6.00 mm		 1 = White 5 = Gray 2 = Brown 6 = Green 3 = Shield 7 = Blue 4 = Yellow 8 = Shield	• LH
	4.57 m	MQLH-815-MF				
	9.14 m	MQLH-830-MF				
Male Straight/ Male Straight	0.30 m	MQLH-801-MM	6.00 mm			

8-Pin Threaded M12/Euro-Style Cordsets—Double Ended

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 60 V ac/75 V dc, 2.0 A
Temperature: -40° to +105° C Environmental Rating: IP68

Style	Length	Model* 8-pin/ 8-pin	8-pin/ 4-pin**†	8-pin/ 5-pin**	Cable Diameter	Dimensions (mm)	Pinout	Used With
Female Straight/ Male Straight	0.31 m	DEE2R-81D	DEE8-41D	DEE8-51D	6.00 mm			• EZ-SCREEN w/8-pin QD (14 & 30 mm Resolution) • EZ-SCREEN LP w/8-pin QD (14 & 25 mm Resolution) • EZ-SCREEN w/8-pin QD (Point & Grid) • EZ-SCREEN Type 2 (DEE2R only) • AC Interface Boxes (DEE2R only) • E-Stops 8-pin QD w/Q8 suffix
	0.91 m	DEE2R-83D	—	—				
	2.44 m	DEE2R-88D	DEE8-48D	DEE8-58D				
	4.57 m	DEE2R-815D	DEE8-415D	DEE8-515D				
	7.62 m	DEE2R-825D	DEE8-425D	DEE8-525D				
	15.2 m	DEE2R-850D	—	—				
	22.9 m	DEE2R-875D	—	—				
	30.5 m	DEE2R-8100D	—	—				

* Standard cordsets are yellow PVC with black overmold. For black PVC and overmold, add suffix B to model number (example, DEE2R-81DB)
** For connection to safety BUS gateway/node, a "smart" self-monitored safety module, safety controller or safety PLC.
† DEE8-4..D do not have the pin 5 GND/chassis connection. GND/chassis connection should be made via the mounting hardware.

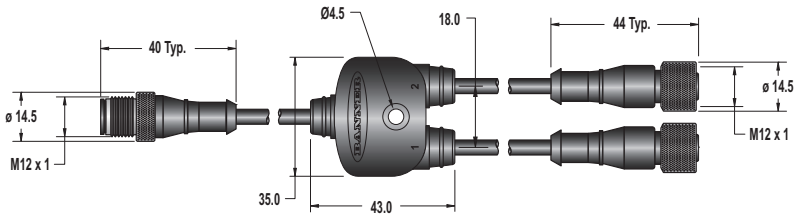
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

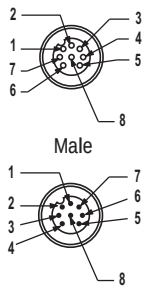
8-Pin Threaded M12/Euro-Style Splitter Cordsets with Shield—Flat Junction

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 24 AWG (shielded), gold-plated contacts
Voltage/Current Rating: 60 V ac/75 V dc, 2.0 A
Temperature: -40° to +80° C Environmental Rating: IP67
Wiring: Parallel wired Y-cord

Model	Connections: Branches (Female)	Connections: Trunk (Male)	Cable Diameter	Pinout	Used With
CSB-M1280M1280-LH	No branches	No trunk	6.00 mm	Female / Male	• LH
CSB-M1281M1282-LH	0.60 m	0.30 m			

Dimensions (mm)





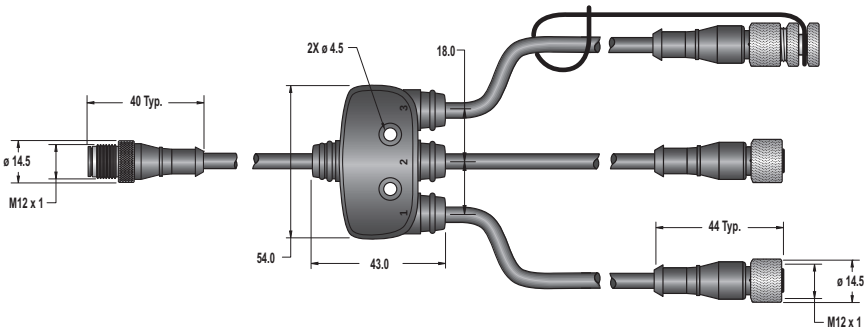
1 = White 5 = Gray
2 = Brown 6 = Green
3 = Shield 7 = Blue
4 = Yellow 8 = Shield

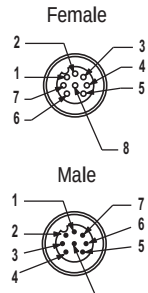
8-Pin Threaded M12/Euro-Style Splitter Cordsets with Shield—Flat Junction

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 24 AWG (shielded), gold-plated contacts
Voltage/Current Rating: 60 V ac/75 V dc, 2.0 A
Temperature: -40° to +150° C Environmental Rating: IP67
Wiring: Parallel wired Y-cord

Model	Connections: Branches (Female)	Connections: Trunk (Male)	Cable Diameter	Pinout	Used With
CSB3-M1281M1282-LH	0.60 m	0.30 m	6.00 mm	Female / Male	• LH

Dimensions (mm)





1 = White 5 = Gray
2 = Brown 6 = Green
3 = Shield 7 = Blue
4 = Yellow 8 = Shield

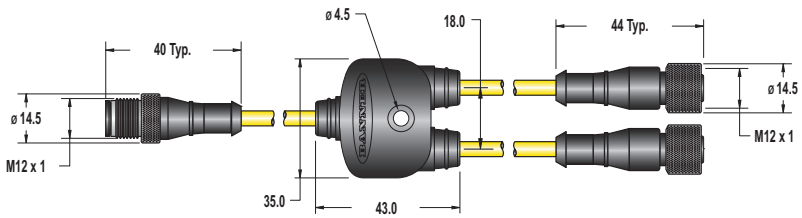
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

8-Pin Threaded M12/Euro-Style Splitter Cordsets—Flat Junction

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 60 V ac/75 V dc, 2.0 A
Temperature: -40° to +105° C Environmental Rating: IP68
Wiring: Parallel wired Y-cord

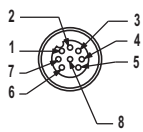
Model	Connections: Branches (Female)	Connections: Trunk (Male)	Cable Diameter
CSB-M1280M1280	No branches	No trunk	6.00 mm
CSB-M1281M1281	2 x 0.3 m	0.3 m	
CSB-M1288M1281		2.5 m	
CSB-M12815M1281		4.6 m	
CSB-M12825M1281		7.6 m	
CSB-UNT825M1281*		7.6 m Unterminated	

Dimensions (mm)

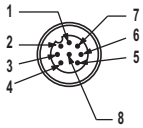


Pinout

Female



Male



1 = Brown 5 = Black
2 = Or/Bk 6 = Blue
3 = Orange 7 = Gn/Ye
4 = White 8 = Violet

Used With

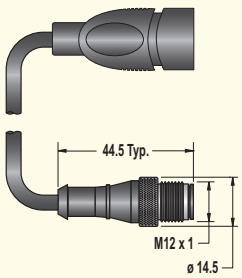
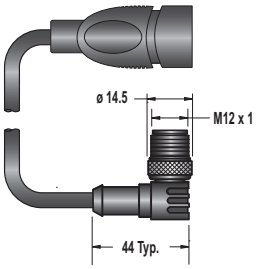
- EZ-ARRAY
- EZ-LIGHT Indicator Lights
- EZ-SCREEN w/8-pin QD (14 & 30 mm Resolution)
- EZ-SCREEN LP w/8-pin QD (14 & 25 mm Resolution)
- EZ-SCREEN w/8-pin QD (Point & Grid)
- EZ-SCREEN Type 2
- AC Interface Boxes

*Unterminated cordset is not compatible with the EZ-ARRAY

* Standard cordsets are yellow PVC with black overmold. For black PVC and overmold, add suffix B to model number (example, CSB-M1280M1280B).

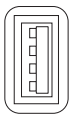
8-Pin Threaded M12/Euro-Style to USB Cordsets—Double Ended

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut on Euro QD end
Conductors: 28 AWG or 24 AWG, gold-plated contacts
Voltage Rating: 60 V ac/75 V dc
Temperature: -40° to +90° C

Style	Length	Model	Cable Diameter	Dimensions (mm)
Straight Euro QD/ USB	0.15 m	MQDEC-8005-USB	4.80 mm	
	0.30 m	MQDEC-801-USB		
	0.90 m	MQDEC-803-USB		
	3.00 m	MQDEC-810-USB		
Right-Angle Euro QD/ USB	0.15 m	MQDEC-8005RA-USB	4.80 mm	
	0.30 m	MQDEC-801RA-USB		
	0.90 m	MQDEC-803RA-USB		
	3.00 m	MQDEC-810RA-USB		

Pinout

USB



Male



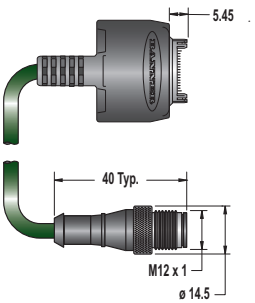
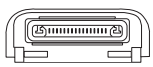
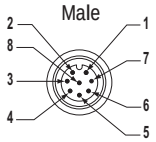
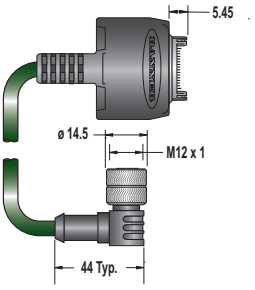
Used With

- iVu TG & BCR—Integrated Touch Screen models

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

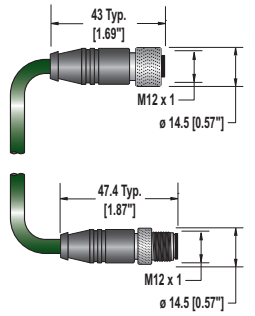
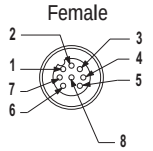
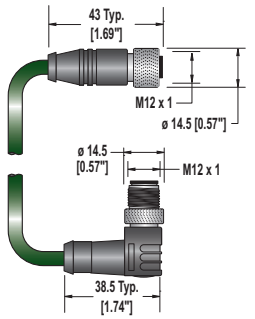
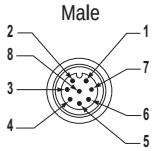
8-Pin Threaded M12/Euro-Style to Molex Cordsets—Double Ended

Cable: Euro: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Molex: Nylon (polyamide)/PUR (polyurethane)
Conductors: 24 AWG, gold-plated contacts
Voltage Rating: 30 V ac/dc 2.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight Euro QD/ Molex	0.91 m	IVURD-MX-803	6.10 mm		Molex  Male  1 = Orange 5 = Green 2 = Brown 6 = Blue 3 = Wh/Bn 7 = Wh/Or 4 = Wh/Bl 8 = Wh/Gn	• iVu RD35 remote display
	1.83 m	IVURD-MX-806				
	4.57 m	IVURD-MX-815				
	9.14 m	IVURD-MX-830				
	15.2 m	IVURD-MX-850				
Right-Angle Euro QD/ Molex	0.91 m	IVURD-MX-803RA	6.10 mm			
	1.83 m	IVURD-MX-806RA				
	4.57 m	IVURD-MX-815RA				
	9.14 m	IVURD-MX-830RA				
	15.2 m	IVURD-MX-850RA				

8-Pin Threaded M12/Euro-Style—Double Ended

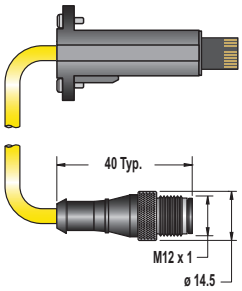
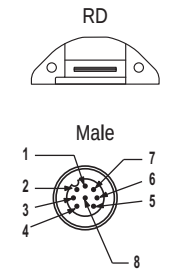
Cable: Euro: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Molex: Nylon (polyamide)/PUR (polyurethane)
Conductors: 24 AWG, gold-plated contacts
Voltage Rating: 30 V ac/dc 2.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight Euro QD/ Molex	0.91 m	IVURDM-QD-803	6.10 mm		Female  1 = Wh/Or 5 = Wh/Bl 2 = Green 6 = Blue 3 = Wh/Bn 7 = Wh/Gn 4 = Orange 8 = Brown	• iVu RDM35 remote display
	1.83 m	IVURDM-QD-806				
	4.57 m	IVURDM-QD-815				
	9.14 m	IVURDM-QD-830				
	15.2 m	IVURDM-QD-850				
Right-Angle Euro QD/ Molex	0.91 m	IVURDM-QD-803RA	6.10 mm		Male  1 = Orange 5 = Green 2 = Brown 6 = Blue 3 = Wh/Bn 7 = Wh/Or 4 = Wh/Bl 8 = Wh/Gn	
	1.83 m	IVURDM-QD-806RA				
	4.57 m	IVURDM-QD-815RA				
	9.14 m	IVURDM-QD-830RA				
	15.2 m	IVURDM-QD-850RA				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

8-Pin Threaded M12/Euro-Style QD to RD Cordsets

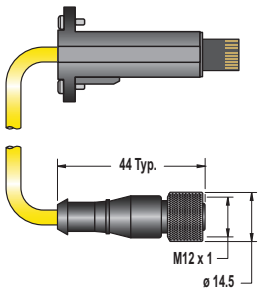
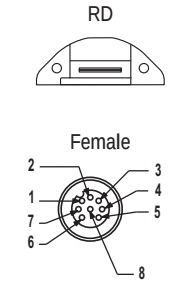
Cable: Euro: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
RD: Nylon (polyamide)/PUR (polyurethane) RD connector
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 60 V ac/75 V dc, 2.0 A
Temperature: 0° to +55° C Environmental Rating: IP67

Style	Length	Model*	Cable Diameter	Dimensions (mm)	Pinout	Used With
RD/ Male Straight	0.31 m	DELPE-81D	6.00 mm		 1 = Brown 5 = Black 2 = Or/Bk 6 = Blue 3 = Orange 7 = Gn/Ye 4 = White 8 = Violet	• EZ-SCREEN LP w/RD (14 & 25 mm Resolution) NOTE: Requires QDE-8...D, DEE2R-8..D, CSB-M128... or other M12/Euro QD cordset
	0.91 m	DELPE-83D				
	2.44 m	DELPE-88D				
	4.57 m	DELPE-815D				
	7.62 m	DELPE-825D				
	15.2 m	DELPE-850D				
	22.9 m	DELPE-875D				
	30.5 m	DELPE-8100D				

* Standard cordsets are yellow PVC with black overmold. For black PVC cable and overmold, add suffix B to model number (example, DELPE-81DB).

8-Pin Threaded M12/Euro-Style QD to RD Cordsets

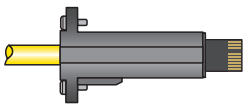
Cable: Euro: PVC jacket, PVC connector body, nickel-plated brass coupling nut
RD: Nylon (polyamide)/PUR (polyurethane) RD connector
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 60 V ac/75 V dc, 2.0 A
Temperature: 0° to +55° C Environmental Rating: IP67

Style	Length	Model*	Cable Diameter	Dimensions (mm)	Pinout	Used With
RD/ Female Straight	0.31 m	DELPEF-81D	6.00 mm		 1 = Brown 5 = Black 2 = Or/Bk 6 = Blue 3 = Orange 7 = Gn/Ye 4 = White 8 = Violet	• EZ-SCREEN LP (Cascade) w/RD (14 & 25 mm); requires QDE2R4-8…D cordset or connection of E-Stop or other hard/relay contact; for connection to DEE2R-8..D or to EZ-SCREEN LP w/8-pin QD
	0.91 m	DELPEF-83D				
	2.44 m	DELPEF-88D				
	4.57 m	DELPEF-815D				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

RD to Flying Lead Cordsets

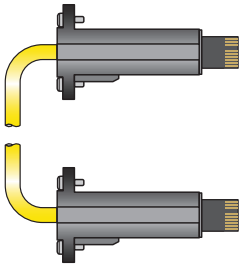
Cable: PVC jacket, nylon (polyamide)/PUR (polyurethane) RD connector
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 60 V ac/75 V dc, 2.0 A
Temperature: 0° to +55° C Environmental Rating: IP67

Style	Length	Model* 8 wire	Model* 4 wire†	Cable Diameter	Dimensions (mm)	Pinout	Used With
RD	4.57 m	RDLP-815D	RDLP6G-415D	6.00 mm		RD 	• EZ-SCREEN LP w/RD (14 & 25 mm Resolution)
	7.62 m	RDLP-825D	RDLP6G-425D				
	15.2 m	RDLP-850D	RDLP6G-450D				
	22.9 m	RDLP-875D	—				
	30.5 m	RDLP-8100D	—				

† For connection of E-Stop or other hard/relay contacts. See EZ-SCREEN installation manual p/n 140044 for more information.

RD to RD Cordsets

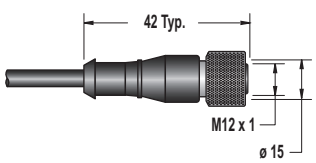
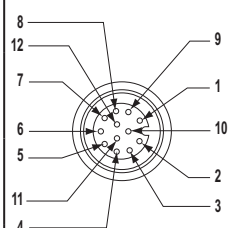
Cable: PVC jacket, nylon (polyamide)/PUR (polyurethane) RD connector
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 60 V ac/75 V dc, 2.0 A
Temperature: 0° to +55° C Environmental Rating: IP67

Style	Length	Model*	Cable Diameter	Dimensions (mm)	Pinout	Used With
RD/RD	0.05 m	DELP-110E	6.00 mm		RD 	• EZ-SCREEN LP w/RD Cascading (14 & 25 mm Resolution)
	0.30 m	DELP-111E				
	0.91 m	DELP-113E				
	2.44 m	DELP-118E				
	4.57 m	DELP-1115E				
	7.62 m	DELP-1125E				
	15.2 m	DELP-1150E				
	22.9 m	DELP-1175E				
	30.5 m	DELP-11100E				

* Standard cordsets are yellow PVC with black overmold. For black PVC cable and overmold, add suffix B to model number (example, DELP-110EB).

12-Pin M12/Euro-Style Cordsets with Open Shield

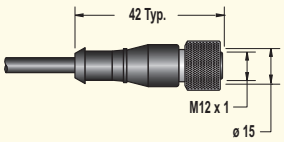
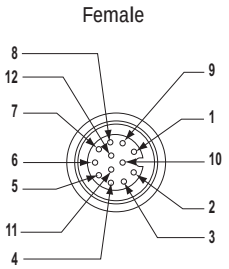
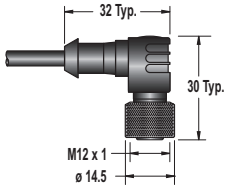
Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 20 and 24 AWG, gold-plated contacts
Voltage Rating: 250 V ac/300 V dc
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQDC2S-1206	7.50 mm		Female  1 = White, 2 = Brown, 3 = Green, 4 = Yellow, 5 = Gray, 6 = Pink, 7 = Blue, 8 = Red, 9 = Orange, 10 = Lt. Blue, 11 = Black, 12 = Violet	• IP68 Sealed *P4* • iVu BCR—Integrated Touch Screen models • iVu Plus (For CE compliance)
	4.57 m	MQDC2S-1215				
	9.14 m	MQDC2S-1230				
	15.2 m	MQDC2S-1250				
	22.9 m	MQDC2S-1275				

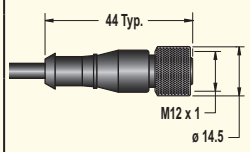
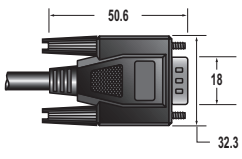
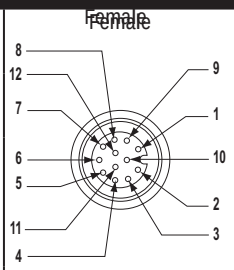
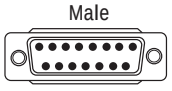
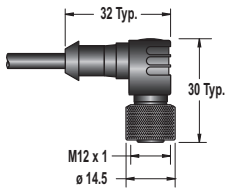
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

12-Pin M12/Euro-Style Cordsets

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 24, 20 AWG, gold-plated contacts
Voltage Rating: 300 V ac/dc, 2.0,7.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	iVUC-1206	7.50 mm		 1 = White 7 = Blue 2 = Brown 8 = Red 3 = Green 9 = Orange 4 = Yellow 10 = Lt. Blue 5 = Gray 11 = Black 6 = Pink 12 = Violet	• iVu TG & BCR Remote Touch Screen models • iVu BCR—Integrated Touch Screen models • iVu Plus
	4.57 m	iVUC-1215				
	9.14 m	iVUC-1230				
	15.2 m	iVUC-1250				
	22.9 m	iVUC-1275				
Right-Angle	1.83 m	iVUC-1206RA	7.50 mm			
	4.57 m	iVUC-1215RA				
	9.14 m	iVUC-1230RA				
	15.2 m	iVUC-1250RA				
	22.9 m	iVUC-1275RA				

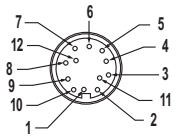
12-Pin Threaded M12/Euro-Style QD to DB15 Cordsets

Style	Length	Model	Cable Diameter	Dimensions (mm)		Pinout	Used With
Straight (High Flex)/ DB15	1.83 m	PPC06SHF	7.60 mm			 1 = Blue 7 = Not Used 2 = Violet 8 = Pink 3 = Green 9 = Gray 4 = Red 10 = Brown 5 = White 11 = Yellow 6 = Black 12 = Drain Male 	• *Pro* • Mini *Pro* • Sealed *Pro*
	3.96 m	PPC13SHF					
	7.01 m	PPC23SHF					
	9.75 m	PPC32SHF					
Right-Angle (High Flex)/ DB15	1.83 m	PPC06SRAHF	7.60 mm				
	3.96 m	PPC13SRAHF					
	7.01 m	PPC23SRAHF					
	9.75 m	PPC32SRAHF					

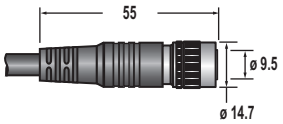
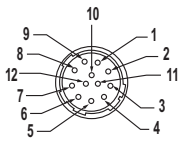
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

12-Pin M16 Cordsets

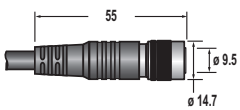
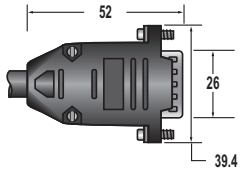
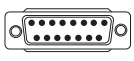
Cable: PVC jacket, nickel-plated brass coupling nut
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 60 V ac/dc, 4.0 A
Temperature: 40° to +80° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	3.05 m	MQDC-1210ST	7.60 mm		Female  1 = White 7 = Red 2 = Brown 8 = Black 3 = Green 9 = Violet 4 = Yellow 10 = Gy/Pk 5 = Gray 11 = Rd/Bu 6 = Pink 12 = Blue	• LT7
	9.14 m	MQDC-1230ST				
	24.4 m	MQDC-1280ST				

12-Pin QD Cordsets

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	P4C06	7.70 mm		Female  1 = Yellow 7 = White 2 = Gray 8 = Lt. Blue 3 = Orange 9 = Violet 4 = Pink 10 = Green 5 = Black 11 = Blue 6 = Red 12 = Brown Shield = Bare Metal	• *P4* • PPSIM with terminal strip to *P4*
	7.01 m	P4C23				
	9.75 m	P4C32				
	15.2 m	P4C50				
	22.9 m	P4C75				
	34.0 m	P4C110				

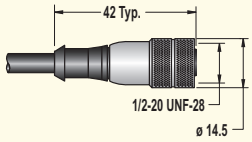
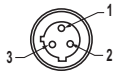
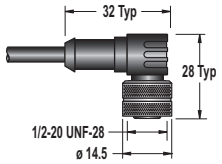
12-Pin QD to DB15 Cordsets

Style	Length	Model	Cable Diameter	Dimensions (mm)		Pinout	Used With
Straight/ DB15	2.00 m	P4C06SIM	6.9 mm			Female  Male 	• *P4* to PPSIM
	7.00 m	P4C23SIM					
	10.0 m	P4C32SIM					

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

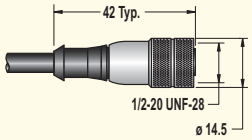
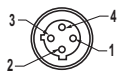
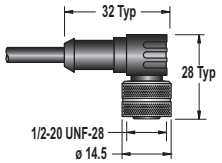
3-Pin Micro-Style Cordsets

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 250 V ac/dc, 4.0 A
Temperature: -40 to +80° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQDC-306	5.20 mm		Female  1 = Green 2 = Red/Black 3 = Red/White	• MINI-BEAM ac SM2A312 sensors
	4.57 m	MQDC-315				
	9.14 m	MQDC-330				
Right-Angle	1.83 m	MQDC-306RA	5.20 mm			
	4.57 m	MQDC-315RA				
	9.14 m	MQDC-330RA				

4-Pin Micro-Style Cordsets

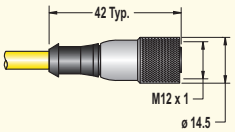
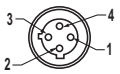
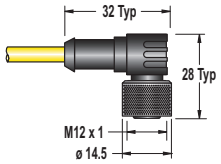
Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 250 V ac/dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQAC-406	5.70 mm		Female  1 = Red/Black 2 = Red/White 3 = Red 4 = Green	• QS18 ac/dc sensors • Q45 ac series (suffix Q1) • S18, M18, T18, Q25, S30, T30 & Q40 ac sensors (suffix Q1) • Q60 ac series
	4.57 m	MQAC-415				
	9.14 m	MQAC-430				
Right-Angle	1.83 m	MQAC-406RA	5.70 mm			
	5.00 m	MQAC-415RA				
	9.14 m	MQAC-430RA				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

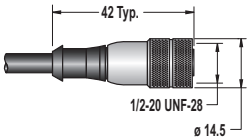
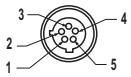
4-Pin Micro-Style Cordsets

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG, gold-plated contacts
Voltage Rating: 125 V ac/150 V dc
Temperature: -40° to +80 °C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQEAC-406	5.7 mm		Female  1 = Red/Black 2 = Red/White 3 = Red 4 = Green	• SI-HG80 hinge-style switches
	4.57 m	MQEAC-415				
	9.14 m	MQEAC-430				
Right-Angle	1.83 m	MQEAC-406RA	5.70 mm			
	4.57 m	MQEAC-415RA				
	9.14 m	MQEAC-430RA				

5-Pin Micro-Style Cordsets

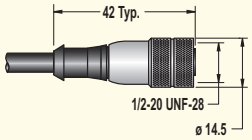
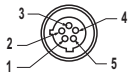
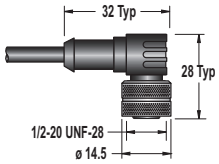
Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 250 V ac/dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQAC2-506	6.10 mm		Female  1 = Brown 2 = Blue 3 = White 4 = Black 5 = Gray	
	4.57 m	MQAC2-515				
	9.14 m	MQAC2-530				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

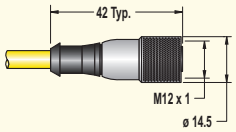
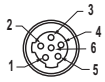
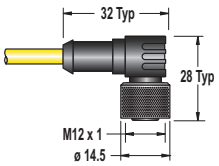
5-Pin Micro-Style Cordsets with Shield

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG with 22 AWG drain wire (shielded), gold-plated contacts
Voltage/Current Rating: 250 V ac/dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQVR3S-506	6.10 mm		Female  1 = Brown 2 = White 3 = Yellow 4 = Black 5 = Blue	• QT50U ac/dc sensors • EZ-LIGHT ac indicators
	4.57 m	MQVR3S-515				
	9.14 m	MQVR3S-530				
Right-Angle	1.83 m	MQVR3S-506RA	6.10 mm			
	4.57 m	MQVR3S-515RA				
	9.14 m	MQVR3S-530RA				

6-Pin Micro-Style Cordsets

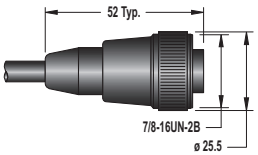
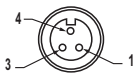
Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 22 AWG, gold-plated contacts
Voltage/Current Rating: 125 V ac, 4.0 A
Temperature: -40° to +80° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MQEAC-606	5.60 mm		Female  1 = Red/White 2 = Red 3 = Green 4 = Red/Yellow 5 = Red/Black 6 = Red/Blue	• SI-HG63 hinge-style switches
	4.57 m	MQEAC-615				
	9.14 m	MQEAC-630				
Right-Angle	1.83 m	MQEAC-606RA	5.60 mm			
	4.57 m	MQEAC-615RA				
	9.14 m	MQEAC-630RA				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

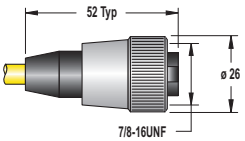
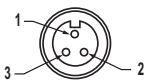
3-Pin Mini-Style Cordsets

Cable: PVC jacket, PUR (polyurethane) connector body, nylon coupling nut
Conductors: 18 AWG, PVC insulation, gold-plated contacts
Voltage/Current Rating: 300 V ac/dc, 9.0 A
Temperature: -40° to +80° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MBCC-306	7.00 mm		Female  1 = Brown 3 = Blue 4 = Black	• Q45
Straight	3.66 m	MBCC-312				
Straight	9.14 m	MBCC-330				
Straight	1.83 m	SMICC-306				• SMI30 Intrinsically safe dc sensors
Straight	3.66 m	SMICC-312				
Straight	9.14 m	SMICC-330				
Straight	1.83 m	SM30CC-306			1 = Red/Black 3 = Red/White 4 = Green	• SM30 2-wire ac sensors
Straight	3.66 m	SM30CC-312				

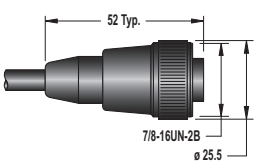
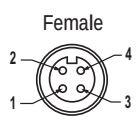
3-Pin Mini-Style Cordsets

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 18 AWG, PVC insulation, gold-plated contacts
Voltage Rating: 250 V ac/300 dc
Temperature: -40° to +80° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	4.75 m	QDS-315C	7.00 mm		Female  1 = Green/Ye 2 = Brown 3 = Blue	• EZ-SCREEN Emitters w/3-pin mini-style QD (Point & Grid) • EZAC Box w/3-pin mini-style QD
Straight	7.62 m	QDS-325C				
Straight	15.2 m	QDS-350C				
Straight	22.9 m	QDS-375C				
Straight	30.5 m	QDS-3100C				

4-Pin Mini-Style Cordsets

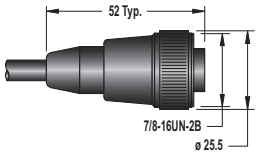
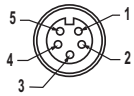
Cable: PVC jacket, PUR (polyurethane) connector body, nylon coupling nut
Conductors: 18 AWG, gold-plated contacts
Voltage/Current Rating: 300 V ac/dc, 9.0 A
Temperature: -40° to +80° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MBCC-406	7.00 mm		Female  1 = Brown 2 = White 3 = Blue 4 = Black	• Q45 dc sensors (suffix Q) • OMNI-BEAM dc power blocks • SM30 dc sensors • OTB w/solid-state output • STB with solid-state output • Q45 4-wire ac/dc
Straight	3.66 m	MBCC-412				
Straight	9.14 m	MBCC-430				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

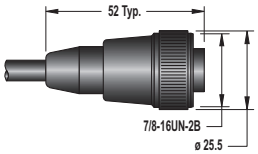
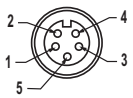
5-Pin Mini-Style Cordsets

Cable: PVC jacket, PUR (polyurethane) connector body, nylon coupling nut
Conductors: 18 AWG, gold-plated contacts
Voltage/Current Rating: 300 V ac/dc, 9.0 A
Temperature: -40° to +80° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MBCC-506	7.00 mm		Female  1 = Black 2 = Blue 3 = Yellow 4 = Brown 5 = White	• Q45 Laser Retro • OMNI-BEAM ac power blocks • OMNI-BEAM dc w/ e/m relay • OTB & LTB w/SPDT relay • Q45 5-wire ac • STB with e/m relay
	3.66 m	MBCC-512				
	9.14 m	MBCC-530				

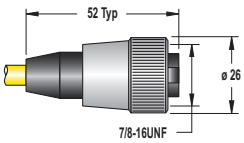
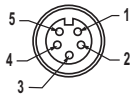
5-Pin Mini-Style Cordsets with Shield

Cable: PVC jacket, PUR (polyurethane) connector body, nylon coupling nut
Conductors: 22 AWG (shielded), PVC insulation, gold-plated contacts
Voltage/Current Rating: 300 V ac/dc, 9.0 A
Temperature: -40° to +80° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	1.83 m	MBCC2-506	6.10 mm		Female  1 = Brown 2 = White 3 = Blue 4 = Black 5 = Yellow	• QT50U • Q45U • Q45UR
	3.66 m	MBCC2-512				
	9.14 m	MBCC2-530				

5-Pin Mini-Style Cordsets with Green/Yellow Grounding Wire

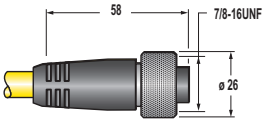
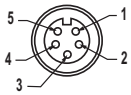
Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 20 AWG, gold-plated contacts
Voltage/Current Rating: 250 V ac/300 V dc, 9.0 A
Temperature: -40° to +90° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	4.75 m	QDS-515C	7.00 mm		Female  1 = Black 2 = Blue 3 = Gn/Ye 4 = Brown 5 = White	• EZ-SCREEN Receivers w/5-pin mini-style QD & TEST (Point & Grid) • EZAC Box w/5-pin mini-style QD
	7.62 m	QDS-525C				
	15.2 m	QDS-550C				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

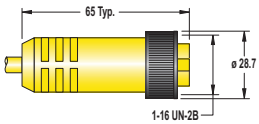
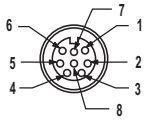
5-Pin Mini-Style Cordsets with Shield and "Twisted Pair"

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut
Conductors: 20 AWG (shielded), PVC insulation, gold-plated contacts
Voltage Rating: 250 V ac/300 V dc
Temperature: -40° to +90° C Environmental Rating: IP67

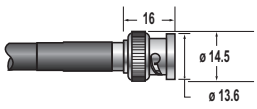
Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	4.57 m	QDC-515C	7.00 mm		Female  1 = Black 2 = Blue 3 = Drain 4 = Brown 5 = White	• MINI-ARRAY • High-Resolution MINI-ARRAY
	7.62 m	QDC-525C				
	15.2 m	QDC-550C				
	22.9 m	MAQDC-575C				
	30.5 m	MAQDC-5100C				
	38.1 m	MAQDC-5125C				
	45.7 m	MAQDC-5150C				

8-Pin Mini-Style Cordsets

Cable: PVC jacket, PUR (polyurethane) connector body, nylon coupling nut
Conductors: 20 AWG, PVC insulation, gold-plated contacts
Voltage Rating: 250 V ac/300 V dc
Temperature: -40° to +80° C Environmental Rating: IP67

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Straight	4.51 m	QDS-815C	6.90 mm		Female  1 = Brown 2 = Or/Bk 3 = Orange 4 = White 5 = Black 6 = Blue 7 = Gn/Ye 8 = Violet	• EZ-SCREEN Receivers w/8-pin mini-style QD (Point & Grid) • DUO-TOUCH SG Run Bar • EZAC Box w/8-pin mini-style QD
	7.62 m	QDS-825C				
	15.2 m	QDS-850C				
	22.9 m	QDS-875C				

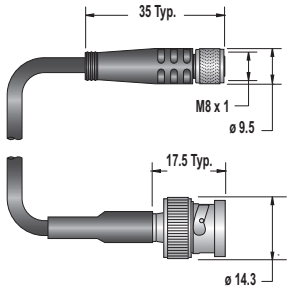
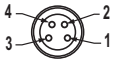
BNC Coaxial Video Cordsets

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Video Coaxial with BNC	1.83 m	BNC06	6.00 mm		Male 	• *Pro* • *P4*
	4.57 m	BNC15				
	9.14 m	BNC30				
	14.6 m	BNC48				

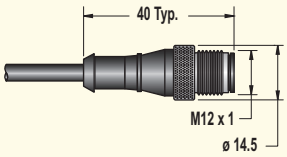
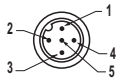
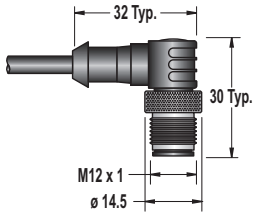
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

BNC to 4-Pin Threaded M8/Pico-Style Cordsets with Shield

Cable: PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut on QD end
Conductors: 26 AWG
Voltage/Current Rating: 125 V ac/125 V dc, 4.0 A
Temperature: -40° to +105° C Environmental Rating: IP67

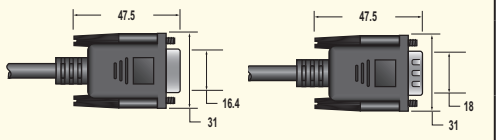
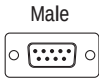
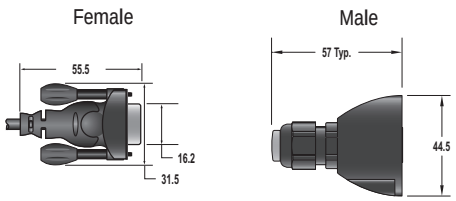
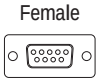
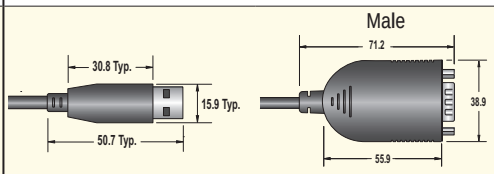
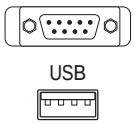
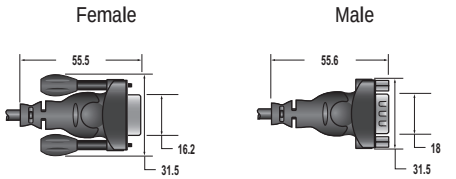
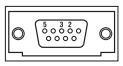
Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
BNC/ Pico QD Straight	2.00 m	PKG4M-2/CS	4.40 mm		Female  1 = Brown 3 = Blue 2 = Not Used 4 = Drain Male 	• IP68 Sealed *P4*
	5.00 m	PKG4M-5/CS				
	9.00 m	PKG4M-9/CS				

Communication Cordsets

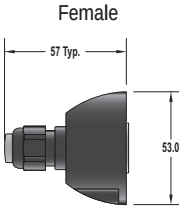
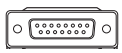
Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
5-Pin M12/ Euro-Style, Straight	1.83 m	MQDMC-506	5.60 mm		Male  1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray	• EZ-ARRAY to INTUSB485-1 USB Serial Adapter
	4.57 m	MQDMC-515				
	9.14 m	MQDMC-530				
5-Pin M12/ Euro-Style, Right-Angle	1.83 m	MQDMC-506RA	5.60 mm			
	4.57 m	MQDMC-515RA				
	9.14 m	MQDMC-530RA				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DB9 Communication Cordsets

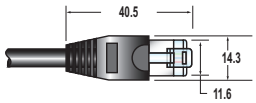
Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Male DB9/ Female DB9	1.83 m	DB9P06	6.00 mm		 Male	• *Pro*
	4.57 m	DB9P15				
	9.14 m	DB9P30				
Male DB9/ Female DB9	3.00 m	AG4-PCD9-3	5.00 mm		 Female	• AG4
	5.00 m	AG4-PCD9-5				
	10.0 m	AG4-PCD9-10				
Male DB9/USB	1.00 m	AG4-PCD9USB-1	4.6 mm		 Male USB	• AG4 Serial-to USB Adapter
Male DB9/ Female DB9	2.00 m	MASC	5.00 mm		 Female 2 = Transmit (TX) 3 = Receive (RX) 5 = Ground (GRD)	• MINI-ARRAY • High-Resolution MINI-ARRAY

DB15 Configuration/Machine Interface Cordsets

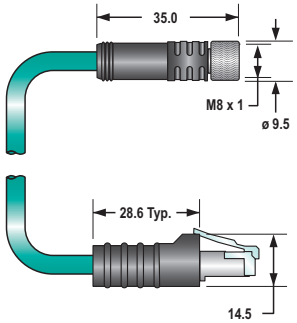
Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
DB15	5.00 m	AG4-CPD15-5	8.50 mm		 Female	• AG4
	10.0 m	AG4-CPD15-10				
	25.0 m	AG4-CPD15-25				
	50.0 m	AG4-CPD15-50				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

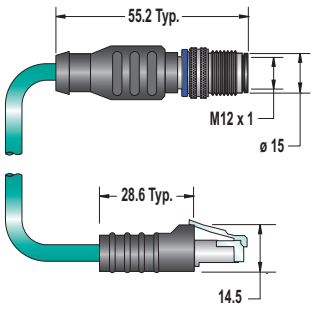
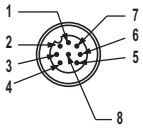
RJ45 Ethernet Cordsets

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Cat5e Shielded	2.13 m	STP07	6.80 mm		Male 	• *Pro* • *P4* • SC22-3E
Cat5e Crossover Shielded		STPX07				
Cat5e Shielded	7.62 m	STP25				
Cat5e Crossover Shielded		STPX25				
Cat5e Shielded	15.2 m	STP50				
Cat5e Crossover Shielded		STPX50				
Cat5e Shielded	22.9 m	STP75				
Cat5e Crossover Shielded		STPX75				

RJ45 Ethernet to 4-Pin Threaded M8/Pico-Style Cordsets

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Cat5e Shielded	2.00 m	IVUC-E-406	6.00 mm		Male  Female  1 = Blue 2 = White/Blue 3 = White/Orange 4 = Orange	• iVu Plus
	5.00 m	IVUC-E-415				
	9.00 m	IVUC-E-430				
	16.0 m	IVUC-E-450				
	23.0 m	IVUC-E-475				

RJ45 Ethernet to 8-Pin Threaded M12/Euro-Style Cordsets

Style	Length	Model	Cable Diameter	Dimensions (mm)	Pinout	Used With
Cat5e Shielded	1.83 m	STP-MAQDC-806	7.90 mm		Male  Male  1 = Wh/Bl 2 = Wh/Br 3 = Brown 4 = Orange 5 = Wh/Gr 6 = Wh/Or 7 = Blue 8 = Green	• IP68 Sealed *P4*
	4.57 m	STP-MAQDC-815				
	9.14 m	STP-MAQDC-830				

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

QD End-Caps

Replace or convert EZ-SCREEN Grid and Point hard-wire terminal chamber end cap to QD model.

Style	Model	Dimensions	Used With
8-pin Euro QD	EZA-QDE-8E	Converts terminal chamber end cap to QD model	• EZ-SCREEN Emitters w/Terminal Chamber (Point & Grid)
8-pin Euro QD	EZA-QDR-8E		• EZ-SCREEN Receivers w/Terminal Chamber (Point & Grid)

Unterminated Bulk Cable

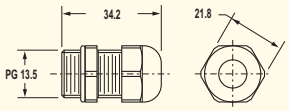
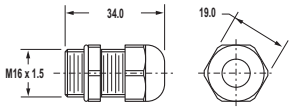
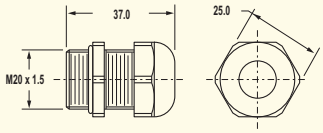
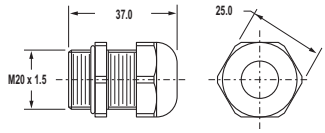
Cable: PVC jacket
Conductors: 20 AWG, PVC insulation
Voltage Rating: 250V ac/300V dc
Temperature: -40° to +80° C

Length	Models	Dimensions	Used With
7.6 m	UTB-325C	3-conductor (Brown, Blue, Green/Yellow)	• EZ-SCREEN Emitters w/Terminal Chamber (Point & Grid) • EZAC Interface Boxes
15.2 m	UTB-350C		
30.4 m	UTB-3100C		
76.2 m	UTB-3250C		
7.6 m	UTB-525C	5-conductor (Black, Blue, Brown, White, Green/Yellow)	• EZ-SCREEN Emitters w/Terminal Chamber & TEST (Point & Grid) • EZAC Interface Boxes
15.2 m	UTB-550C		
30.4 m	UTB-5100C		
76.2 m	UTB-5250C		
7.6 m	UTB-825C	8-conductor (Brown, Orange/Black, Orange, White, Black, Blue, Violet, Green/Yellow)	• EZ-SCREEN Receivers w/Terminal Chamber (Point & Grid) • EZAC Interface Boxes • DUO-TOUCH SG Run Bars
15.2 m	UTB-850C		
30.4 m	UTB-8100C		
76.2 m	UTB-8250C		

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Cable Glands

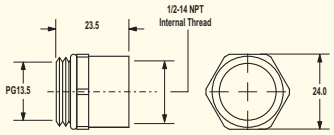
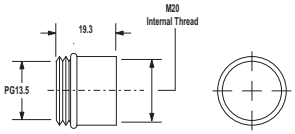
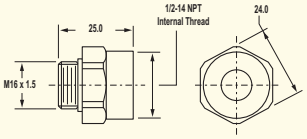
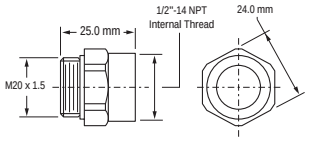
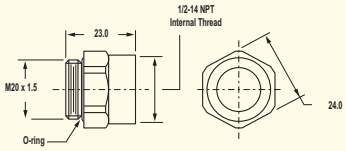
- Secures the cable end in the housing and seals the point of connection
- Available for EZ-SCREEN Point and Grid, rope pulls and safety interlock switches

Model	Size	For Cable Diameter	Dimensions	Used With
SI-QS-CG13	PG13.5 Plastic	3.0 to 8.0 mm		• EZ-SCREEN w/Terminal Chamber (Point & Grid)
SI-QS-CGM16	M16 x 1.5 Plastic	3.0 to 8.0 mm		• SI-QS75 Safety Interlock Switches • SI-LS83 Safety Interlock Switches
SI-QS-CGM20	M20 x 1.5 Plastic	5.0 to 12.0 mm		• SI-QS90 Safety Interlock Switches • SI-LS100 Safety Interlock Switches • SI-LS31 Safety Interlock Switches • SI-LS42 Safety Interlock Switches • RP-LS42 Rope Pull Switches
SI-QM-CGM20	M20 x 1.5 Metal	5.0 to 12.0 mm		• SI-LM40 Safety Interlock Switches • SI-QM100 Safety Interlock Switches • SI-LM40 Safety Interlock Switches • RP-RM83 Rope Pull Switches • RP-LM40 Rope Pull Switches • RP-QM72/QMT72 Rope Pull Switches • RP-QM90 Rope Pull Switch

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Conduit Adapters

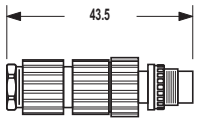
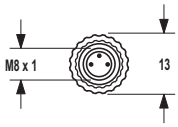
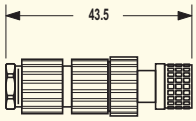
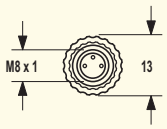
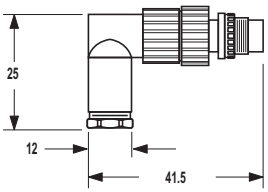
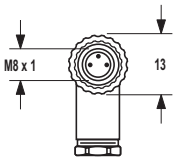
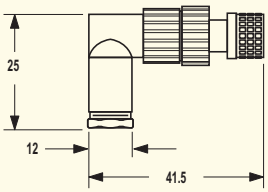
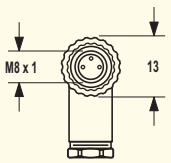
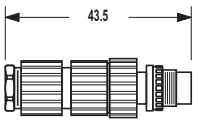
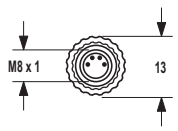
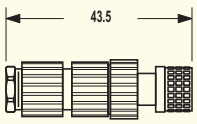
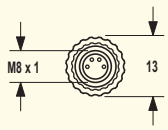
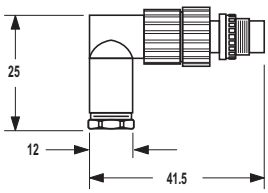
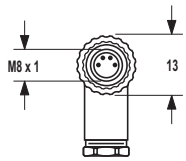
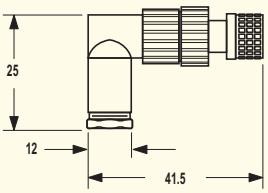
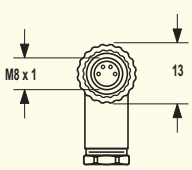
- Connects conduit of different diameters
- Available for EZ-SCREEN Point and Grid, rope pulls and safety interlock switches

Model	Size	Thread Conversion	Dimensions	Used With
SI-QM-13	1/2" NPT to PG13.5 Metal	PG 13.5 to 1/2" NPT		• EZ-SCREEN w/Terminal Chamber (Point & Grid)
SI-QM-13-M20	M20 to PG13.5 Metal	PG 13.5 to M20		• EZ-SCREEN w/Terminal Chamber (Point & Grid)
SI-QS-M16	1/2" – 14 NPT Plastic	M16 x 1.5 to 1/2" – 14 NPT		• SI-QS75 Safety Interlock Switches • SI-LS83 Safety Interlock Switches
SI-QS-M20	1/2" – 14 NPT Plastic	M20 x 1.5 to 1/2" – 14 NPT		• SI-QS90 Safety Interlock Switches • SI-LS100 Safety Interlock Switches • SI-LS31 Safety Interlock Switches • SI-LS42 Safety Interlock Switches • RP-LS42 Rope Pull Switches
SI-QM-M20	1/2" – 14 NPT Metal	M20 x 1.5 to 1/2" – 14 NPT		• SI-LM40 Safety Interlock Switches • SI-QM100 Safety Interlock Switches • SI-LM40 Safety Interlock Switches • RP-RM83 Rope Pull Switches • RP-LM40 Rope Pull Switches • RP-QM72/QMT72 Rope Pull Switches • RP-QM90 Rope Pull Switch

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Pico-Style Field-Wireable Connectors (M8)

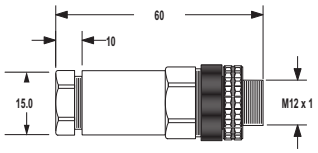
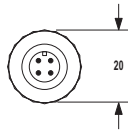
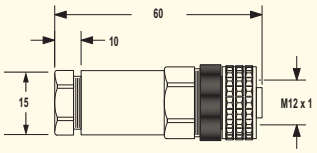
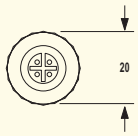
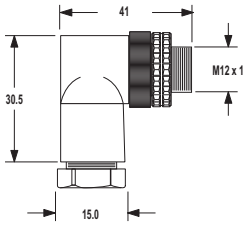
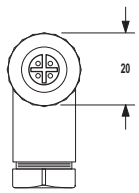
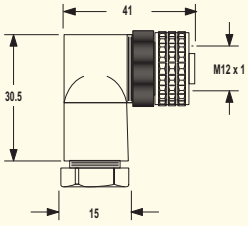
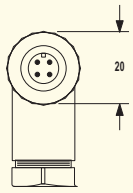
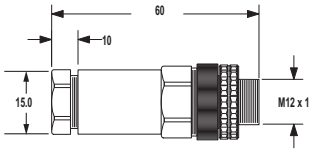
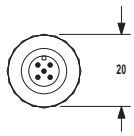
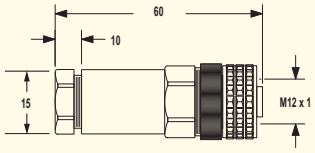
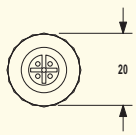
Contacts: Gold-plated, rated 60V ac/dc max., 4.0 A max.
Cable Diameter: 4.0 to 5.0 mm
Temperature: -25° to +70° C
Environmental Rating: NEMA 6P, IP67

Style	Model	Dimensions	Pinout
3-Pin Male Straight	FIC-M8M3		
3-Pin Female Straight	FIC-M8F3		
3-Pin Male Right-Angle	FIC-M8M3A		
3-Pin Female Right-Angle	FIC-M8F3A		
4-Pin Male Straight	FIC-M8M4		
4-Pin Female Straight	FIC-M8F4		
4-Pin Male Right-Angle	FIC-M8M4A		
4-Pin Female Right-Angle	FIC-M8F4A		

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Euro-Style Field-Wireable Connectors (M12)

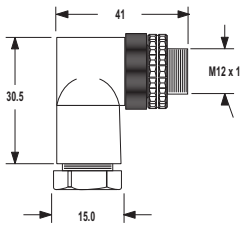
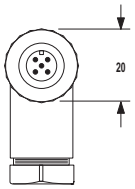
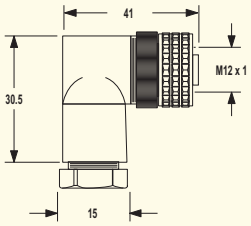
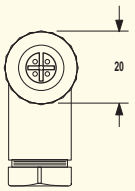
Contacts: Gold-plated; 4-pin models rated 250V ac/dc max., 4.0 A max.; 5-pin models rated 50V ac/dc max., 4.0 A max.
Cable Diameter: 4.0 to 5.0 mm
Temperature: -25° to +90° C
Environmental Rating: NEMA 6P, IP67

Style	Model	Dimensions	Pinout
4-Pin Male Straight	FIC-M12M4		
4-Pin Female Straight	FIC-M12F4		
4-Pin Male Right-Angle	FIC-M12M4A		
4-Pin Female Right-Angle	FIC-M12F4A		
5-Pin Male Straight	FIC-M12M5		
5-Pin Female Straight	FIC-M12F5		

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Euro-Style Field-Wireable Connectors (M12)

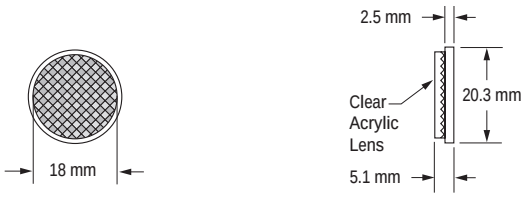
Contacts: Gold-plated; 4-pin models rated 250V ac/dc max., 4.0 A max.; 5-pin models rated 50V ac/dc max., 4.0 A max.
Cable Diameter: 4.0 to 5.0 mm
Temperature: -25° to +90° C
Environmental Rating: NEMA 6P, IP67

Style	Model	Dimensions	Pinout
5-Pin Male Right-Angle	FIC-M12M5A		
5-Pin Female Right-Angle	FIC-M12F5A		

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

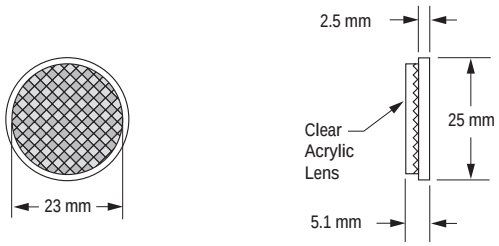
BRT-.6

Description: Round, acrylic target
Reflectivity Factor: 1.0
Temperature: -20° to +60° C



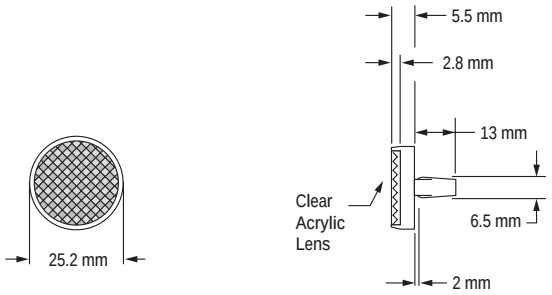
BRT-1

Description: Round, acrylic target
Reflectivity Factor: 1.0
Temperature: -20° to +60° C



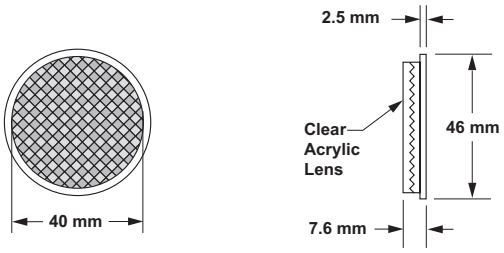
BRT-25R

Description: Round, rivet-secured acrylic target
Reflectivity Factor: 1.0
Temperature: -20° to +60° C



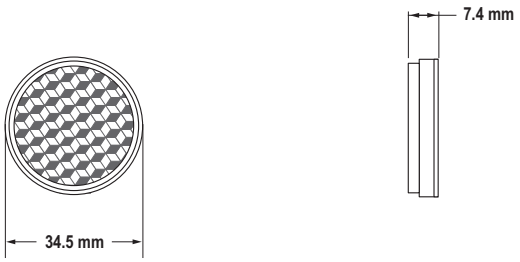
BRT-1.5

Description: Round, acrylic target
Reflectivity Factor: 1.0
Temperature: -20° to +60° C



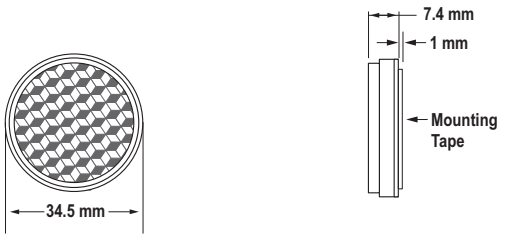
BRT-34

Description: Round, acrylic target
Reflectivity Factor: 1.2
Temperature: -20° to +60° C



BRT-34T

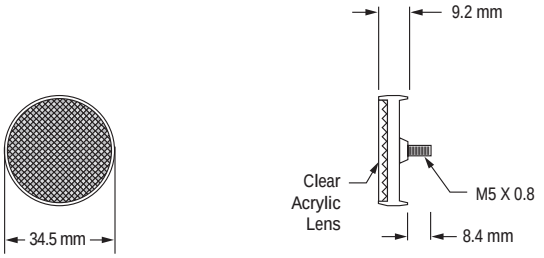
Description: Round, acrylic target includes mounting tape
Reflectivity Factor: 1.2
Temperature: -20° to +60° C



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

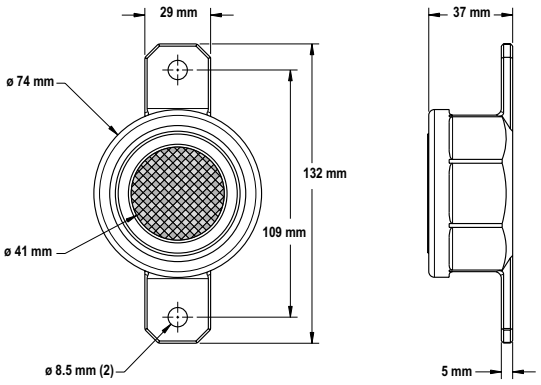
BRT-35DM

Description: Round, acrylic target with mounting stud
Reflectivity Factor: 1.2
Temperature: -20° to +60° C
Other: This target has micro-prism geometry.



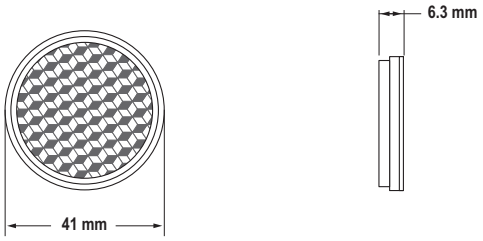
BRT-41AHT

Description: Round, borosilicate (Pyrex type) glass target
Reflectivity Factor: 1.0
Temperature: -20° to +200° C



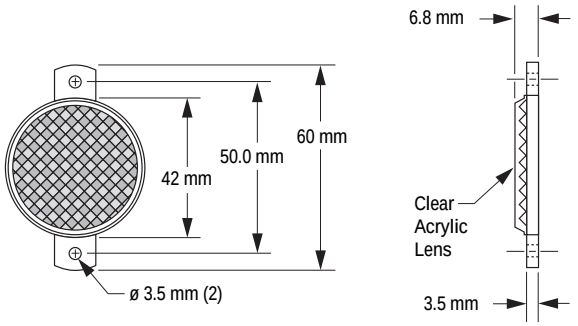
BRT-42

Description: Round, acrylic target
Reflectivity Factor: 1.0
Max. Temperature: 65° C



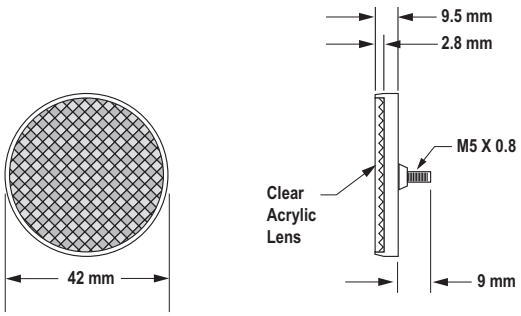
BRT-42A

Description: Round, acrylic target
Reflectivity Factor: 1.0
Temperature: -20° to +60° C



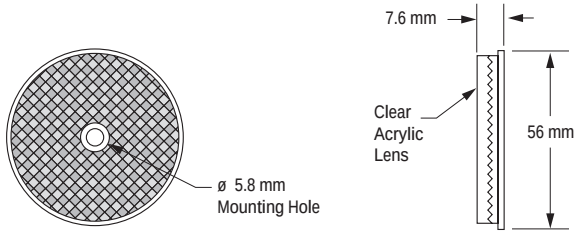
BRT-42D

Description: Round, acrylic target with mounting stud
Reflectivity Factor: 1.0
Temperature: -20° to +60° C



BRT-2A

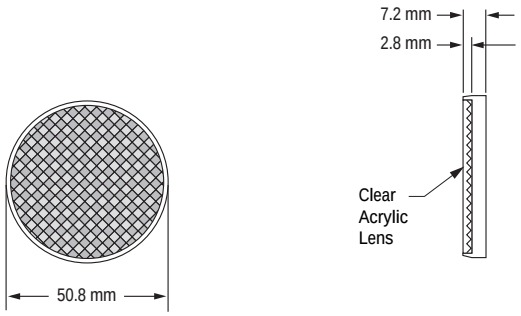
Description: Round, acrylic target
Reflectivity Factor: 1.0
Max. Temperature: 65° C



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

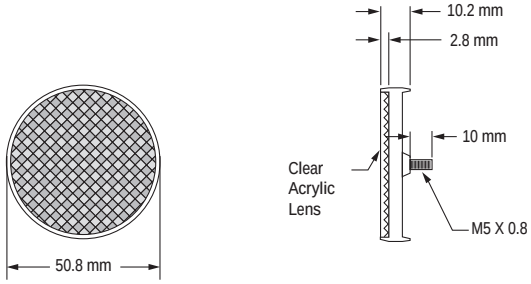
BRT-50

Description: Round, acrylic target
Reflectivity Factor: 1.0
Temperature: -20° to +60° C



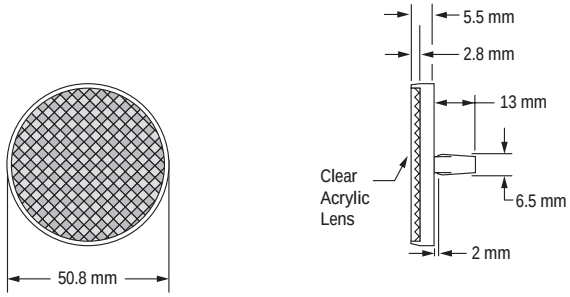
BRT-50D

Description: Round, acrylic target with mounting stud
Reflectivity Factor: 1.0
Temperature: -20° to +60° C
Other: Optional brackets are available.



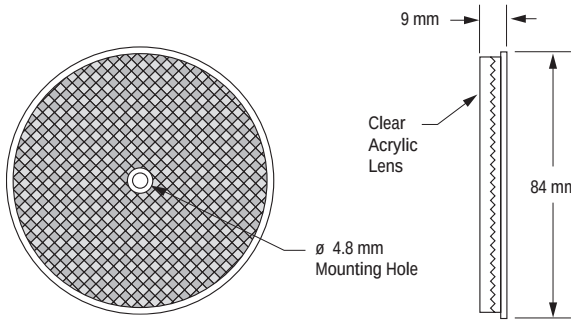
BRT-50R

Description: Round, rivet-secured acrylic target
Reflectivity Factor: 1.0
Max. Temperature: -20° to +60° C
Other: Optional brackets are available.



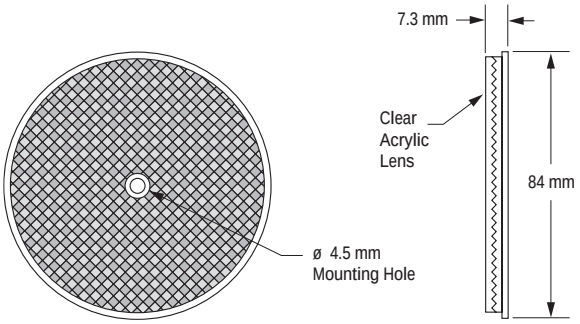
BRT-3

Description: Round, acrylic target
Reflectivity Factor: 1.0
Temperature: -20° to +60° C
Other: Optional brackets are available.



BRT-84

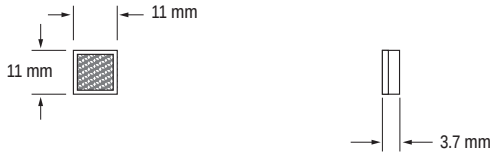
Description: Round, acrylic target
Reflectivity Factor: 1.4
Max. Temperature: -20° to +60° C
Other: Optional brackets are available.



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

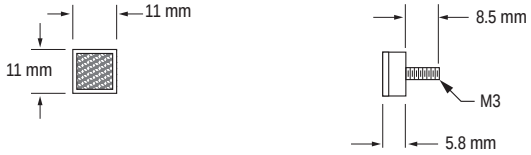
BRT-11X11M

Description: Square, acrylic target
Reflectivity Factor: 1.2
Temperature: -20° to +60° C
Other: This target has micro-prism geometry.



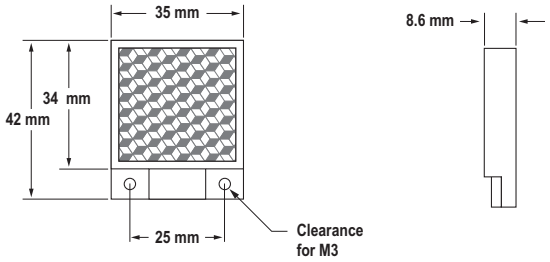
BRT-11X11MD

Description: Square, acrylic target with mounting stud
Reflectivity Factor: 1.2
Temperature: -20° to +60° C
Other: This target has micro-prism geometry.



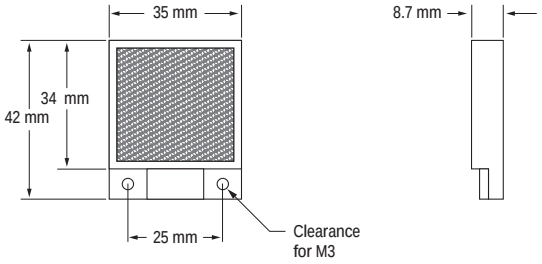
BRT-35X35B

Description: Square, acrylic target
Reflectivity Factor: 1.3
Temperature: -20° to +60° C



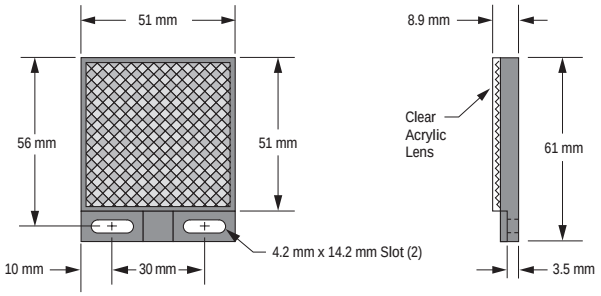
BRT-35X35BM

Description: Square, acrylic target
Reflectivity Factor: 1.2
Temperature: -20° to +60° C
Other: This target has micro-prism geometry.



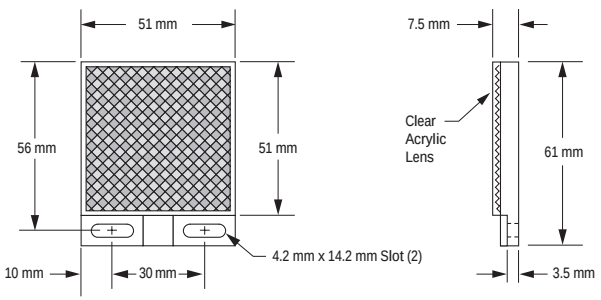
BRT-2X2

Description: Square, acrylic target
Reflectivity Factor: 1.0
Max. Temperature: 50° C
Others: Optional brackets are available.



BRT-2X2LVC

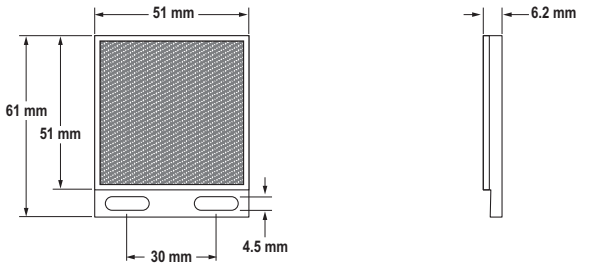
Description: Square, acrylic target
Reflectivity Factor: 1.0
Max. Temperature: -20° to +60° C
Others: Optional brackets are available.



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

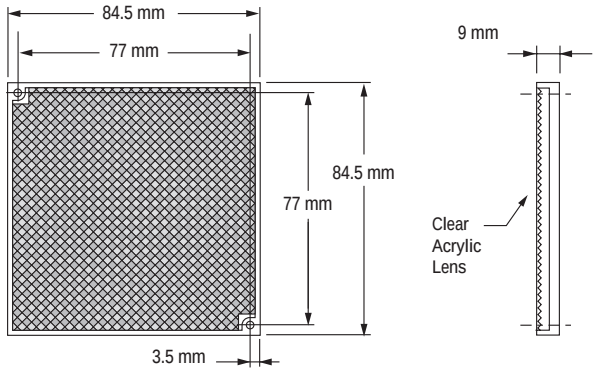
BRT-51X51BM

Description: Square, acrylic target
Reflectivity Factor: 1.5 Max. Temperature: 50° C
Other: This target has micro-prism geometry. Optional brackets are available on
Replaces reflector BRT-36X40BM.



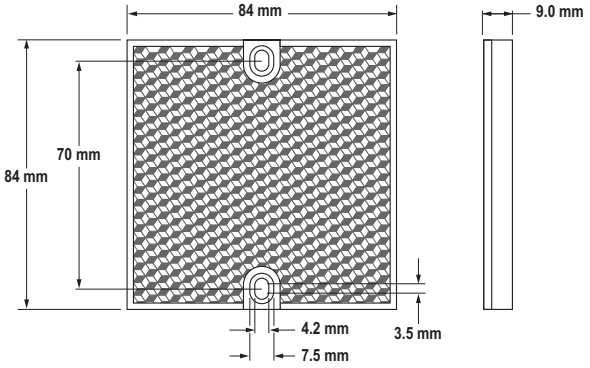
BRT-77X77C

Description: Square, acrylic target
Reflectivity Factor: 2.0
Temperature: -20° to +60° C
Other: Optional brackets are available.



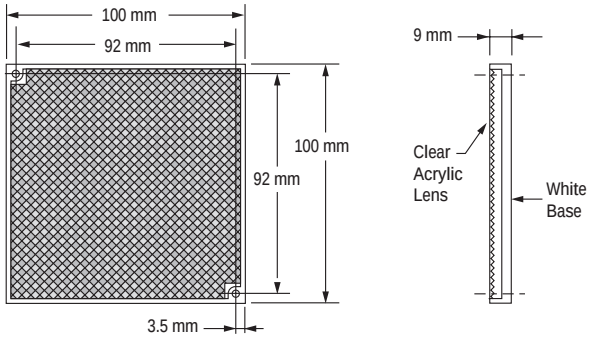
BRT-84X84A

Description: Square, acrylic target
Reflectivity Factor: 2.0
Temperature: -20° to +60° C



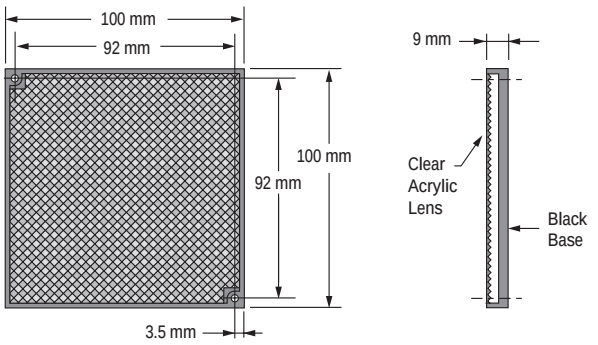
BRT-92X92C

Description: Square, acrylic target
Reflectivity Factor: 3.0
Temperature: -20° to +60° C
Other: Optional brackets are available.



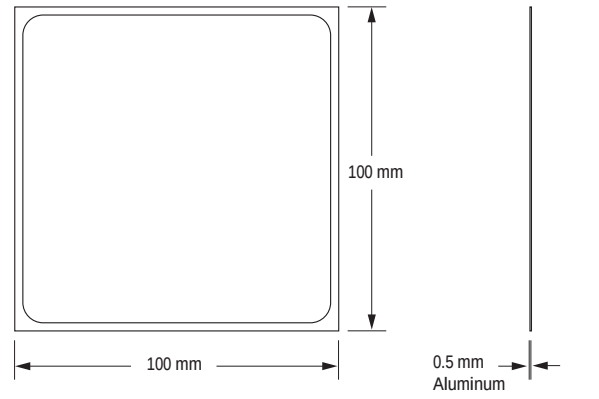
BRT-92X92CB

Description: Square, acrylic target with black mounting base
Reflectivity Factor: 3.0
Max. Temperature: 50° C
Other: Optional brackets are available.



BRT-4HT

Description: Square, aluminum target
Reflectivity Factor: 0.15
Max. Temperature: 480° C
Other: This target is not recommended for polarized retroflective sensors.

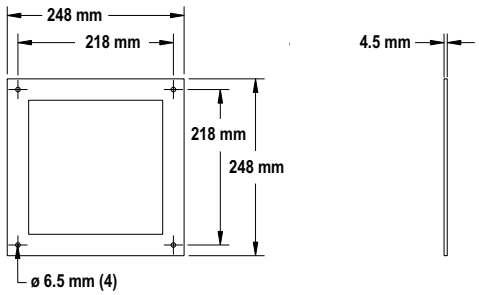


Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

BRT-250

250 x 250 mm

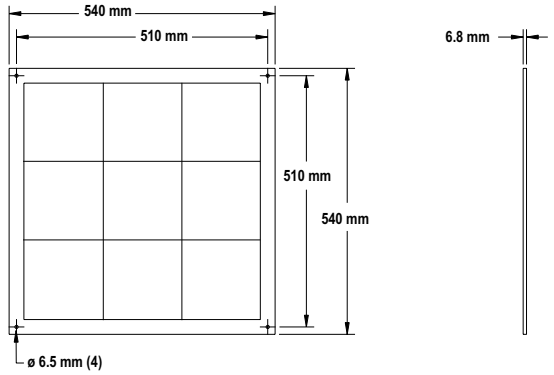
Temperature: -20° to +50° C
Other: Square reflector with rigid aluminum backing for use with LT7



BRT-540

540 x 540 mm

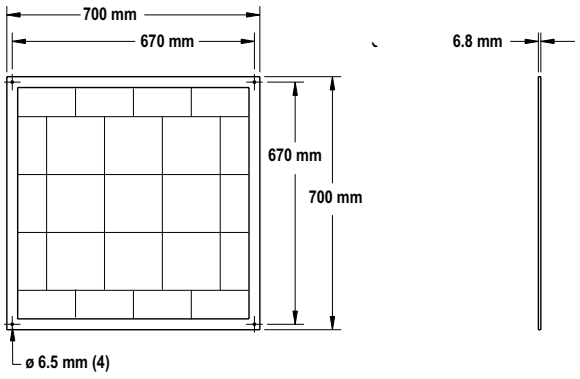
Temperature: -20° to +50° C
Other: Square reflector with rigid aluminum backing for use with LT7



BRT-700

700 x 700 mm

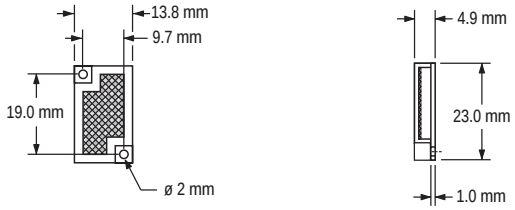
Temperature: -20° to +50° C
Other: Square reflector with rigid aluminum backing for use with LT7



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

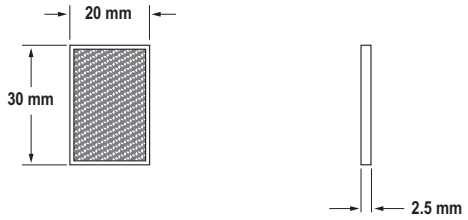
BRT-23X14CM

Description: Rectangular, acrylic target
Reflectivity Factor: 1.2
Temperature: -20° to +60° C
Other: This target has micro-prism geometry.



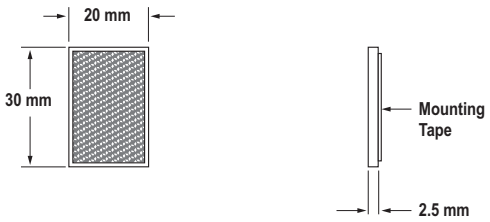
BRT-30X20M

Description: Rectangular, acrylic target
Reflectivity Factor: 1.2
Temperature: -20° to +60° C



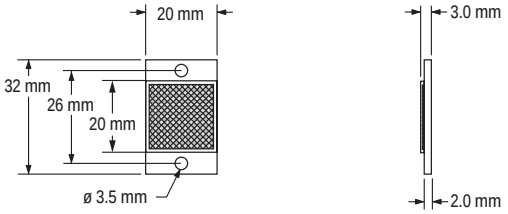
BRT-30X20MT

Description: Rectangular, acrylic target includes mounting tape
Reflectivity Factor: 1.2
Temperature: -20° to 60° C



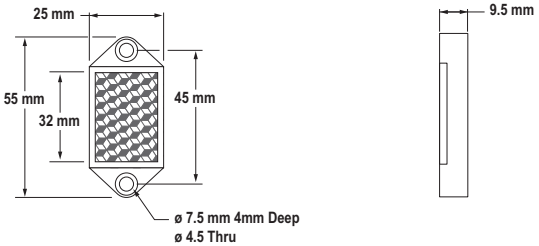
BRT-32X20AM

Description: Rectangular, thin profile acrylic target
Reflectivity Factor: 1.2
Temperature: -20° to +60° C
Other: This target has micro-prism geometry.



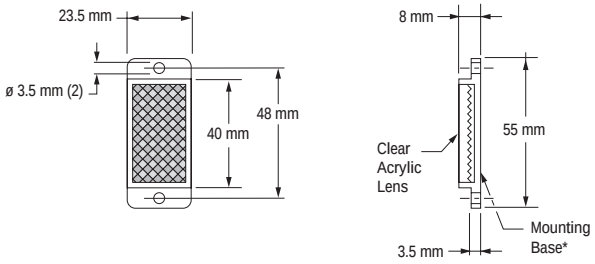
BRT-32X22A

Description: Rectangular, acrylic target
Reflectivity Factor: 1.3
Max. Temperature: 65° C



BRT-35X20A
BRT-35X20AB

Description: Rectangular, acrylic target*
Reflectivity Factor: 1.4
Temperature: -20° to +60° C

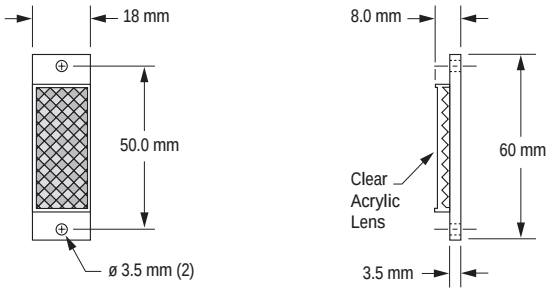


*Mounting base available in white (BRT-35X20A) or black (BRT-35X20AB).

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

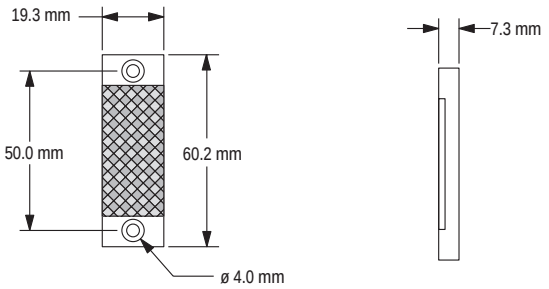
BRT-40X18A

Description: Rectangular, acrylic target
Reflectivity Factor: 1.0
Temperature: -20° to +60° C



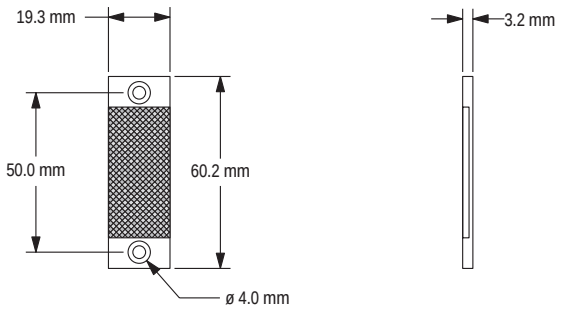
BRT-40X19A

Description: Rectangular, acrylic target
Reflectivity Factor: 1.3
Temperature: -20° to +60° C



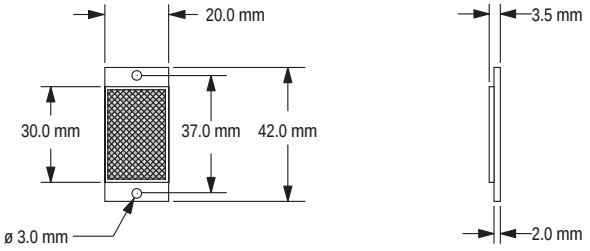
BRT-40X19AM

Description: Rectangular, thin profile acrylic target
Reflectivity Factor: 1.2
Temperature: -20° to +60° C
Other: This target has micro-prism geometry.



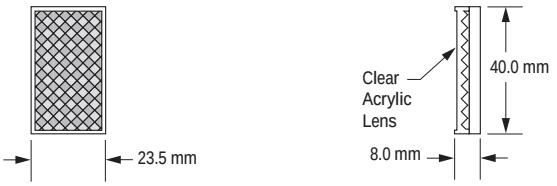
BRT-40X20AM

Description: Rectangular, thin profile acrylic target
Reflectivity Factor: 1.2
Temperature: -20° to +60° C
Other: This target has micro-prism geometry.



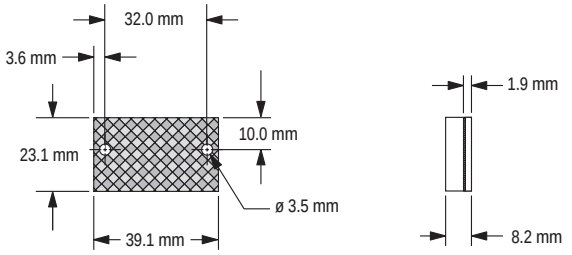
BRT-40X23

Description: Rectangular, acrylic target
Reflectivity Factor: 1.4
Temperature: -20° to +60° C



BRT-40X23A

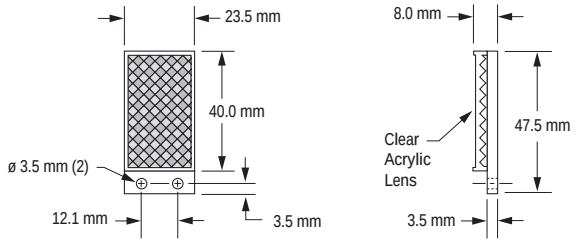
Description: Rectangular, acrylic target
Reflectivity Factor: 1.4
Max. Temperature: -20° to +60° C



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

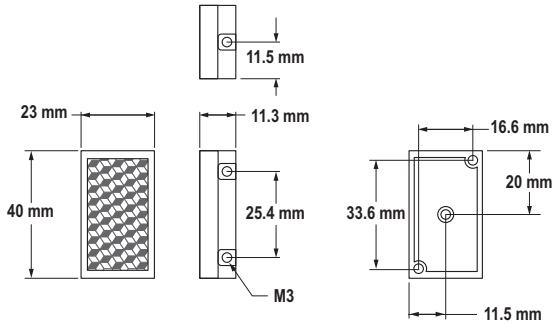
BRT-40X23B

Description: Rectangular, acrylic target
Reflectivity Factor: 1.4
Max. Temperature: -20° to +60° C



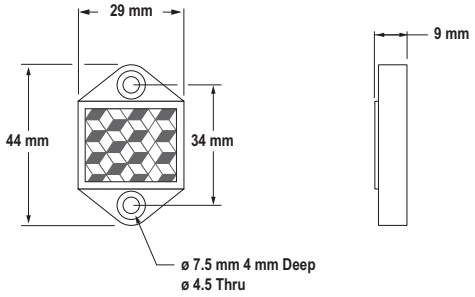
BRT-40X23ABC

Description: Rectangular, acrylic target
Reflectivity Factor: 1.4
Max. Temperature: 50° C



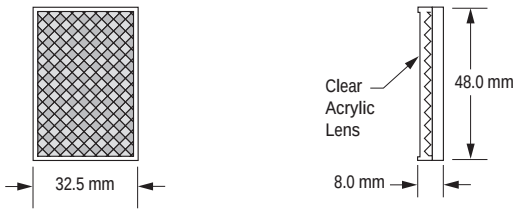
BRT-44X29A6

Description: Rectangular, acrylic target
Reflectivity Factor: 1.1
Max. Temperature: 50° C
Other: 6 mm facets; close to the face retroreflective sensing with bifurcated lens.



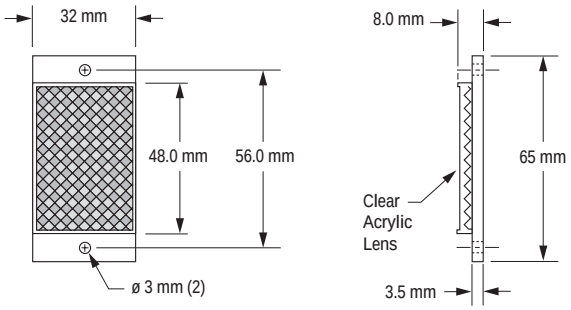
BRT-48X32

Description: Rectangular, acrylic target
Reflectivity Factor: 1.0
Temperature: -20° to +60° C



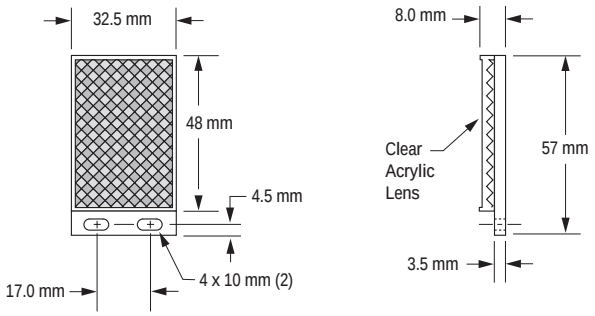
BRT-48X32A

Description: Rectangular, acrylic target
Reflectivity Factor: 1.0
Max. Temperature: -20° to +60° C



BRT-48X32B

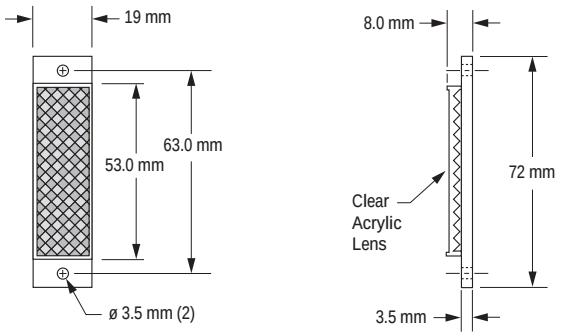
Description: Rectangular, acrylic target
Reflectivity Factor: 1.0
Temperature: -20° to +60° C



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

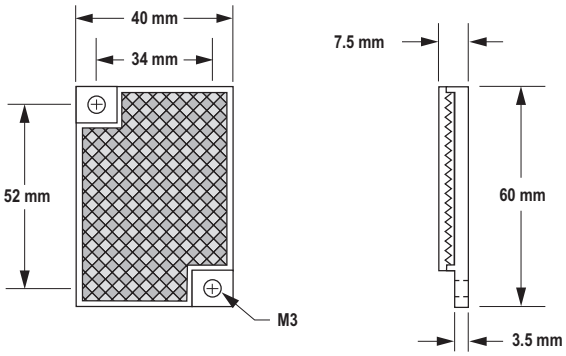
BRT-53X19A

Description: Rectangular, acrylic target
Reflectivity Factor: 1.4
Max. Temperature: -20° to +60° C



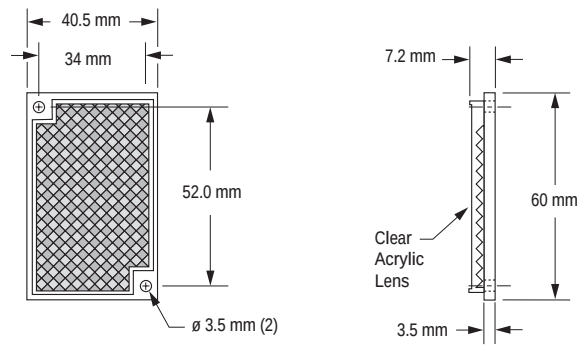
BRT-60X40AF

Description: Rectangular, acrylic target
Reflectivity Factor: 1.4 **Max. Temperature:** -20° to +60° C
Other: Anti-fogging coating for use around steam. Optional brackets are available.



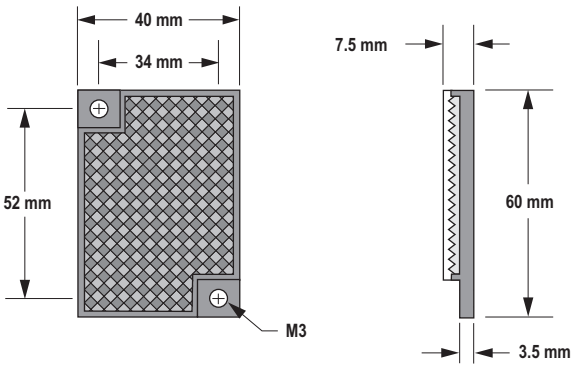
BRT-60X40C

Description: Rectangular, acrylic target
Reflectivity Factor: 1.4 **Max. Temperature:** -20° to +60° C
Other: Optional brackets are available.



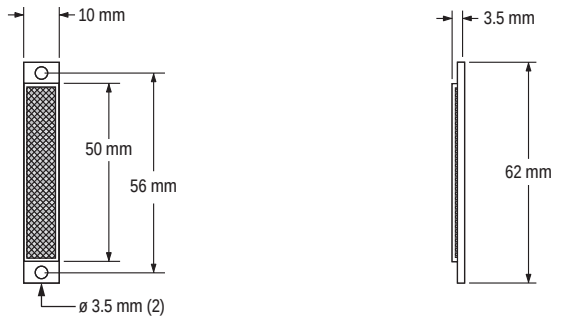
BRT-60X40IP69K

Description: Rectangular, acrylic target (color is amber)
Reflectivity Factor: 0.7 **Max. Temperature:** -20° to 60° C
Other: Chemically resistant and IP69K washdown rated. Optional brackets are available.



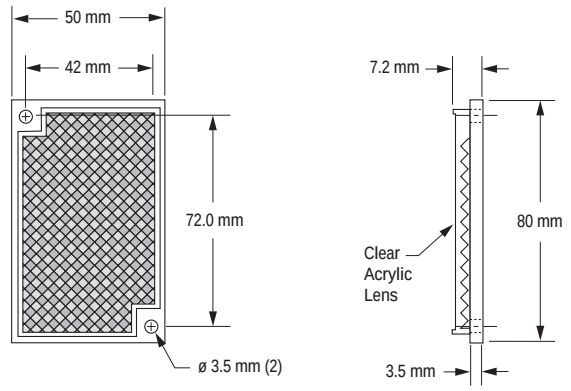
BRT-62X10AM

Description: Rectangular, thin profile acrylic target
Reflectivity Factor: 1.2
Max. Temperature: -20° to +60 C
Other: This target has micro-prism geometry.



BRT-80X50C

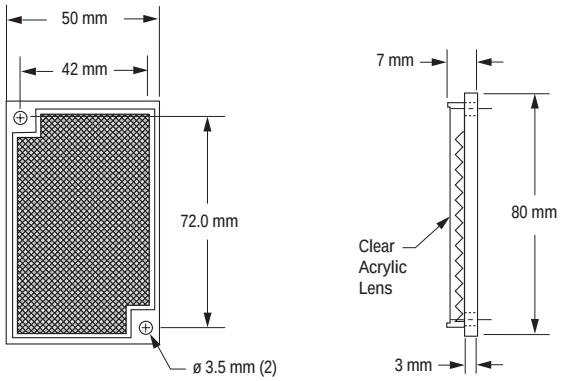
Description: Rectangular, acrylic target
Reflectivity Factor: 1.4
Temperature: -20° to +60° C



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

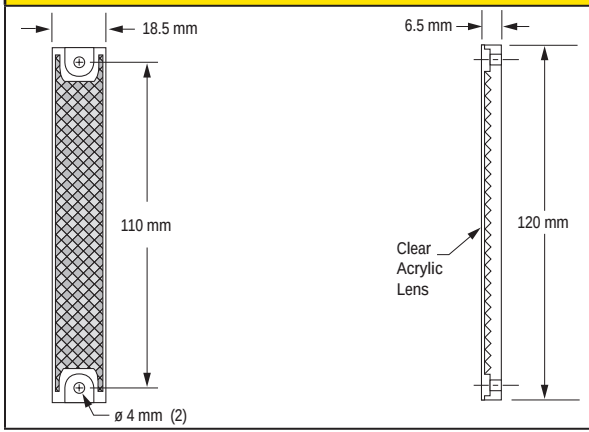
BRT-80X50CM

Description: Rectangular, acrylic target
Reflectivity Factor: 1.4
Temperature: -20° to +60° C
Other: This target has micro-prism geometry.



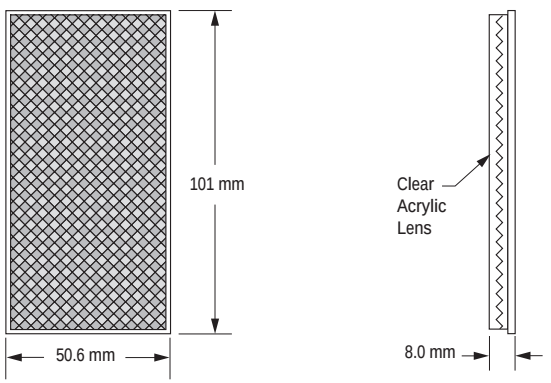
BRT-100X18A

Description: Rectangular, acrylic target
Reflectivity Factor: 1.4
Temperature: -20° to +60° C



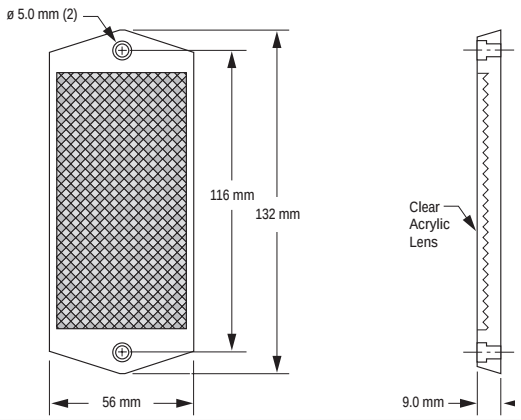
BRT-100X50

Description: Rectangular, acrylic target
Reflectivity Factor: 1.5
Temperature: -20° to +60° C



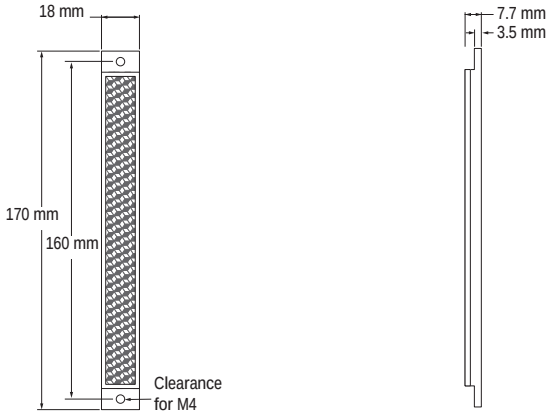
BRT-100X55A

Description: Rectangular, acrylic target
Reflectivity Factor: 1.5
Temperature: -20° to +60° C



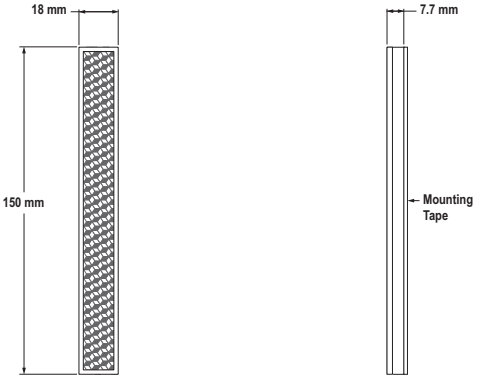
BRT-150X18A

Description: Rectangular, acrylic target
Reflectivity Factor: 1.4
Temperature: -20° to +60° C



BRT-150X18T

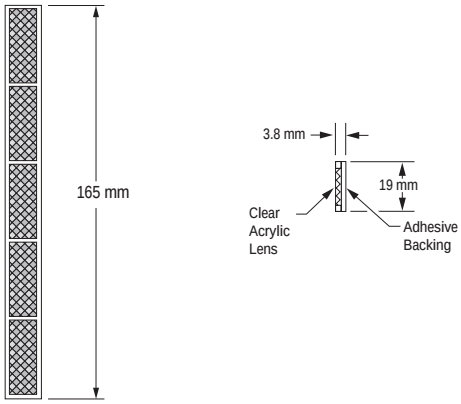
Description: Rectangular, acrylic target includes mounting tape.
Reflectivity Factor: 1.4
Temperature: -20° to 60° C



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

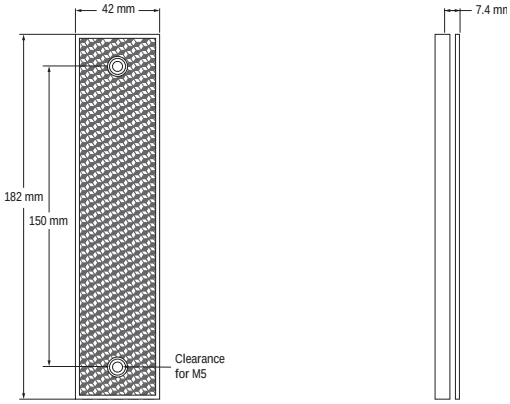
BRT-L

Description: Rectangular, acrylic target
Reflectivity Factor: 0.8
Max. Temperature: 65° C



BRT-180X40A

Description: Rectangular, acrylic target
Reflectivity Factor: 1.4
Temperature: -20° to +60° C



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Retroreflective Tape

NOTE: Sensing range and signal strength at any given sensor-to-target distance will vary due to target reflectivity and target area. A "Reflectivity Factor" is included for each target model to help predict sensor performance, relative to the excess gain curve plotted for target model BRT-3. Consider, also, target area when predicting performance. Changing to a high reflectivity reflector (like BRT-92X92C) may also extend sensor range and/or reduce the need for frequent reflector maintenance. A high reflectivity factor AND large surface area are needed for maximum range.

Reflectivity Factor	Maximum Temperature	Size	Model	Unit
0.7	60° C	75 x 75 mm	BRT-THG-3X3-10	10 per pack
0.7	60° C	100 x 100 mm	BRT-THG-4X4-5	5 per pack
0.7	60° C	216 x 280 mm	BRT-THG-8.5X11-2	2 per pack
0.7	60° C	457 x 914 mm	BRT-THG-18X36	Single sheet
0.7	60° C	25 mm wide	BRT-THG-1-100	2.5 m length
0.7	60° C	50 mm wide	BRT-THG-2-100	2.5 m length
0.7	60° C	75 mm wide	BRT-THG-3-100	2.5 m length
0.07	175° C	25 mm wide	BRT-THT-100†	2.5 m length
0.2	85° C	25 mm wide	BRT-T-100CC	2.5 m length
0.8	60° C	50 x 50 mm	BRT-TVHG-2X2*	4 per pack
0.8	60° C	203 x 254 mm	BRT-TVHG-8X10P†	1 per pack



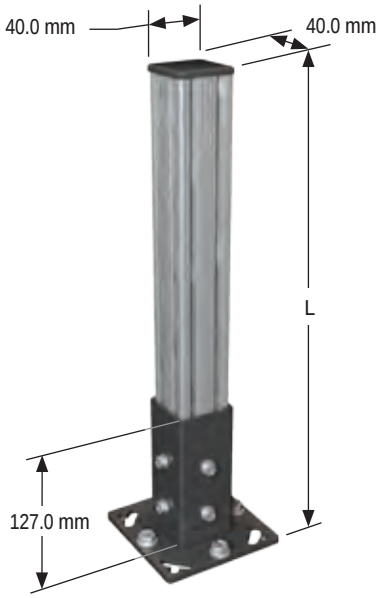
NOTE: Retroreflective material has a pressure-sensitive adhesive. For maximum adhesion, surfaces must be clean and dry before applying. For best results, use full size; target may be trimmed as necessary.

† These targets are not recommended for polarized retroreflective sensors.

* These are sealed micro-prism style pieces and may not be cut.
Suitable for use with Laser sensors, VS3 sensors and SME312LPC model sensors.
Not suggested for close range (less than 102 mm) except with VS3 sensors.

MSA Stands

- Supports emitter, receiver or corner mirror
- Available without stand base, for attaching to a surface
- Assembles easily
- Includes mounting hardware
- Provides mounting T-slots with center dimension of 20 mm



MSA Series Stands

Used With**	Stand Height (L)	Usable Stand Length	Model*
EZ-SCREEN, PICO-GUARD Grids/Points, Mirrors, EZ-ARRAY, MINI-ARRAY and High-Resolution MINI-ARRAY	616 mm	483 mm	MSA-S24-1
	1073 mm	940 mm	MSA-S42-1

* Available without a base by adding suffix NB to model number (example, MSA-S24-1NB).

** Adapter brackets EZA-MBK-2 (2 each) are required for mounting EZ-SCREEN Grid and Point emitters/receivers or SSM Series mirrors (ordered separately).

Continued on next page

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

MSA Series Stands (cont'd)

Used With**	Stand Height (L)	Usable Stand Length	Model*
EZ-SCREEN, PICO-GUARD Grids/Points, Mirrors, EZ-ARRAY, MINI-ARRAY and High-Resolution MINI-ARRAY	1682 mm	1550 mm	MSA-S66-1
	2140 mm	2007 mm	MSA-S84-1
	2673 mm	2667 mm	MSA-S105-1

* Available without a base by adding suffix NB to model number (example, MSA-S24-1NB).

** Adapter brackets EZA-MBK-2 (2 each) are required for mounting EZ-SCREEN Grid and Point emitters/receivers or SSM Series mirrors (ordered separately).

Run Bar Telescoping Stands

- Locates touch buttons 800 to 1232 mm above the floor surface
- Includes swivel-mount bracket to mount Run Bar (Run Bar not included, see page 842)
- Made of cold-rolled steel; black powdercoat finish



STBA...S1



STBA...S2

Telescoping Stands

Used with	Description	Model
STBVP6-RB1	• Floor-mounted telescoping stand • Stationary base with 4 mounting holes in corners	STBA-RB1-S1
STBVP6-RB2		STBA-RB2-S1
STBVP6-RB1	• Free-standing, telescoping stand • Movable H-shaped floor base with mounting holes 560 mm apart	STBA-RB1-S2
STBVP6-RB2		STBA-RB2-S2

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Adjustable Mounting Systems

- Provides flexible mounting and positioning of sensors and lights
- Includes 3" and 6" column mounting kits for mounting area lights and backlights
- Features Bogen Arm and clamp for use with *P4* and *Pro* sensors
- Offers 2" mounting knuckle assembly for spot lights



SMBPPLK SMBPPK6 SMBPPK3 SMBPPF1 & SMBPPFB

Adjustable Mounting Systems

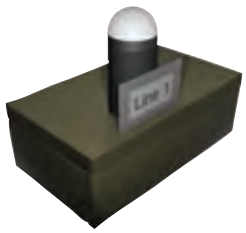
Used With	Description	Model
Pro *P4* Vision Lights	3" Column, Base, and Knuckle Kit	SMBPPK3
	6" Column, Base, and Knuckle Kit	SMBPPK6
	Mounting Bracket Knuckle	SMBPPK
	3" Column	SMBPPKE3
	6" Column	SMBPPKE6
	Mounting Bracket Base	SMBPPKB
	2" Mounting Knuckle Assembly	SMBPPLK
	Bogen Arm with Single Knob	SMBPPF1
	Bogen Arm Clamp	SMBPPFB

Elevated Use—Stand-off Pipe, Brackets and Adapters

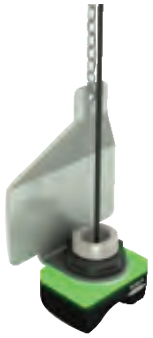
	Description	Length	Model	Used With
	Thermoplastic Acetal adapter and cover (M30 to ½" NPSM/DN15)	—	SA-M30TE12	Connects TL50 to 1/2" NPSM/DN15 pipe
	Thermoplastic Acetal adapter and cover (M30 to ½" NPSM/DN15)	—	SA-M30E12	Connects K50L & K80L to 1/2" NPSM/DN15 pipe
	Stainless steel pipe (½" NPSM/DN15)	150 mm	SOP-E12-150SS	K50L K80L TL50
		300 mm	SOP-E12-300SS	
	Anodized aluminum pipe (1/2" NPSM/D15)	150 mm	SOP-E12-150A	
		300 mm	SOP-E12-300A	
	Thermoplastic Acetal mounting base (½" NPSM/DN15 to M30)	—	SA-E12M30	SOP-E12-150A SOP-E12-300A SOP-E12-150SS SOP-E12-300SS
	Stainless steel bracket for wall or other flat surfaces	—	SMBE12USS	

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Elevated Use—Enclosure Mounts and Extensions

Description		Length	Model	Used With
	Thermoplastic Acetal standoff with 30 mm mounting base for cabinet mounting or use with most 30 mm brackets	75 mm	SA-M30M30-75	K50L
	Zinc coated, oversized right-angle legend plate for identification labels	—	SA-30RL55X93	SA-M30M30-75
	Thermoplastic Acetal standoff with 22.5 mm mounting base for cabinet mounting	50 mm	SA-M22M22-50	K30L

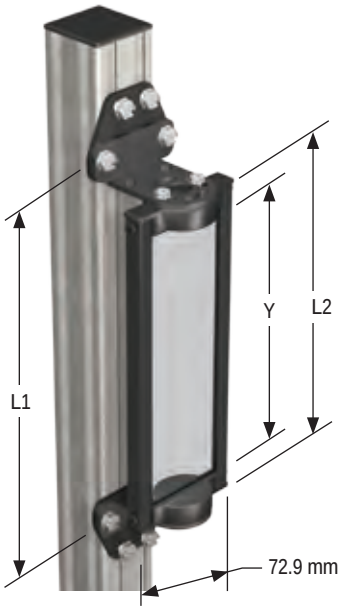
Elevated Use—Hanging Bracket

	Description	Length	Model	Used With
	Zinc coated bracket with strain relief for mounting one device	—	SA-30RL55X93C	K50 Push Button VTB
	Zinc coated bracket for mounting two devices	—	SA-30DRL55X93C	Sensors and indicators with 30 mm base or barrel mount

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

MSM Corner Mirrors

- Compact for light-duty applications
- Available in 12 lengths
- Decreases range by 8%
- Rated 85% efficiency



MSM Corner Mirrors
(shown with standard brackets and MSAMB** adapter bracket mounted on MSA stand)

MSM Corner Mirrors

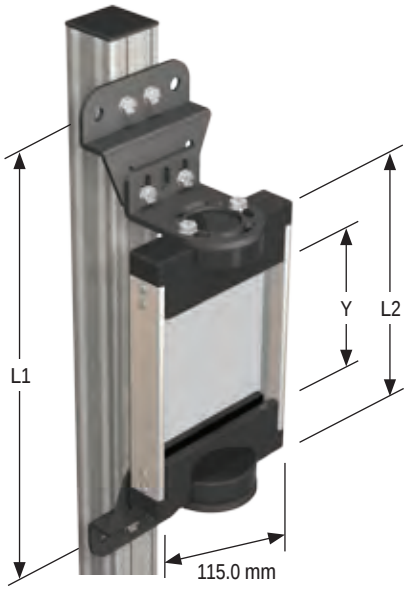
Reflective Area (Y)	Mounting Height (L1)*	Mirror Height (L2)	Model
165 mm	221 mm	191 mm	MSM4A
267 mm	323 mm	292 mm	MSM8A
356 mm	411 mm	381 mm	MSM12A
457 mm	513 mm	483 mm	MSM16A
559 mm	615 mm	584 mm	MSM20A
660 mm	716 mm	686 mm	MSM24A
762 mm	818 mm	787 mm	MSM28A
864 mm	919 mm	889 mm	MSM32A
965 mm	1021 mm	991 mm	MSM36A
1067 mm	1123 mm	1092 mm	MSM40A
1168 mm	1224 mm	1194 mm	MSM44A
1270 mm	1326 mm	1295 mm	MSM48A

* The mounting brackets may be inverted from the positions shown (flanges pointing “inward” instead of “outward,” as shown). When this is done, dimension L1 decreases by 57 mm.
** MSAMB adapter bracket kit included with each MSA stand.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

SSM Corner Mirrors

- Robust for heavy-duty applications
- Extra wide for use with long-range optical safety systems
- Available in stainless steel for harsh applications
- Available in 20 lengths
- Rated 85% efficiency for SSM models and 50% on SSM-S models
- Decreases range by 8% for SSM models and 30% for SSM-S models



SSM and SSM-S Corner Mirrors
(shown with standard brackets and EZA-MBK-2** adapter bracket mounted on MSA stand)

SSM Glass Corner Mirrors

Reflective Area (Y)	Mounting Height (L1)*	Mirror Height (L2)	Model	
			Glass	Stainless Steel
100 mm	211 mm	178 mm	SSM-100	SSM-100-S
150 mm	261 mm	228 mm	SSM-150	SSM-150-S
200 mm	311 mm	278 mm	SSM-200	SSM-200-S
250 mm	361 mm	328 mm	SSM-250	SSM-250-S
375 mm	486 mm	453 mm	SSM-375	SSM-375-S
475 mm	586 mm	553 mm	SSM-475	SSM-475-S
550 mm	661 mm	628 mm	SSM-550	SSM-550-S
675 mm	786 mm	753 mm	SSM-675	SSM-675-S
825 mm	936 mm	903 mm	SSM-825	SSM-825-S
875 mm	986 mm	953 mm	SSM-875	SSM-875-S
975 mm	1086 mm	1053 mm	SSM-975	SSM-975-S
1100 mm	1211 mm	1178 mm	SSM-1100	SSM-1100-S
1175 mm	1286 mm	1253 mm	SSM-1175	SSM-1175-S
1275 mm	1386 mm	1353 mm	SSM-1275	SSM-1275-S
1400 mm	1511 mm	1478 mm	SSM-1400	SSM-1400-S
1475 mm	1586 mm	1553 mm	SSM-1475	SSM-1475-S
1550 mm	1661 mm	1628 mm	SSM-1550	SSM-1550-S
1675 mm	1786 mm	1753 mm	SSM-1675	SSM-1675-S
1750 mm	1861 mm	1828 mm	SSM-1750	SSM-1750-S
1900 mm	2011 mm	1978 mm	SSM-1900	SSM-1900-S

* The mounting brackets may be inverted from the positions shown (flanges pointing “inward” instead of “outward,” as shown). When this is done, dimension L1 decreases by 58 mm.
** One EZA-MBK-2 adapter bracket kit required if used with a MSA stand.
NOTE: The total range decreases by approximately 8% per mirror.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Tubular Enclosures

- Available for EZ-ARRAY™, MINI-ARRAY® or EZ-SCREEN® standard 14 & 30 mm
- Ideal for high-pressure washdown environments
- Made of clear FDA-grade polycarbonate tubing, with acetal end caps
- Includes stainless mounting brackets and hardware
- Rated NEMA 4X; IP67



EZA-TE Tubular Enclosures

Emitter/Receiver Model		Used With Emitter/Receiver	Enclosure Height (L)	Model
EZ-SCREEN	EZ-ARRAY	Defined Area/Array Length		
SLS..-150	EA5..-150	150 mm	439 mm	EZA-TE-150
SLS..-300	EA5..-300	300 mm	541 mm	EZA-TE-300
SLS..-450	EA5..-450	450 mm	744 mm	EZA-TE-450
SLS..-600	EA5..-600	600 mm	846 mm	EZA-TE-600
SLS..-750	EA5..-750	750 mm	1024 mm	EZA-TE-750
SLS..-900	EA5..-900	900 mm	1151 mm	EZA-TE-900
SLS..-1050	EA5..-1050	1050 mm	1354 mm	EZA-TE-1050
SLS..-1200	EA5..-1200	1200 mm	1455 mm	EZA-TE-1200
SLS..-1350	—	1350 mm	1608 mm	EZA-TE-1350
SLS..-1500	EA5..-1500	1500 mm	1760 mm	EZA-TE-1500
SLS..-1650	—	1650 mm	1913 mm	EZA-TE-1650
SLS..-1800	EA5..-1800	1800 mm	2065 mm	EZA-TE-1800

NOTE: Use of the enclosure affects the sensing range of the emitter/receiver used: when in pairs, range can be reduced by 50%.

MSA-TE Tubular Enclosures

Used With			Enclosure Height (L)	Model
Emitter/Receiver Model		Emitter/Receiver Array Length		
MINI-ARRAY	BMEL616A/BMRL616A	201 mm	439 mm	MSA-TE-8
	BMEL632A/BMLR632A			
High-Resolution MINI-ARRAY	MAHE6A/MAHR6A	233 mm		
MINI-ARRAY	BMEL1216A/BMRL1216A	356 mm	541 mm	MSA-TE-12
	BMEL1232A/BMRL1232A	356 mm		
High-Resolution MINI-ARRAY	MAHE13A/MAHR13A	396 mm		
MINI-ARRAY	BMEL1816A/BMRL1816A	505 mm	744 mm	MSA-TE-20
	BMEL1832A/BMRL1832A	505 mm		
High-Resolution MINI-ARRAY	MAHE19A/MAHR19A	559 mm		
MINI-ARRAY	BMEL2416A/BMRL2416A	659 mm	846 mm	MSA-TE-24
	BMEL2432A/BMRL2432A	659 mm		
High-Resolution MINI-ARRAY	MAHE26A/MAHR26A	721 mm	947 mm	MSA-TE-28

NOTE: Use of the enclosure affects the sensing range of the emitter/receiver used: when in pairs, range can be reduced by 50%.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

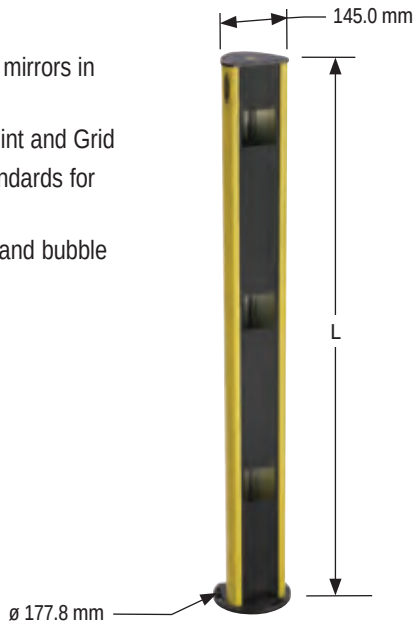
MSA-TE Tubular Enclosures (cont'd)

Used With			Enclosure Height (L)	Model
Emitter/Receiver Model		Emitter/Receiver Array Length		
MINI-ARRAY	BMEL3016A/BMRL3016A	810 mm	1049 mm	MSA-TE-32
	BMEL3032A/BMRL3032A			
High-Resolution MINI-ARRAY	MAHE32A/MAHR32A	884 mm		
MINI-ARRAY	BMEL3616A/BMRL3616A	963 mm	1151 mm	MSA-TE-36
	BMEL3632A/BMRL3632A			
High-Resolution MINI-ARRAY	MAHE38A/MAHR38A	1046 mm		
MINI-ARRAY	BMEL4216A/BMRL4216A	1115 mm	1354 mm	MSA-TE-44
	BMEL4232A/BMRL4232A	1115 mm		
High-Resolution MINI-ARRAY	MAHE45A/MAHR45A	1212 mm		
MINI-ARRAY	BMEL4816A/BMRL4816A	1267 mm	1455 mm	MSA-TE-48
	BMEL4832A/BMRL4832A			
High-Resolution MINI-ARRAY	MAHE51A/MAHR51A	1377 mm		

NOTE: Use of the enclosure affects the sensing range of the emitter/receiver used: when in pairs, range can be reduced by 50%.

EZA-S Protective Enclosures

- Provide rugged protection for sensors and mirrors in high-traffic areas
- Available for mirrors and EZ-SCREEN® Point and Grid
- Meets ANSI/RIA 15.06 and ISO 13855 standards for beam spacing
- Includes independently adjustable mirrors and bubble level to simplify alignment
- Rotates up to 20°



EZA-S Protective Enclosure

EZA-S EZ-SCREEN® Protective Enclosures

Used With		Enclosure Height (L)	No. of Openings	Application Standard	Models
Emitter/Receiver Model	Emitter/Receiver Protected Area				
SG..4-300	900 mm	1543 mm	4	ANSI/RIA R15.06 ISO 13855	EZA-S300
					EZA-S300-M*
SG..3-400	800 mm	1238 mm	3	ANSI/RIA R15.06 ISO 13855	EZA-S400
					EZA-S400-M*

* Model numbers with suffix M include vertical mirrors for perimeter-guarding applications.
Model numbers with suffix M45 include two 45°-mounted mirrors for access-guarding applications.

NOTE: The rear-surfaced glass mirrors are rated at 85% efficiency per mirror and reduce maximum range by 8% per mirror.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZA-S EZ-SCREEN® Protective Enclosures (cont'd)

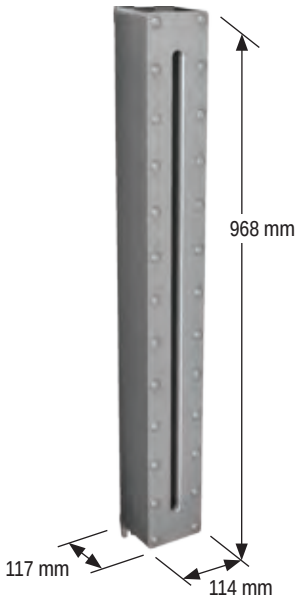
Used With		Enclosure Height (L)	No. of Openings	Application Standard	Models
Emitter/Receiver Model	Emitter/Receiver Protected Area				
SG..2-500	500 mm	1035 mm	2	ISO 13855	EZA-S500
					EZA-S500-M
SP..1	—				EZA-S500-M45
SG..3-533	1066 mm	1543 mm	3	ANSI/RIA R15.06	EZA-S533
					EZA-S533-M
SG..2-584	584 mm	1238.2 mm	2	ANSI/RIA R15.06	EZA-S584
					EZA-S584-M
SP..1	—				EZA-S584-M45

* Model numbers with suffix M include vertical mirrors for perimeter-guarding applications.
Model numbers with suffix M45 include two 45°-mounted mirrors for access-guarding applications.

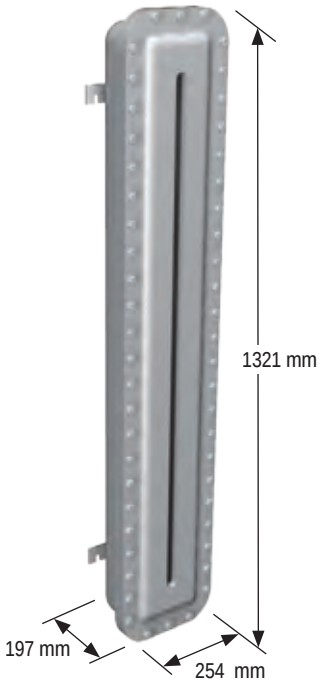
NOTE: The rear-surfaced glass mirrors are rated at 85% efficiency per mirror and reduce maximum range by 8% per mirror.

Explosion-Proof Enclosures

- Protects light screen in environments with flammable gases, liquids or dust
- Available for EZ-SCREEN® 14 and 30 resolution models
- Complies with UL and CSA for use in specific hazardous atmospheres
- Includes mounting brackets and hardware
- Reduces range by approximately 25% per emitter/receiver pair



Model ..-XPE-32
Explosion-Proof Enclosure



Model ..-XPE-43
Explosion-Proof Enclosure

Explosion-Proof Enclosures

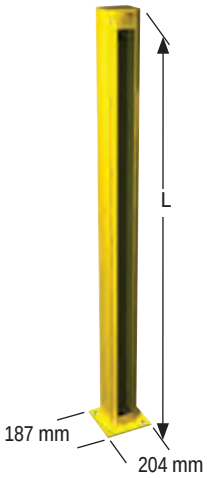
Used With		Model
Model Family	Emitter/Receiver Defined Area	
EZ-SCREEN (14 and 30 mm Resolution)	450 to 600 mm	SS-XPE-32
EZ-SCREEN (14 and 30 mm Resolution)	750 to 1050 mm	SS-XPE-43

NOTE: Use of enclosure affects the sensing range of emitter/receiver used: when used in pairs, range can be reduced by 25%.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Heated Enclosures

- Available for MINI-ARRAY® or High-Resolution MINI-ARRAY®
- Protects emitter/receiver in outdoor environments
- Includes humidistat and resistance wires to keep window free of condensation, snow or ice
- Provides choice of stainless steel or aluminum housings



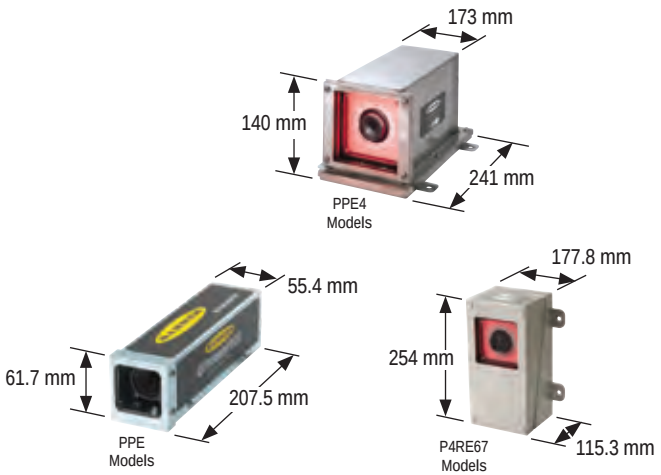
MINI-ARRAY® and High-Resolution MINI-ARRAY® Heated Enclosures

Material	Finish**	Array Length	Overall Enclosure/Height (L)	Clear Window Height	Model
Aluminum	Painted	133 to 1210 mm	1.7 m	1.5 m	BMHE4A/BMHL4G
Aluminum	Painted	1505 to 1514 mm	2.0 m	1.8 m	BMHE5A/BMHL5G
Aluminum	Painted	1810 to 1819 mm	2.2 m	2.0 m	BMHE6A/BMHL6G
Stainless Steel	Painted	133 to 1210 mm	1.7 m	1.5 m	BMHE4SS/BMHL4GSS
Stainless Steel	Painted	1505 to 1514 mm	2.0 m	1.8 m	BMHE5SS/BMHL5GSS
Stainless Steel	Painted	1810 to 1819 mm	2.2 m	2.0 m	BMHE6SS/BMHL6GSS
Stainless Steel	Non-painted	133 to 1210 mm	1.7 m	1.5 m	BMHE4SSN/BMHL4GSSN
Stainless Steel	Non-painted	1505 to 1514 mm	2.0 m	1.8 m	BMHE5SSN/BMHL5GSSN
Stainless Steel	Non-painted	1810 to 1819 mm	2.2 m	2.0 m	BMHE6SSN/BMHL6GSSN

* Enclosures require a power supply (see page 969).
** Standard color is Federal Safety Yellow (Federal Standard color# 23538). Contact Factory for other colors.

*Presence*PLUS® Enclosure Kits

- Protects sensor, ring light or both
- Keeps dust and dirt off lens and light
- Prevents accidental bumps and scratches
- Discourages vandalism and tampering
- Helps maintain lens focus by enclosing the lens and sensor
- Available in models that protect camera and light during washdown
- Offers choice of models with glass or plastic viewport



*Presence*PLUS® Enclosure Kits

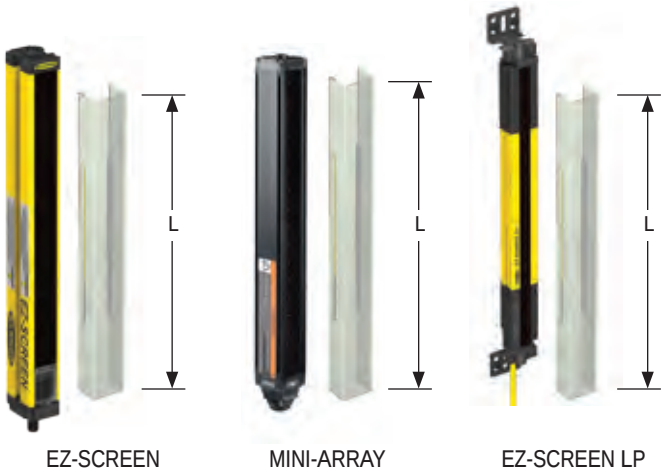
Description	Used With	Model
Heavy-duty stainless-steel enclosure kit—glass viewport; NEMA 6 rated	*P4* (right-angle) & Ring Light	P4RE67-G
Heavy-duty stainless-steel enclosure kit—polycarbonate viewport; NEMA 6 rated		P4RE67-P

*Presence*PLUS® Enclosure Kits (cont'd)

Description	Used With	Model
Heavy-duty cold-rolled steel industrial protection kit—glass viewport; NEMA 1 rated	*Pro* Camera & Lens	PPE-G
Heavy-duty cold-rolled steel industrial protection kit—polycarbonate viewport; NEMA 1 rated		PPE-P
Replacement viewport—glass	PPE-G	PPE-RG
Replacement viewport—polycarbonate	PPE-P	PPE-RP
Straight Mounting bracket	PPE-P & PPE-G	SMBPPES
Right-angle mounting bracket		SMBPPEA
Front mounting bracket		SMBPPEF
Heavy-duty stainless-steel enclosure kit—glass viewport; NEMA 4 rated	*Pro* Camera & Ring Light	PPE4-G
Heavy-duty stainless-steel enclosure kit—polycarbonate viewport; NEMA 4 rated		PPE4-P

Lens Shields

- Covers the lens of the emitter/receiver to prevent damage
- Available for the LX, EZ-ARRAY™, MINI-ARRAY® and EZ-SCREEN®
- Installs easily
- Made of rugged polycarbonate



EZ-SCREEN MINI-ARRAY EZ-SCREEN LP

EZ-ARRAY™ & EZ-SCREEN® (14 & 30 mm Resolution) Lens Shields

Installation*	Used With			Lens Shield Length (L)	Model
	EZ-ARRAY	EZ-SCREEN	Defined Area/Array Length		
Adhesive	EA5..150	—	150 mm	218 mm	EZS-150EA
Snap-on				196 mm	EZSS-150EA
Adhesive	—	SLS..-150..	150 mm	258 mm	EZS-150
Snap-on				236 mm	EZSS-150
Adhesive	EA5..300	SLS..-300..	300 mm	368 mm	EZS-300
Snap-on				346 mm	EZSS-300
Adhesive	EA5..450	SLS..-450..	450 mm	518 mm	EZS-450
Snap-on				496 mm	EZSS-450
Adhesive	EA5..600	SLS..-600..	600 mm	667 mm	EZS-600
Snap-on				645 mm	EZSS-600
Adhesive	EA5..750	SLS..-750..	750 mm	817 mm	EZS-750
Snap-on				795 mm	EZSS-750
Adhesive	EA5..900	SLS..-900..	900 mm	967 mm	EZS-900
Snap-on				945 mm	EZSS-900

NOTE: When shields are installed on both the emitter and receiver, maximum operating range is reduced by 20%.
* Adhesive models are polycarbonate with neoprene gasket. Snap-on models are constructed of copolyester.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-ARRAY™ & EZ-SCREEN® (14 & 30 mm Resolution) Lens Shields (cont'd)

Installation*	Used With			Lens Shield Length (L)	Model
	EZ-ARRAY	EZ-SCREEN	Defined Area/Array Length		
Adhesive	EA5..1050	SLS..-1050..	1050 mm	1116 mm	EZS-1050
Snap-on				1094 mm	EZSS-1050
Adhesive	EA5..1200	SLS..-1200..	1200 mm	1266 mm	EZS-1200
Snap-on				1244 mm	EZSS-1200
Adhesive	—	SLS..-1350..	1350 mm	1416 mm	EZS-1350
Snap-on				1394 mm	EZSS-1350
Adhesive	—	SLS-1650..	1650 mm	1715 mm	EZS-1650
Snap-on				1693 mm	EZSS-1650
Adhesive	EA5..1500	SLS..-1500..	1500 mm	1565 mm	EZS-1500
Snap-on				1543 mm	EZSS-1500
Adhesive	EA5..1800	SLS..-1800..	1800 mm	1865 mm	EZS-1800
Snap-on				1843 mm	EZSS-1800
Snap-on	EA5..2100	—	2100 mm	2144 mm	EZSS-2100
Snap-on	EA5..2400	—	2400 mm	2444 mm	EZSS-2400

NOTE: When shields are installed on both the emitter and receiver, maximum operating range is reduced by 20%.
* Adhesive models are polycarbonate with neoprene gasket. Snap-on models are constructed of copolyester.

MINI-ARRAY® Lens Shields

Installation	Used With			Lens Shield Length (L)*	Model
	Emitter/Receiver Model		Array Length		
Adhesive	MINI-ARRAY	BMEL1216A/BMRL1216A	286 mm	341 mm	MSS12
		BMEL1232A/BMRL1232A	295 mm		
		BMEL2416A/BMRL2416A	591 mm	643 mm	MSS24
		BMEL2432A/BMRL2432A	600 mm		
		BMEL3616A/BMRL3616A	895 mm	948 mm	MSS36
		BMEL3632A/BMRL3632A	905 mm		
		BMEL4816A/BMRL4816A	1200 mm	1253 mm	MSS48
		BMEL4832A/BMRL4832A	1210 mm		

NOTE: When shields are installed on both the emitter and receiver, maximum operating range is reduced by 20%.
* Other lens shield lengths are available, contact factory at 1-888-373-6767.

EZ-SCREEN® LP (14 & 25 mm Resolution) Lens Shields

Installation*	Used With	Lens Shield Length (L)	Model
	Emitter/Receiver Model		
Snap-on	SLP..-270	270 mm	LPSS-270
	SLP..-410	410 mm	LPSS-410
	SLP..-550	550 mm	LPSS-550
	SLP..-690	690 mm	LPSS-690
	SLP..-830	830 mm	LPSS-830
	SLP..-970	970 mm	LPSS-970
	SLP..-1110	1110 mm	LPSS-1110

NOTE: When shields are installed on both the emitter and receiver, maximum operating range is reduced by 20%.
* Adhesive models are polycarbonate with neoprene gasket. Snap-on models are constructed of copolyester.

Continued on next page

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-SCREEN® LP (14 & 25 mm Resolution) Lens Shields (cont'd)

Installation*	Used With: Emitter/Receiver Model	Lens Shield Length (L)	Model
Snap-on	SLP..-1250	1250 mm	LPSS-1250
	SLP..-1390	1390 mm	LPSS-1390
	SLP..-1530	1530 mm	LPSS-1530
	SLP..-1670	1670 mm	LPSS-1670
	SLP..-1810	1810 mm	LPSS-1810

NOTE: When shields are installed on both the emitter and receiver, maximum operating range is reduced by 20%.
* Adhesive models are polycarbonate with neoprene gasket. Snap-on models are constructed of copolyester.

EZ-SCREEN® Grids and Points Lens Shields–Adhesive Backed

Type	Lens Shield Length (L)	Emitter/Receiver Model	Emitter/Receiver Protected Height	Model
Point	149 mm	SP..1	—	EZS-149
Grid	684 mm	SG..2-500	500 mm	EZS-684
	768 mm	SG..2-584	584 mm	EZS-768
	984 mm	SG..3-400	800 mm	EZS-984
	1251 mm	SG..3-533	900 mm	EZS-1251
	1084 mm	SG..4-300	1066 mm	EZS-1084

Polycarbonate construction with neoprene gasket

EZ-SCREEN® Type 2 Lens Shields–Adhesive Backed

Used With: Emitter/Receiver Model	Used With: Emitter/Receiver Defined Area	Lens Shield Length (L)	Model
LS2..30-150	150 mm	210 mm	LSS-150
LS2..30-300	300 mm	360 mm	LSS-300
LS2..30-450	450 mm	510 mm	LSS-450
LS2..30-600	600 mm	660 mm	LSS-600
LS2..30-750	750 mm	810 mm	LSS-750
LS2..30-900	900 mm	959 mm	LSS-900
LS2..30-1050	1050 mm	1109 mm	LSS-1050
LS2..30-1200	1200 mm	1558 mm	LSS-1200
LS2..30-1350	1350 mm	1708 mm	LSS-1350
LS2..30-1500	1500 mm	1858 mm	LSS-1500

Polycarbonate construction with neoprene gasket.

LX Lens Shields

Installation	Used With: Emitter/Receiver Model	Used With: Array Length	Lens Shield Length (L)	Model
Adhesive	LX3 models	67 mm	98.3 mm	LXS3
	LX6 models	143 mm	174.5 mm	LXS6
	LX12 models	295 mm	326.9 mm	LXS12

NOTE: When shields are installed on both the emitter and receiver, maximum operating range is reduced by 20%.

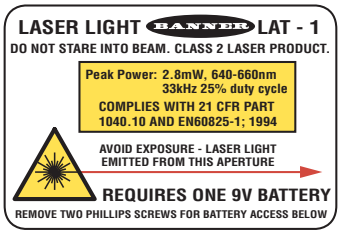
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Laser Alignment Tools

- Simplifies the alignment of any emitter/receiver pair
- Available for EZ-SCREEN®, PICO-GUARD™, LT7, and 18 and 30 mm barrel sensors
- Includes a built-in bubble level
- Uses one 9-volt battery, which is included (some models)



LAT-1 Laser Alignment Tool
(shown without clip)



Laser Alignment Tools

Used With	Supply Voltage	LAT-1 with Clip Kit	Clip w/Target*
EZ-SCREEN Grid or Points and PICO-GUARD Grids	9 V battery for 20 hours of continuous use	LAT-1-HD	EZA-LAT-1
EZ-SCREEN 14 & 30 mm Resolution		LAT-1-SS	EZA-LAT-2
EZ-SCREEN LP 14 & 25 mm Resolution		LAT-1-LP	LPA-LAT-1
EZ-SCREEN Type 2		LAT-1-LS	LSA-LAT-1
EZ-SCREEN Grid or Points, PICO-GUARD Grids, EZ-SCREEN 14 & 30 mm Resolution, EZ-SCREEN LP 14 & 25 mm Resolution and EZ-SCREEN Type 2	9 V battery for 20 hours of continuous use	LAT-1	–
PICO-GUARD SFP12 Safety Points		LAT-1-SFP12	SFA-LAT-12
PICO-GUARD SFP30 Safety Points		LAT-1-SFP30	SFA-LAT-30

Description		Used With	Supply Voltage	Model
 LAT-2 shown with LT7	• Allows for long distance alignment greater than 50 m • Clip-on attachment for sensor	LT7	—	LAT-2
	• Enables easy sensor alignment at long distances • Kit includes one SMB1812 bracket and M12 laser emitter (Class 2 visible red laser) • Clip-on attachment for 18 mm threaded barrel sensors	18 mm threaded barrel sensors	10 to 30V dc	LAT1812
	• Enables easy sensor alignment at long distances • Kit includes one SMB3012 bracket and M12 laser emitter (Class 2 visible red laser) • Clip-on attachment for 30 mm threaded barrel sensors	30 mm threaded barrel sensors	10 to 30V dc	LAT3012

* LAT-1 purchased separately.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

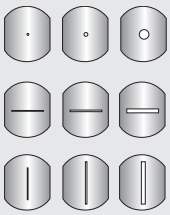
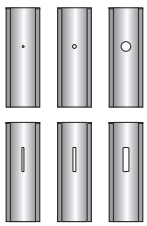
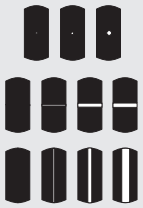
BEAM-TRACKER™ Alignment Tool

The BEAM-TRACKER is a low-cost, wireless, battery-operated and completely self-contained photoelectric diagnostic sensor. It is a quick and simple way to evaluate photoelectric system performance. It receives light from all modulated photoelectric emitters and transmits light to receivers to check the system operation. It has a built-in frequency emitter that will be detected by any Banner photoelectric receiver, as well as by those of most other photoelectric manufacturers. It is a valuable tool for locating the center of the beam when installing long-range opposed-mode photoelectric sensor pairs and for locating sources of severe EMI and RFI noise.

	Supply Voltage	Beam	Construction	Model
	9V battery for 10 hours of continuous use	70 kHz infrared	Cycolac® T case	BT-1

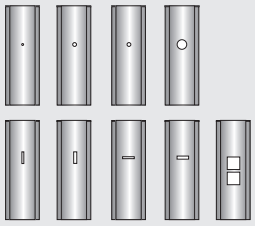
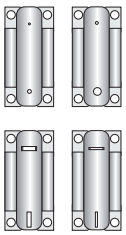
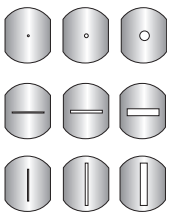
Apertures and Aperture Kits

Opposed-mode sensors may be fitted with apertures which narrow or shape the effective beam of the sensor to more closely match the size of profile of the object to be sensed. A common example is the use of “line” or “slit” type aperture when wire or thread is being sensed.

Aperture Description	Units	Model	Product	Used With
Circular, 0.5 mm dia.	6	APQS18-020		QS18 Opposed-mode
Circular, 1.0 mm dia.	6	APQS18-040		
Circular, 2.5 mm dia.	6	APQS18-100		
Horizontal, slotted, 0.5 x 6.4 mm	6	APQS18-020H		
Horizontal, slotted, 1.0 x 6.4 mm	6	APQS18-040H		
Horizontal, slotted, 2.5 x 6.4 mm	6	APQS18-100H		
Vertical, slotted, 0.5 x 12.7 mm	6	APQS18-020V		
Vertical, slotted, 1.0 x 12.7 mm	6	APQS18-040V		
Vertical, slotted. 2.5 x 12.7 mm	6	APQS18-100V		
Kit with 2 of each aperture	18	APQS18-DVHX2		
Circular, 0.5 mm dia.	2	APQ20-0.5		Q20 Opposed-mode
Circular, 1 mm dia.	2	APQ20-1		
Circular, 2 mm dia.	2	APQ20-2		
Vertical, slotted, 0.5 mm	2	APQ20-0.5V		
Vertical, slotted, 1 mm	2	APQ20-1V		
Vertical, slotted, 2 mm	2	APQ20-2V		
Kit with 2 of each aperture	12	APK-Q20		
Circular, 0.5 mm dia.	20	AP31-020		MINI-BEAM Opposed-mode
Circular, 1.0 mm dia.	20	AP31-040		
Circular, 2.5 mm dia.	20	AP31-100		
Horizontal, slotted, 0.5 x 6.4 mm	20	AP31-020H		
Horizontal, slotted, 1.0 x 6.4 mm	20	AP31-040H		
Horizontal, slotted, 2.5 x 6.4 mm	20	AP31-100H		
Horizontal, slotted, 5.1 x 6.4 mm	20	AP31-200H		
Vertical, slotted, 0.5 x 12.7 mm	20	AP31-020V		
Vertical, slotted, 1.0 x 12.7 mm	20	AP31-040V		
Vertical, slotted, 2.5 x 12.7 mm	20	AP31-100V		
Vertical, slotted, 5.1 x 12.7 mm	20	AP31-200V		
Kit with 2 of each aperture	22	AP31-DVHX2		

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Apertures and Aperture Kits (cont'd)

Aperture Description	Units	Model	Product	Used With
Kit includes 3 round apertures of: 0.5, 1.0 & 2.5 mm dia.	3	AP18SC*		S18 & M18
Kit includes 3 rectangular apertures of: 0.5, 1.0 & 2.5 mm dia.	3	AP18SR*		S18 & M18
Kit includes 3 round apertures of: 0.5, 1.0 & 2.5 mm dia.	3	AP18SCN*		T18 & YM18
Kit includes 3 rectangular apertures of: 0.5, 1.0 & 2.5 mm dia.	3	AP18SRN*		T18 & TM18
* Kits include Teflon® FEP® lens, o-ring and thread-on housing.				
Kit with glass lens to protect plastic sensor lens from chemical environments	1	APG18S		S18, M18, T18 & TM18
Circular, 0.5 mm dia.	10	APQ12-.5		Q12 Opposed-mode
Circular, 1.0 mm dia.	10	APQ12-1		
Circular, 1.5 mm dia.	10	APQ12-1.5		
Circular, 2.0 mm dia.	10	APQ12-2		
Horizontal, slotted, 0.5 mm dia.	10	APQ12-.5H		
Horizontal, slotted, 1.0 mm dia.	10	APQ12-1H		
Vertical, slotted, 0.5 mm dia.	10	APQ12-.5V		
Vertical, slotted, 1.0 mm dia.	10	APQ12-1V		
Protective jacket, 4 mm square	10	APQ12-4S		
Kit containing 2 of each aperture	18	APKQ12		
Circular, 2 openings, 0.5 & 1.0 mm dia.	2	APVS2-0204		VS2 Opposed-mode
Circular, 2 openings, 1.5 and 2.0 mm dia.	2	APVS2-0608		
Horizontal (1) and vertical (1), slotted, 0.5 mm wide	2	APVS2-02R		
Horizontal (1) and vertical (1), slotted, 1.0 mm wide	2	APVS2-04R		
Circular, 1.0 mm dia.	6	APQS30-040		QS30 Opposed-mode
Circular, 2.5 mm dia.	6	APQS30-100		
Circular, 5 mm dia.	6	APQS30-200		
Horizontal, slotted, 1 x 12 mm	6	APQS30-040H		
Horizontal, slotted, 2.5 x 12 mm	6	APQS30-100H		
Horizontal, slotted, 5 x 12 mm	6	APQS30-200H		
Vertical, slotted, 1 x 17 mm	6	APQS30-040V		
Vertical, slotted, 2.5 x 17 mm	6	APQS30-100V		
Vertical, slotted, 5 x 17 mm	6	APQS30-200V		
Kit with 2 of each aperture	18	APQS30-DVHX2		

* Teflon® is a registered trademark of Dupont™.

Ultrasonic Wave Guides

Guide attaches to 18 mm threaded barrel of ultrasonic sensors to focus ultrasonic sensing beam.

	Size	Style	Model	Used With
	5.0 mm inside dia.	Barrel	UWG18-5.0	QS18U S18U
	6.4 mm inside dia.	Barrel	UWG18-6.4	

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Replacement Lens Assemblies

Lens assemblies are field-replaceable. In addition, some lenses may be used to convert from one sensing mode to another, or to change the sensing range of a particular sensor. The possible conversions are listed in the table below.

Replacement Lens for	Possible Sensing Mode or Range Changes	Model	Used With
LVAG	Change LV to LVAG	UC-300AG	MINI-BEAM
W and DBZ	Change D to DBZ and F to DBZ	UC-300BZ	
C, CV and CVG	Change CV2 to CV	UC-300C.7	
C2 and CV2	Change CV to CV2	UC-300C2	
E and R	—	UC-300E	
EL and RL	Extend range of E/R	UC-300EL	
EPD	—	UC-300EPD	
F and FV	Change D to F and DBZ to F	UC-300F	
FP (old style)	—	UC-300FP	
FP	—	UC-300FP2	
LV and D	Change F to D, LVAG to LV and DBZ to D	UC-300L	
LP	—	UC-300LP	
RPD	—	UC-300RPD	
E, R, DL, DX and LV	N/A	UC-45L	Q45
LL		UC-45LL	
LLP		UC-45LLP	
LP		UC-45LP	
D		UC-45D	
F and FV		UC-45F	
FP		UC-45FP	
CV		UC-45C	
CV4		UC-45C4	
CV, CVB and CVG	N/A	OUC-C	OMNI-BEAM
D		OUC-D	
F, FAC, FV, FVB, FVG, FX, EF and RF		OUC-F	
FP, FPB and FPG		OUC-FP	
DX, LV, E and R		OUC-L	
LVAG and LVAGC		OUC-LAG	
R58E	N/A	UC-R55	R58E

Portable Demo Box

The Portable Demo Box is used to power dc self-contained photoelectric sensors for testing purposes. It is battery-powered and features bicolor LEDs which indicate sensor output status and output type (NPN or PNP). It is designed for a 4-pin Euro-style connector, but cable adapters are available to convert to Pico-style or Mini-style connectors. A 4-pin wiring barrier is mounted on the top of the box to allow connection of cabled dc sensors.

	Supply Voltage	Cable Type	Model	Cable Adapters
	3 - 9V battery	4-pin Euro	DBQ5	Euro-to-Pico p/n 39536 Euro-to-Mini p/n 39537

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Test Power Supply

Test power supply is a 1 amp power supply used to power *P4* sensors and lighting for proving an application without integration into a control panel.

	Input	Input	Trigger Option	Model	Used With
	100-240V ac	North America (AC plug)	• 24V dc NPN Sensor • Continuous pulse • Single pulse	P4D1	*P4* Vision Lighting

A-GAGE® MINI-ARRAY® Series Power Supplies for Heated Enclosures

	Used With	Primary	Secondary	Models
	Two BMHE4 Enclosures	105 to 130V ac	23V ac	BMHPS4
	Two BMHE5 Enclosures	105 to 130V ac	27V ac	BMHPS5
	Two BMHE6 Enclosures	105 to 130V ac	35V ac	BMHPS6
	One BMHE4 Enclosure	105 to 130V ac	23V ac	BMHPS14
	One BMHE5 Enclosure	105 to 130V ac	27V ac	BMHPS15
	One BMHE6 Enclosure	105 to 130V ac	35V ac	BMHPS16

Continuous Power Supplies

12 or 24V dc power supplies provide power to dc sensors, safety products and specialty lights.

	Input	Input Cord	Outputs	Output Cable	Model	Used With
	100-240V ac 50/60 Hz	—	24V dc @ 4 A max.	—	PSDINA-24-4 (DIN-rail mountable)	dc Sensors Vision Lights
	115/230V ac, 50-60 Hz	—	24V dc (22.5-28.5V dc adj.) @ 2.5 A (60 W)	—	PSDINA-24* (DIN-rail mountable)	Safety products requiring a SELV rating (EN 60950)

* These products are not stocked and are non-returnable.

USB Serial Adapter

	Description	Power	Model	Used With
	USB to RS-485 serial adapter with integral communication cordset and USB cable for advanced configuration with a PC.	USB Cable	EZA-USB485-01	EZ-ARRAY
	USB to RS-485 serial adapter with integral communication cordset and USB cable for easy configuration of a single sensor or a network of sensors.	USB Cable	INTUSB485-LH	LH
	USB to RS-485 serial adapter for advanced configuration with a PC. NOTE: Communication cordset ordered separately.	USB Cable	INTUSB485-1	EZ-ARRAY

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Power Supplies and Interface Modules

The power supplies provide a low-cost interface between ac power supply and dc-operated sensors. They can source up to 100 milliamps. All models are available with integral TEACH push button and remote TEACH function. The interface module is a passive module that allows additional status indicators to be located in the user's control cabinet. It provides remote indication and TEACH capability.

	Description	Sensor Input	Input Supply	Sensor Supply	Models
	Power Supply e/m relay output, status lights, and TEACH button	NPN	24V ac	15V dc	PS24-1N
		PNP			PS24-1P
		NPN	115V ac		PS115-1N
		PNP			PS115-1P
	Passive Interface Module Status lights and TEACH button	—	10-30V dc	—	SIM-525T

Sensor Interface Modules

Low-cost modules provide a dc powered interface for sensors.

	Input	Outputs	Connections	Model	Used With
	10-30V dc	Current Sinking (NPN)	Two 13-pin Terminals	PPSIM-NT	*Presence*PLUS *P4*
			One 13-pin Terminals One DB-15 Connector	PPSIM-NC	
		Current Sourcing (PNP)	Two 13-pin Terminals	PPSIM-PT	
			One 13-pin Terminals One DB-15 Connector	PPSIM-PC	
	10-30V dc	Current Sinking (NPN)/ Current Sourcing (PNP)	Two 13-pin Terminals	IVUSIM	iVu

Light Interface Modules

Low-cost interface module allows strobe operation of Banner vision lighting with any vision sensor or system.

	Input	Strobe Output	Model	Used With
	24V dc	5V @ 10 mA max.	PPLIM	Vision lighting

EZ-LIGHT™ Controllers

- Manually operated controllers for Andon, call-for-parts and machine status indication
- Toggle switch model can control up to 5 indicators simultaneously

	Description	Switch Function	Supply Voltage	Model	Used With
	5 toggle switches	ON-OFF-FLASH	30V dc	LC80T	EZ-LIGHT indicators with PNP input
	12-position rotary switch			LC80R	

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

AC Emitter/Receiver Interface Boxes

- Provides AC power for up to three receivers or two cascaded emitter/receiver pairs, with external device monitoring (EDM) available
- Supplies +24V dc power at 0.7 amps (16.8 W max. power) and accepts input voltages from 100-250V ac (50-60 Hz)

	Safety Outputs	EDM	Emitter/Receiver Connection	AC Power Connection	Output and EDM Connections	Model	Used with
 CORDSETS PAGE 904	3 NO	Selectable 1- or 2-Channel or no EDM	8-Pin M12/Euro QD	Hard-wired	Hard-wired	EZAC-R9-QE8	EZ-SCREEN
	2 NO & 1 NC			Hard-wired	Hard-wired	EZAC-R11-QE8	
	1 NO & 1 SPDT	1-Channel		3-Pin Mini QD	8-Pin Mini QD	EZAC-R15A-QE8-QS83	
	1 NO & 1 NC	Power Monitoring		3-Pin Mini QD	5-Pin Mini QD	EZAC-R8N-QE8-QS53	
	2 NO			3-Pin Mini QD	5-Pin Mini QD	EZAC-R10N-QE8-QS53	

AC Emitter Interface Boxes

- Provides AC power for up to four emitters, with external device monitoring (EDM) available
- Supplies +24V dc power at 0.7 amps (16.8 W max. power) and accepts input voltages from 100-250V ac (50-60 Hz)

	Emitter Connection	AC Power Connection	Model	Used with
 CORDSETS PAGE 904	8-Pin M12/Euro QD	Hard-wired	EZAC-E-QE8	• EZ-SCREEN SLSE..-..Q8 (without Test input) • EZ-SCREEN SLPE..
	5-Pin M12/Euro QD	Hard-wired	EZAC-E-QE5	• EZ-SCREEN SLSE..-..Q5 (with Test input)
	8-Pin M12/Euro QD	3-Pin Mini QD	EZAC-E-QE8-QS3	• EZ-SCREEN SLSE..-..Q8 (without Test input) • EZ-SCREEN SLPE..
	5-Pin M12/Euro QD	5-Pin Mini QD	EZAC-E-QE5-QS5	• EZ-SCREEN SLSE..-..Q5 (with Test input)

NC = Normally Closed, NO = Normally Open

AC Interface Box Specifications

Important Notice:
European Community Machinery Directive 2006/42/EC
The EZ-Screen EZAC- Interface Boxes comply with Machinery Directive 98/37/EC, but not with Machinery Directive 2006/42/EC. Therefore, these Interface Boxes can only be installed as a replacement component within the European Union (EU). For more information, please see www.bannerengineering.com/144763 or call 1-888-373-6767.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Mechanically Linked Contactors*

Provides an additional 10 or 18 amp carrying capability to any safety system.

	Coil Voltage	Contacts	Contact Rating	Dimensions (h x w x l)	Model	Used With
	120V ac	3 NO & 1 NC	10 amps	57 x 44 x 58 mm	11-BG00-31-A12060	• EZ-SCREEN • SC22-3/-3E
	24V dc		10 amps (thermal)	57 x 44 x 58 mm	11-BG00-31-D-024	
	120V ac	3 NO & 1 NC	18 amps**	80 x 44 x 80 mm	BF1801A-12060	
	24V dc		18 amps** (inductive)	80 x 44 x 80 mm	BF1801L-024	

NC = Normally Closed, NO = Normally Open, minimum switching current (power): 5 mA @ 17V dc (85 mw)

* One Arc Suppressor is needed for each relay across the coil (see below).

** NC contact is rated at 10 amps

Auxiliary Contacts for Mechanically Linked Contactors

Adds contacts to mechanically linked contactors.

	Contacts	Positively Guided	Model	Used With
	4 NO	No (Aux. only)	11-BGX10-40	11-BG Series
	3 NO	Yes	11-G484-30	BF Series

NC = Normally Closed, NO = Normally Open

Suppressors for Mechanically Linked Contactors

Extends the life of the actuating device—such as a light screen or control module—that uses a mechanically linked contactor.

	Voltage	Model	Used With
	48V dc	11-BGX77-048	11-BG00-31-D024
	125-240V ac	11-BGX77-240	11-BG00-31-A12060
	48V dc	11-G318-48	BF1801L-024
	125-240V ac	BFX77-240	BF1801A-12060

NC = Normally Closed, NO = Normally Open

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Lighting & Indicators

	Models
	• LED Lighting • Tower Lights • Base Mount • T-Style Mount • Barrel Mount • Flat Mount • Indicators for Safety devices See page 529

Indicator Lamps

• Indicates whether a switch is open or closed
• Available in red or green, 120V ac or 24V ac/dc

	Supply Voltage	Lamp Color	Thread	Models	Used With
	24V ac/dc	Red	M20 x 1.5	SI-PL3T-R	• SI-QS90 Safety Interlock Switches • SI-LS42 Safety Interlock Switches • SI-QM100 Safety Interlock Switches • RP-LS42 Rope Pull Switches • RP-QM72/QMT72 Rope Pull Switches • RP-RM83 Rope Pull Switches • RP-QM90 Rope Pull Switch
	120V ac			SI-PL3A-R	
	24V ac/dc	Green		SI-PL3T-G	
	120V ac			SI-PL3A-G	

Muting Lamps

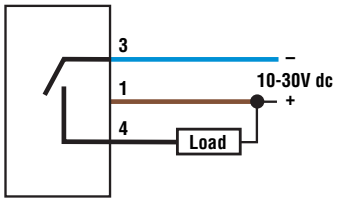
• Indicates when muting is active for optical safety systems with a muting module
• Uses a solid-state LEDs light, eliminating the need to replace bulbs

	Supply Voltage	Lamp Color	Overall Height	Models	Used with
	18-30V dc or 24V ac	Green, Yellow, Red, White	142.6 mm	TL50GYRWQ	• EZ-SCREEN • Muting Modules
		Yellow	61.2 mm	TL50YQ	
		White		TL50WQ	
	+24V dc	Red, Green, Yellow (Amber)	ø 18 mm	M18RGR5PNQ	
	12-30 V dc	Green, Red, White	58 mm	K50LGRW2PQ-18886	
	12-30 V dc	White	58 mm	K50LWXXPQ	
	12-30 V dc	Yellow	58 mm	K50LYXXPQ	

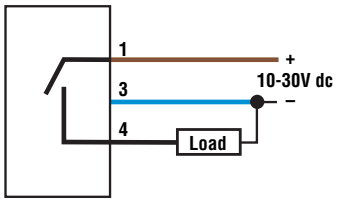
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DC Hookups

DC01 Current Sinking (NPN)



Current Sourcing (PNP)



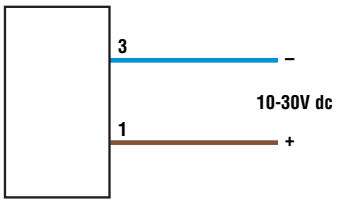
Key

1 = Brown
3 = Blue
4 = Black

3-Pin Pico



DC02 Emitter



Key

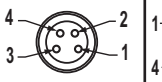
1 = Brown
2 = White†
3 = Blue
4 = Black†

† Not Used

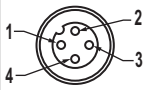
3-Pin Pico



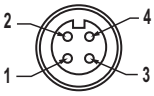
4-Pin Pico



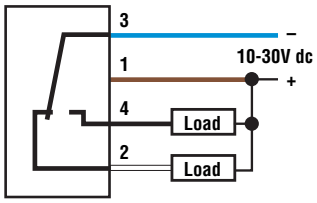
4-Pin Euro



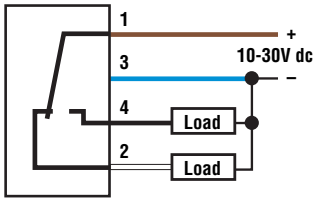
4-Pin Mini



DC03 Complementary Current Sinking (NPN)



Complementary Current Sourcing (PNP)



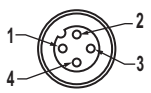
Key

1 = Brown
2 = White
3 = Blue
4 = Black

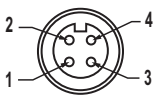
4-Pin Pico



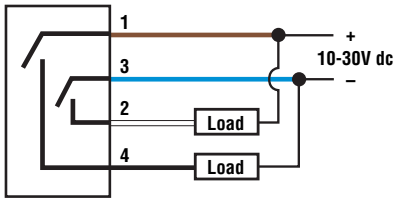
4-Pin Euro



4-Pin Mini



DC04 Bipolar (NPN + PNP)



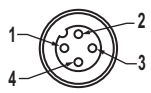
Key

1 = Brown
2 = White
3 = Blue
4 = Black

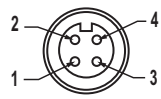
4-Pin Pico



4-Pin Euro



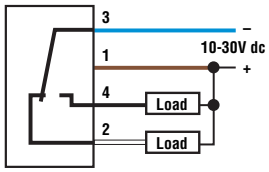
4-Pin Mini



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DC Hookups

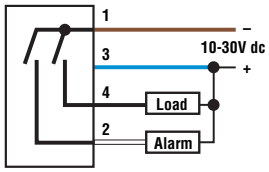
DC05 Complementary Current Sinking (NPN) Standard Hookup

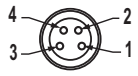
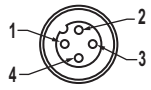


Key

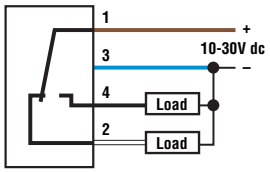
1 = Brown
2 = White
3 = Blue
4 = Black

Current Sinking (NPN) Plus Current Sinking Alarm



4-Pin Pico	4-Pin Euro
	

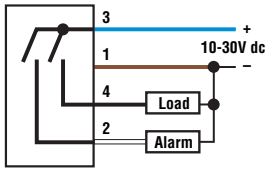
DC06 Complementary Current Sourcing (PNP) Standard Hookup

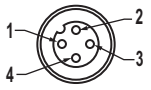


Key

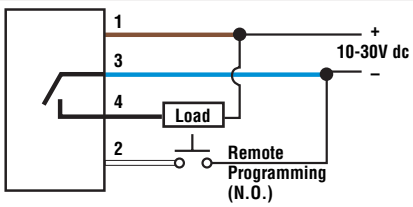
1 = Brown
2 = White
3 = Blue
4 = Black

Current Sourcing (PNP) Plus Current Sourcing Alarm



4-Pin Pico	4-Pin Euro
	

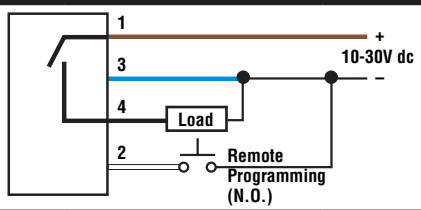
DC07 Current Sinking (NPN)

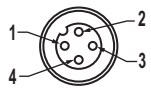


Key

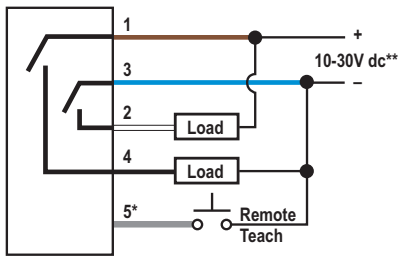
1 = Brown
2 = White
3 = Blue
4 = Black

Current Sourcing (PNP)



4-Pin Pico	4-Pin Euro
	

DC08 Bipolar (NPN + PNP)

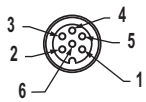
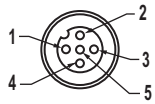


*NOTE: For some QS30 models, gray wire is used for LO/DO Select. See data sheet.
** Bussable Power models are 12-30V dc

Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray
6 = Pink †

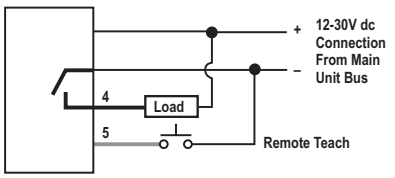
† Not Used

6-Pin Pico	5-Pin Euro
	

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DC Hookups

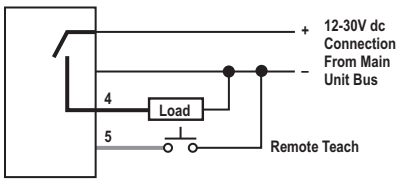
DC09 Current Sinking (NPN) with Bussable Power



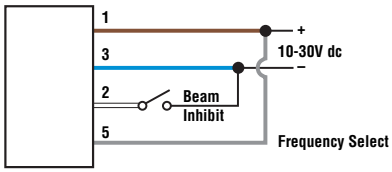
Key

4 = Black
5 = Gray

Current Sourcing (PNP) with Bussable Power



DC10 Emitter Frequency A

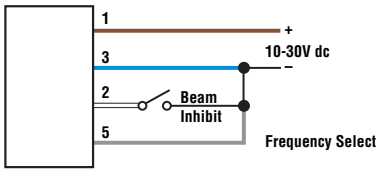


Key

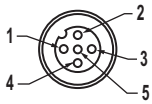
1 = Brown
2 = White
3 = Blue
4 = Black †
5 = Gray

† Not Used

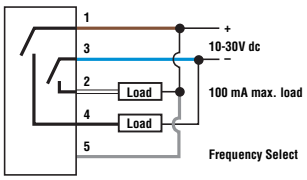
Emitter Frequency B



5-Pin Euro



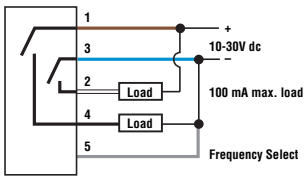
DC11 Receiver Frequency A



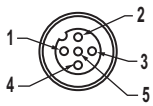
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

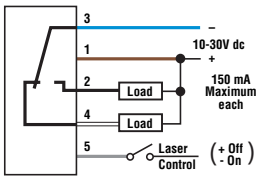
Receiver Frequency B



5-Pin Euro



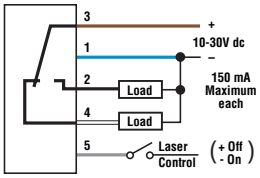
DC12 Complementary Current Sinking (NPN)



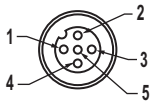
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

Complementary Current Sourcing (PNP)



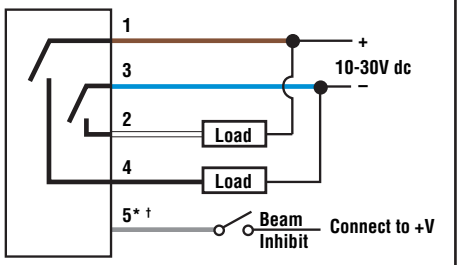
5-Pin Euro



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

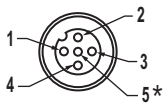
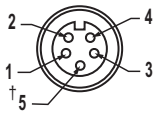
DC Hookups

DC13 Bipolar (NPN + PNP)

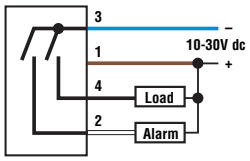


Key

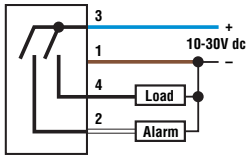
1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray*/
Yellow†

5-Pin Euro	5-Pin Mini
	

DC14 Current Sinking (NPN) Configuration

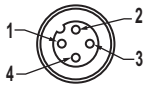
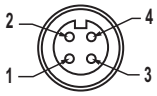


Current Sourcing (PNP) Configuration

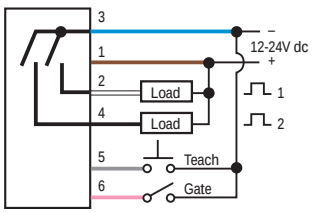


Key

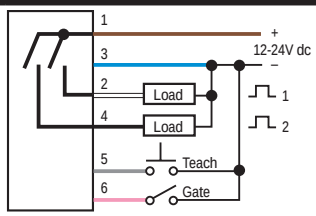
1 = Brown
2 = White
3 = Blue
4 = Black

4-Pin Euro	4-Pin Mini
	

DC15 Current Sinking (NPN)



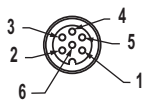
Current Sourcing (PNP)



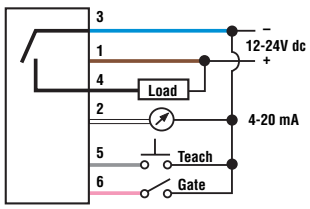
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray
6 = Pink

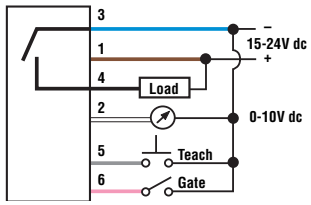
6-Pin Pico



DC16 Current Sinking (NPN) & Analog Current



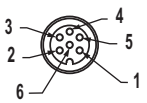
Current Sinking (NPN) & Analog Voltage



Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray
6 = Pink

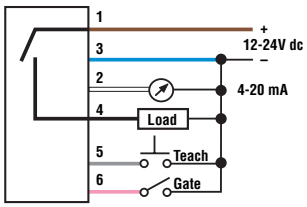
6-Pin Pico



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DC Hookups

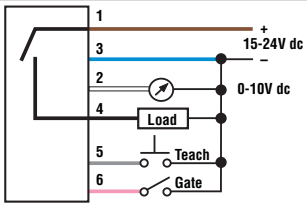
DC17 Current Sourcing (PNP) & Analog Current



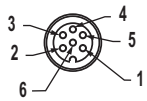
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray
6 = Pink

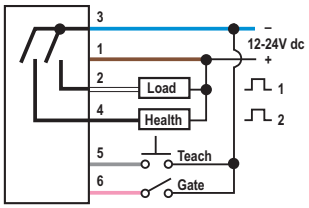
Current Sourcing (PNP) & Analog Voltage



6-Pin Pico



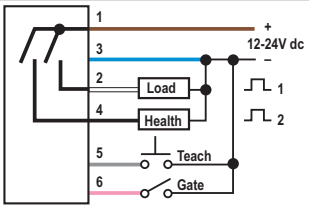
DC18 Current Sinking (NPN) & Health Mode Output



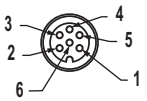
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray
6 = Pink

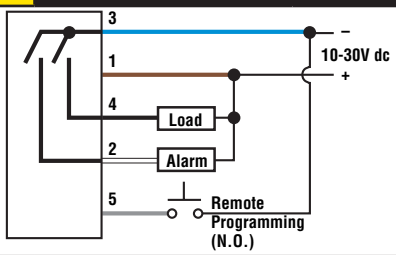
Current Sourcing (PNP) & Health Mode Output



6-Pin Pico



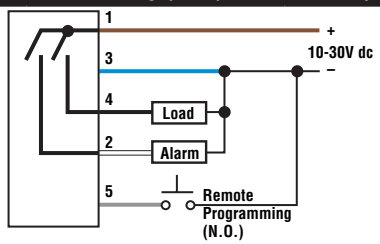
DC19 Current Sinking (NPN) Cable Hookup



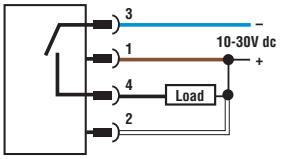
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

Current Sourcing (PNP) Cable Hookup



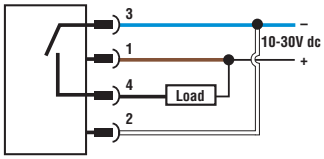
DC20 SM30 DC Receivers (NPN) Light Operate



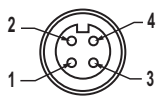
Key

1 = Brown
2 = White
3 = Blue
4 = Black

SM30 DC Receivers (NPN) Dark Operate



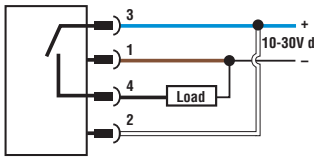
4-Pin Mini



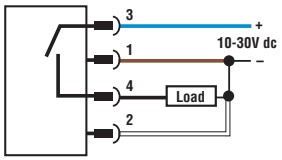
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DC Hookups

DC21 SM30 DC Receivers (PNP) Light Operate



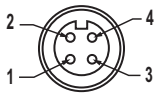
SM30 DC Receivers (PNP) Dark Operate



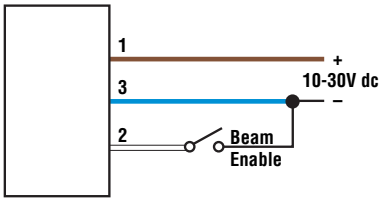
Key

1 = Brown
2 = White
3 = Blue
4 = Black

4-Pin Mini



DC22 Laser Emitter



Key

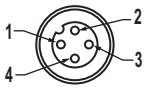
1 = Brown
2 = White
3 = Blue
4 = Black†

† Not Used

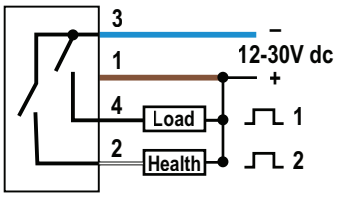
4-Pin Pico



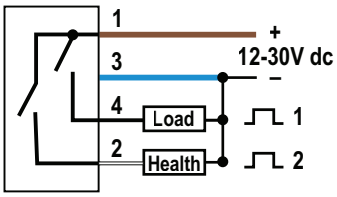
4-Pin Euro



DC23 Complementary Current Sinking (NPN)



Complementary Current Sourcing (PNP)



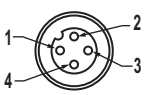
Key

1 = Brown
2 = White
3 = Blue
4 = Black

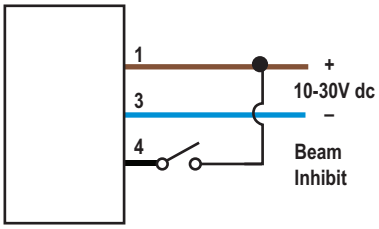
4-Pin Pico



4-Pin Euro



DC24 Emitter with Beam Inhibit (cabled)



Key

1 = Brown
3 = Blue
4 = Black

4-Pin Pico

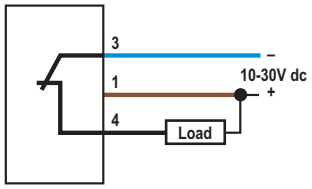


Cabled emitters with beam inhibit use the white wire to error-proof wiring in the cabinet. QD models use the standard pinout and the beam inhibit (pin 4) wire color is determined by the cordset used, but is typically black.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

DC Hookups

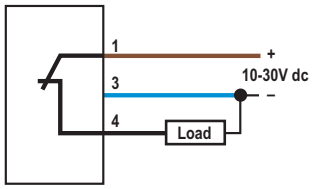
DC25 S12-2 DC Receivers (NPN) Dark Operate



Key

1 = Brown
2 = White
3 = Blue
4 = Black

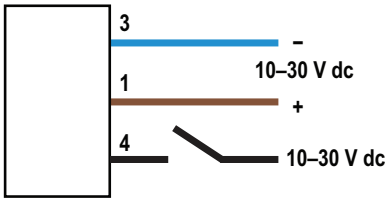
S12-2 DC Receivers (PNP) Dark Operate



4-Pin Pico

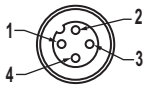


DC26 Emitter with Beam Inhibit

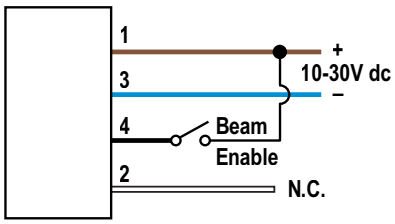


Key

1 = Brown
2 = White
3 = Blue
4 = Black

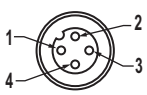
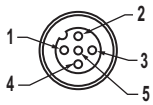
4-Pin Euro	4-Pin Pico
	

DC27 QM26



Key

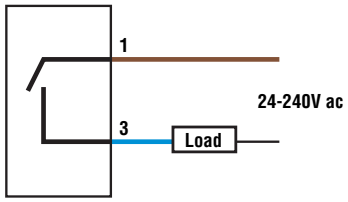
1 = Brown
2 = White
3 = Blue
4 = Black

4-Pin Euro	5-Pin Euro (washdown)	4-Pin Pico
		

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

AC Hookups

AC01 2-wire AC

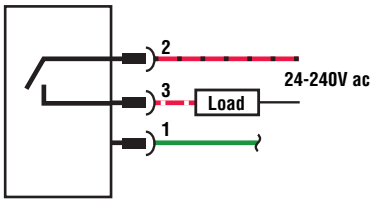


Key

1 = Brown
3 = Blue

NOTE: Wire a load in series before powering up sensor.

AC02 2-wire AC with Quick-Disconnect Cable



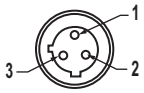
Key

1 = Green†
2 = Red/Black
3 = Red/White

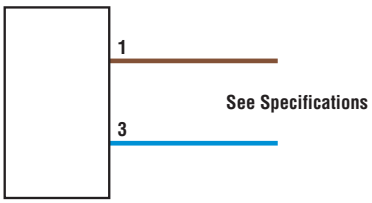
† Not Used

NOTE: Wire a load in series before powering up sensor.

3-Pin Micro



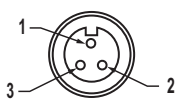
AC03 Emitters



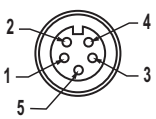
Key

1 = Brown
3 = Blue

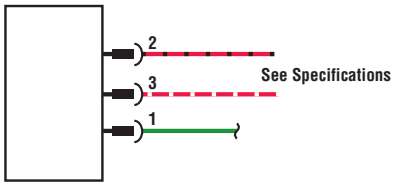
3-Pin Mini



5-Pin Mini



AC04 Emitters with Quick-Disconnect Cable

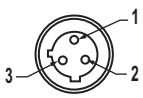


Key

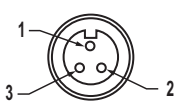
1 = Green†
2 = Red/Black
3 = Red/White

† Not Used

3-Pin Micro



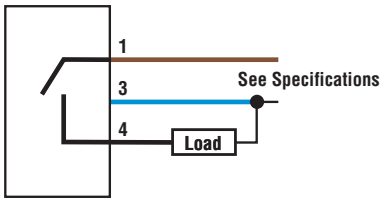
3-Pin Mini



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

AC Hookups

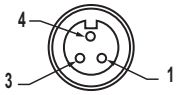
AC05 3-wire AC



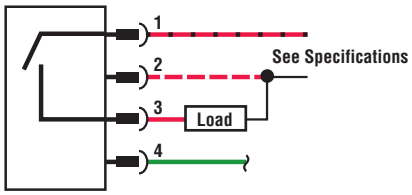
Key

1 = Brown
3 = Blue
4 = Black

3-Pin Mini



AC06 3-wire AC with Quick-Disconnect Cable

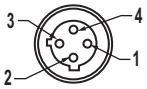


Key

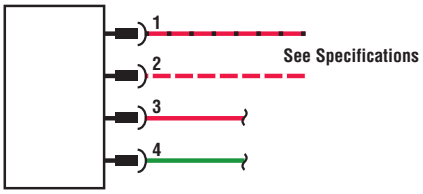
1 = Red/Black
2 = Red/White
3 = Red
4 = Green†

† Not Used

4-Pin Micro



AC07 Emitters with Quick-Disconnect Cable

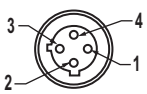


Key

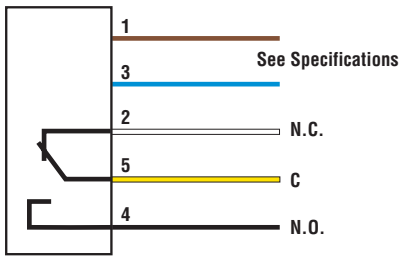
1 = Red/Black
2 = Red/White
3 = Red†
4 = Green†

† Not Used

4-Pin Micro



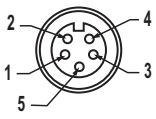
AC08 SPDT Electromechanical Relay Output



Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Yellow

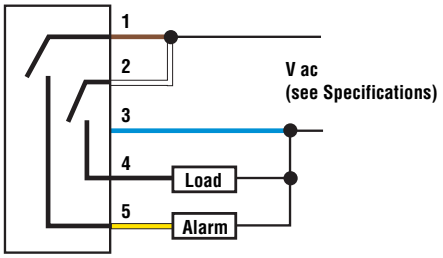
5-Pin Mini



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

AC Hookups

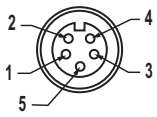
AC09 OPBA2 or OPBB2 3-wire SPST Solid-State Power Block



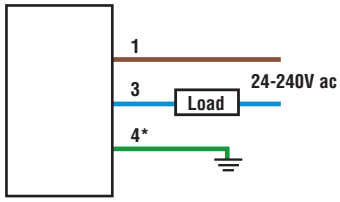
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Yellow

5-Pin Mini



AC10 SM30 2-wire AC Receivers with Attached Cables



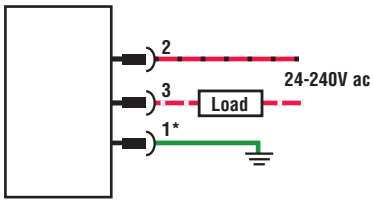
* Connect green wire to earth ground whenever a stainless steel model is powered by ac voltage.

NOTE: Wire a load in series before powering up sensor.

Key

1 = Brown
2 = Blue
4 = Green

AC11 SM30 2-wire AC Receivers



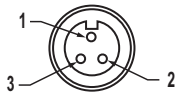
* Connect green wire to earth ground whenever a stainless steel model is powered by ac voltage.

NOTE: Wire a load in series before powering up sensor.

Key

1 = Green
2 = Red/Black
3 = Red/White

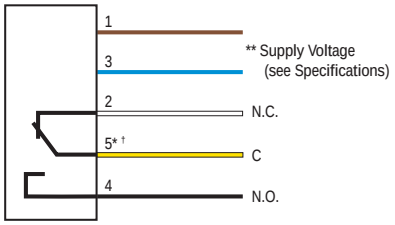
3-Pin Mini



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Universal AC/DC Hookups

UN01 SPDT Electromechanical Relay Output



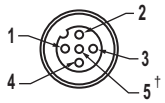
** NOTE: Connection of dc power is without regard to polarity.

Key

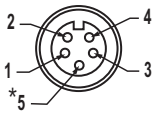
5-Pin Euro
1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray†

5-Pin Mini
1 = Brown
2 = White
3 = Blue
4 = Black
5 = Yellow*

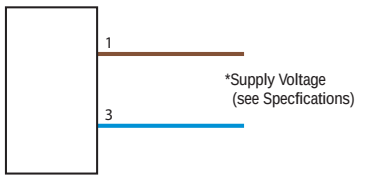
5-Pin Euro



5-Pin Mini



UN02 Emitters



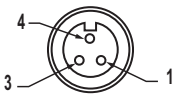
* NOTE: Connection of dc power is without regard to polarity.

Key

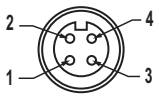
1 = Brown
2 = Blue
3 = Black†

† Not Used

3-Pin Mini



4-Pin Mini



UN03 Emitters with Attached Cable

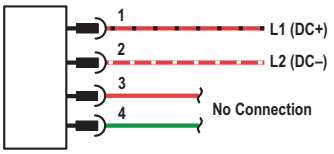


Key

1 = Brown
3 = Blue
4 = Black†

† No Connection

UN04 Emitters with Quick-Disconnect Cable

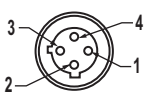


Key

1 = Red/Black
2 = Red/White
3 = Red†
4 = Green †

† No Connection

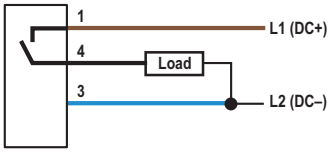
4-Pin Micro



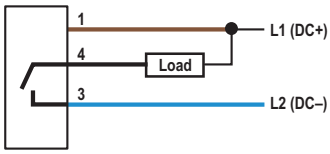
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Universal AC/DC Hookups

UN05 P-MOSFET (Sourcing) Receiver—Cabled



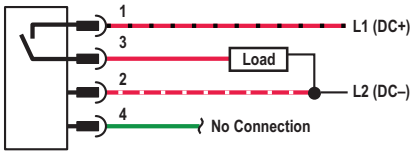
N-MOSFET (Sinking) Receiver—Cabled



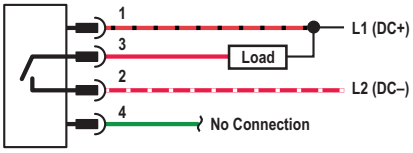
Key

1 = Brown
3 = Blue
4 = Black

UN06 P-MOSFET (Sourcing) Receiver—Quick-Disconnect



N-MOSFET (Sinking) Receiver—Quick-Disconnect

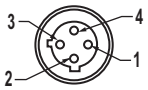


Key

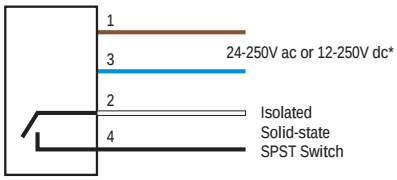
1 = Red/Black
2 = Red/White
3 = Red
4 = Green

† No Connection

4-Pin Micro



UN07 SPST Solid-State Relay Output

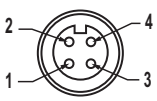


*NOTE: Connection of dc power is without regard to polarity.

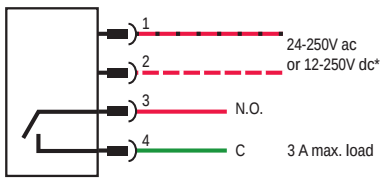
Key

1 = Brown
2 = White
3 = Blue
4 = Black

4-Pin Mini



UN08 SPST Electromechanical Relay Output

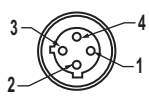


*NOTE: Connection of dc power is without regard to polarity.

Key

1 = Red/Black
2 = Red/White
3 = Red
4 = Green

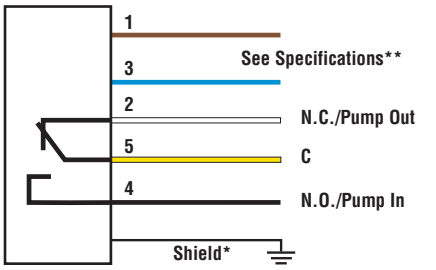
4-Pin Micro



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Universal AC/DC Hookups

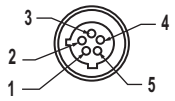
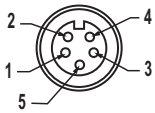
UN09 Normally Open/Pump-In



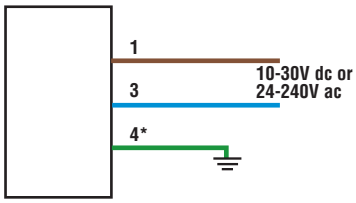
* It is recommended that the shield wire be connected to earth ground.
** DC hookup is without regard to polarity.

Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Yellow

5-Pin Micro	5-Pin Mini
 4A max. Load	 8A max. Load

UN10 SM30 Emitters with Attached Cable



* Connect green wire to earth ground whenever a stainless steel model is powered by ac voltage.

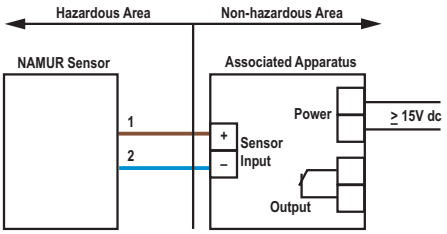
Key

1 = Brown
3 = Blue
4 = Green

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Special Hookups

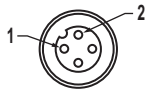
SP01 NAMUR Hookup



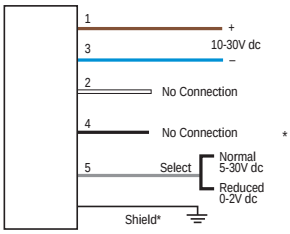
Key

1 = Brown
2 = Blue

4-Pin Euro NAMUR

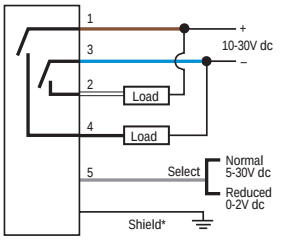


SP02 LX Emitter



* It is recommended that the shield wire be connected to earth ground or DC common.

LX Receiver

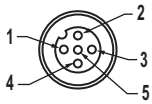


* It is recommended that the shield wire be connected to earth ground or DC common.

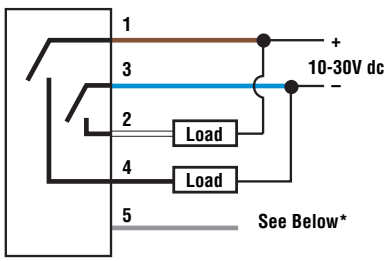
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

5-Pin Euro



SP03 SL10, SL30 and SLO30

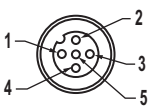


* For Dark Operate, connect gray wire to + (brown).
For Light Operate, connect gray wire to – (blue) or leave circuit open.

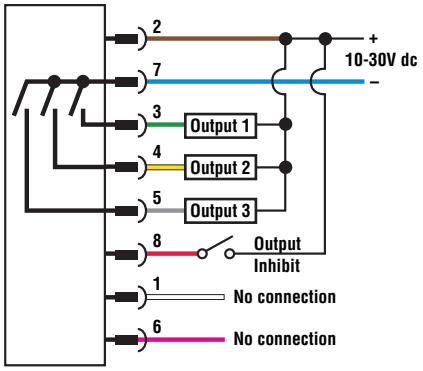
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

5-Pin Euro



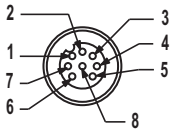
SP04 QC50/QCX50 Current Sinking (NPN)



Key

1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Red

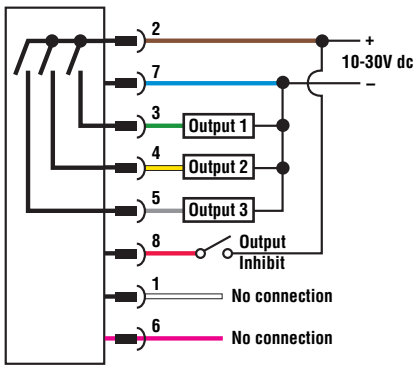
8-Pin Euro



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Special Hookups

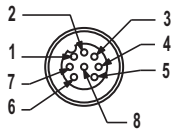
SP05 QC50/QCX50 Current Sourcing (PNP)



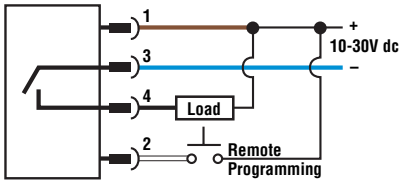
Key

1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Red

8-Pin Euro



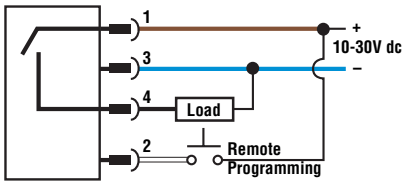
SP06 QL50 Current Sinking (NPN)



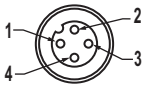
Key

1 = Brown
2 = White
3 = Blue
4 = Black

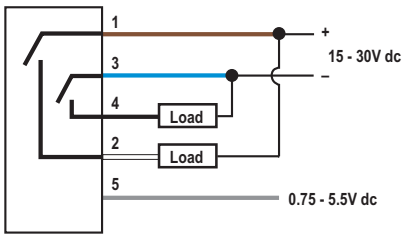
QL50 Current Sourcing (PNP)



4-Pin Euro



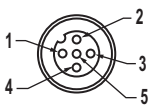
SP07 QL56 Bipolar (NPN + PNP) with Analog Output



Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

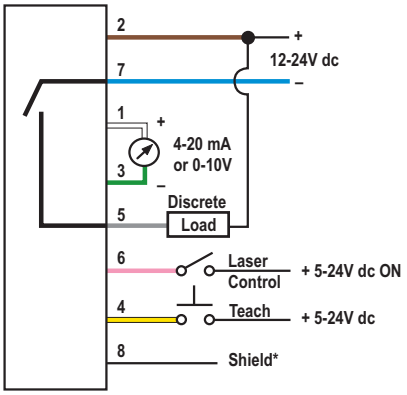
5-Pin Euro



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Measurement Hookups

MI01 LT3 Analog and Current Sinking (NPN) Discrete Outputs

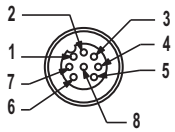


* It is recommended that the shield wire be connected to either earth ground or DC common.

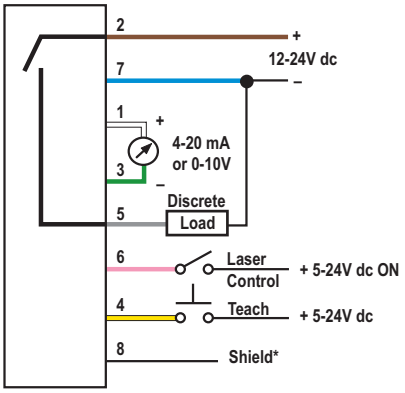
Key

1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Shield

8-Pin Euro



MI02 LT3 Analog and Current Sourcing (PNP) Discrete Outputs

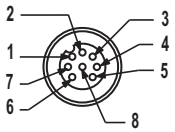


* It is recommended that the shield wire be connected to either earth ground or DC common.

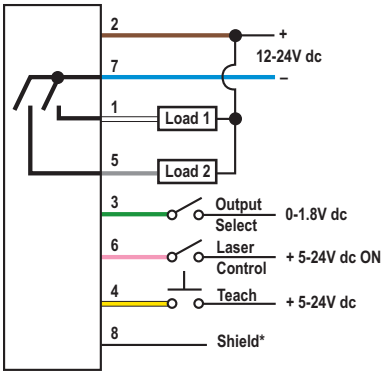
Key

1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Shield

8-Pin Euro



MI03 LT3 with Two Discrete Outputs Current Sinking (NPN)

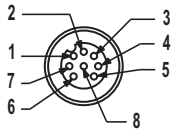


* It is recommended that the shield wire be connected to either earth ground or DC common.

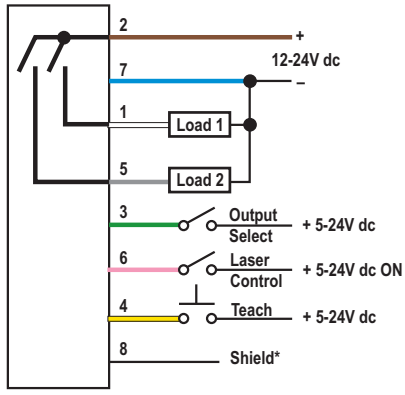
Key

1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Shield

8-Pin Euro



MI04 LT3 with Two Discrete Outputs Current Sourcing (PNP)

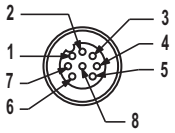


* It is recommended that the shield wire be connected to either earth ground or DC common.

Key

1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Shield

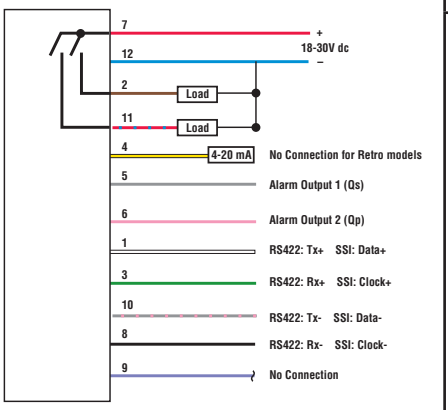
8-Pin Euro



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Measurement Hookups

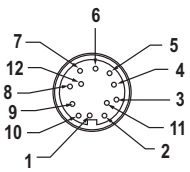
MI05 LT7 Current Sourcing (PNP) and Analog Outputs



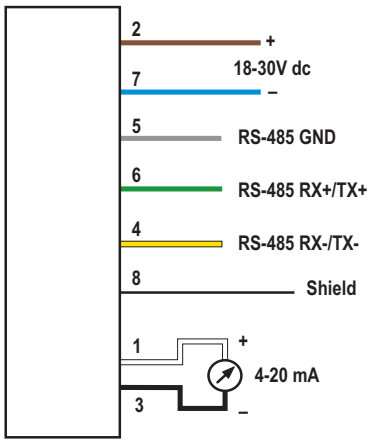
Key

1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Red
8 = Black
9 = Purple
10 = Gray/Pink
11 = Red/Blue
12 = Blue

12-Pin M16



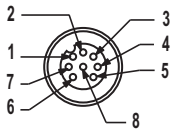
MI06 LH Current Sourcing (PNP) and Analog Outputs



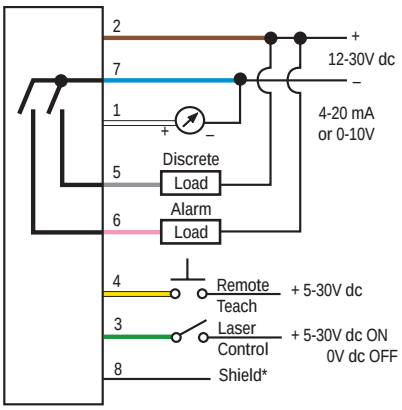
Key

1 = White
2 = Brown
3 = Shield
4 = Yellow
5 = Gray
6 = Green
7 = Blue
8 = Shield

8-Pin Euro QD



MI07 LG5/LG10 Analog and Current Sinking (NPN) Discrete Outputs

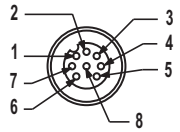


* See data sheet for shield wire connection.

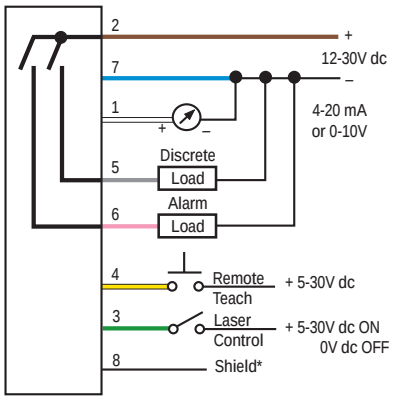
Key

1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Shield

8-Pin Euro



MI08 LG5/LG10 Analog and Current Sourcing (PNP) Discrete Outputs

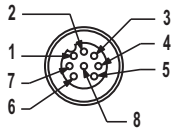


* See data sheet for shield wire connection.

Key

1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Shield

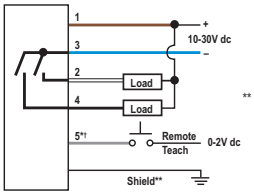
8-Pin Euro



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Measurement Hookups

MI09 QT50U with Discrete Outputs Current Sinking (NPN)



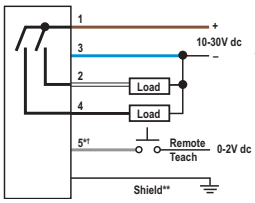
** It is recommended that the shield wire be connected to either earth ground or DC common.

Key

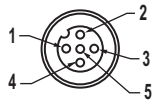
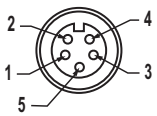
5-Pin Euro
1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray†

5-Pin Mini
1 = Brown
2 = White
3 = Blue
4 = Black
5 = Yellow*

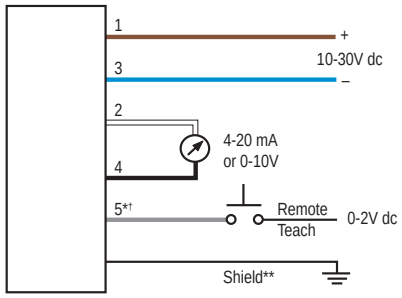
QT50U with Discrete Outputs Current Sourcing (PNP)



** It is recommended that the shield wire be connected to either earth ground or DC common.

5-Pin Euro	5-Pin Mini
	

MI10 QT50U with Analog Output

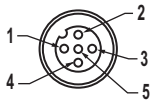
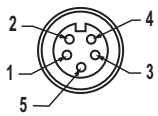


** It is recommended that the shield wire be connected to either earth ground or DC common.

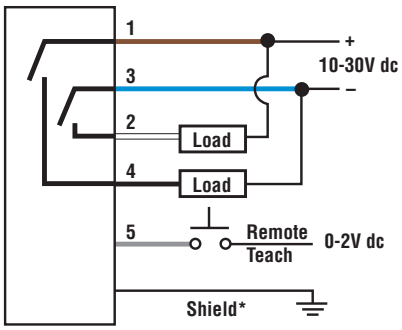
Key

5-Pin Euro
1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray†

5-Pin Mini
1 = Brown
2 = White
3 = Blue
4 = Black
5 = Yellow*

5-Pin Euro	5-Pin Mini
	

MI11 Bipolar (NPN + PNP) with Shield

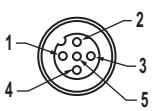


* It is recommended that the shield wire be connected to either earth ground or DC common.

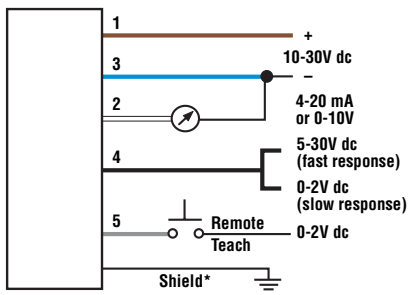
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

5-Pin Euro



MI12 S18U with Analog Output

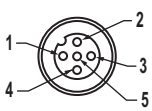


* It is recommended that the shield wire be connected to either earth ground or DC common.

Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

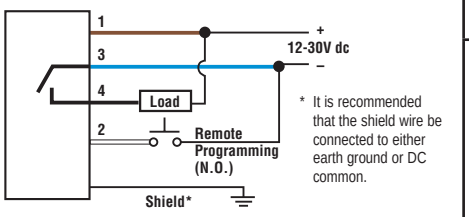
5-Pin Euro



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

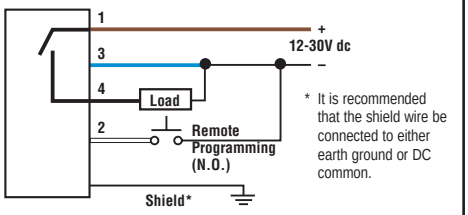
Measurement Hookups

MI13 Current Sinking (NPN) with Shield



* It is recommended that the shield wire be connected to either earth ground or DC common.

Current Sourcing (PNP) with Shield



* It is recommended that the shield wire be connected to either earth ground or DC common.

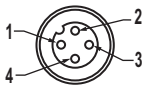
Key

1 = Brown
2 = White
3 = Blue
4 = Black

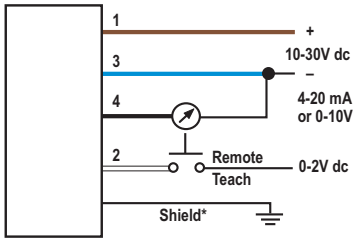
4-Pin Pico



4-Pin Euro



MI14 Analog Output with Shield

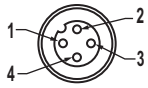


* It is recommended that the shield wire be connected to either earth ground or DC common.

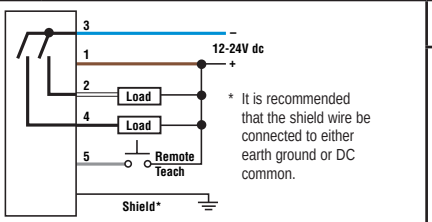
Key

1 = Brown
2 = White
3 = Blue
4 = Black

4-Pin Euro

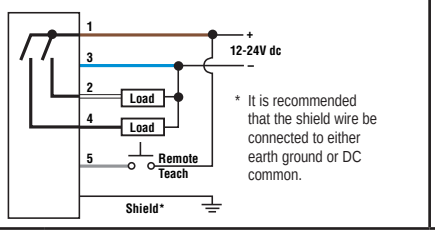


MI15 T30U with Discrete Outputs Current Sinking (NPN)



* It is recommended that the shield wire be connected to either earth ground or DC common.

T30U with Discrete Outputs Current Sourcing (PNP)

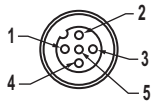


* It is recommended that the shield wire be connected to either earth ground or DC common.

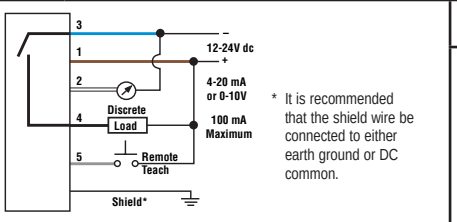
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

5-Pin Euro

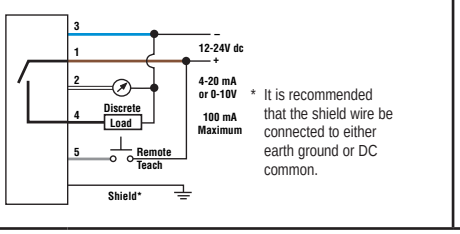


MI16 T30U with Analog & Discrete Outputs Current Sinking (NPN)



* It is recommended that the shield wire be connected to either earth ground or DC common.

T30U with Analog & Discrete Outputs Current Sourcing (PNP)

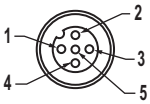


* It is recommended that the shield wire be connected to either earth ground or DC common.

Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

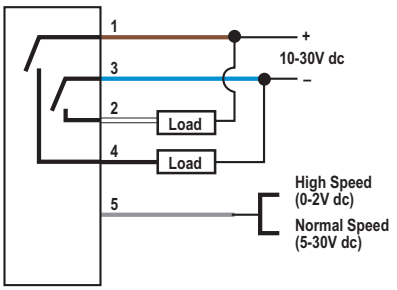
5-Pin Euro



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Measurement Hookups

MI17 M25U Receiver

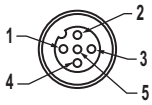


* It is recommended that the shield wire be connected to either earth ground or DC common.

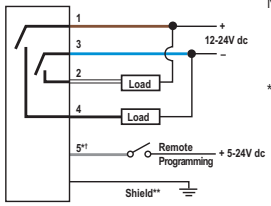
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

5-Pin Euro QD



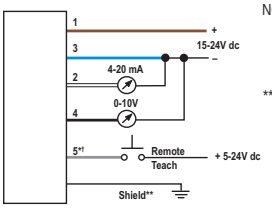
MI18 Q45U & Q45UR with Discrete Outputs



NOTE: Gray/Yellow wires on Q45U models used for enable.

** It is recommended that the shield wire be connected to either earth ground or DC common.

Q45U & Q45UR with Analog Outputs



NOTE: Gray/Yellow wires on Q45U models used for enable.

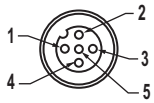
** It is recommended that the shield wire be connected to either earth ground or DC common.

Key

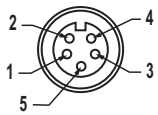
5-Pin Euro
1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray†

5-Pin Mini
1 = Brown
2 = White
3 = Blue
4 = Black
5 = Yellow*

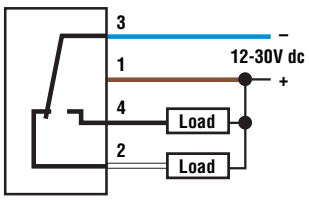
5-Pin Euro



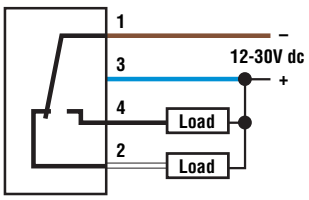
5-Pin Mini



MI19 T18U Current Sinking (NPN) NORMAL Resolution



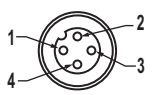
T18U Current Sinking (NPN) HIGH Resolution



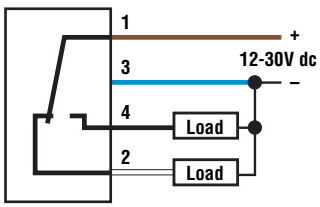
Key

1 = Brown
2 = White
3 = Blue
4 = Black

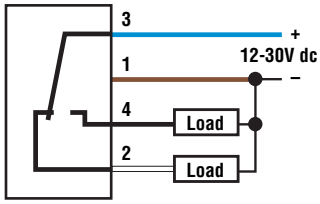
4-Pin Euro



MI20 T18U Current Sourcing (PNP) NORMAL Resolution



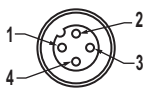
T18U Current Sourcing (PNP) HIGH Resolution



Key

1 = Brown
2 = White
3 = Blue
4 = Black

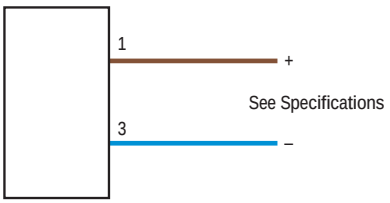
4-Pin Euro



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Measurement Hookups

MI21 Emitter

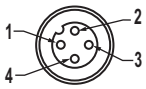


Key

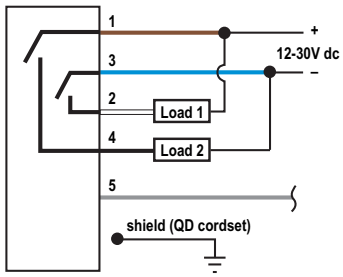
1 = Brown
2 = White†
3 = Blue
4 = Black†

† Not Used

4-Pin Euro



MI22 R-GAGE™



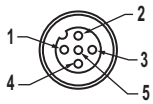
NOTE: It is recommended that the shield wire (QD cordsets only) be connected to earth ground or dc common. Shielded cordsets are recommended for all models.

Key

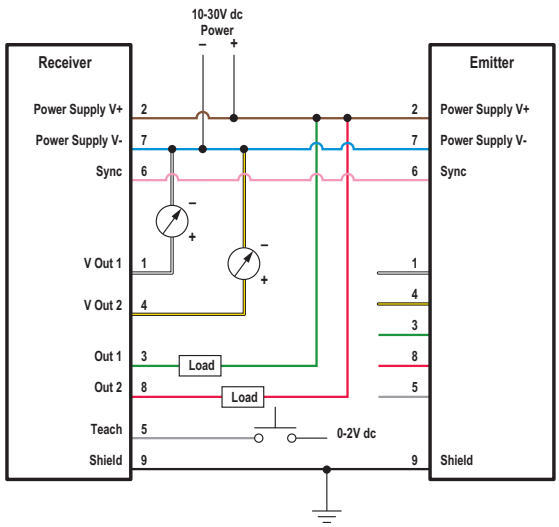
1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray*

* Not used

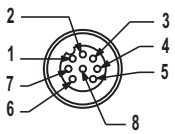
5-Pin Euro



MI23 EZ-ARRAY™ Sinking (NPN) with Analog Output

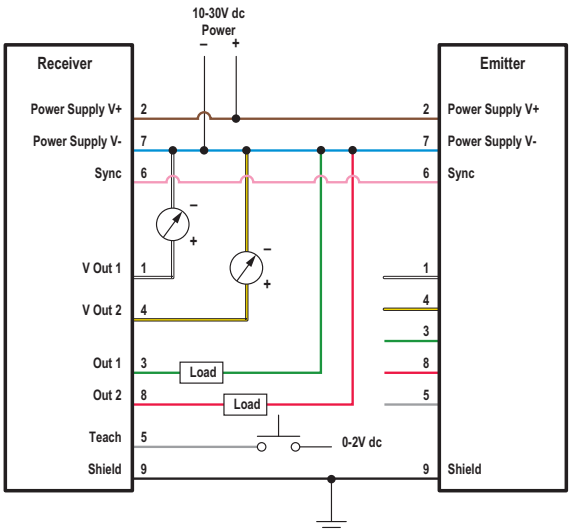


8-Pin Euro

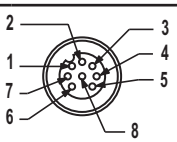


1 = White	5 = Gray
2 = Brown	6 = Pink
3 = Green	7 = Blue
4 = Yellow	8 = Red

MI24 EZ-ARRAY™ Sourcing (PNP) with Analog Output



8-Pin Euro

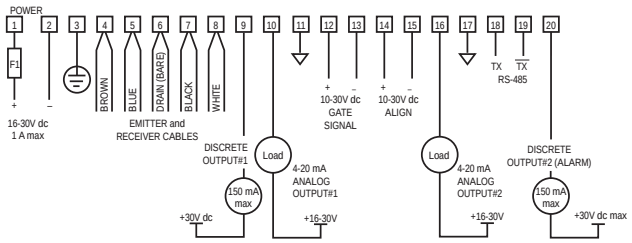


1 = White	5 = Gray
2 = Brown	6 = Pink
3 = Green	7 = Blue
4 = Yellow	8 = Red

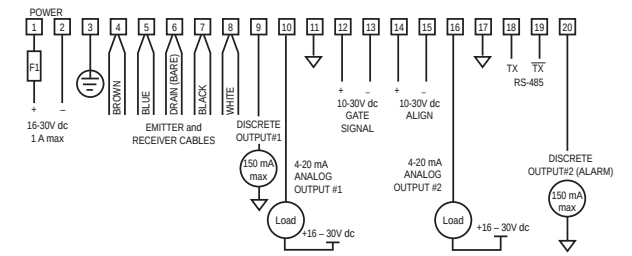
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Measurement Hookups

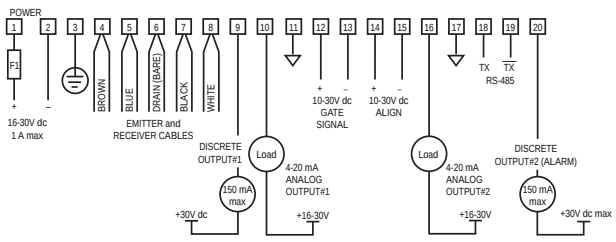
MI25 High-Resolution MINI-ARRAY Discrete (NPN) and Analog (0-10V) MAHCVN-1



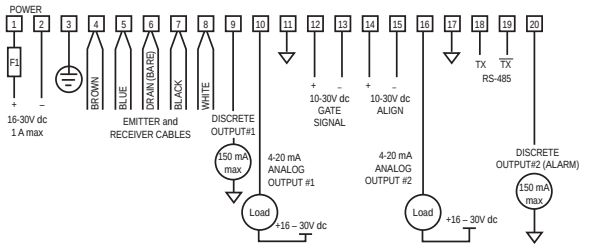
High-Resolution MINI-ARRAY Discrete (PNP) and Analog (0-10V) MAHCVP-1



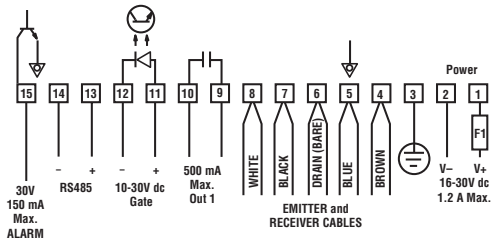
MI26 High-Resolution MINI-ARRAY Discrete (NPN) and Analog (4-20 mA) MAHCIN-1



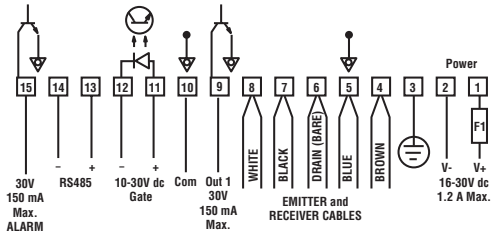
High-Resolution MINI-ARRAY Discrete (PNP) and Analog (4-20 mA) MAHCIP-1



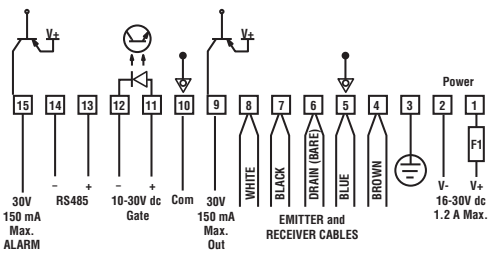
MI27 MINI-ARRAY Discrete Sinking (1-NPN) MAC-1



MI28 MINI-ARRAY Discrete Sinking (2-NPN) MACN-1



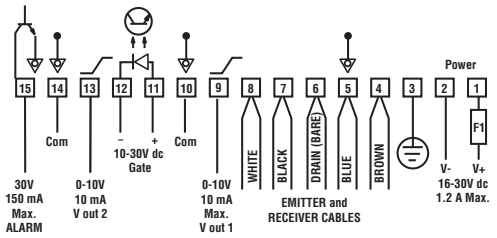
MINI-ARRAY Discrete Sourcing (2-PNP) MACP-1



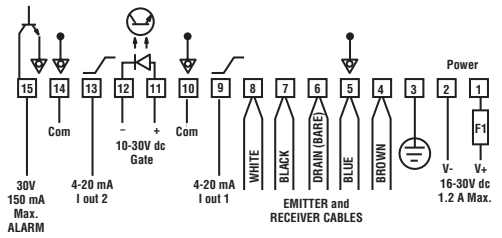
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Measurement Hookups

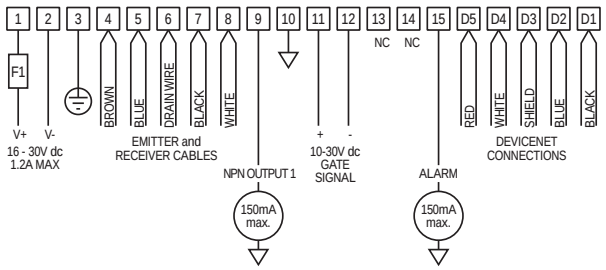
MI29 MINI-ARRAY Discrete Sinking (1-NPN) and Analog (0-10V) MACV-1



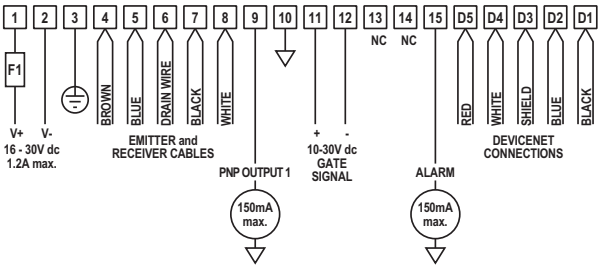
MINI-ARRAY Discrete Sinking (1-NPN) and Analog (4-20 mA) MACI-1



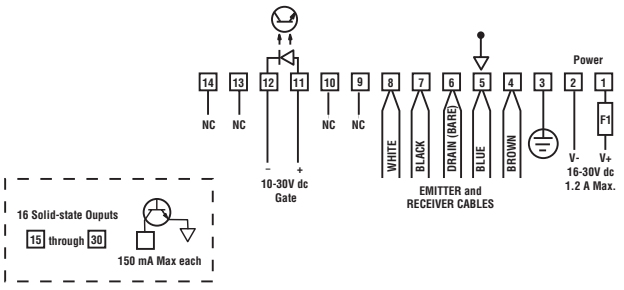
MI30 MINI-ARRAY with DeviceNet™ Sinking (NPN) MACNXDN-1



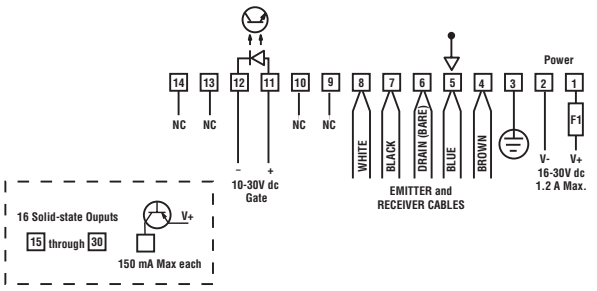
MINI-ARRAY with DeviceNet™ Sourcing (PNP) MACPXDN-1



MI31 MINI-ARRAY Discrete Sinking (16-NPN) MAC16N-1



MINI-ARRAY Discrete Sourcing (16-PNP) MAC16P-1



Key

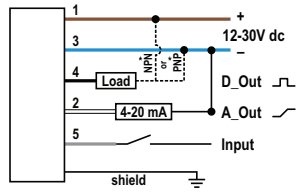
Output 1 = Pin 16
Output 2 = Pin 17
Output 3 = Pin 18
Output 4 = Pin 19
Output 5 = Pin 20
Output 6 = Pin 21
Output 7 = Pin 22
Output 8 = Pin 23
Output 9 = Pin 24
Output 10 = Pin 25
Output 11 = Pin 26
Output 12 = Pin 27
Output 13 = Pin 28
Output 14 = Pin 29
Output 15 = Pin 30
Output 16 = Pin 15

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Measurement Hookups

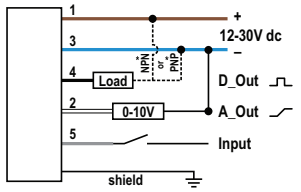
MI32

LE550 Analog Current & (NPN/PNP) Discrete Outputs



* User-configurable PNP/NPN setting

LE550 Analog Voltage & (NPN/PNP) Discrete Outputs

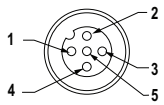


* User-configurable PNP/NPN setting

Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

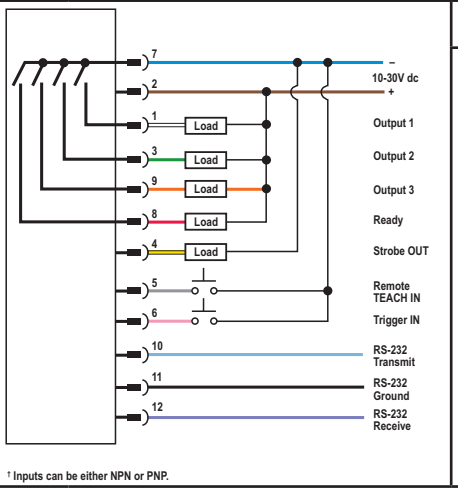
5-Pin Euro



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Vision Hookups

VS01 iVu Plus Sensors NPC Output with NPN Input†

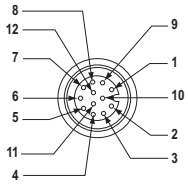


† Inputs can be either NPN or PNP.

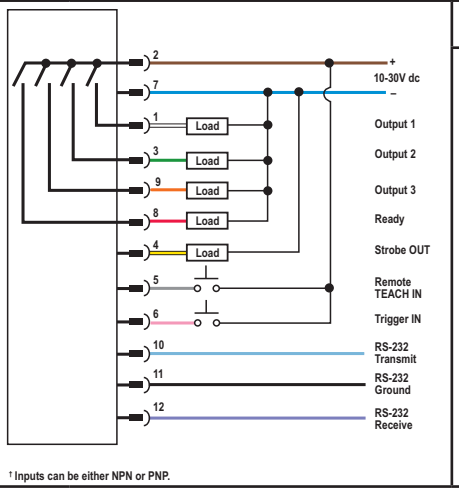
Key

1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Red
9 = Orange
10 = Light Blue
11 = Black
12 = Violet

12-Pin Euro



VS02 iVu Plus Sensors PNP Output with PNP Input†

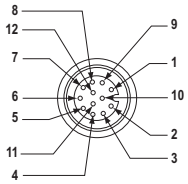


† Inputs can be either NPN or PNP.

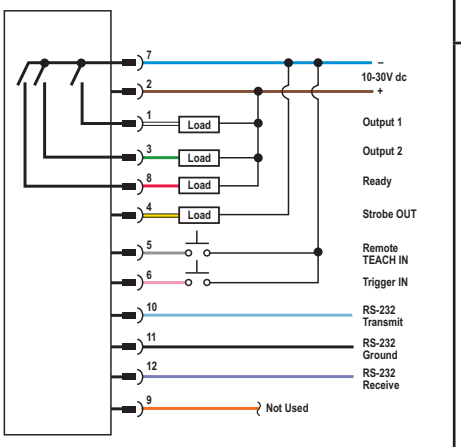
Key

1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Red
9 = Orange
10 = Light Blue
11 = Black
12 = Violet

12-Pin Euro



VS03 iVu Sensors with Remote Touch Screen & iVu BCR with Integrated Touch Screen NPN Output with NPN Input†

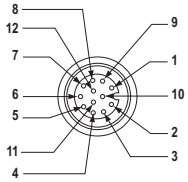


† Inputs can be either NPN or PNP.

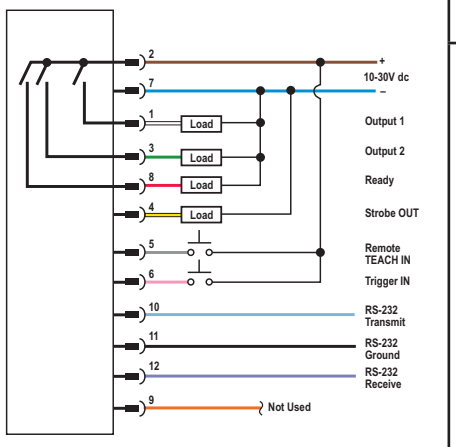
Key

1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Red
9 = Orange
10 = Light Blue
11 = Black
12 = Violet

12-Pin Euro



VS04 iVu Sensors with Remote Touch Screen & iVu BCR with Integrated Touch Screen PNP Output with PNP Inputs†

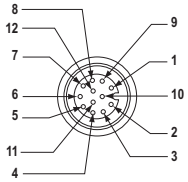


† Inputs can be either NPN or PNP.

Key

1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Red
9 = Orange
10 = Light Blue
11 = Black
12 = Violet

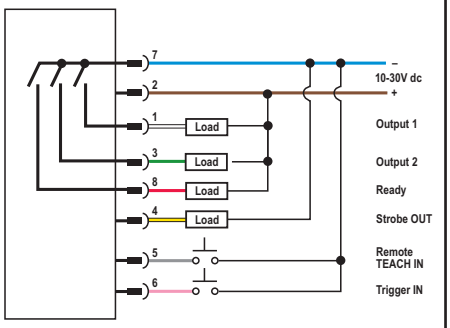
12-Pin Euro



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Vision Hookups

VS05 iVu TG with Integrated Touch Screen NPN Output with NPN Input†

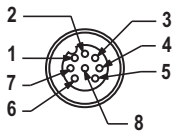


† Inputs can be either NPN or PNP.

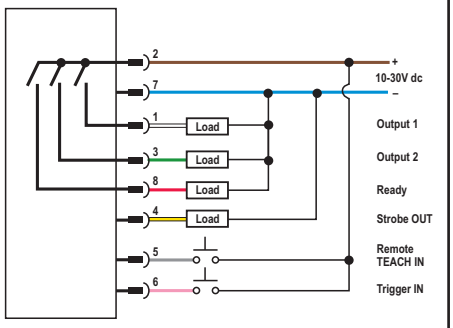
Key

1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Red

8-Pin Euro



VS06 iVu TG with Integrated Touch Screen PNP Output with PNP Input†

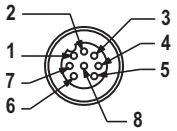


† Inputs can be either NPN or PNP.

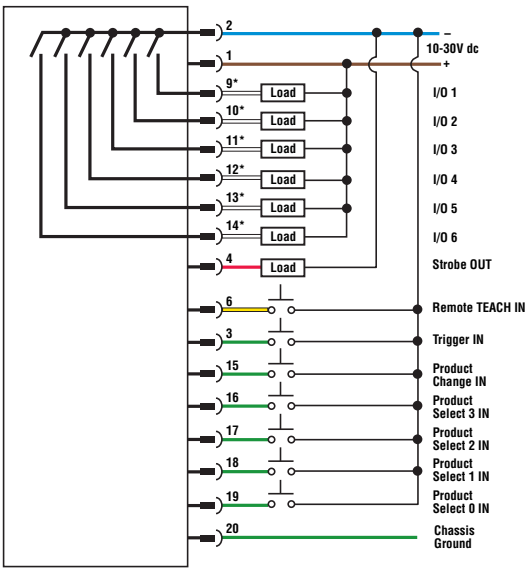
Key

1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Red

8-Pin Euro



VS07 *Pro* NPN Outputs with NPN Inputs†

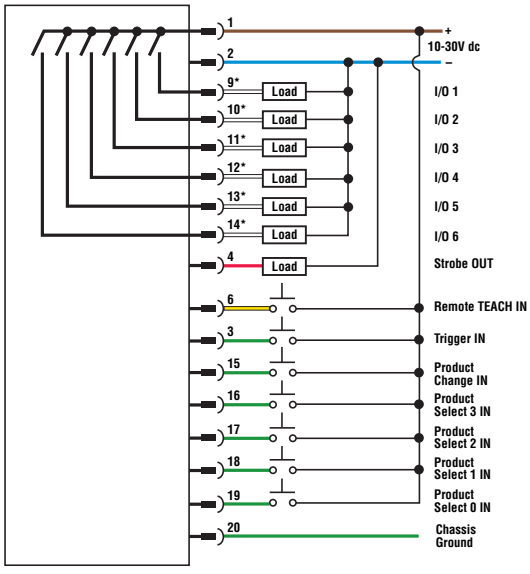


† Inputs can be either NPN or PNP.
* Can be independently configured as an output or input.
** Not used

Key

1 = Brown
2 = Blue
3 = Green
4 = Red
5 = Yellow**
6 = Yellow
7 = Yellow**
8 = Yellow**
9 = White*
10 = White*
11 = White*
12 = White*
13 = White*
14 = White*
15 = Green
16 = Green
17 = Green
18 = Green
19 = Green
20 = Green

VS08 *Pro* PNP Outputs with PNP Inputs†

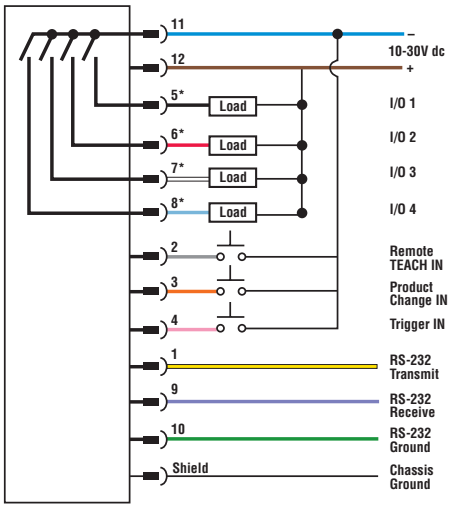


† Inputs can be either NPN or PNP.
* Can be independently configured as an output or input.
** Not used

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Vision Hookups

VS09 — *P4* NPN Outputs with NPN Inputs†

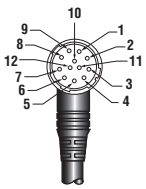


† Inputs can be either NPN or PNP.
* Can be independently configured as an output or input.

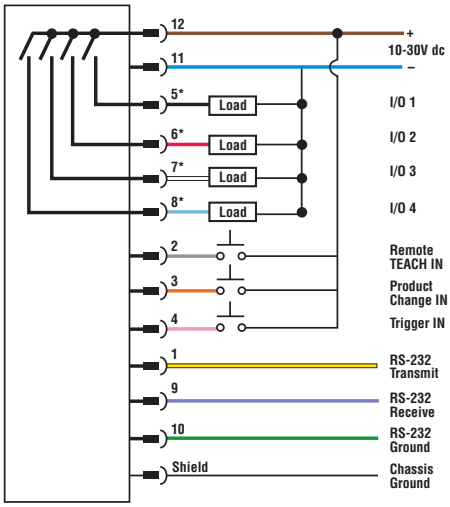
Key

1 = Yellow
2 = Gray
3 = Orange
4 = Pink
5 = Black*
6 = Red*
7 = White*
8 = Light Blue*
9 = Purple
10 = Green
11 = Blue
12 = Brown
Shield = Bare Metal

12-Pin QD



VS10 — *P4* PNP Outputs with PNP Inputs†

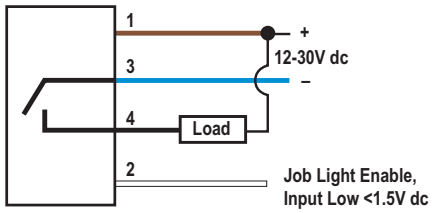


† Inputs can be either NPN or PNP.
* Can be independently configured as an output or input.

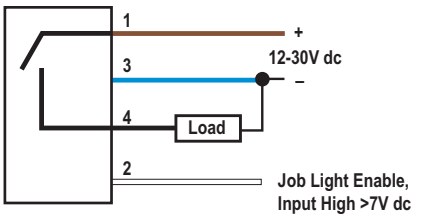
Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Lighting & Indicators Hookups

LI01 K50 and K80 Current Sinking (NPN) Hookup for Solid Job Light—1 or 2 Color



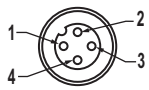
K50 and K80 Current Sourcing (PNP) Hookup for Solid Job Light— 1 or 2 Color



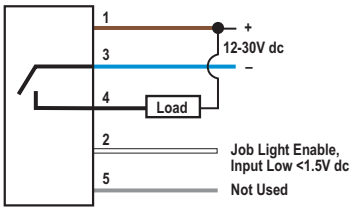
Key

1 = Brown
2 = White
3 = Blue
4 = Black

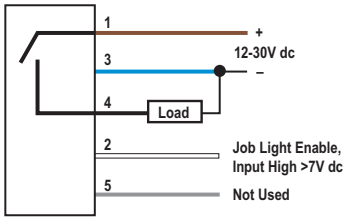
4-Pin Euro



LI02 K50 and K80 Current Sinking (NPN) for Solid Job Light—3 Color



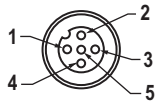
K50 and K80 Current Sourcing (PNP) for Solid Job Light—3 Color



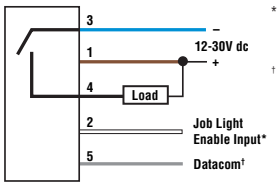
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

5-Pin Euro



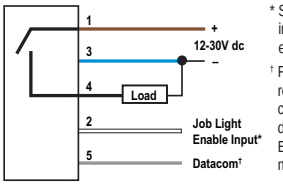
LI03 PVD with Switch-Selectable Output Current Sinking (NPN)



* See configuration information in data sheet for job light enable input requirements.

† For specialized applications requiring custom configuration options. See data sheet and contact your Banner representative for more information.

PVD with Switch-Selectable Output Current Sourcing (PNP)



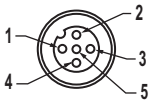
* See configuration information in data sheet for job light enable input requirements.

† For specialized applications requiring custom configuration options. See data sheet and contact your Banner representative for more information.

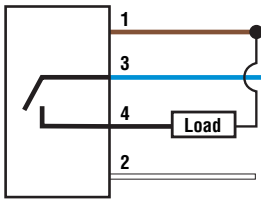
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

5-Pin Euro

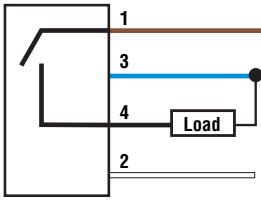


LI04 PVA Current Sinking (NPN)



* See data sheet for Programming information or job light enable requirements.

PVA Current Sourcing (PNP)

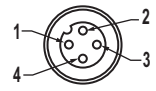


* See data sheet for Programming information or job light enable requirements.

Key

1 = Brown
2 = White
3 = Blue
4 = Black

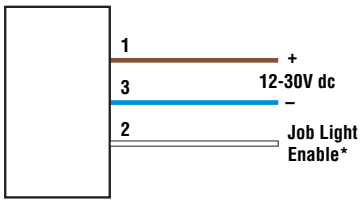
4-Pin Euro



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Lighting & Indicators Hookups

LI05 PVA Emitter



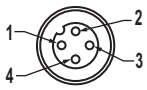
* See data sheet for programming information or job light enable requirements.

Key

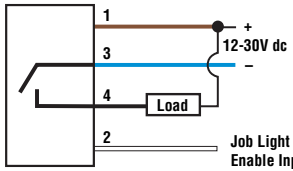
1 = Brown
2 = White
3 = Blue
4 = Black†

† Not Used

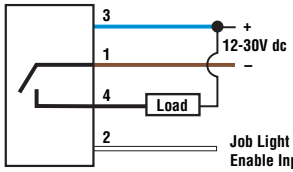
4-Pin Euro



LI06 VTB Current Sinking (NPN) for Solid Job Light—1 Color



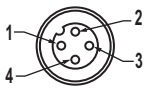
VTB Current Sinking (NPN) for Flashing Job Light—1 Color



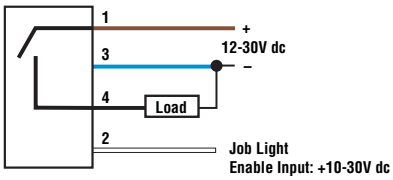
Key

1 = Brown
2 = White
3 = Blue
4 = Black

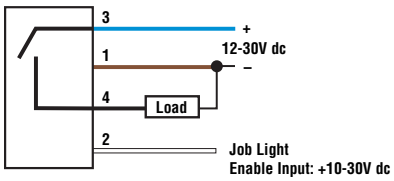
4-Pin Euro



LI07 VTB Current Sourcing (PNP) for Solid Job Light—1 Color



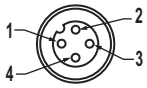
VTB Current Sourcing (PNP) for Flashing Job Light—1 Color



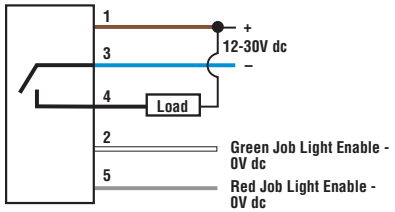
Key

1 = Brown
2 = White
3 = Blue
4 = Black

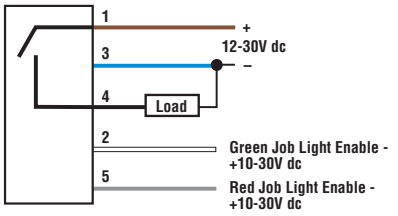
4-Pin Euro



LI08 VTB Current Sinking (NPN) Job Light—2 Color



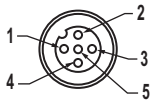
VTB Current Sourcing (PNP) Job Light—2 Color



Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

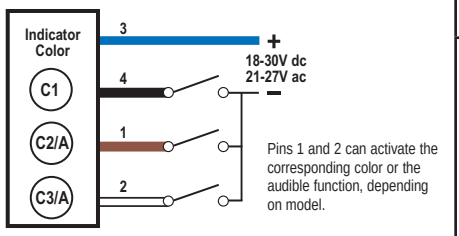
5-Pin Euro QD



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

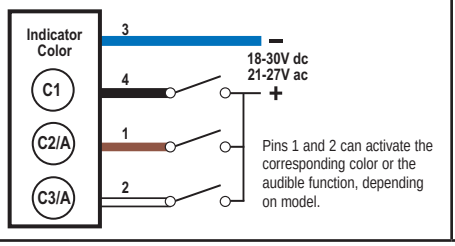
Lighting & Indicators Hookups

LI09 Tower Lights Sinking (NPN) Input—1 to 3 Color



Pins 1 and 2 can activate the corresponding color or the audible function, depending on model.

Tower Lights Sourcing (PNP) Input—1 to 3 Color

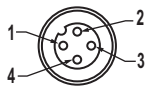


Pins 1 and 2 can activate the corresponding color or the audible function, depending on model.

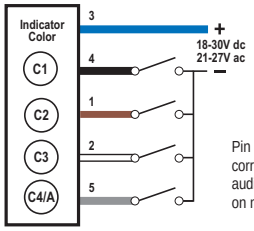
Key

1 = Brown
2 = White
3 = Blue
4 = Black

4-Pin Euro

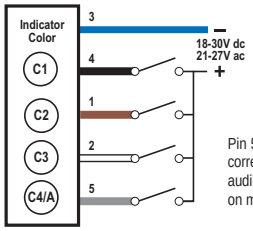


LI10 Tower Lights Sinking (NPN) Input—4 Color



Pin 5 can activate the corresponding color or the audible function, depending on model.

Tower Lights Sourcing (PNP) Input—4 Color

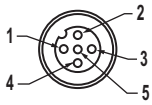


Pin 5 can activate the corresponding color or the audible function, depending on model.

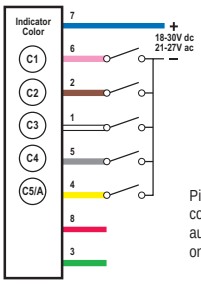
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

5-Pin Euro

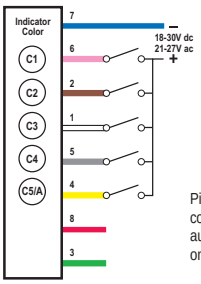


LI11 Tower Lights Sinking (NPN) Input—5 Color



Pin 4 can activate the corresponding color or the audible function, depending on model.

Tower Lights Sourcing (PNP) Input —5 Color



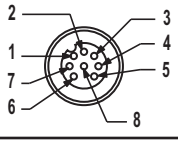
Pin 4 can activate the corresponding color or the audible function, depending on model.

Key

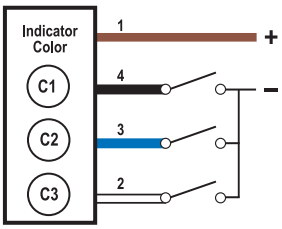
1 = White
2 = Brown
3 = Green†
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Red†

† Not used

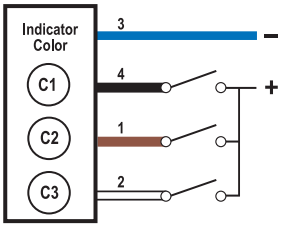
8-Pin Euro



LI12 General-Purpose DC & SP150/SP350 Traffic Light Sinking (NPN) Input



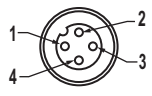
General-Purpose DC & SP150/SP350 Traffic Light Sourcing (PNP) Input



Key

1 = Brown
2 = White
3 = Blue
4 = Black

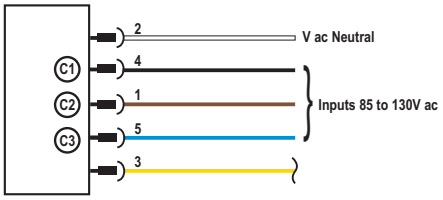
4-Pin Euro



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Lighting & Indicators Hookups

LI13 EZ-LIGHT General-Purpose AC Input

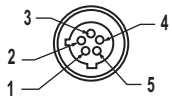


Key

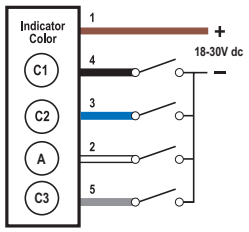
1 = Brown
2 = White
3 = Yellow†
4 = Black
5 = Blue

† Not used

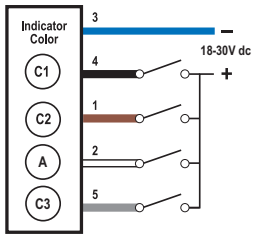
5-Pin Micro



LI14 EZ-LIGHT K50L & K80L Audible Sinking (NPN) Input



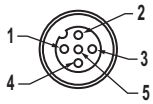
EZ-LIGHT K50L & K80L Audible Sourcing (PNP) Input



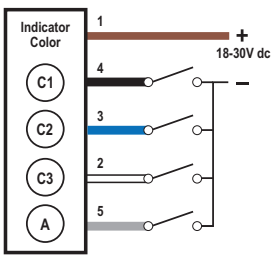
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

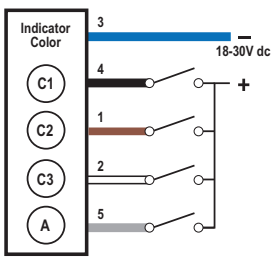
5-Pin Euro



LI15 EZ-LIGHT CL50 Audible Sinking (NPN) Input



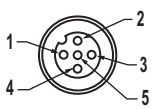
EZ-LIGHT CL50 Audible Sourcing (PNP) Input



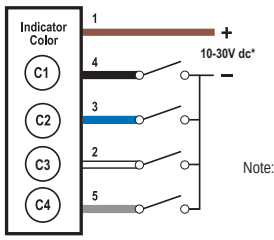
Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

5-Pin Euro



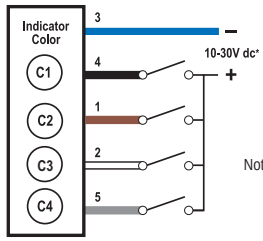
LI16 EZ-LIGHT Multi-Function Sinking (NPN) Input— 3 or 4 Color



Note: Hookup diagrams are for LED ON Steady. See data sheet for LED Function Information.

* K50L, K50FL and K80L models are 18 to 30V dc

EZ-LIGHT Multi-Function Sourcing (PNP) Input— 3 or 4 Color



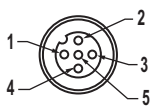
Note: Hookup diagrams are for LED ON Steady. See data sheet for LED Function Information.

* K50L, K50FL and K80L models are 18 to 30V dc

Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

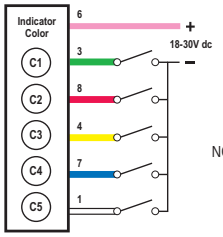
5-Pin Euro



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

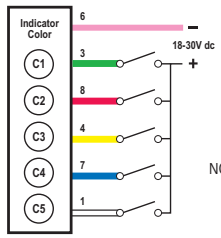
Lighting & Indicators Hookups

LI17 EZ-LIGHT K50L & K80L Multi-Function Sinking (NPN) Input—5 Color



NOTE: Hookup diagrams are for LED ON Steady. See data sheet for LED Function Information.

EZ-LIGHT K50L & K80L Multi-Function Sourcing (PNP) Input—5 Color



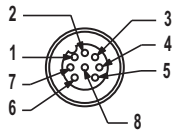
NOTE: Hookup diagrams are for LED ON Steady. See data sheet for LED Function Information.

Key

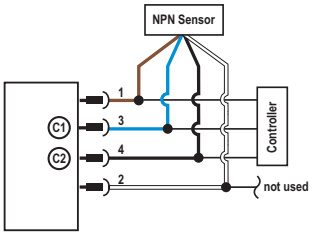
1 = White
2 = Brown†
3 = Green
4 = Yellow
5 = Gray†
6 = Pink
7 = Blue
8 = Red

† Not Used

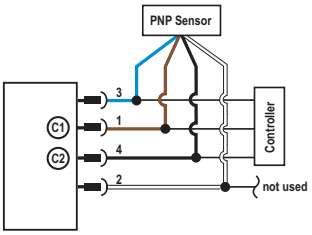
8-Pin Euro



LI18 EZ-LIGHT Sensor Emulator Sinking (NPN) Input



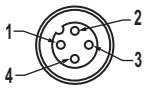
EZ-LIGHT Sensor Emulator Sourcing (PNP) Input



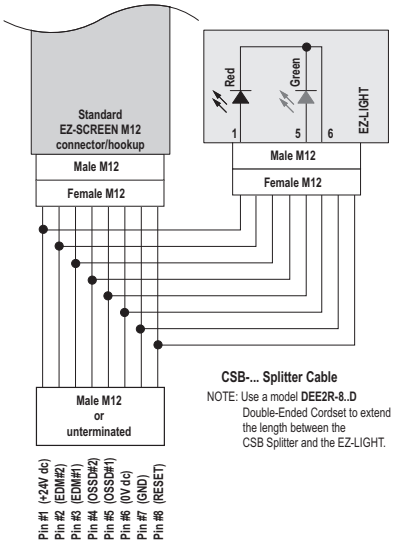
Key

1 = Brown
2 = White
3 = Blue
4 = Black

4-Pin Euro



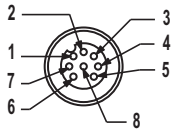
LI19 EZ-LIGHT for EZ-SCREEN®



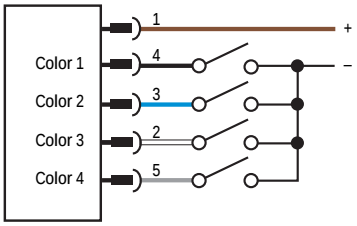
Key

1 = Brown
2 = Or/Bk
3 = Orange
4 = White
5 = Black
6 = Blue
7 = Gn/Yw
8 = Violet

8-Pin Euro

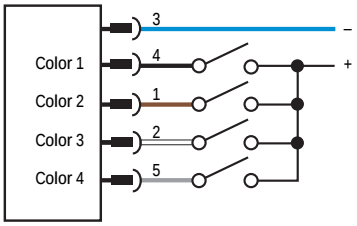


LI20 EZ-LIGHT K80L Segmented Sinking (NPN) Input



Hookups for 4-segment models. Depending on the number of segments, pins 5, 3, 2 and 1 may not be used.

EZ-LIGHT K80L Segmented Sourcing (PNP) Input

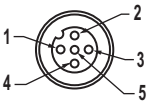


Hookups for 4-segment models. Depending on the number of segments, pins 5, 3, 2 and 1 may not be used.

Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray

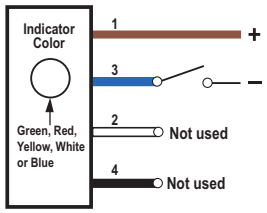
5-Pin Euro



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Lighting & Indicators Hookups

LI21 EZ-LIGHT K50LD Daylight Visible NPN Hookup—1 Color

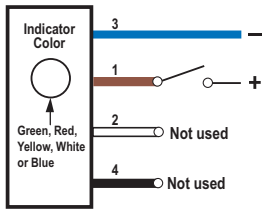


Key

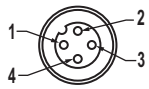
1 = Brown
2 = White†
3 = Blue
4 = Black†

† Not Used

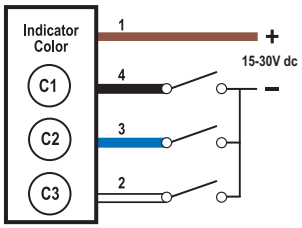
EZ-LIGHT K50LD Daylight Visible PNP Hookup—1 Color



4-Pin Euro



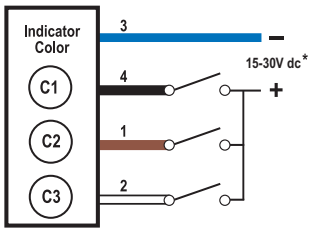
LI22 EZ-LIGHT K50LD Daylight Visible Sinking (NPN) Input— 3 Color



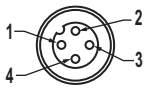
Key

1 = Brown
2 = White
3 = Blue
4 = Black

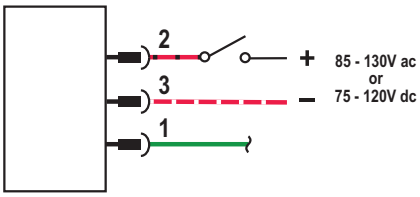
EZ-LIGHT K50LD Daylight Visible Sinking (PNP) Input— 3 Color



4-Pin Euro



LI23 EZ-LIGHT K50LD Daylight Visible AC Input (Quick-Disconnect)— 1 Color



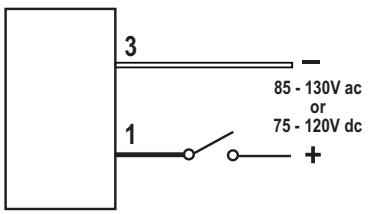
Key

Micro
1 = Green†
2 = Red/Black
3 = Red/White

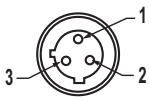
Cabled
1 = Black
2 = White

† Not Used

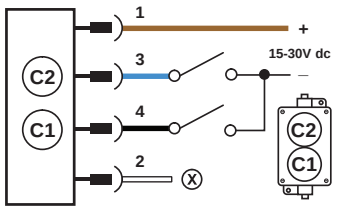
EZ-LIGHT K50LD Daylight Visible AC Input (Cabled)— 1 Color



3-Pin Micro



LI24 EZ-LIGHT SP250 Traffic Lights Sinking (NPN) Input



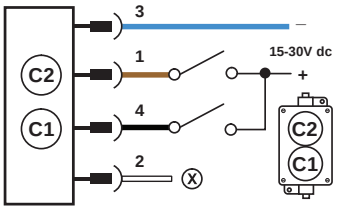
NOTE: Hookup diagrams are for quick-disconnect models.
See data sheet for field-wireable hookup information.

Key

1 = Brown
2 = White
3 = Blue
4 = Black

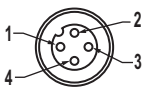
X = Not Used

EZ-LIGHT SP250 Traffic Lights Sourcing (PNP) Input



NOTE: Hookup diagrams are for quick-disconnect models.
See data sheet for field-wireable hookup information.

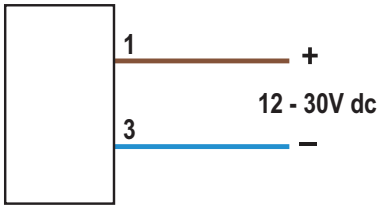
4-Pin Euro QD



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Lighting & Indicators Hookups

LI25 Work Lights

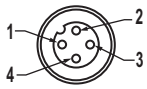


Key

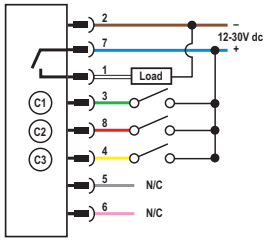
1 = Brown
2 = White†
3 = Blue
4 = Black†

† = Not Used

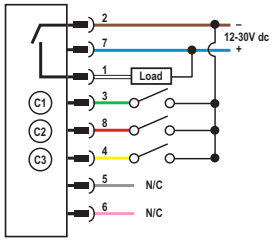
4-Pin Euro QD



LI26 EZ-LIGHT K50 Multipurpose Button Sinking (NPN) Input—3 Color



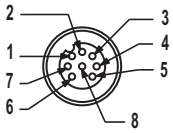
EZ-LIGHT K50 Multipurpose Button Sourcing (PNP) Input—3 Color



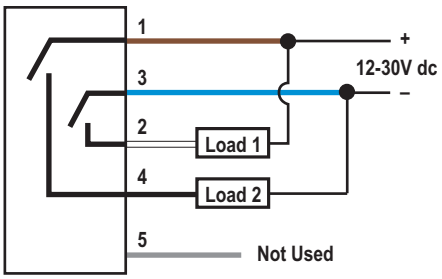
Key

1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Red

8-Pin Euro



LI27 EZ-LIGHT K50 Illuminated Button

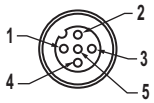


Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray†

† = Not Used

5-Pin Euro QD



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD001

EZ-SCREEN® System (Type 4)

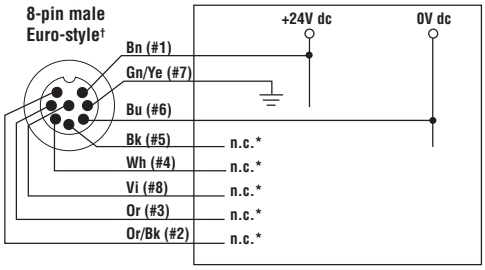


Page 493

Models

- EZ-SCREEN 14 & 30 mm models with 8-pin M12/Euro QD
- EZ-SCREEN Grid & Point models with 8-pin M12/Euro QD

Emitter 8-Pin Euro-Style (Standard Emitter)



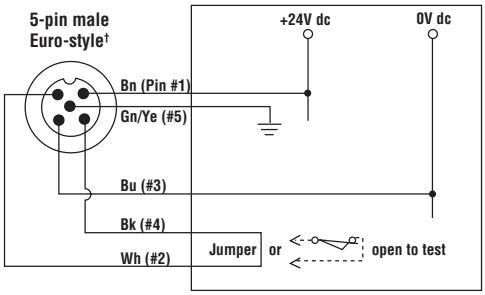
***NOTE: Pins 2, 3, 4, 5, and 8 are not connected, *or* are paralleled to same color wire from the 8-pin receiver cable**

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Emitter 5-Pin Euro-Style (Emitter with Test)

Models

- EZ-SCREEN 14 & 30 mm models with 5-pin M12/Euro QD
- EZ-SCREEN Grid & Point models with 5-pin M12/Euro QD



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

† See Euro-style connectors on page 682 for female mating cordset.

WD002

EZ-SCREEN® LP System (Type 4)

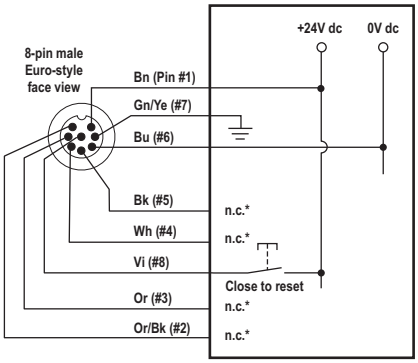


Page 493

Models

- EZ-SCREEN LP 14 & 25 mm models with 8-pin M12/Euro QD

Emitter 8-Pin Euro-Style (Reset Hookup)



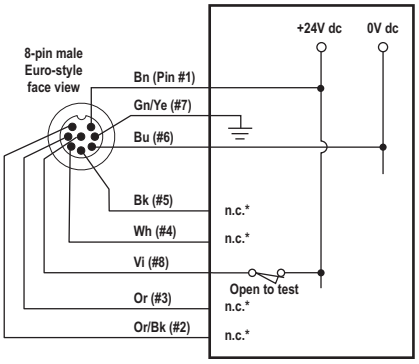
*NOTE: Pins 2, 3, 4 and 5 either are not connected (n.c), or are paralleled to same color wire from the 8-pin receiver cable.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Emitter 8-Pin Euro-Style (Test Hookup)

Models

- EZ-SCREEN LP 14 & 25 mm models with 8-pin M12/Euro QD



*NOTE: Pins 2, 3, 4 and 5 either are not connected (n.c), or are paralleled to same color wire from the 8-pin receiver cable.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

† See Euro-style connectors on page 682 for female mating cordset.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD003

EZ-SCREEN® System (Type 4)

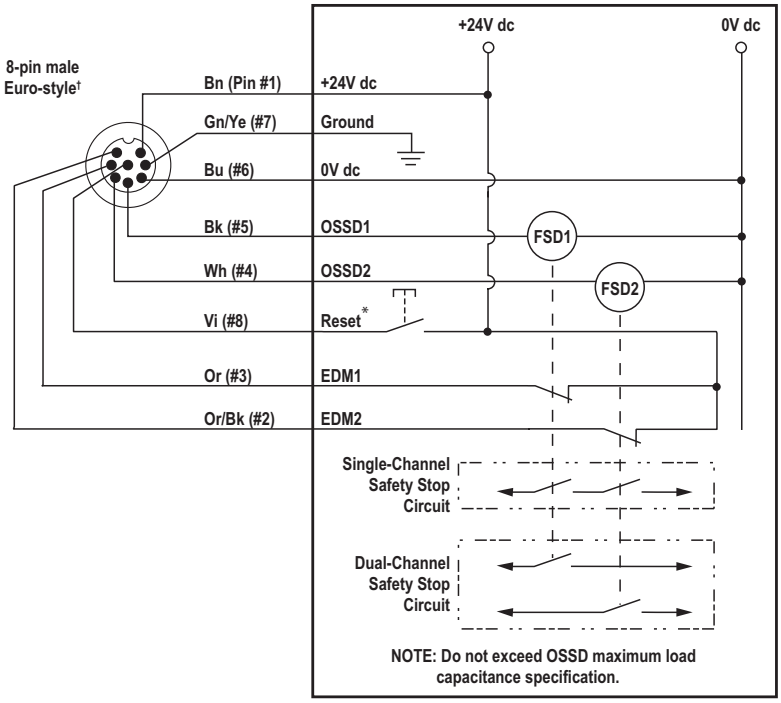
Receiver with 2 Solid-State OSSDs, 2 FSDs and 2-Channel EDM



Page 493

Models

- EZ-SCREEN 14 & 30 mm models with 8-pin M12/Euro QD
- EZ-SCREEN LP 14 & 25 mm models with 8-pin M12/Euro QD
- EZ-SCREEN Grid & Point models with 8-pin M12/Euro QD



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

* Trip (auto reset) not connected
† See Euro-style connectors on page 682 for female mating cordset.

WD004

EZ-SCREEN® System (Type 4)

Receiver with 2 Solid-State OSSDs and 2-Channel EDM of SC22-3

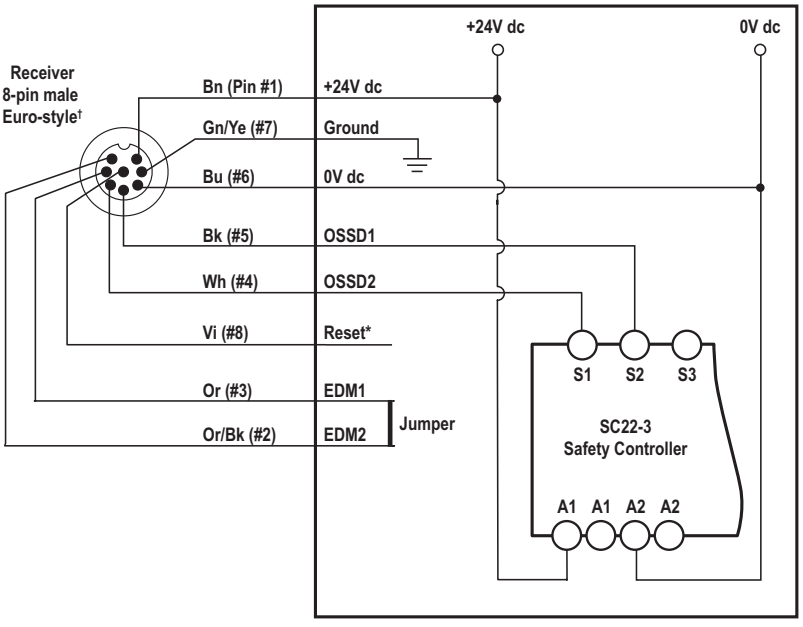


Page 493

Models

- EZ-SCREEN 14 & 30 mm models with 8-pin M12/Euro QD
- EZ-SCREEN LP 14 & 25 mm models with 8-pin M12/Euro QD
- EZ-SCREEN Grid & Point models with 8-pin M12/Euro QD

NOTE: EZ-SCREEN receiver DIP switches are configured for "Trip" (T) output and 2-channel EDM (E2). If the Auxiliary output is to be used, configure the EZ-SCREEN receiver for 1-channel EDM (E1) and connect pin #3 (Or) to +24V dc.



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

* Trip (auto reset) not connected
† See Euro-style connectors on page 682 for female mating cordset.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD005

EZ-SCREEN® System (Type 4)

1-Channel EDM of IM-T-9A Interface Module

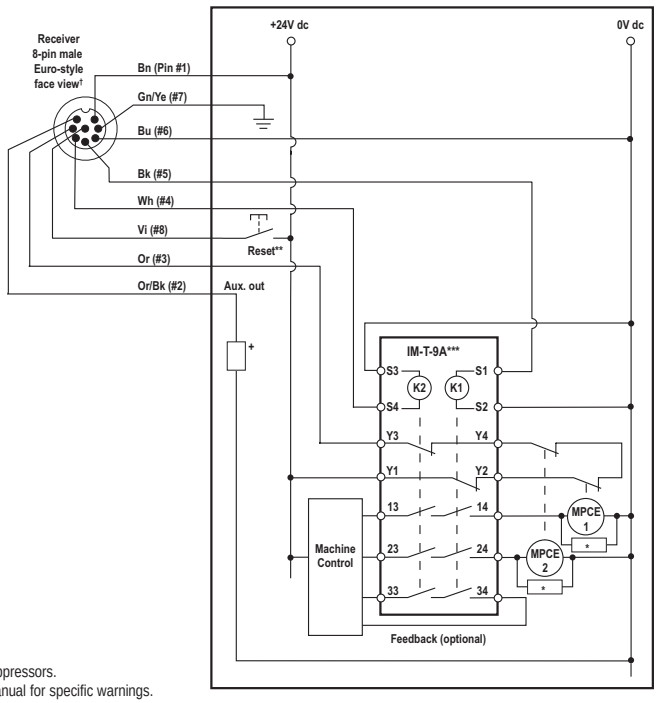


Models

- EZ-SCREEN 14 & 30 mm models with 8-pin M12/Euro QD
- EZ-SCREEN LP 14 & 25 mm models with 8-pin M12/Euro QD
- EZ-SCREEN Grid & Point models with 8-pin M12/Euro QD

IM-T-9A Terminal Locations





* Arc Suppressors.
See manual for specific warnings.
** Trip (auto reset) not connected.
† See Euro-style connectors on page 685 for female mating cordset.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

WD006

EZ-SCREEN® System (Type 4)

2-Channel EDM of IM-T-9A Interface Module

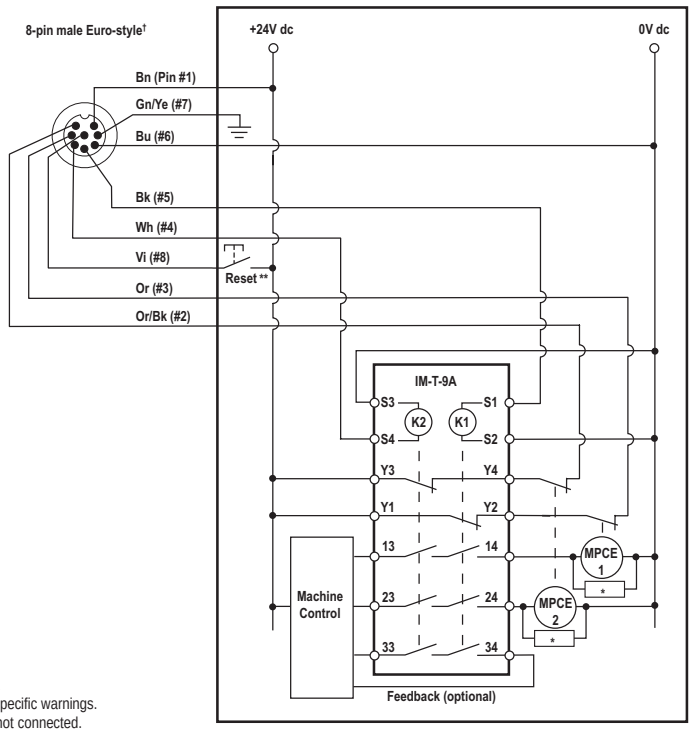


Models

- EZ-SCREEN 14 & 30 mm models with 8-pin M12/Euro QD
- EZ-SCREEN LP 14 & 25 mm models with 8-pin M12/Euro QD
- EZ-SCREEN Grid & Point models with 8-pin M12/Euro QD

IM-T-9A Terminal Locations





* Arc Suppressors.
See manual for specific warnings.
** Trip (auto reset) not connected.
† See Euro-style connectors on page 685 for female mating cordset.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD007

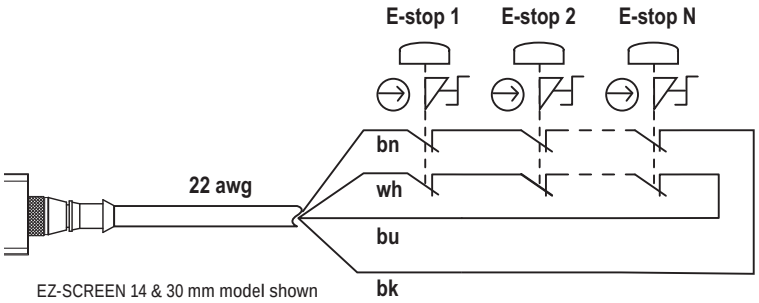
EZ-SCREEN® System (Type 4)



Models

- EZ-SCREEN 14 & 30 mm models
- EZ-SCREEN LP 14 & 25 mm models

Hookup of E-Stop Button to the last Receiver in a Cascade



EZ-SCREEN 14 & 30 mm model shown

EZ-SCREEN LP 14 & 25 mm Models

RDLP6G-4..D Cordset Pinout*	Combination DELPEF-8..D/QDE2R4-8..D Cordset Pinout**	
Brown—Ch 1a	Pin #1 – Brown (Ch 1a)	Pin #5 – Blue (ch 2b)
White—Ch 2a	Pin #2 – n.c.	Pin #6 – n.c.
Blue—Ch 2b	Pin #3 – n.c.	Pin #7 – n.c.
Black—Ch 1b	Pin #4 – Black (Ch 1b)	Pin #8 – White (Ch 2a)

* Other cordset options may also be used, see above for more information.
** Standard M12/Euro-style cordsets (8-pin male QD) can also be used, although pin number/wire color must be verified.

EZ-SCREEN 14 & 30 mm Models

QDE2R4-8..D Cordset Pinout*	
Pin #1 – Brown (Ch 1a)	Pin #5 – n.c
Pin #2 – Black (Ch 1b)	Pin #6 – n.c.
Pin #3 – Blue (Ch 2b)	Pin #7 – n.c.
Pin #4 – n.c.	Pin #8 – White (Ch 2a)

* Standard M12/Euro-style cordsets (8-pin male QD) can also be used, although pin number/wire color must be verified.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

WD008

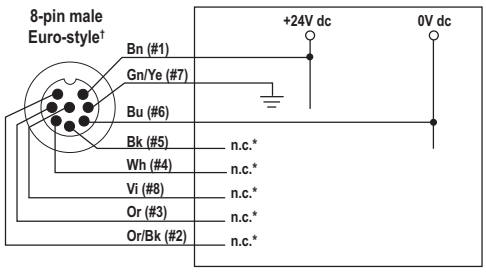
EZ-SCREEN® System (Type 2)



Models

- EZ-SCREEN Type 2 30 mm models

Emitter



* NOTE: Pins 2, 3, 4, 5 and 8 are not connected, or are paralleled to same color wire from the receiver cable.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

† See Euro-style connectors on page 685 for female mating cordset.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD009

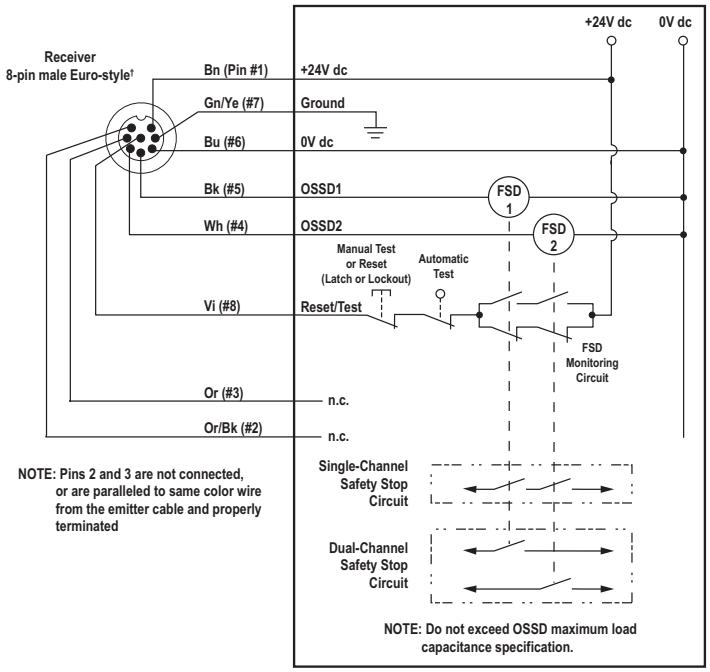
EZ-SCREEN® System (Type 2)

Receiver with 2 Solid-State OSSDs, 2 FSDs and Power Monitoring



Models

• EZ-SCREEN Type 2 30 mm models



† See Euro-style connectors on page 685 for female mating cordset.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

WD010

EZ-SCREEN® System (Type 2)

Power Monitoring of IM-T-9A Interface Module

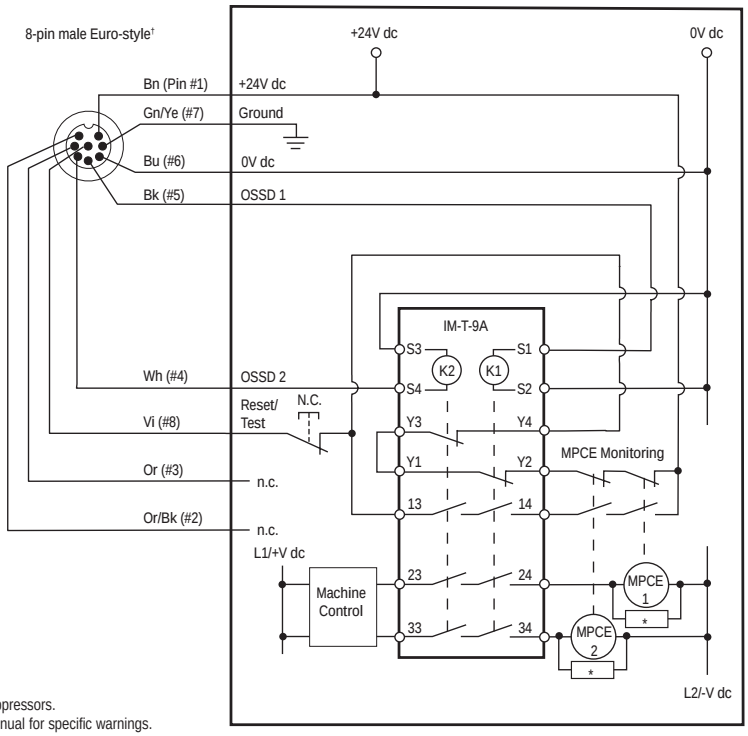


Models

• EZ-SCREEN Type 2 30 mm models

IM-T-9A
Terminal Locations





NOTE: Pins 2 and 3 are not connected, or are paralleled to same color wire from the emitter cable and properly terminated.

* Arc Suppressors.
See manual for specific warnings.

† See Euro-style connectors on page 685 for female mating cordset.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD011

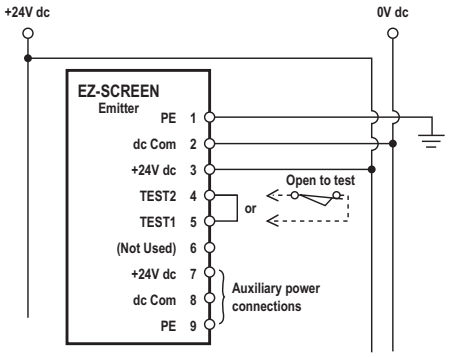
EZ-SCREEN® System (Type 4)



Models

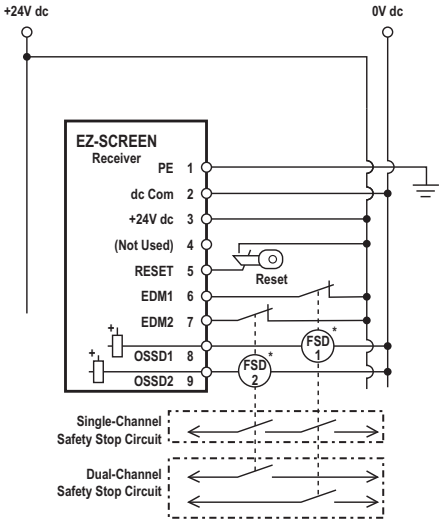
- EZ-SCREEN Grid & Point with terminal chamber hookup
  (Models with M12/Euro QD, see WD001)

Emitter



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Receiver with 2 Solid-State OSSDs, 2 FSDs and 2-Channel EDM



NOTE: Do not exceed OSSD maximum load capacitance specification.

* Arc Suppressors.
See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

WD012

EZ-SCREEN® System (Type 4)



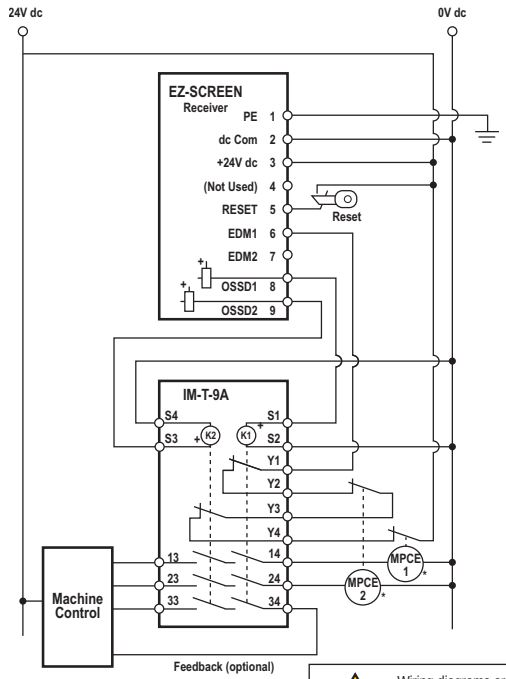
Models

- EZ-SCREEN Grid & Point with terminal chamber hookup
  (Models with M12/Euro QD, see WD003-WD006)

IM-T-9A
Terminal Locations



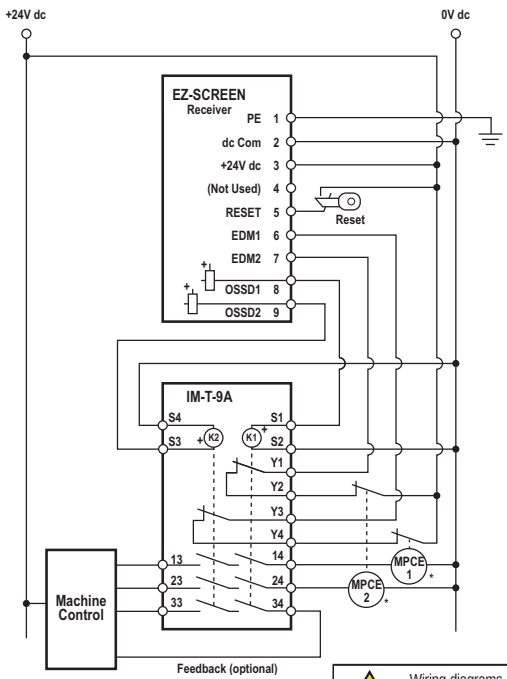
1-Channel EDM of IM-T-9A Interface Module



* Arc Suppressors.
See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

2-Channel EDM of IM-T-9A Interface Module



* Arc Suppressors.
See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD013

EZ-SCREEN® AC Interface Box

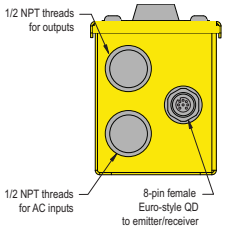
EZAC-R9-QE8 – Hard-Wired with 3 NO and EDM

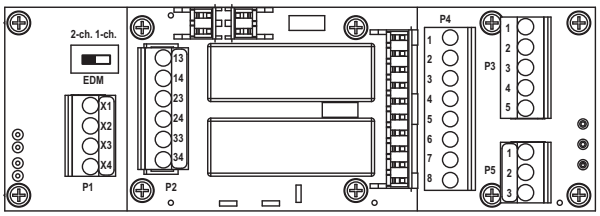


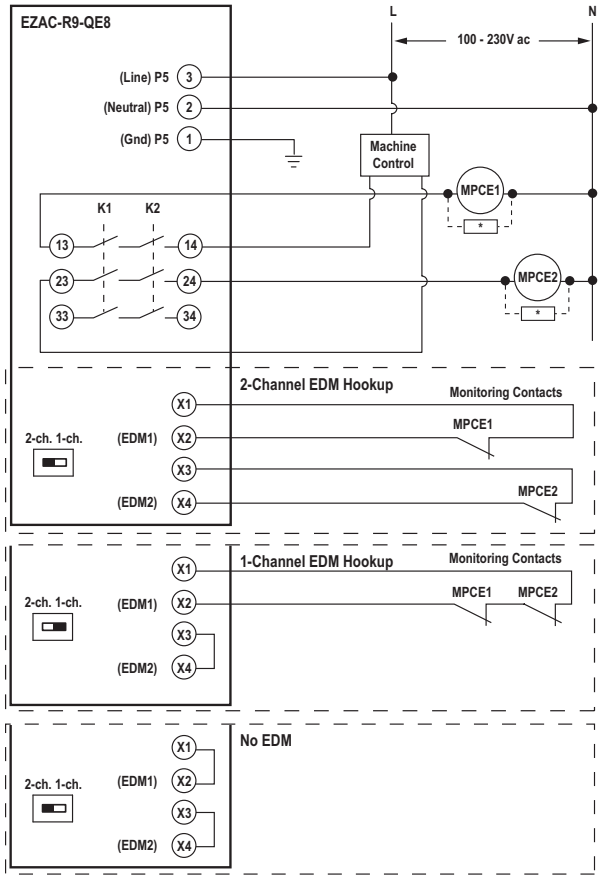
Models

- EZAC-R9-QE8

Connections (Hand Wired)







* Arc Suppressors. See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

EZ-SCREEN® AC Interface Box

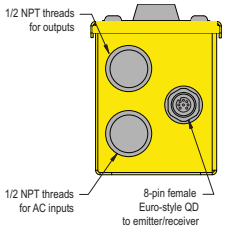
EZAC-R11-QE8 – Hard-Wired with 2 NO, 1 NC and EDM

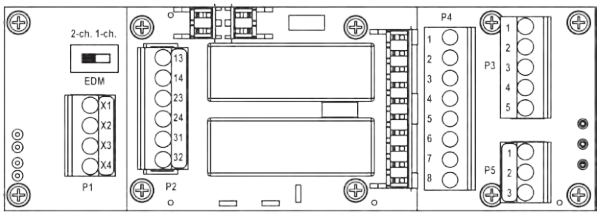


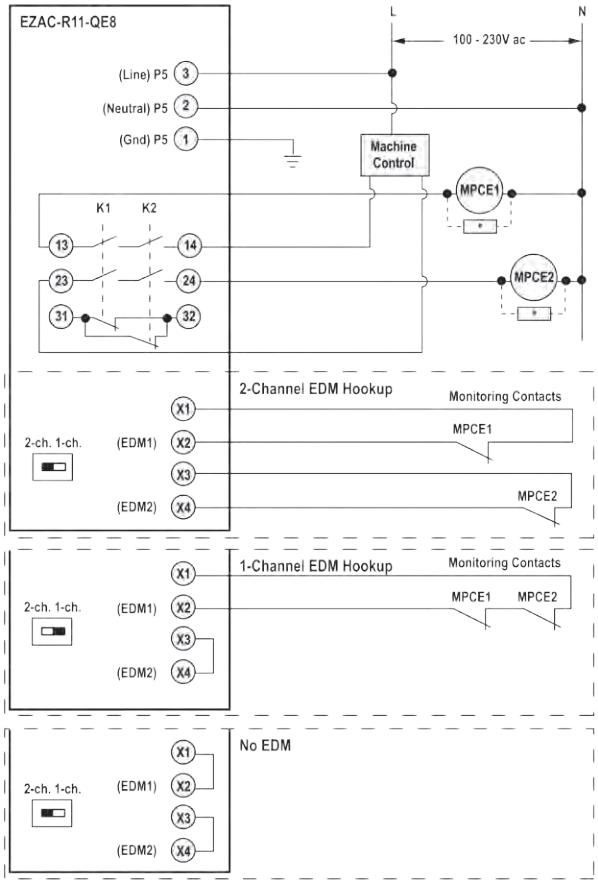
Models

- EZAC-R11-QE8

Connections (Hand Wired)







* Arc Suppressors. See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD015

EZ-SCREEN® System (Type 4)

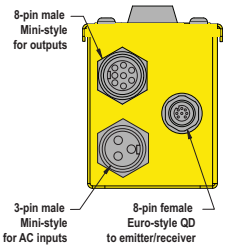
EZAC-R15A-QE8-Q583-Mini-Style QD with 1 NO, 1 SPDT and 1-Channel EDM

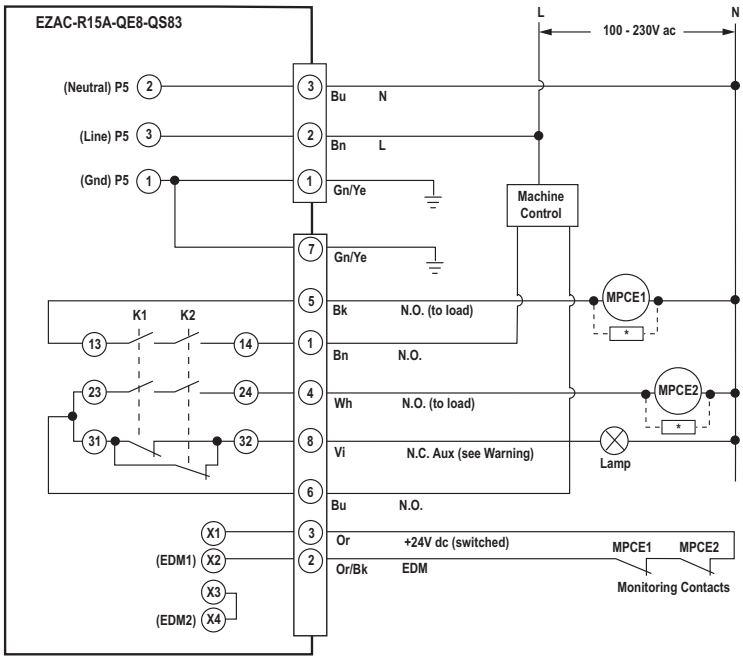


Models

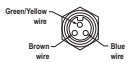
- EZAC-R15A-QE8-QS83

Connections (8-Pin Mini)



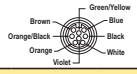


3-Pin Mini-Style Power Connector
Male Face View



Mating Cordset: QDS-3..C		
Pin	Color	Function
1	Green/Yellow	Gnd/PE
2	Brown	Line
3	Blue	Neutral

8-Pin Mini-Style Output Connector
Male Face View



Mating Cordset: QDS-8..C		
Pin	Color	Function
1	Brown	N.O.
2	Orange/Black	+24V dc (EDM)
3	Orange	EDM
4	White	N.O. (to load)
5	Black	N.O. (to load)
6	Blue	Common
7	Green/Yellow	Gnd/PE
8	Violet	N.C. Aux.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

† Arc Suppressors. See manual for specific warnings.

WD016

EZ-SCREEN® AC Interface Box

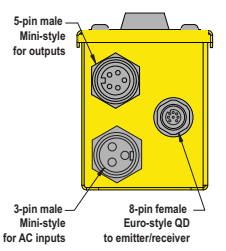
EZAC-R8N-QE8-QS53 – Mini-Style QD with 1 NO, 1 NC and Power Monitoring

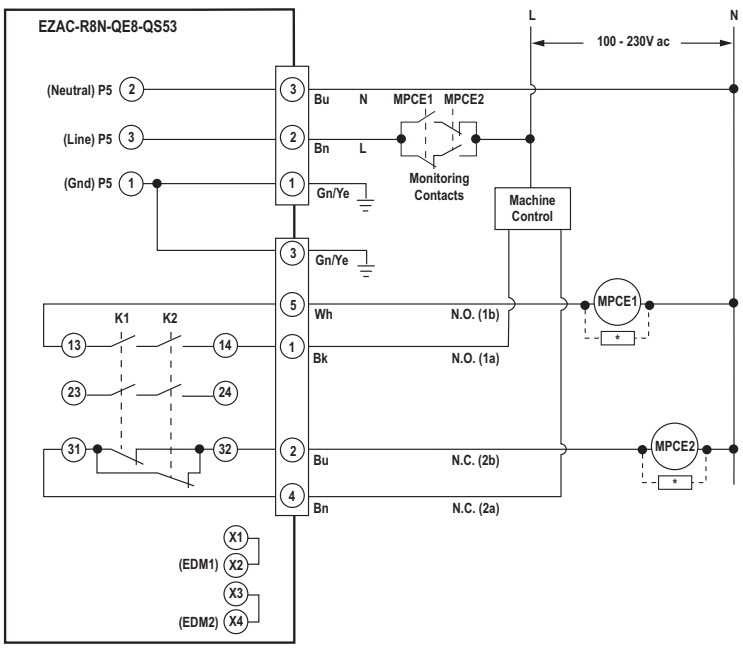


Models

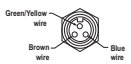
- EZAC-R8N-QE8-QS53

Connections (5-Pin Mini)



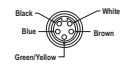


3-Pin Mini-Style Power Connector
Male Face View



Mating Cordset: QDS-3..C		
Pin	Color	Function
1	Green/Yellow	Gnd/PE
2	Brown	Line
3	Blue	Neutral

5-Pin Mini-Style Output Connector
Male Face View



Mating Cordset: QDS-5..C		
Pin	Color	Function
1	Black	N.O. (1a)
2	Blue	N.C. (2a)
3	Green/Yellow	Gnd/PE
4	Brown	N.C. (2b)
5	White	N.O. (1b)

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

† Arc Suppressors. See manual for specific warnings.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD017

EZ-SCREEN® AC Interface Box

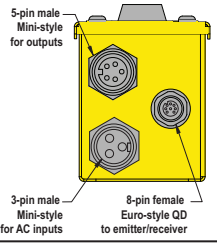
EZAC-R10N-QE8-QS53 – Mini-Style QD with 2 NO and Power Monitoring

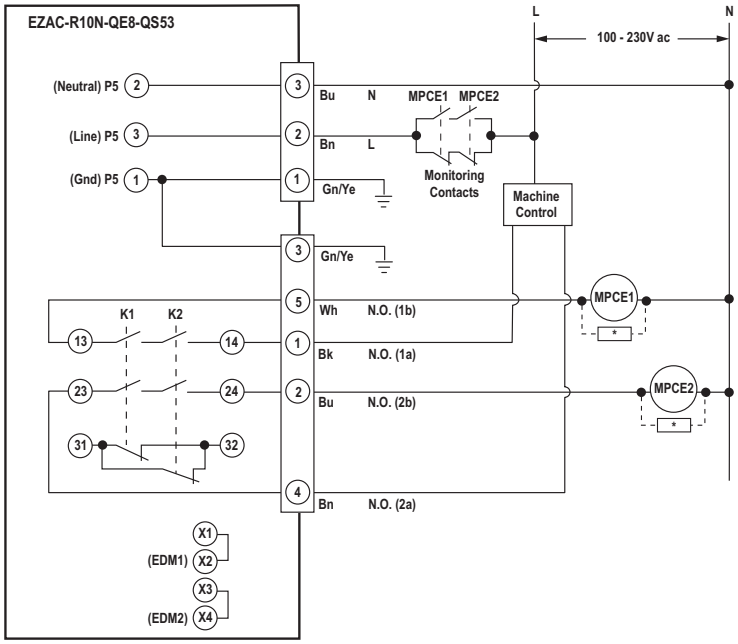


Models

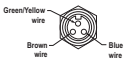
- EZAC-R10N-QE8-QS53

Connections (5-Pin Mini)





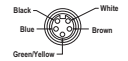
3-Pin Mini-Style Power Connector
Male Face View



Mating Cordset: QDS-3..C

Pin	Color	Function
1	Green/Yellow	Gnd/PE
2	Brown	Line
3	Blue	Neutral

5-Pin Mini-Style Output Connector
Male Face View



Mating Cordset: QDS-5..C

Pin	Color	Function
1	Black	N.O. (1a)
2	Blue	N.C. (2a)
3	Green/Yellow	Gnd/PE
4	Brown	N.C. (2b)
5	White	N.O. (1b)

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

† Arc Suppressors. See manual for specific warnings.

WD018

EZ-SCREEN® AC Interface Box

EZAC-E-QE.. – Hard-Wired Emitters with or without Test

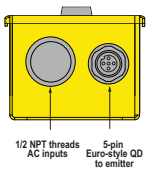


Models

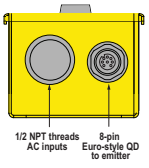
- EZAC-E-QE8
- EZAC-E-QE5

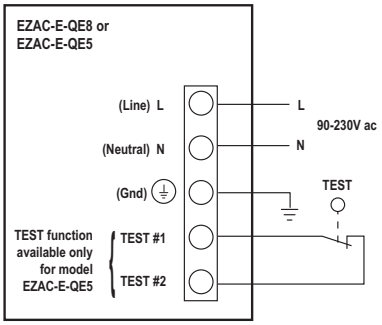
Connections

5-Pin Euro



8-Pin Euro





Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD019

EZ-SCREEN® AC Interface Box

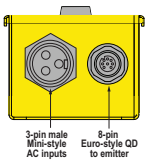


Models

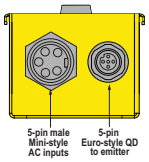
- EZAC-E-QE8-QS3
- EZAC-E-QE5-QS5

Connections

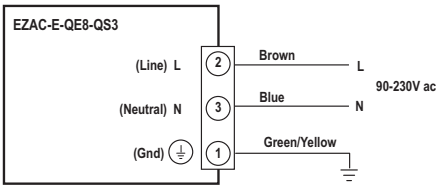
(3-Pin Mini)



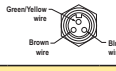
(5-Pin Mini)



EZAC-E-QE8-QS3 – Mini-Style QD Emitter



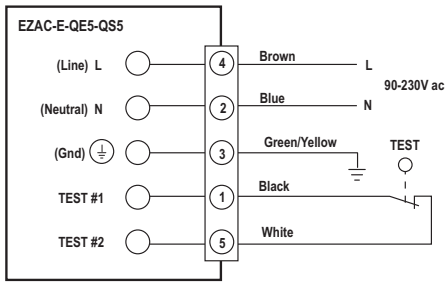
3-Pin Mini-Style Power Connector
Male Face View



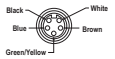
Mating Cordset: QDS-3..C		
Pin	Color	Function
1	Green/Yellow	Gnd/PE
2	Brown	Line
3	Blue	Neutral

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

EZAC-E-QE5-QS5 – Mini-Style QD Emitter with Test



5-Pin Mini-Style Output Connector
Male Face View



Mating Cordset: QDS-5..C		
Pin	Color	Function
1	Black	N.O. (1a)
2	Blue	N.C. (2a)
3	Green/Yellow	Gnd/PE
4	Brown	N.C. (2b)
5	White	N.O. (1b)

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

WD020

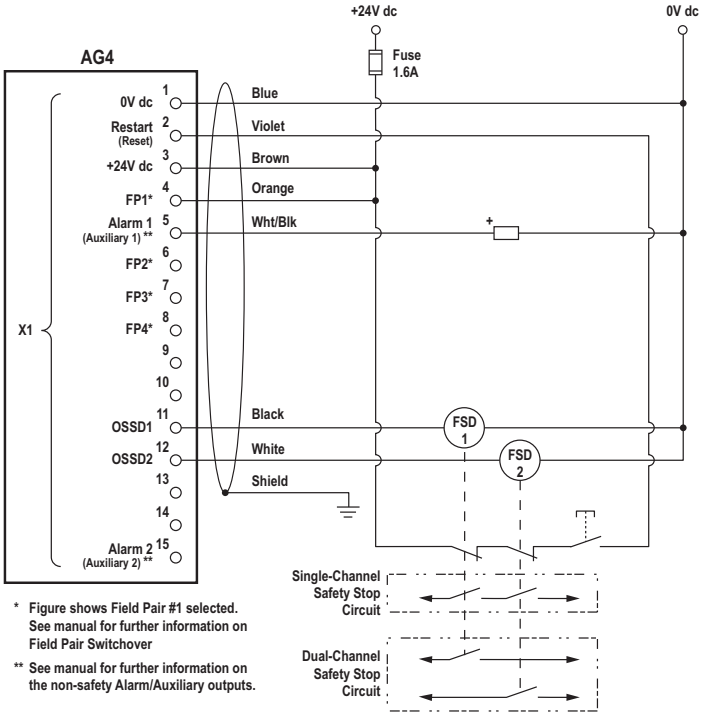
AG4 Laser Scanner



Models

- AG4

AG4 to FSD1 & FSD2



* Figure shows Field Pair #1 selected. See manual for further information on Field Pair Switchover

** See manual for further information on the non-safety Alarm/Auxiliary outputs.

NOTE: Do not exceed OSSD maximum load capacitance specification.

Warning: Monitoring FSDs
FSD's must be monitored for proper operation. 1-channel EDM can only be used when the scanner is configured for manual reset. See manual for more information.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD021

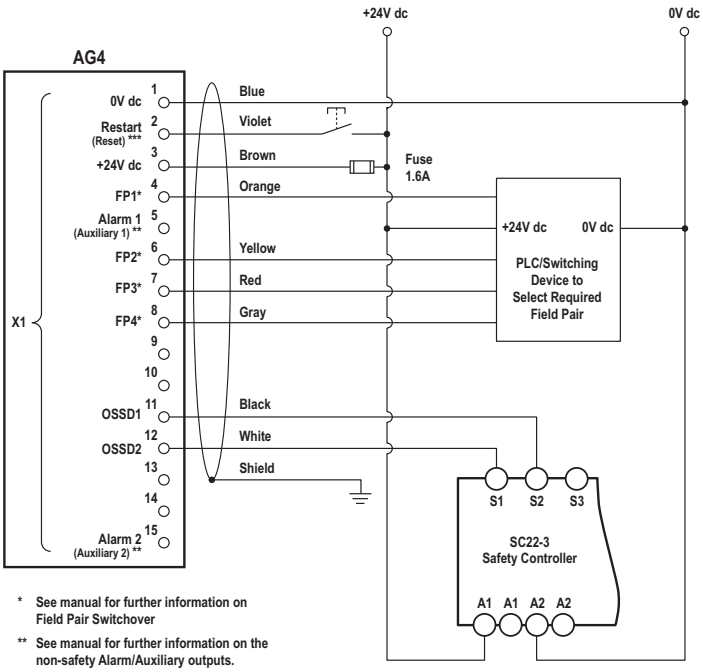
AG4 Laser Scanner



Models

- AG4

AG4 to SC22-3



* See manual for further information on Field Pair Switchover

** See manual for further information on the non-safety Alarm/Auxiliary outputs.

*** The Manual Reset function can be accomplished by the SC22-3 or other safety rated logic device. In this case the scanner is configured for automatic start/restart (Reset).

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

WD022

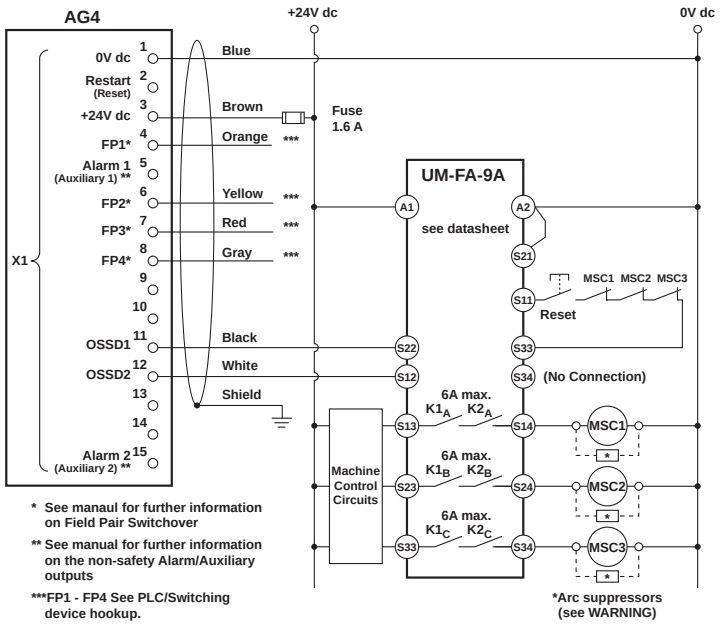
AG4 Laser Scanner



Models

- AG4

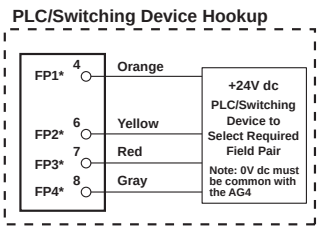
AG4 to UM Modules

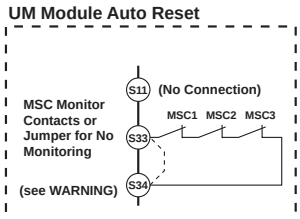


* See manaul for further information on Field Pair Switchover

** See manual for further information on the non-safety Alarm/Auxiliary outputs

***FP1 - FP4 See PLC/Switching device hookup.





Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

UM-FA-..A Terminal Locations



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD023

SC22-3 Safety Controller

1-Channel, 2-Channel and No EDM



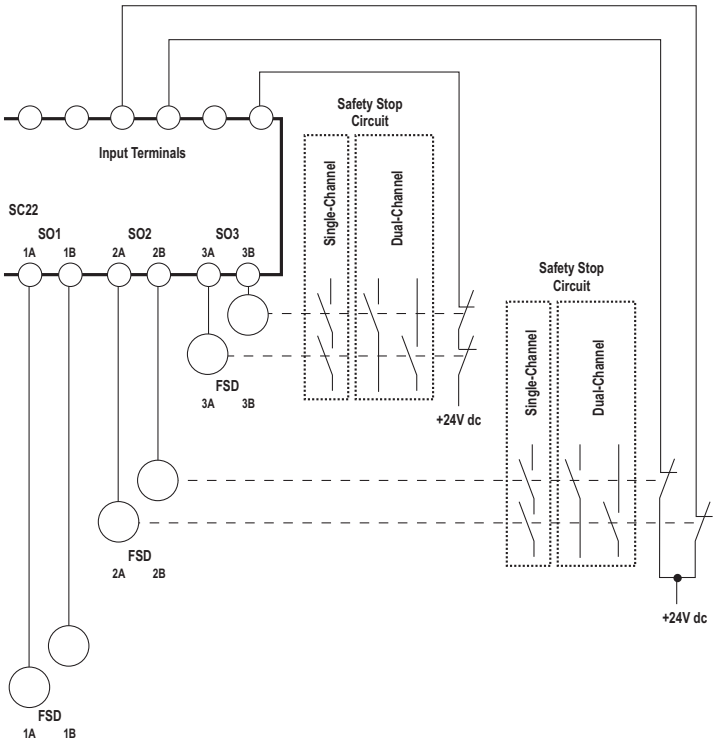
Models

- SC22-3
- SC22-3E

The figure shown is generic in nature and represents all three EDM options:

- Safety Output SO1 is shown with NO EDM configured (typically used with self-monitored devices).
- Safety Output SO2 is shown with Two-Channel EDM configured.
- Safety Output SO3 is shown with One-Channel EDM configured.
- Any particular Safety Controller configuration may use any combination of external device monitoring options, depending on the application.

See product manual for information on external device monitoring and interfacing safety circuits.



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD024

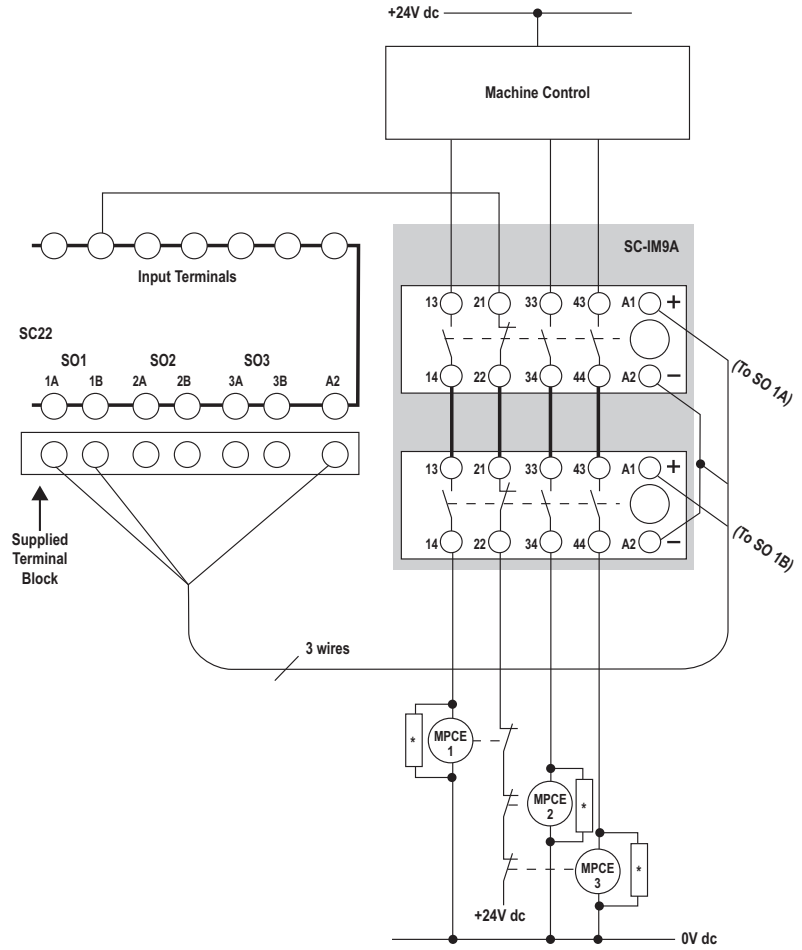
SC22-3 Safety Controller

1-Channel EDM to SC-IM9A



Models

- SC22-3
- SC22-3E



The SC-IM9A interface module depicted in this figure is shown in one-channel EDM hookup. The SC-IM9B and SC-IM9C modules are connected in the same manner, using individual one-channel EDM circuits (terminals 21/22 on each pair of contacts).

See product manual for information on external device monitoring and interfacing safety stop circuits.

* Arc Suppressors. See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD025

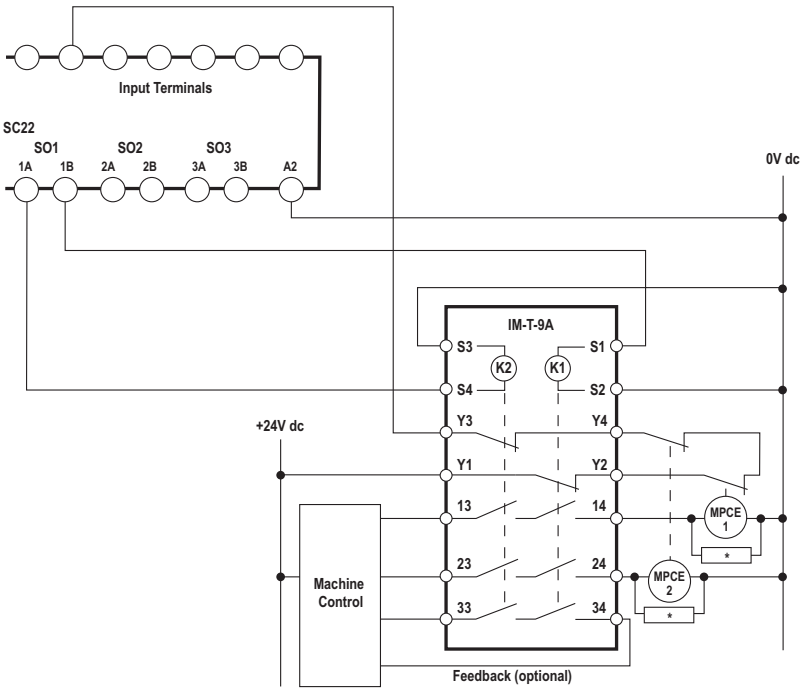
SC22-3 Safety Controller

1-Channel EDM to IM-TA-9A



Models

- SC22-3
- SC22-3E



The IM-TA interface module depicted in this figure is shown in one-channel EDM hookup. The IM-T-11A module is connected in the same manner.

Depending on the application, each safety output requires a separate and individually wired IM-T..A module.

See product manual for information on external device monitoring and interfacing safety stop circuits.

* Arc Suppressors. See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

WD026

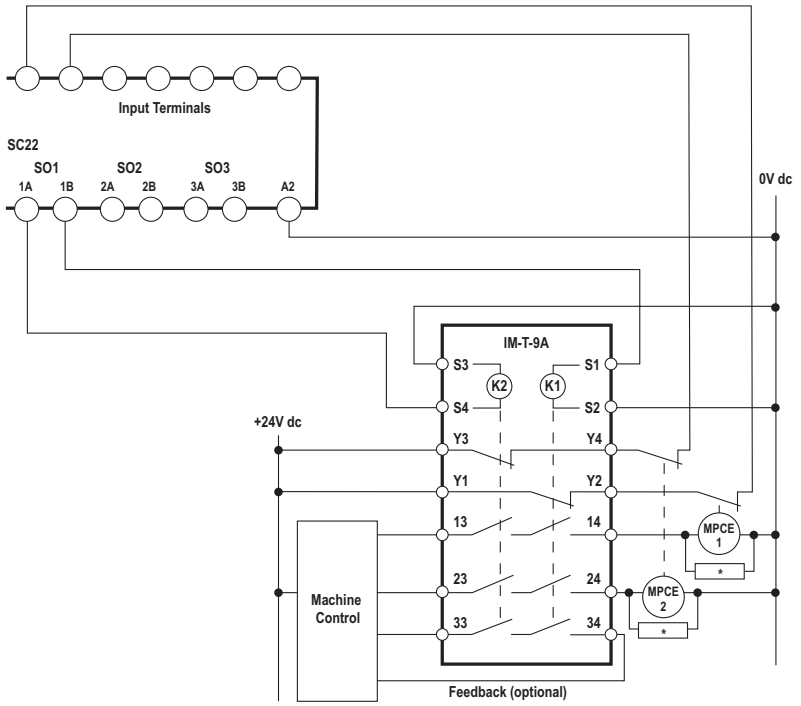
SC22-3 Safety Controller

2-Channel EDM to IM-TA-9A



Models

- SC22-3
- SC22-3E



The IM-TA interface module depicted in this figure is shown in two-channel EDM hookup. The IM-T-11A module is connected in the same manner.

Depending on the application, each safety output requires a separate and individually wired IM-T..A module.

See product manual for information on external device monitoring and interfacing safety stop circuits.

* Arc Suppressors. See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD027

GM-FA-10J Guard Monitoring Safety Module

GM-FA-10J 1-Channel Monitoring to Two 4-Wire Coded Magnetic Safety Switches

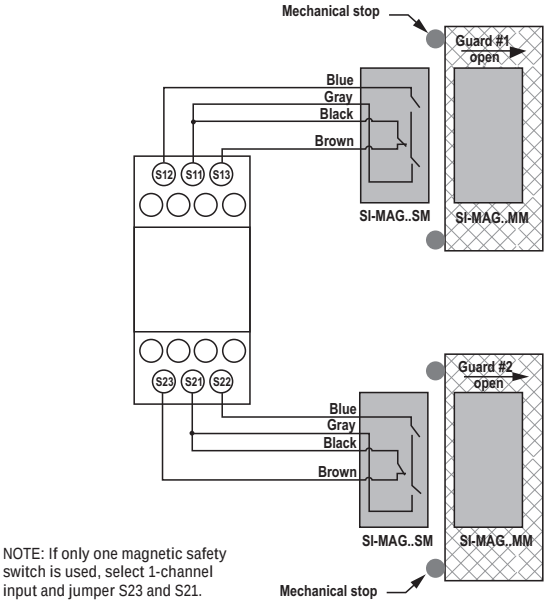


Models

- GM-FA-10J

GM-FA-10J
Terminal Locations





NOTE: If only one magnetic safety switch is used, select 1-channel input and jumper S23 and S21.

Configured for one-channel monitoring of either one or two guards. This application is considered to meet or exceed requirements for OSHA control reliability and Safety Category 3 and 4 per ISO 13849-1 (EN 954-1).

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

WD028

GM-FA-10J Guard Monitoring Safety Module

GM-FA-10J 2-Channel Monitoring to Two Positive-Opening Safety Interlock Switches

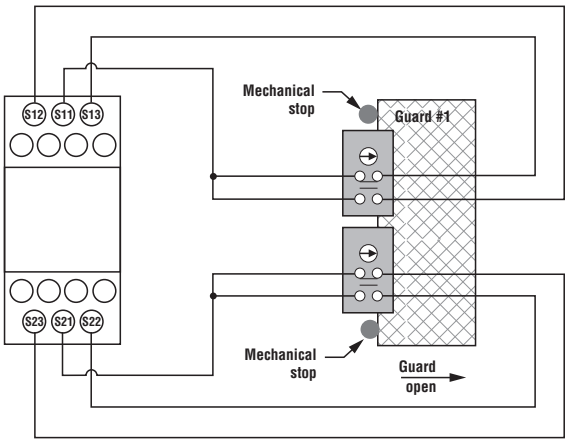


Models

- GM-FA-10J

GM-FA-10J
Terminal Locations





NOTE: Guard shown in closed position.

Configured for one-channel monitoring of either one or two guards. This application is considered to meet or exceed requirements for OSHA control reliability and Safety Category 3 and 4 per ISO 13849-1 (EN 954-1).

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD029

GM-FA-10J Guard Monitoring Safety Module



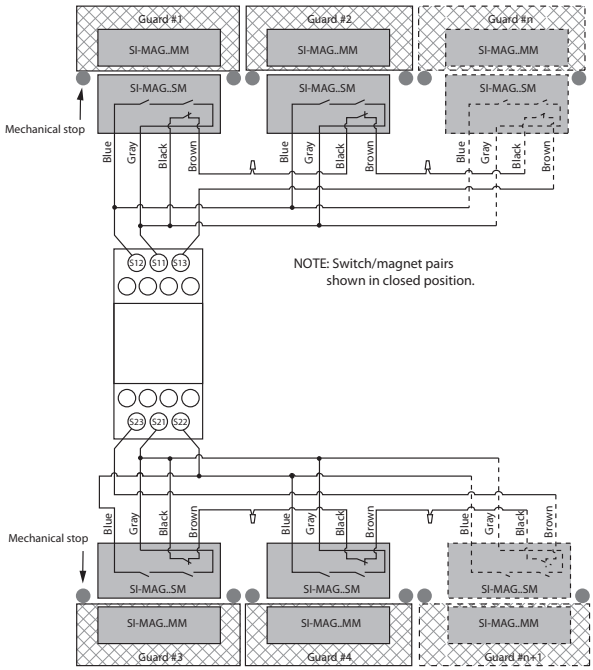
Models

- GM-FA-10J

GM-FA-10J Terminal Locations



GM-FA-10J Alternate Wiring for 1-Channel Monitoring of Multiple Guards



Configured for one-channel monitoring of multiple guards with single switches at each guard. Up to 10 Banner magnetic switches may be connected to each channel in this series/parallel method. If other than Banner magnetic switches are used, a total resistance of 270 ohms between S11/S13, S11/S12, S21/S22 and S21/S23 must not be exceeded. NOTE: Not a Category 4 application per ISO 13849-1 (EN 954-1).

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

WD030

GM-FA-10J Guard Monitoring Safety Module



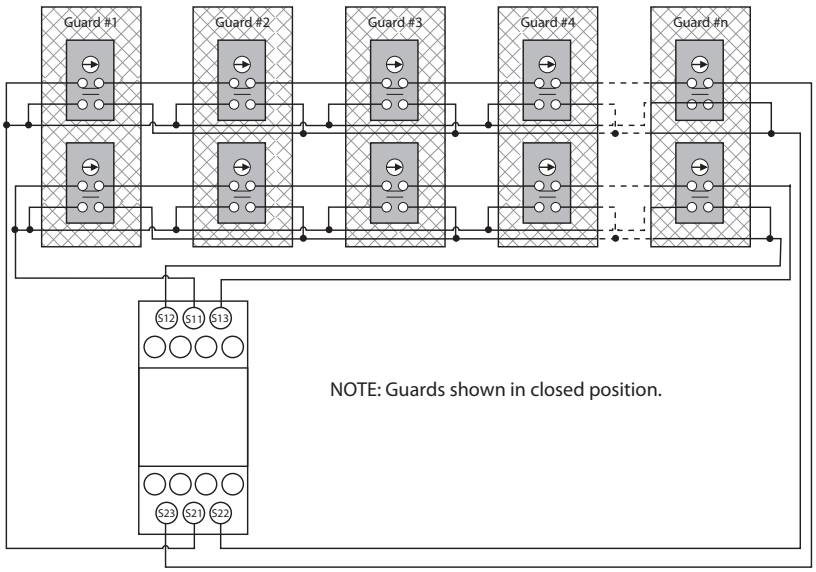
Models

- GM-FA-10J

GM-FA-10J Terminal Locations



GM-FA-10J Alternate Wiring for 2-Channel Monitoring of Multiple Guards



Configured for two-channel monitoring of multiple guards with two safety switches mounted individually on each guard. The number of mechanical switches is limited by the max. resistance of 270 ohm between S11-S13, S11-S12, S21-S22 and S21-S23. The total resistance is calculated by adding the resistance of all guard switch contacts and the resistance of the cables that connect the switches and the switches to the module. NOTE: Not a Category 4 application per ISO 13849-1 (EN 954-1).

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD031

GM-FA-10J Guard Monitoring Safety Module



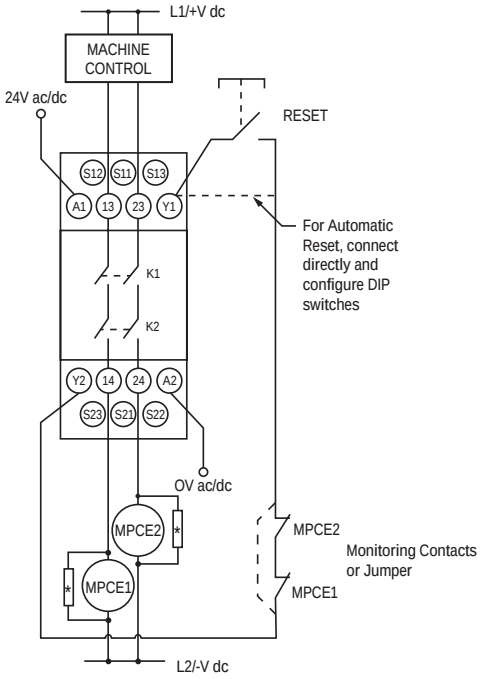
Models

- GM-FA-10J

GM-FA-10J Terminal Locations



GM-FA-10J to Guarded Machine



* Arc Suppressors. See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD032

ES-FA-..AA E-Stop Safety Module

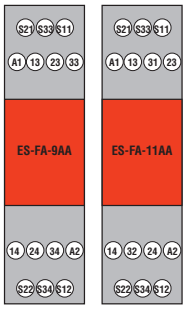
ES-FA-..AA 1-Channel



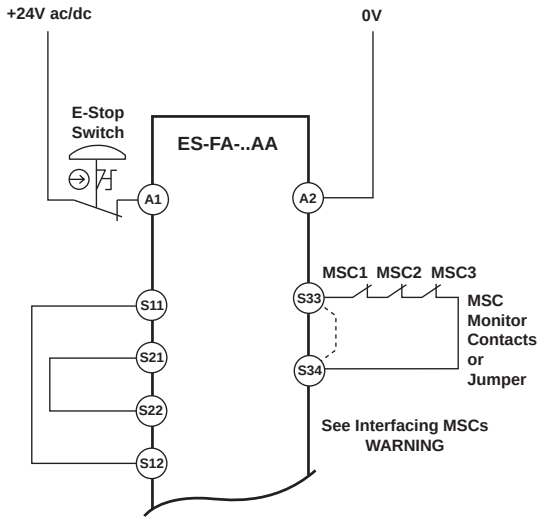
Models

- ES-FA-9AA
- ES-FA-11A

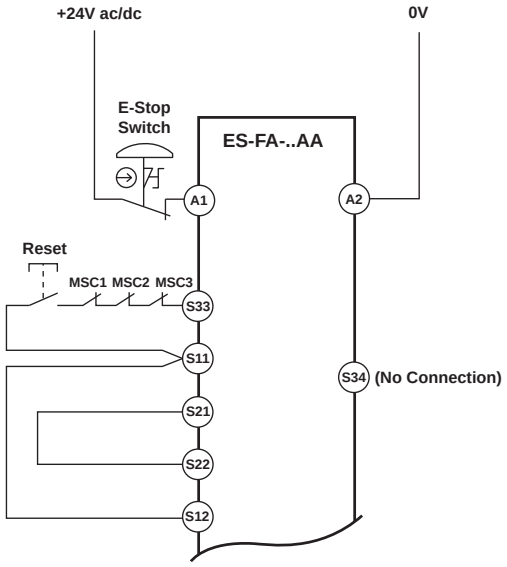
ES-FA-..AA
Terminal Locations



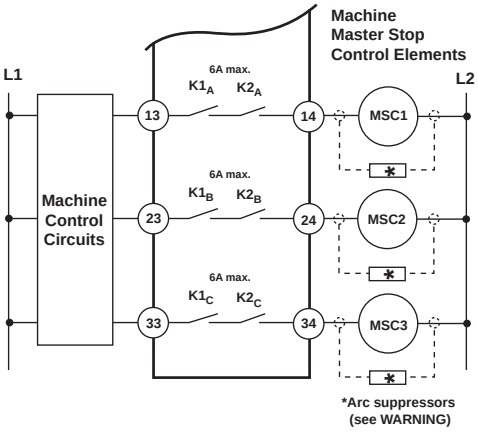
Auto Reset



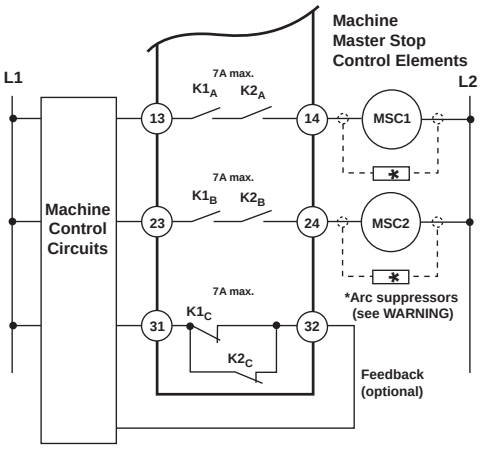
Manual Reset



ES-FA-9AA Machine Connection



ES-FA-11AA Machine Connection



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

* Arc Suppressors. See manual for specific warnings.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

ES-FA-..AA E-Stop Safety Module

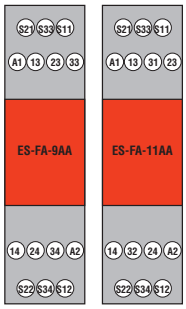
ES-FA-..AA 2-Channel



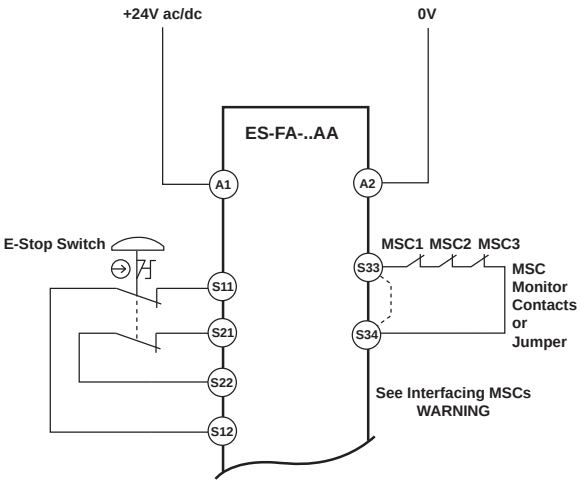
Models

- ES-FA-9AA
- ES-FA-11A

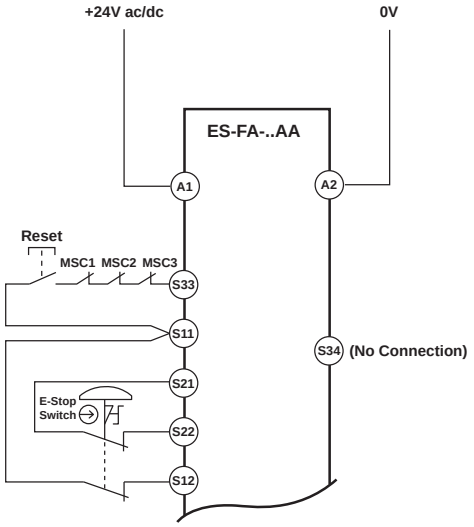
ES-FA-..AA Terminal Locations



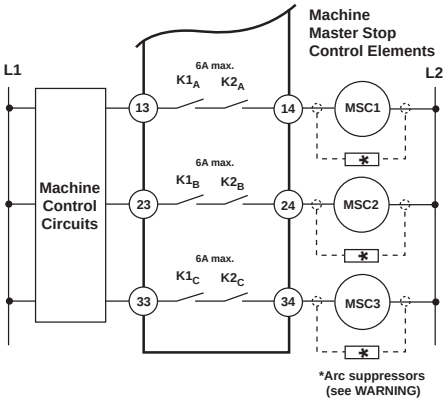
Auto Reset



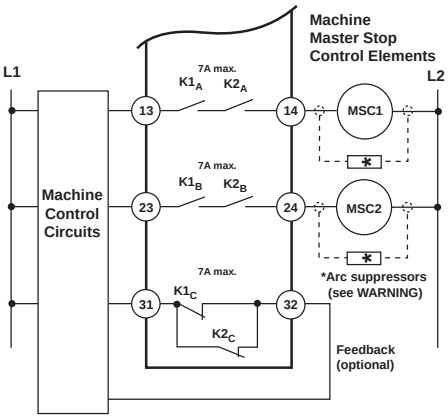
Manual Reset



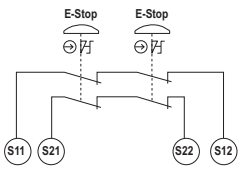
ES-FA-9AA Machine Connection



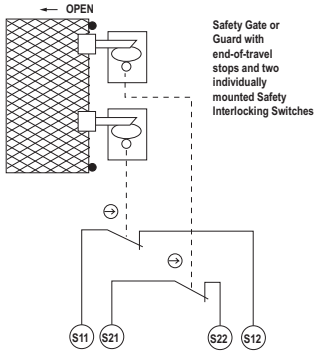
ES-FA-11AA Machine Connection



Series Connection of Multiple E-Stop Switches



Hookup Using Contacts from Two Safety Switches



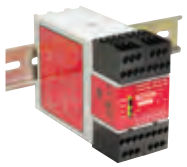
Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

* Arc Suppressors. See manual for specific warnings.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD034

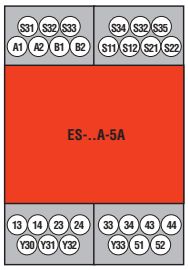
ES-..A-.5 E-Stop Safety Module



Models

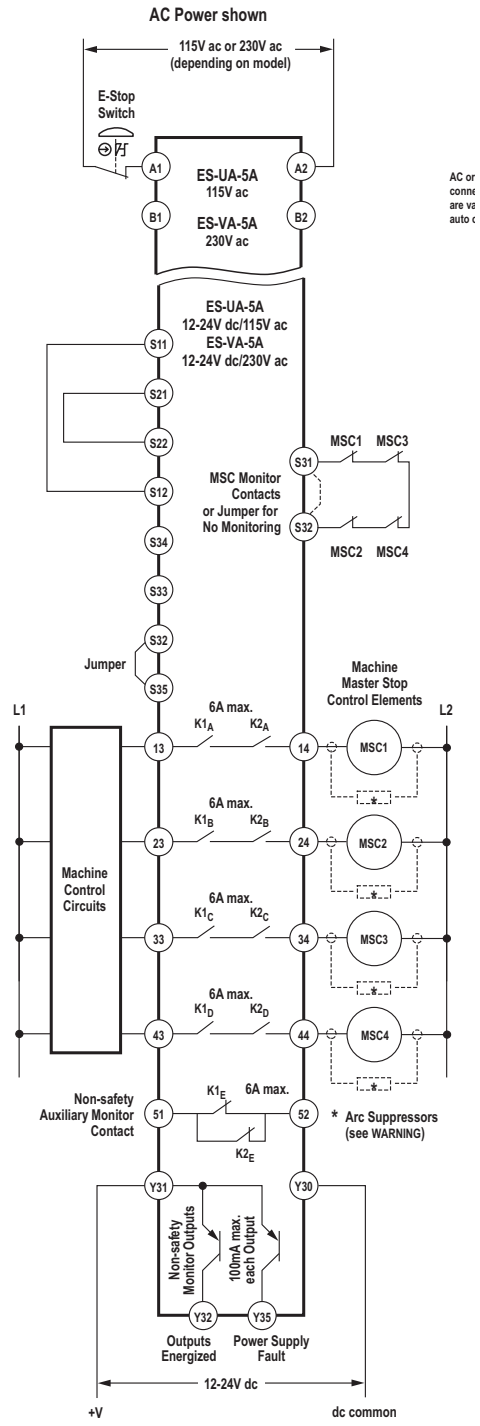
- ES-UA-5A
- ES-VA-5A

ES-..A-5A
Terminal Locations

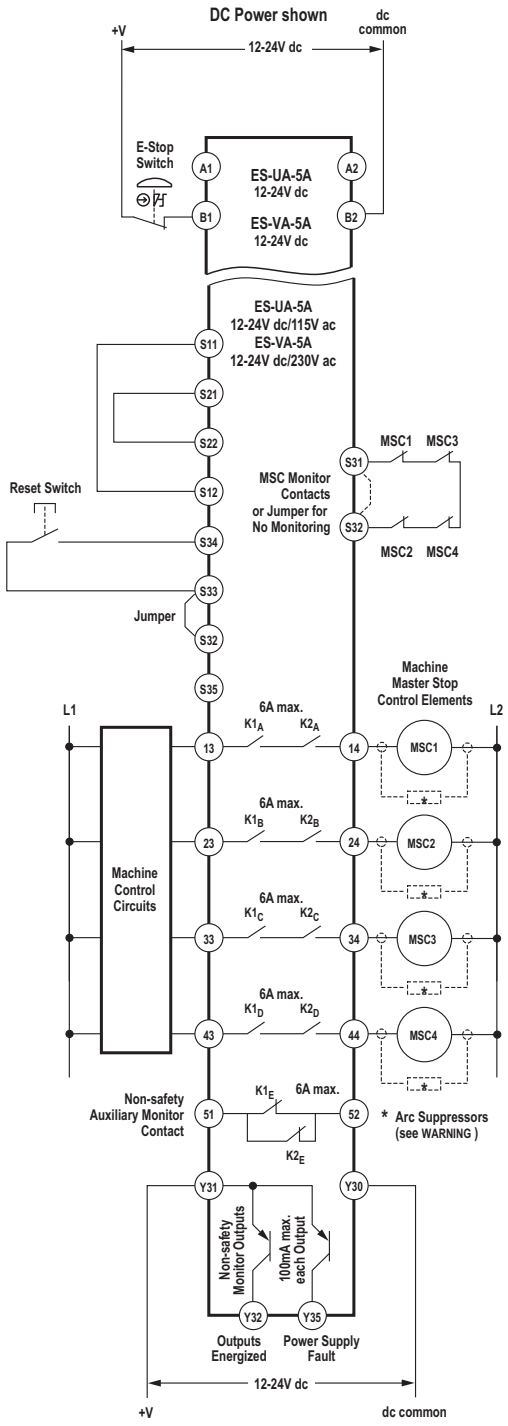


ES-..A-5A 1-Channel

Auto Reset



Manual Reset



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

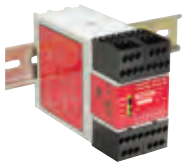
* Arc Suppressors. See manual for specific warnings.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD035

ES-..A-.5 E-Stop Safety Module

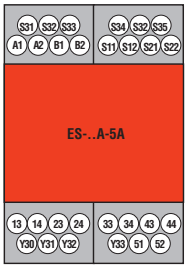
ES-..A-5A 2-Channel



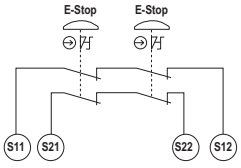
Models

- ES-UA-5A
- ES-VA-5A

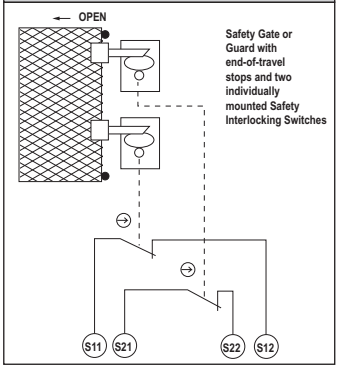
ES-..A-5A Terminal Locations



Series Connection of Multiple E-Stop Switches



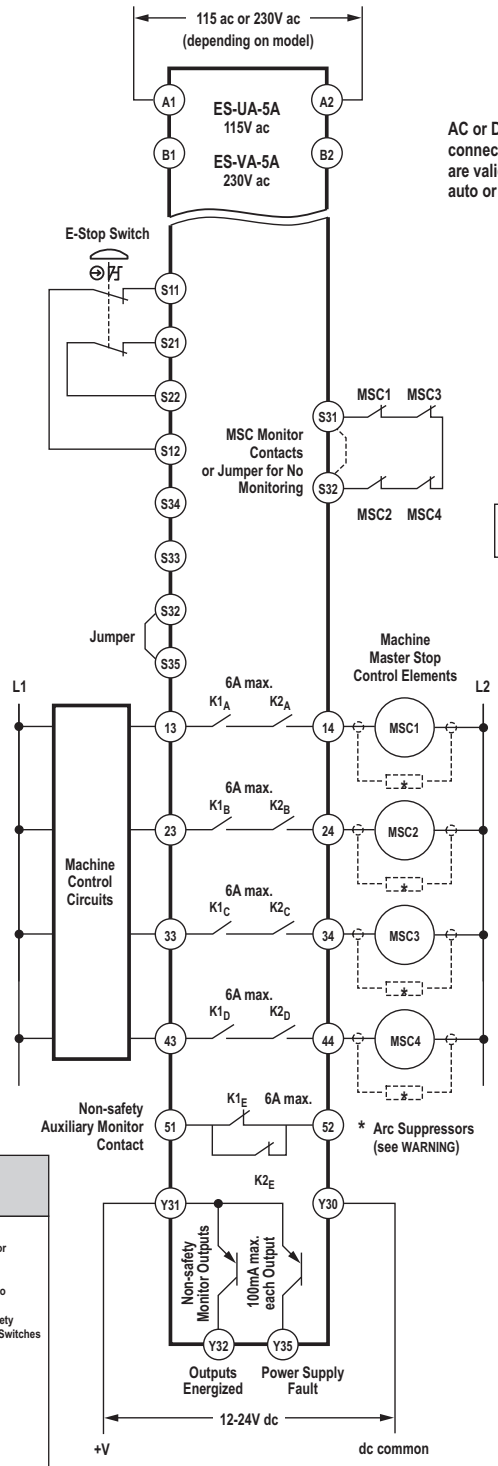
Hookup Using Contacts from Two Safety Switches



* Arc Suppressors. See manual for specific warnings.

Auto Reset

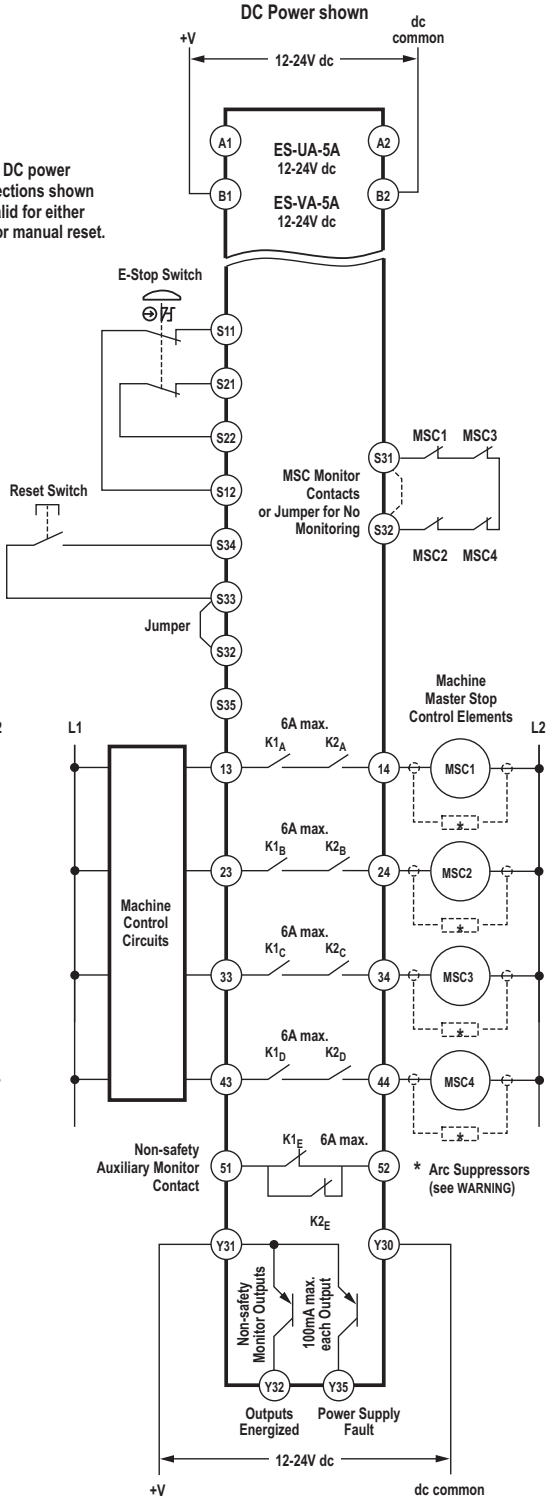
AC Power shown



AC or DC power connections shown are valid for either auto or manual reset.

Manual Reset

DC Power shown



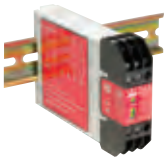
Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD036

ES-FA-6G E-Stop Safety Module

ES-FA-6G 1-Channel

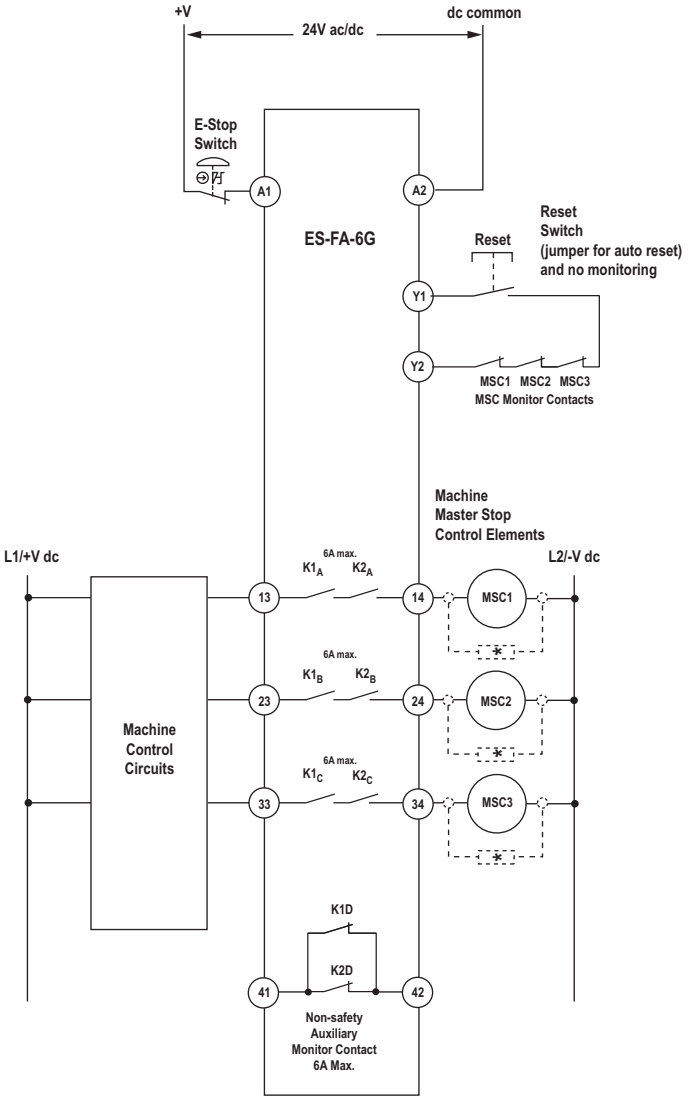


Models

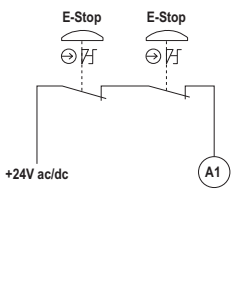
- ES-FA-6G

ES-FA-..6G Terminal Locations





Series Connection of Multiple E-Stop Switches



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

* Arc Suppressors. See manual for specific warnings.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

UM-A... Universal Safety Module

UM-FA-..A Hard Contact, 2-Channel

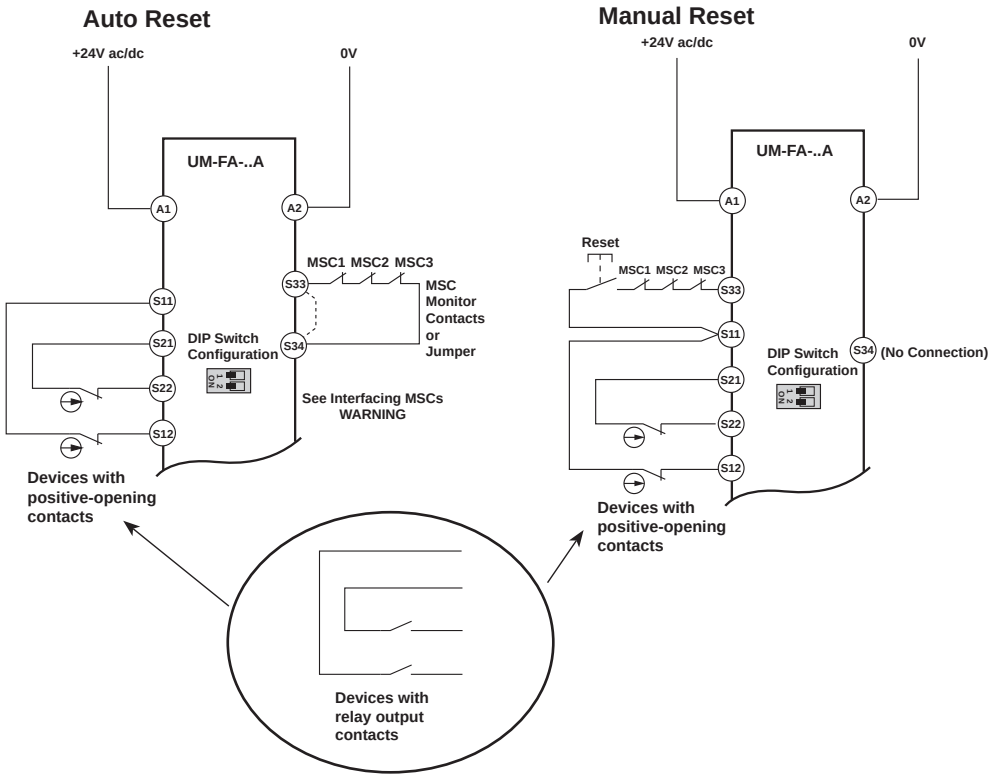


Models

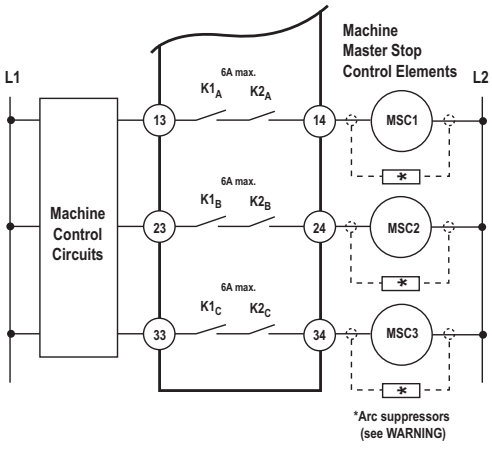
- UM-FA-9A
- UM-FA-11A

UM-FA-..A Terminal Locations

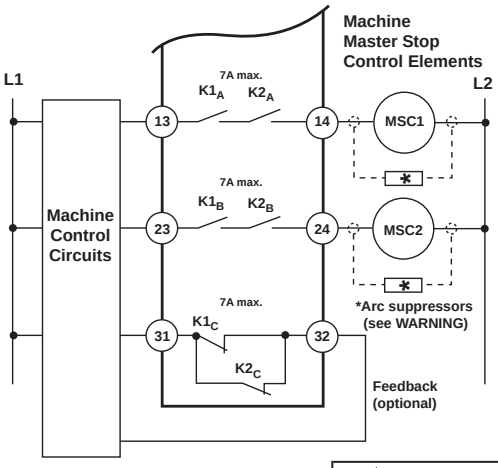




UM-FA-9A Machine Connection



UM-FA-11A Machine Connection



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

* Arc Suppressors. See manual for specific warnings.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD040

UM-FA-..A Universal Safety Module

UM-FA-..A Hard Contact, 1-Channel



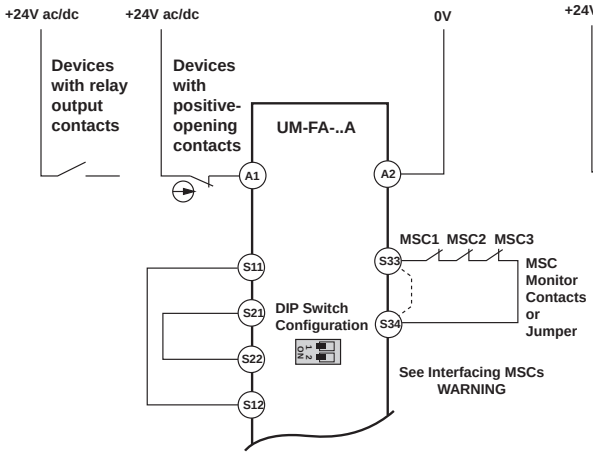
Models

- UM-FA-9A
- UM-FA-11A

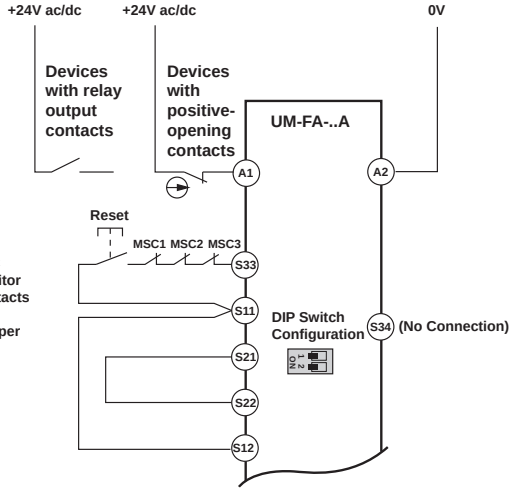
UM-FA-..A Terminal Locations



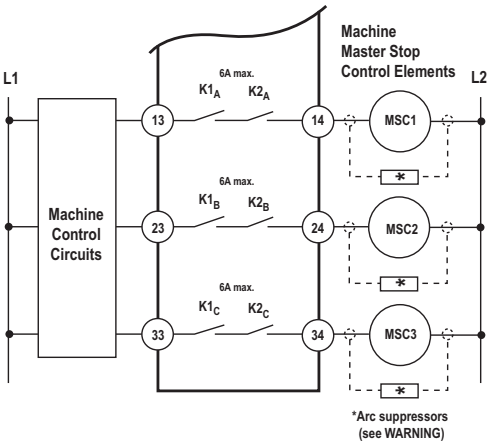
Auto Reset



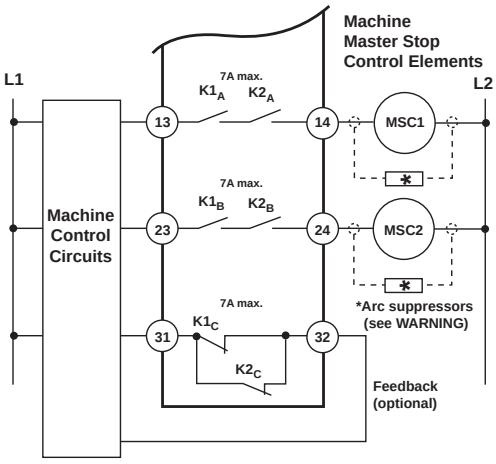
Manual Reset



UM-FA-9A Machine Connection



UM-FA-11A Machine Connection



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

* Arc Suppressors. See manual for specific warnings.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

UM-FA-..A Universal Safety Module

UM-FA-..A Solid-State, 2-Channel



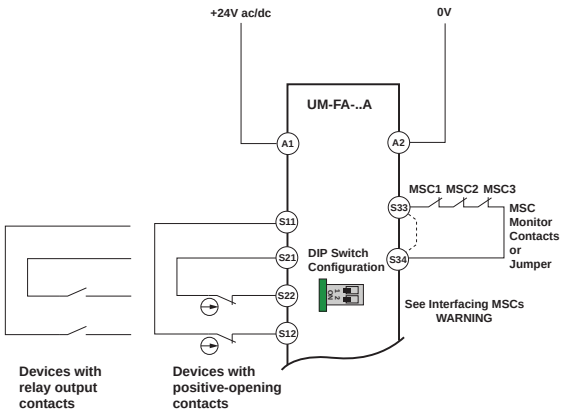
Models

- UM-FA-9A
- UM-FA-11A

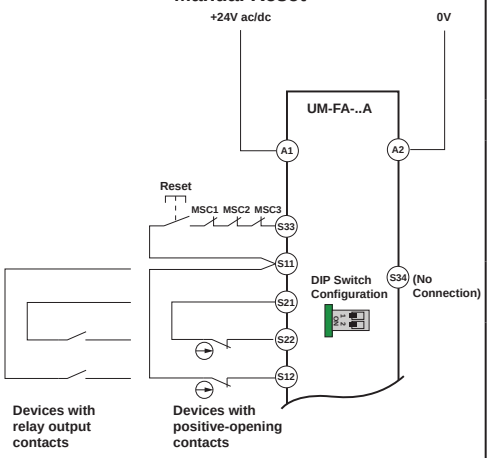
UM-FA-..A Terminal Locations



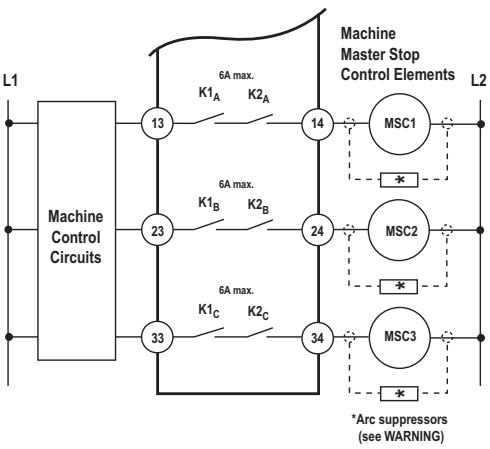
Auto Reset



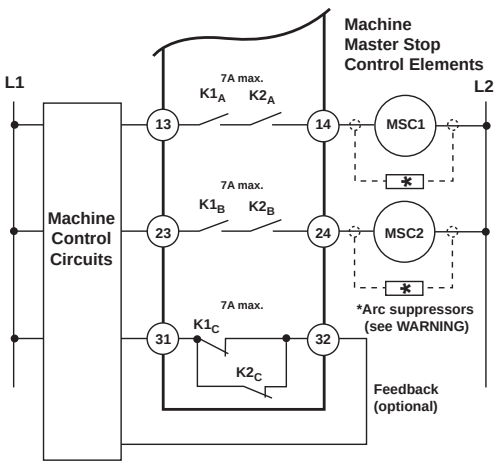
Manual Reset



UM-FA-9A Machine Connection



UM-FA-11A Machine Connection



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

* Arc Suppressors. See manual for specific warnings.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD042

UM-FA-..A Universal Safety Module

UM-FA-..A Solid-State, 1-Channel



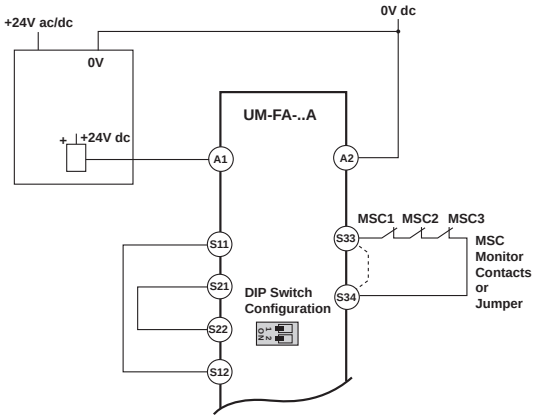
Models

- UM-FA-9A
- UM-FA-11A

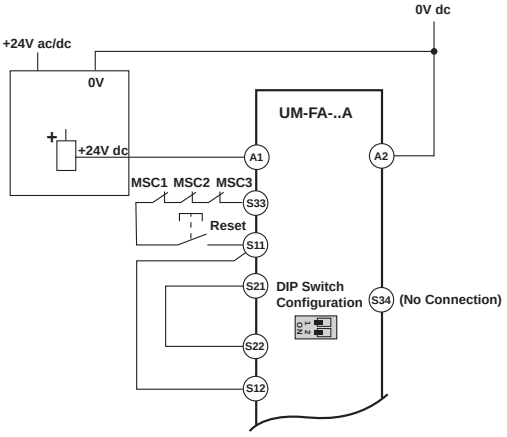
UM-FA-..A Terminal Locations



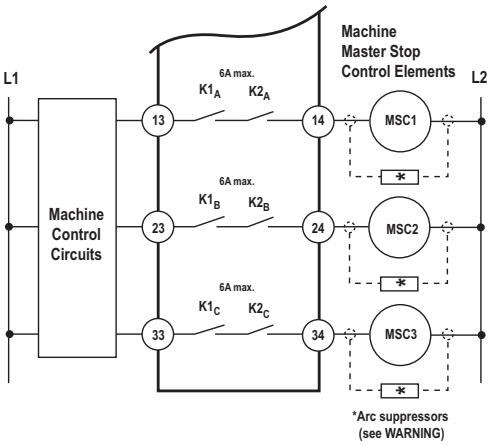
Auto Reset



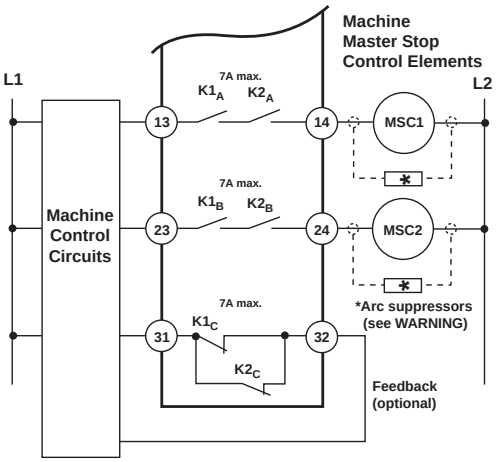
Manual Reset



UM-FA-9A Machine Connection



UM-FA-11A Machine Connection



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

* Arc Suppressors. See manual for specific warnings.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD043

SM-..A-5A Safety Mat Monitoring Module

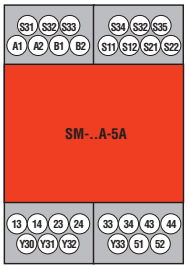
SM-..A-5A to 4-Wire Safety Mat

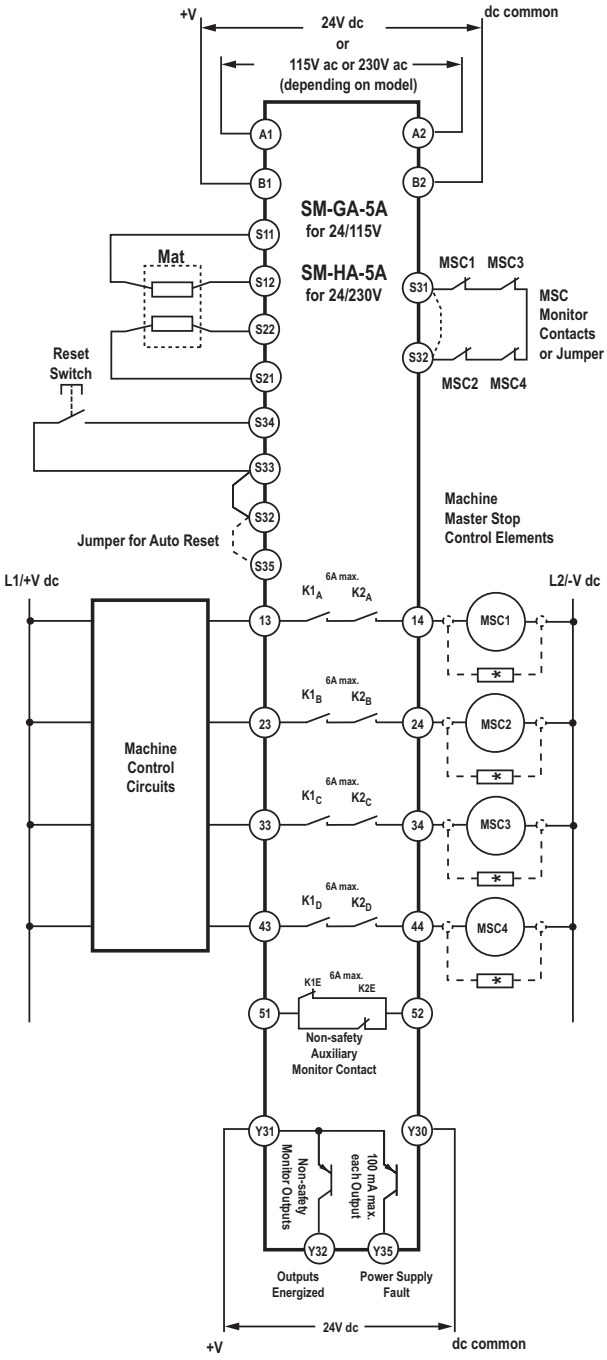


Models

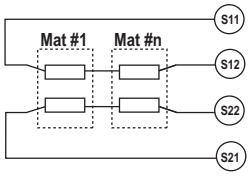
- SM-GA-5A
- SM-HA-5A

SM-..A-5A Terminal Locations





Series Connection of Multiple E-Stop Switches



NOTE: The number of mats is limited by the total series resistance per input channel.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

* Arc Suppressors. See manual for specific warnings.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD044

MMD-TA-12B DIN-Rail Muting Module

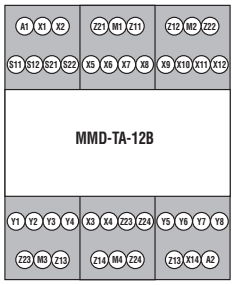
Solid-State Output, 2 FSDs and 2-Channel EDM

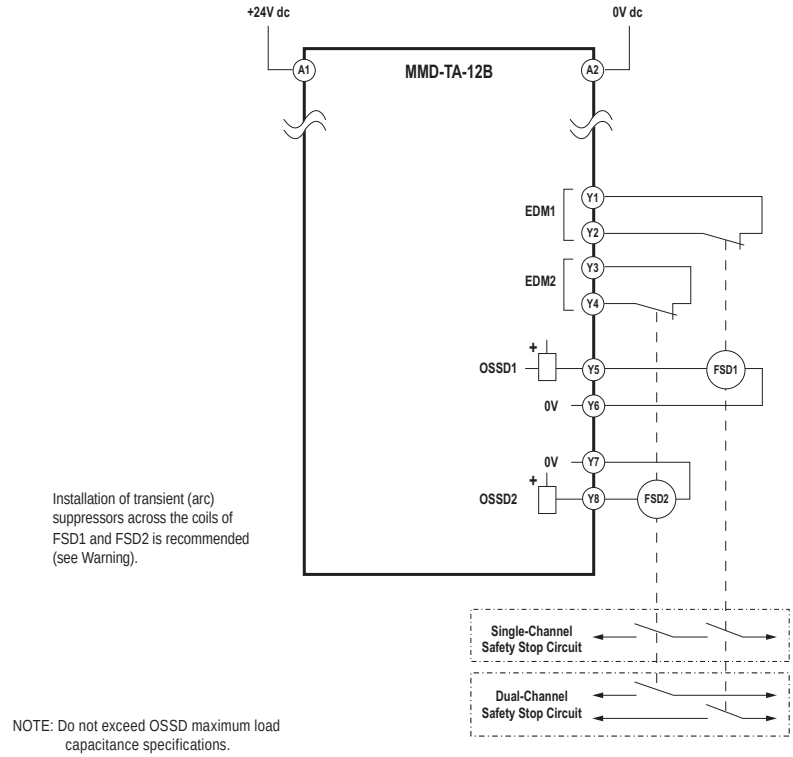


Models

- MMD-TA-12B

MMD-TA-12B Terminal Locations





Installation of transient (arc) suppressors across the coils of FSD1 and FSD2 is recommended (see Warning).

NOTE: Do not exceed OSSD maximum load capacitance specifications.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

WD045

MMD-TA-11B DIN-Rail Muting Module

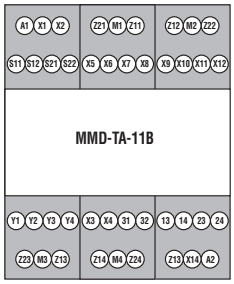
Relay Outputs



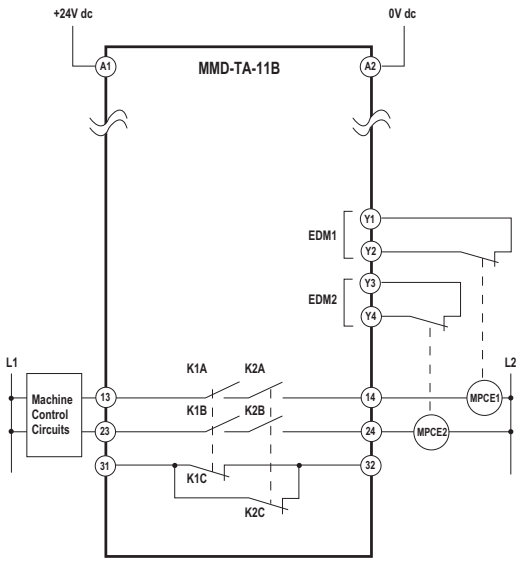
Models

- MMD-TA-11B

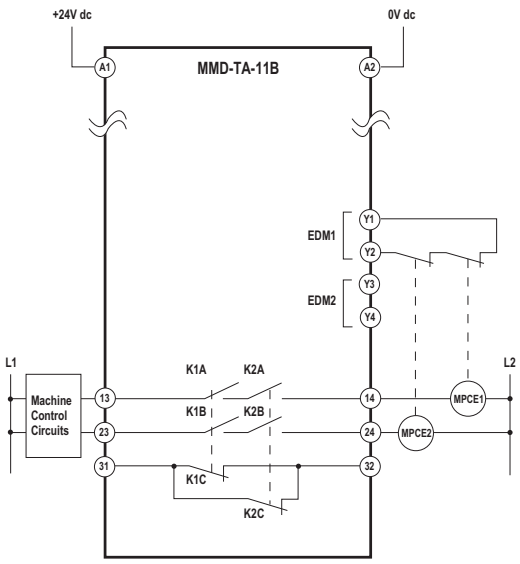
MMD-TA-12B Terminal Locations



2-Channel EDM



1-Channel EDM



Installation of transient (arc) suppressors across the coils of MPCE1 and MPCE2 is recommended (See Warning).

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD046

MMD-TA-12B DIN-Rail Muting Module

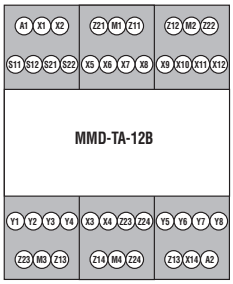
2-Channel EDM with Interface Model

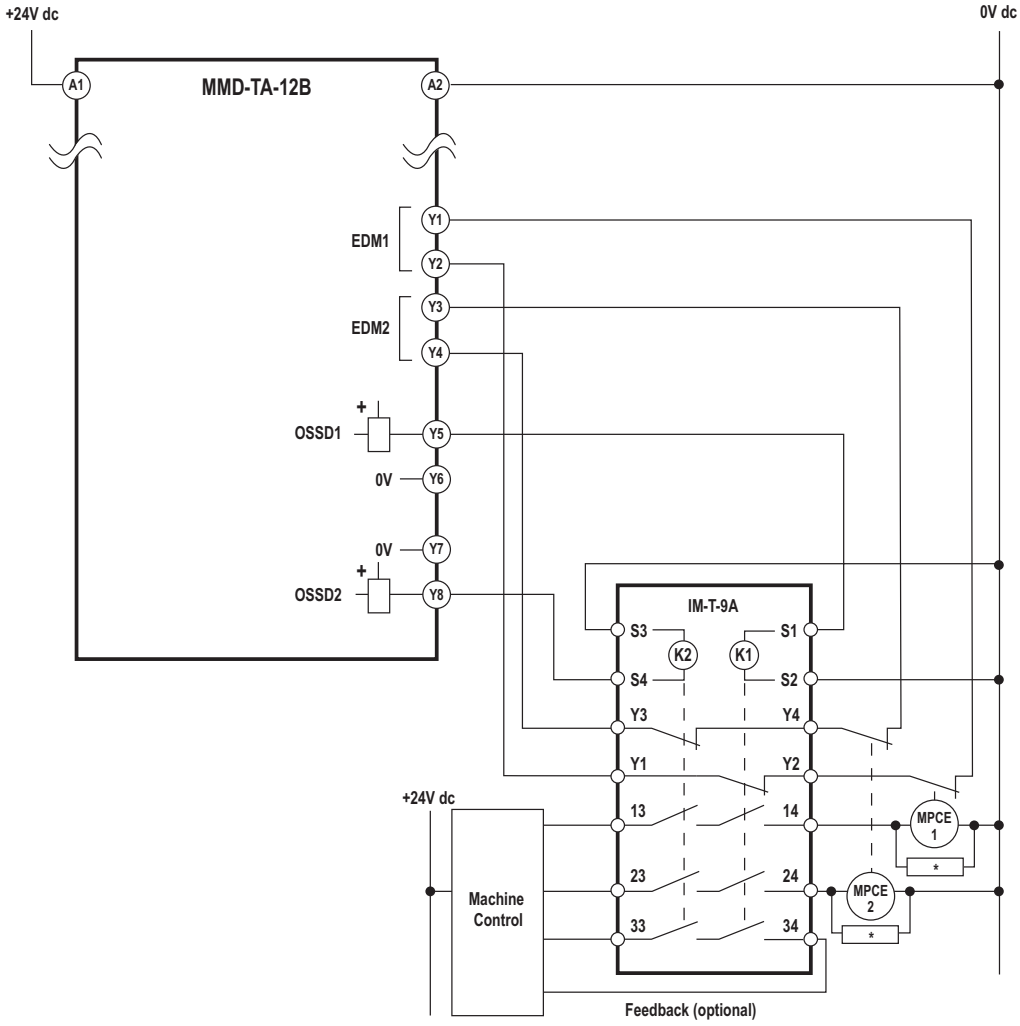


Models

- MMD-TA-12B

MMD-TA-12B Terminal Locations





Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

* Arc Suppressors. See manual for specific warnings.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD047

MMD-TA-12B DIN-Rail Muting Module

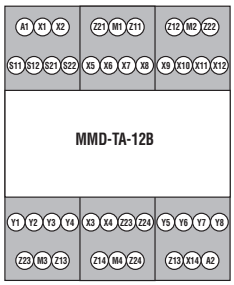
1-Channel EDM with Interface Model

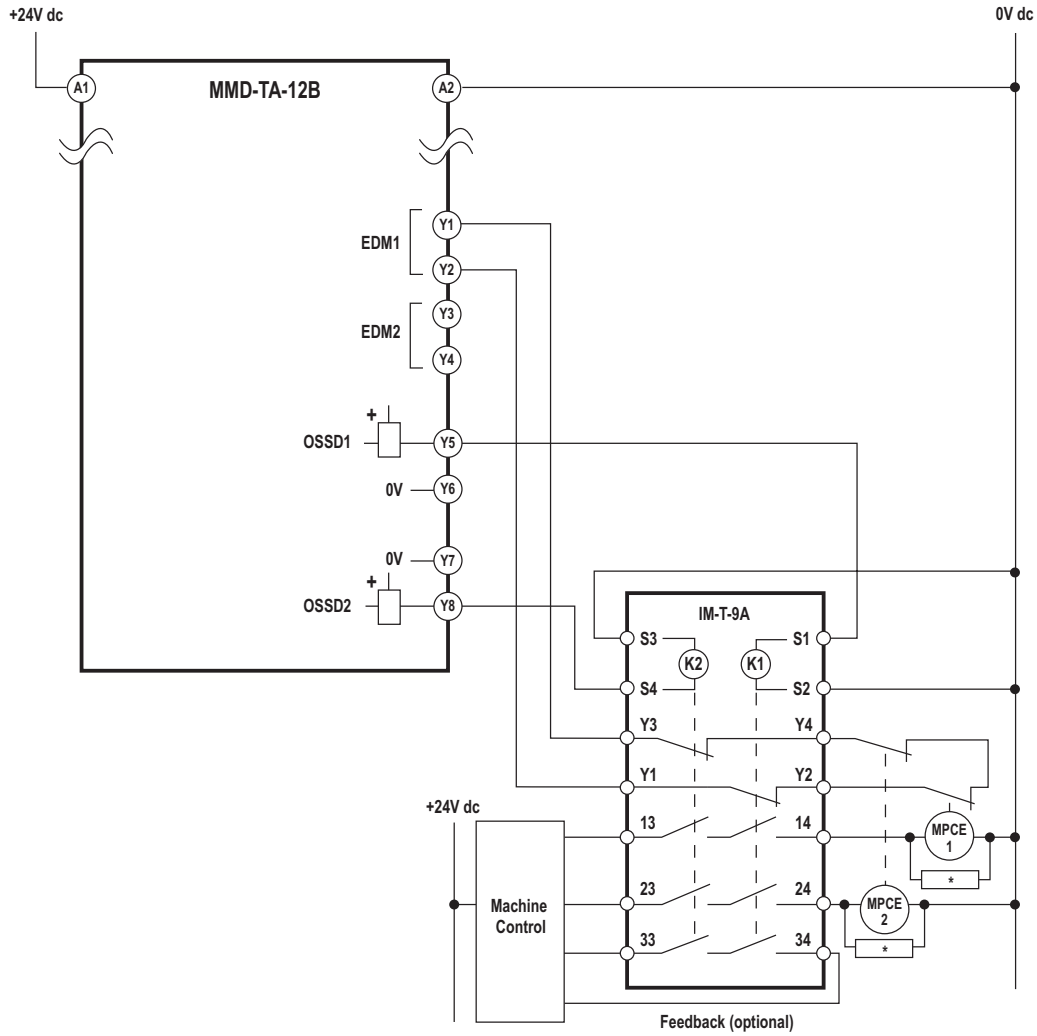


Models

- MMD-TA-12B

MMD-TA-12B
Terminal Locations





* Arc Suppressors. See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD048

SSM Safe Speed Monitor Module

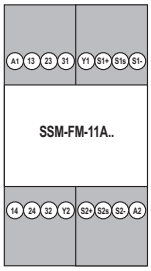
SSM-FM-11.. to Two PNP Sensors

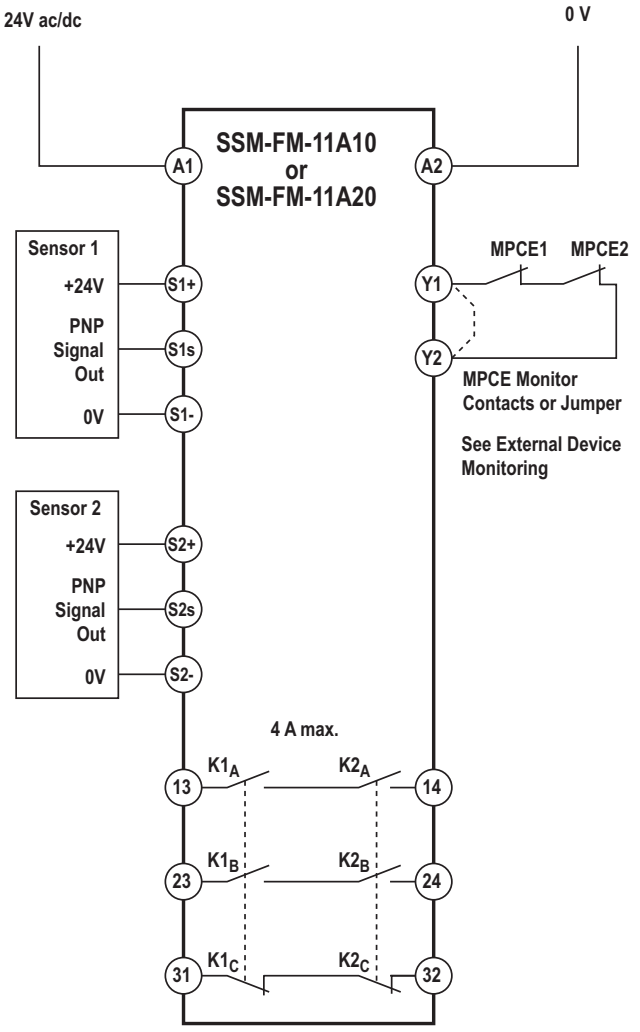


Models

- SSM-FA-11A10
- SSM-FA-11A20

SSM-FA-11A..
Terminal Locations





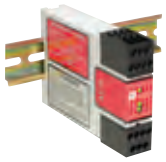
Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

* Arc Suppressors. See manual for specific warnings.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD049

EM-T-7A Extension Module



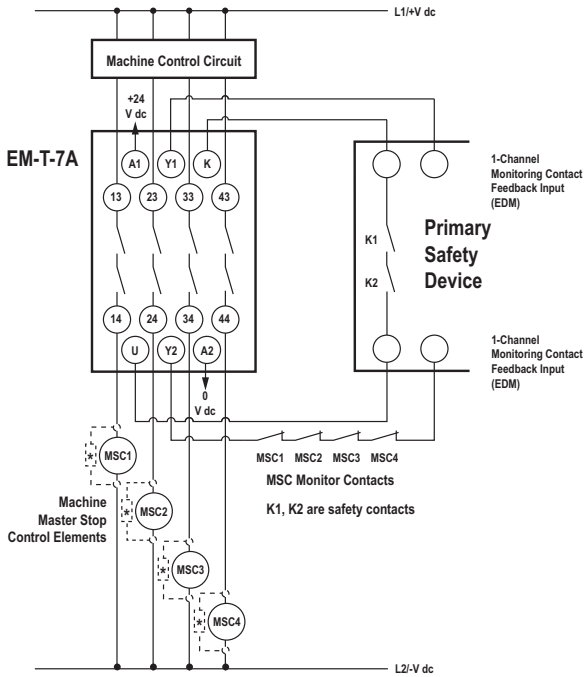
Models

- EM-T-7A

EM-T-7A Terminal Locations



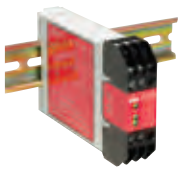
EM-T-7A 1-Channel Control, 1-Channel EDM



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

WD050

EM-T-7A Extension Module



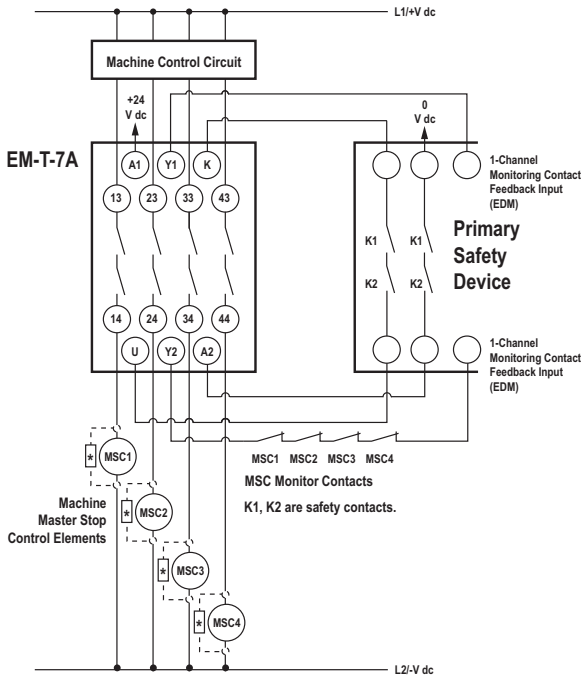
Models

- EM-T-7A

EM-T-7A Terminal Locations



EM-T-7A 2-Channel Control, 1-Channel EDM



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD051

EM-F-7G Extension Module



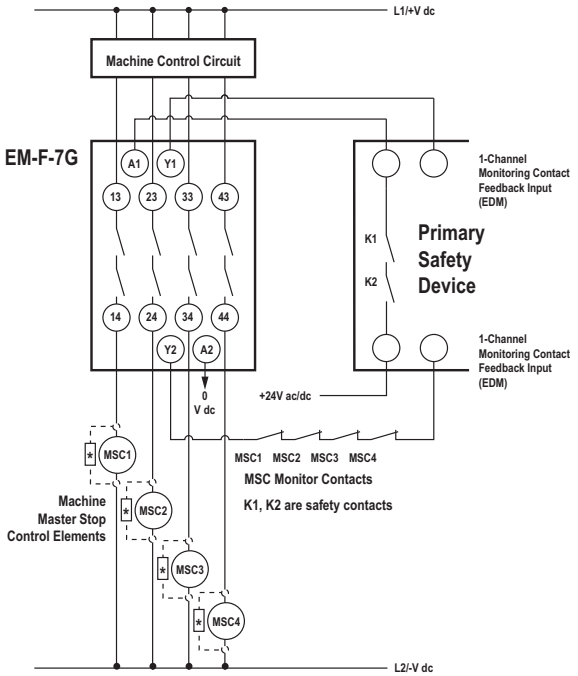
Models

- EM-F-7G

EM-F-7G
Terminal Locations



EM-F-7G One-Channel Control, 1-Channel EDM



* Arc Suppressors. See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

WD052

EM-FD-7G.. Extension Module



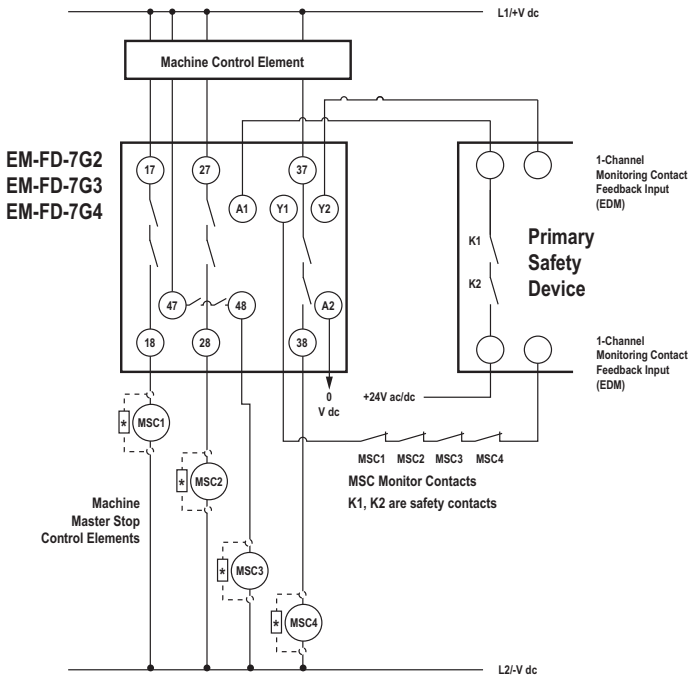
Models

- EM-FD-7G2
- EM-FD-7G3
- EM-FD-7G4

EM-FD-7G
Terminal Locations



EM-FD-7G.. One-Channel Control, 1-Channel EDM



* Arc Suppressors. See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD053

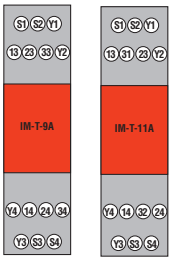
IM-T-..A Interface Module



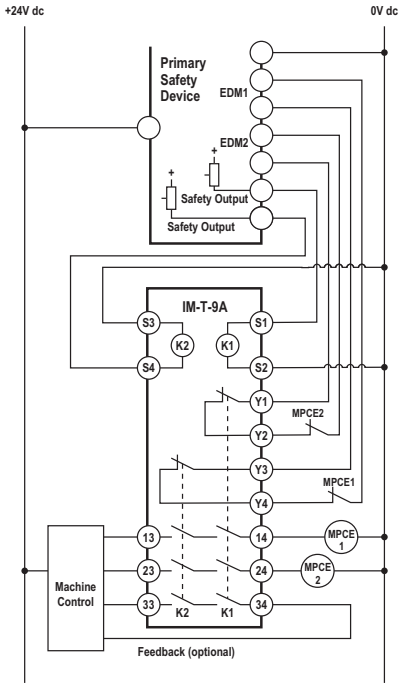
Models

- IM-T-9A
- IM-T-11A

IM-T-..A
Terminal Locations



IM-T-..A 2-Channel Primary Safety Device with 2 OSSDs and 2-Channel EDM



* Arc Suppressors. See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

WD054

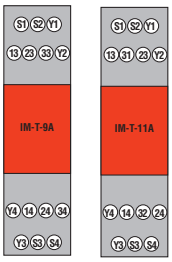
IM-T-..A Interface Module



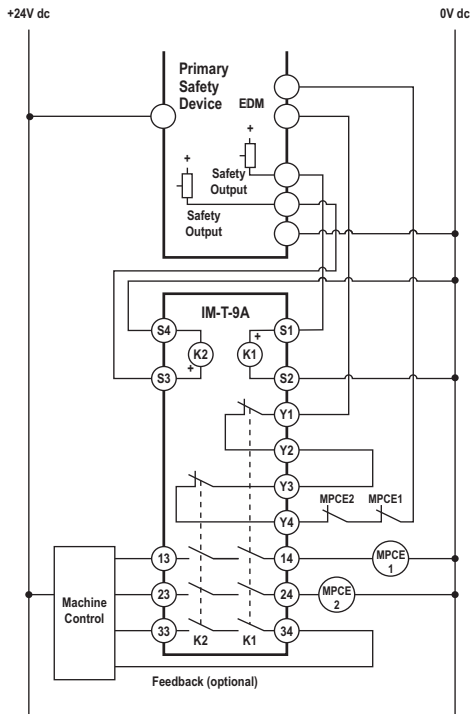
Models

- IM-T-9A
- IM-T-11A

IM-T-..A
Terminal Locations



IM-T-..A 2-Channel Primary Safety Device with 2 OSSDs and 1-Channel EDM



* Arc Suppressors. See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD055

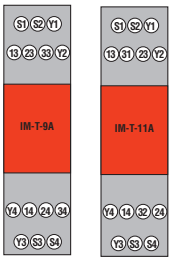
IM-T-..A Interface Module



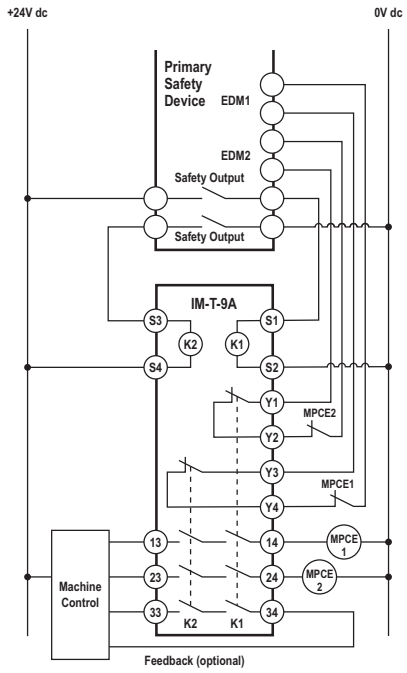
Models

- IM-T-9A
- IM-T-11A

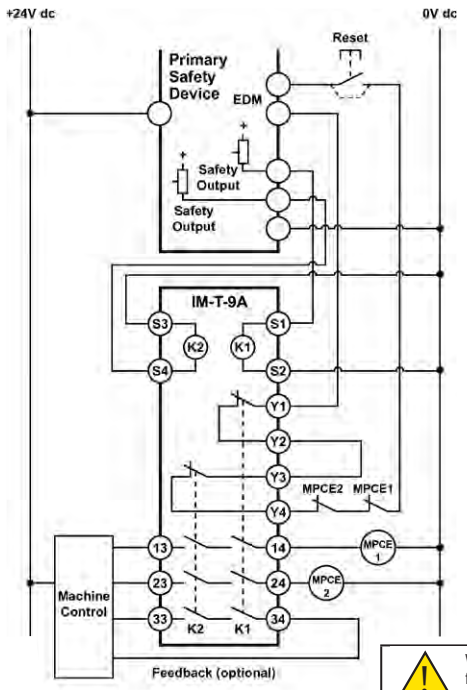
IM-T-..A Terminal Locations



2-Channel PSD with 2 FSDs and 2-Channel EDM



2-Channel PSD with 2 OSSDs and 1-Channel EDM



If arc suppressors are used, they MUST be installed across the coils of machine primary control elements (MPCE 1 and MPCE 2). See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

WD056

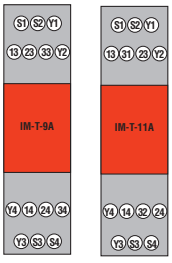
IM-T-..A Interface Module



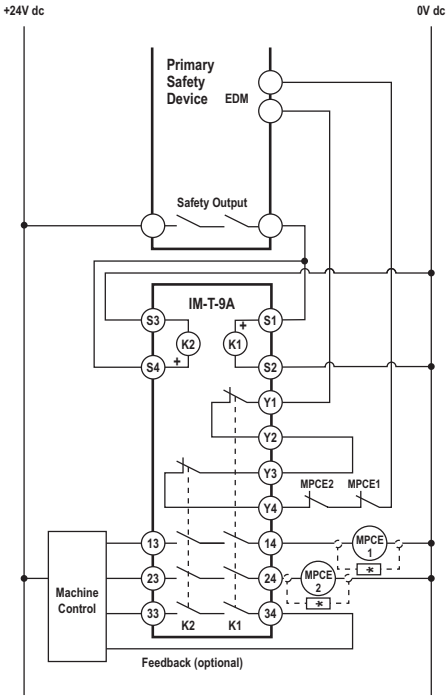
Models

- IM-T-9A
- IM-T-11A

IM-T-..A Terminal Locations



IM-T-..A 1-Channel Primary Safety Device with 1 Redundant-Relay and 1-Channel EDM



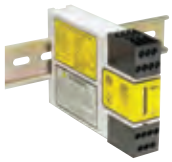
* If arc suppressors are used, they MUST be installed across the coils of machine primary control elements (MPCE 1 and MPCE 2). See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD057

DUO-TOUCH® SG Two-Hand Control Modules STB Compatible



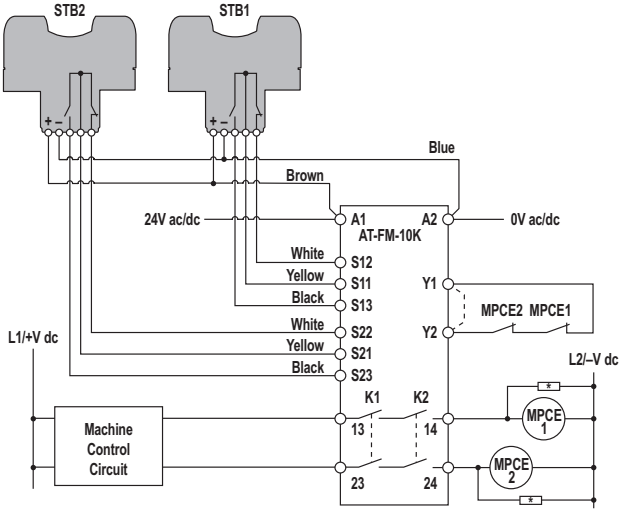
Models

- AT-FM-10K

AT-FM-10K Terminal Locations

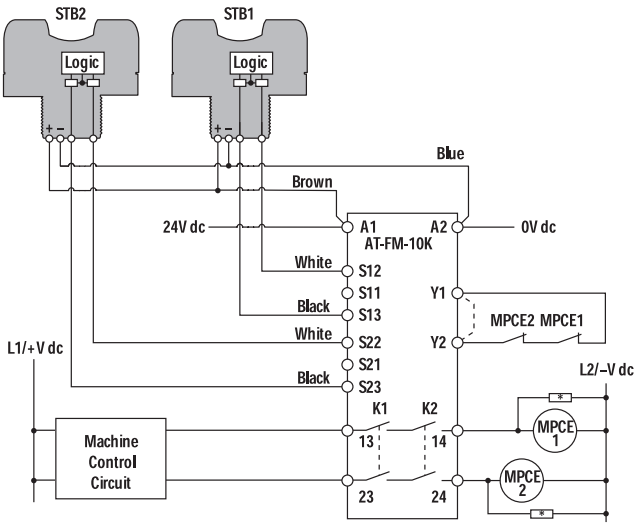


AT-FM-10K to Two STB Touch Buttons with Contact Output



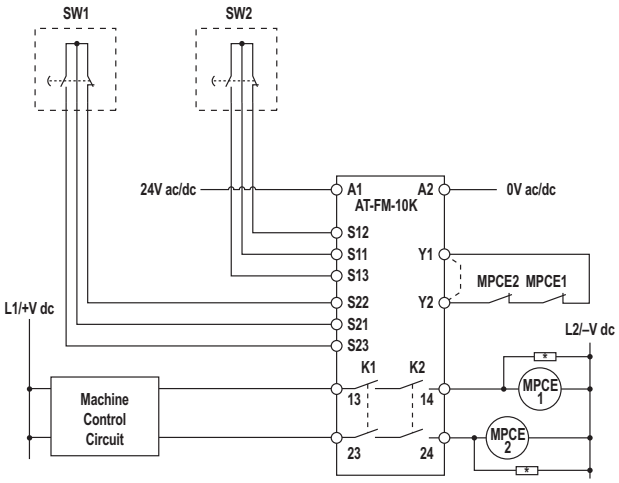
Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

AT-FM-10K to Two STB Touch Buttons with PNP (Sourcing) Outputs



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

AT-FM-10K to Two Mechanical Push Buttons with Contact Outputs

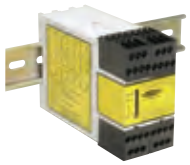


Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

* Arc Suppressors. See manual for specific warnings.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

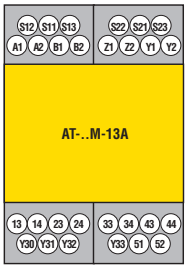
DUO-TOUCH® SG Two-Hand Control Modules, STB Compatible

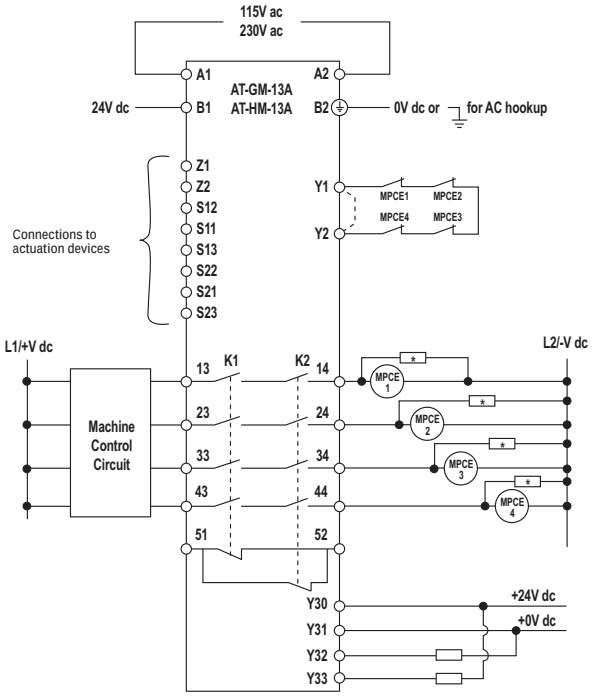


Models

- AT-GM-13A
- AT-HM-13A

AT-..M-13A
Terminal Locations





* Arc Suppressors. See manual for specific warnings.

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

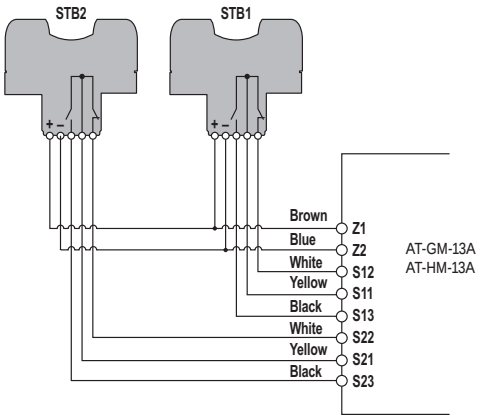
* Arc Suppressors. See manual for specific warnings.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD060

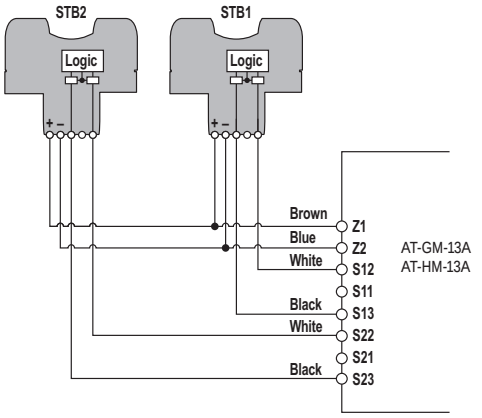
DUO-TOUCH® SG Two-Hand Control Modules, STB Touch-Button with Contact Output

2-Channel EDM with Interface Model



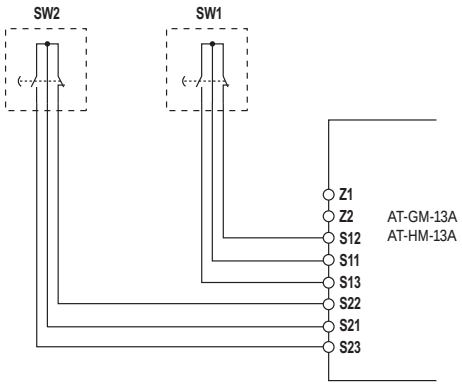
Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

AT-..M-13A and AT-..M-11K to Two STB Touch Buttons with PNP (Sourcing) Outputs



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

AT-..M-13A and AT-..M-11KM to Two Mechanical Push Buttons with Contact Outputs



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

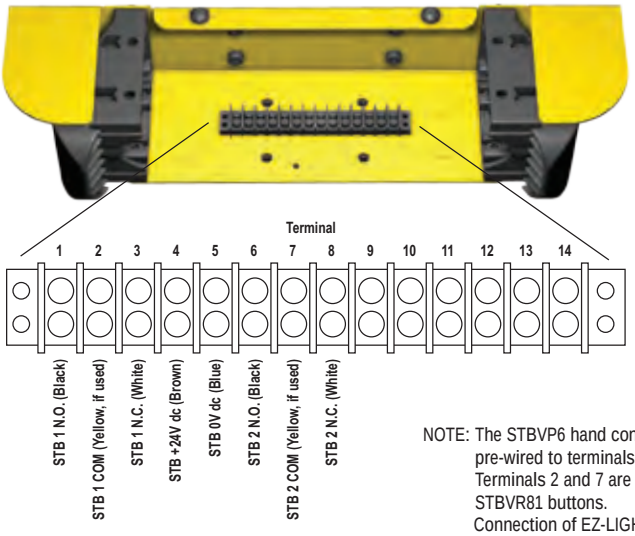
WD061

DUO-TOUCH® Run Bar with STBs



Models

- STBVP6-RB1..



NOTE: The STBVP6 hand control buttons are pre-wired to terminals 1, 3, 4, 5, 6 and 8. Terminals 2 and 7 are reserved for use of STBVR81 buttons.
Connection of EZ-LIGHT indicator(s) and QD connectors not shown. (See data sheet for details)

Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

WD062

EZ-LIGHT™ for Two-Hand Control



LED Function	Brown Wire	Gray Wire	Black Wire	White Wire	Typical Function
Red ON	+V dc	—	—	—	Stop and/or Not Ready
Blue ON	+V dc	+V dc	—	—	Stopped, but Ready/Enabled
Green ON	+V dc	+V dc	+V dc	—	Go
Yellow ON	+V dc	+V dc	+V dc	+V dc	Mute Condition
Red Flashing	Any other hookup combination				Abnormal State

NOTES:
- Blue wire connected to 0V dc
- Supply Voltage and Current = 10 to 30V dc, 60 mA max.

Models

- K50LGRYB11P
- T30GRYB11P

* Arc Suppressors. See manual for specific warnings.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

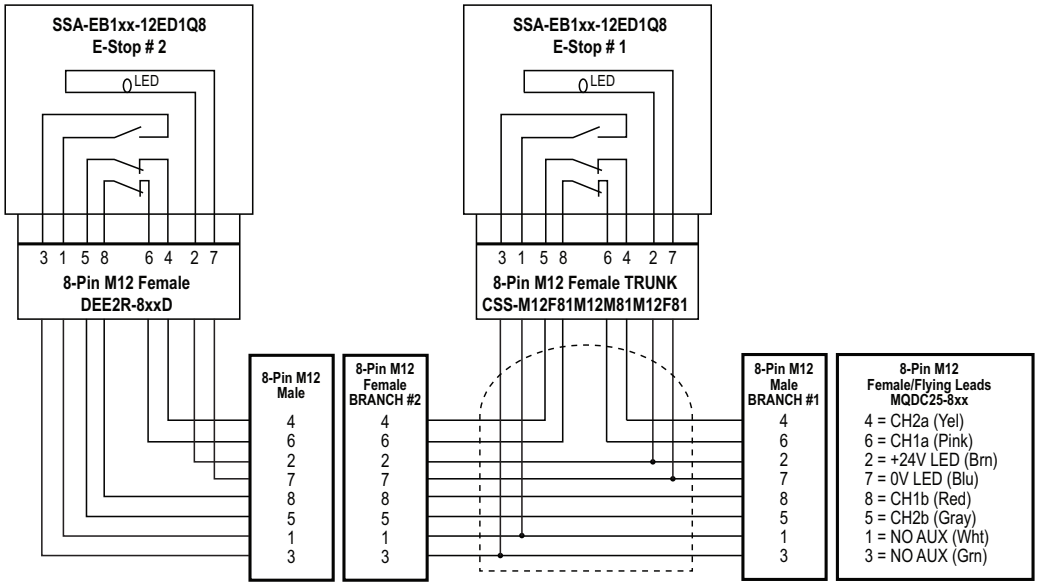
WD063

Flush Mount with and without Lock



Models

- SSA-EB1PL2-12E01Q8
- SSA-EB1ML2-12E01Q8



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

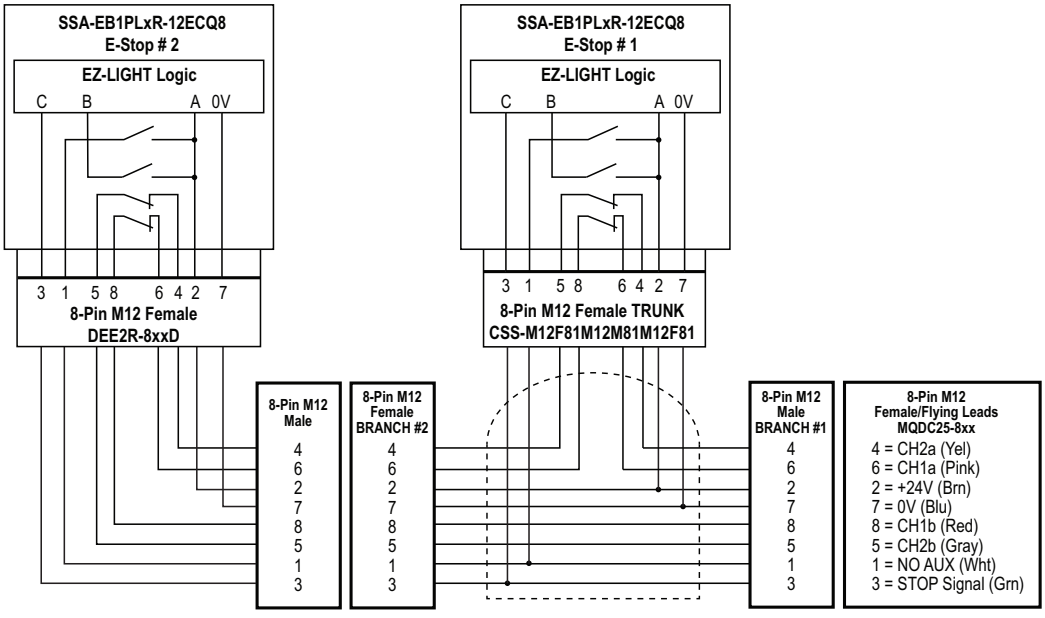
WD064

30 mm E-Stop with Illumination



Models

- SSA-EB1PLYR-12ECQ8
- SSA-EB1PLXA-12EC1Q8



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

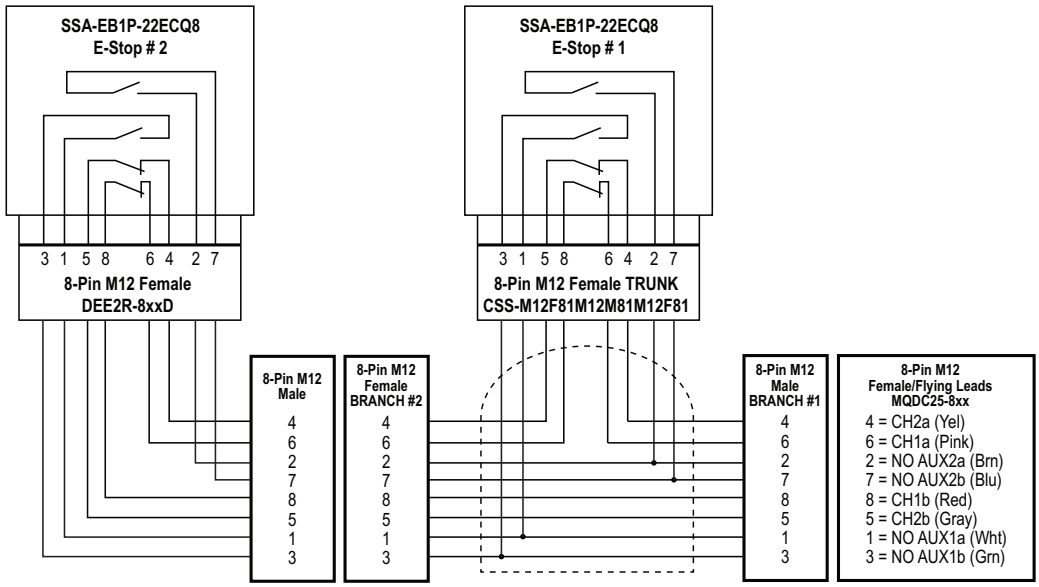
WD065

30 mm E-Stop



Models

- SSA-EB1P-22ECQ8



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

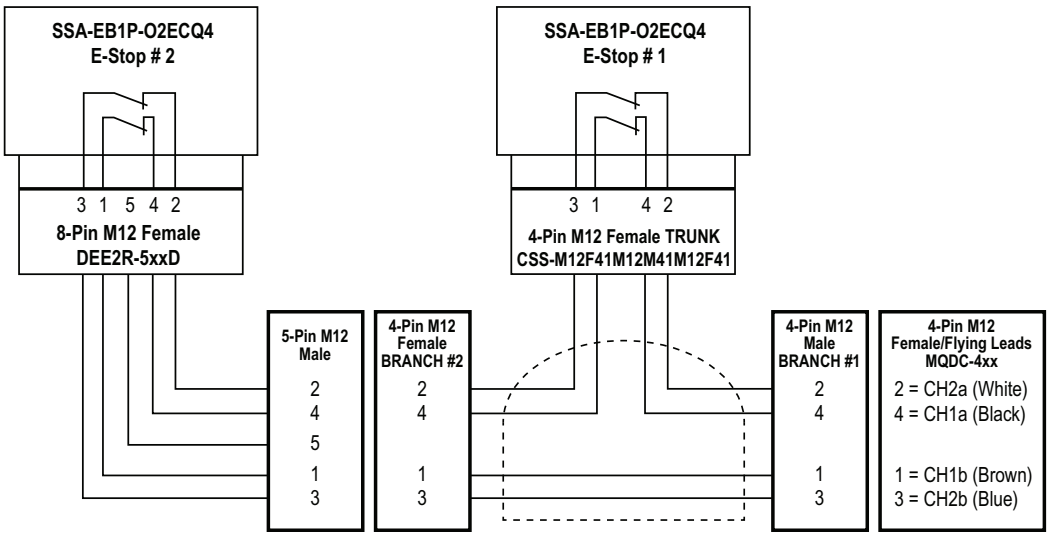
WD066

30 mm E-Stop



Models

- SSA-EB1P-02ECQ4



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD067

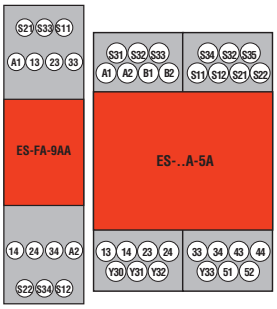
DUO-TOUCH® SG Two-Hand Control Modules, STB Compatible

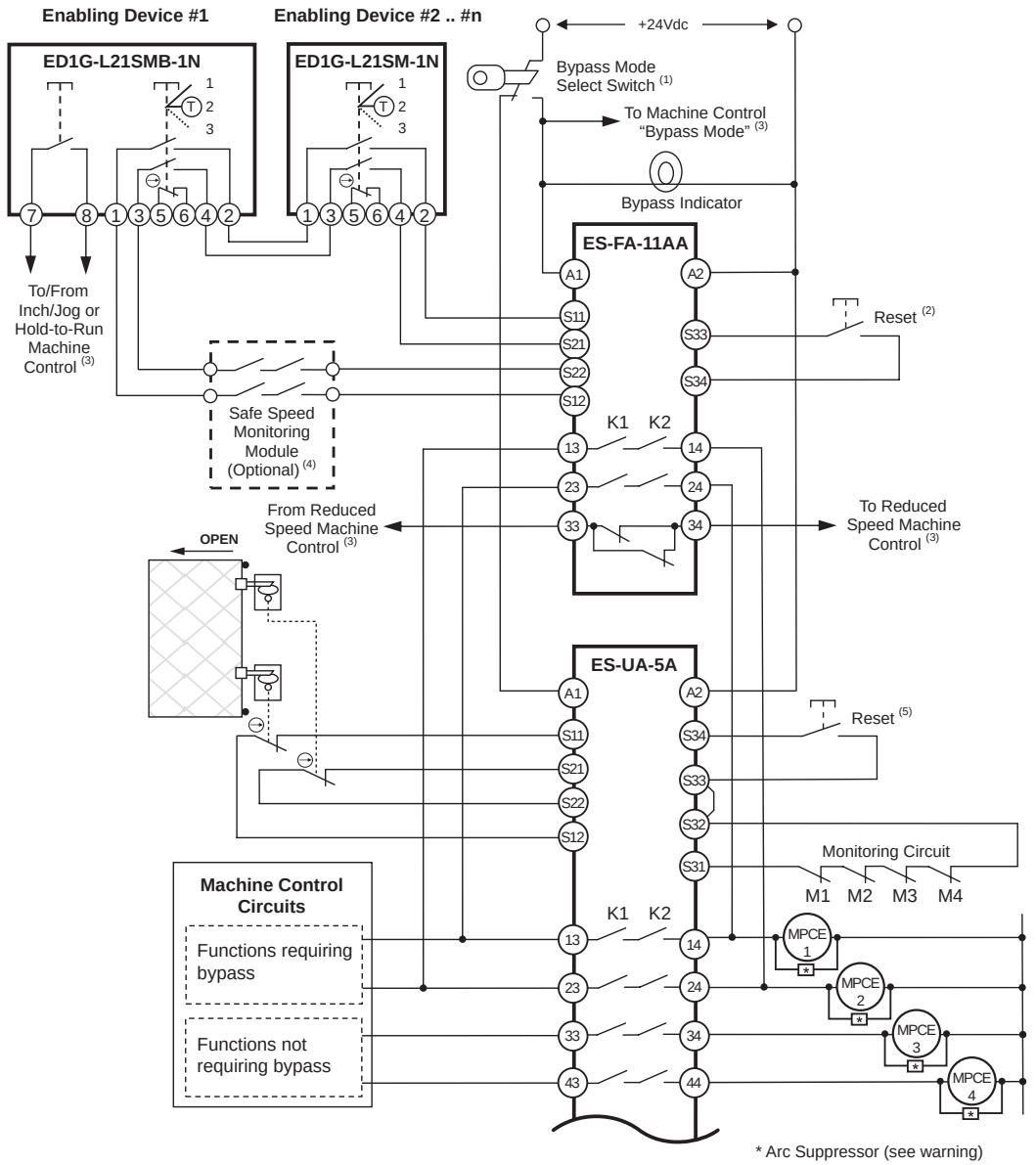


Models

- ED1G

ES-FA-11AA/
ES-UA5A





Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

WD068

SC26-2



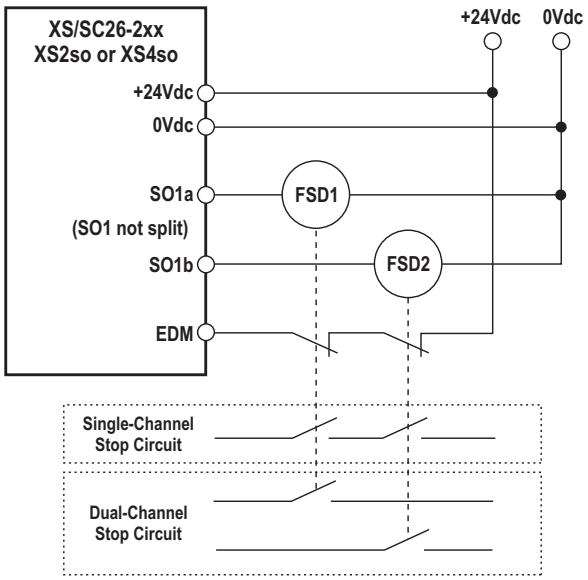
Models

- SC26-2

Solid-State Safety Outputs SO2, SO3, and SO4 can be wired similarly.

When a Solid-State Safety Output has been split into two individual outputs, each output requires an individual EDM or AVM input for monitoring.

DC common (0Vdc) must be common between the module's 0Vdc terminal and the common of the load (e.g. FSD).



Wiring diagrams are for information only. See appropriate manuals for all specific warnings, cautions and information for use.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

English-Metric Conversion

Inch Fraction	Inch Decimal	Millimeter
—	.0039	0.1
—	.0079	0.2
—	.0118	0.3
1/64	.0156	0.397
—	.0157	0.4
—	.0197	0.5
—	.0236	0.6
—	.0276	0.7
1/32	.0312	0.794
—	.0315	0.8
—	.0354	0.9
—	.0394	1
3/64	.0469	1.191
1/16	.0625	1.588
5/64	.0781	1.984
—	.0787	2
3/32	.0938	2.381
7/64	.1094	2.778
—	.1181	3
1/8	.1250	3.175
9/64	.1406	3.572
5/32	.1562	3.969
—	.1575	4
11/64	.1719	4.366
3/16	.1875	4.762
—	.1968	5
13/64	.2031	5.159
7/32	.2188	5.556
15/64	.2344	5.953
—	.2362	6
1/4	.2500	6.350
17/64	.2656	6.747
—	.2756	7
9/32	.2812	7.144
19/64	.2969	7.541
5/16	.3125	7.938
—	.3150	8
21/64	.3281	8.334
11/32	.3438	8.731
—	.3543	9
23/64	.3594	9.128
3/8	.375	9.525
25/64	.3906	9.922
—	.3937	10
13/32	.4062	10.319
27/64	.4219	10.716
—	.4331	11
7/16	.4375	11.112
29/64	.4531	11.509
15/32	.4688	11.906
—	.4724	12
31/64	.4844	12.303
1/2	.500	12.700
—	.5118	13
33/64	.5156	13.097
17/32	.5312	13.494
35/64	.5469	13.891
—	.5512	14
9/16	.5625	14.288
37/64	.5781	14.684
—	.5905	15
19/32	.5938	15.081
39/64	.6094	15.478
5/8	.625	15.875
—	.6299	16
41/64	.6406	16.272
21/32	.6562	16.669
—	.6693	17
43/64	.6719	17.066
11/16	.6875	17.462
45/64	.7031	17.859
—	.7087	18
23/32	.7188	18.256
47/64	.7344	18.653
—	.7480	19
3/4	.750	19.050
49/64	.7656	19.447
25/32	.7812	19.844
—	.7874	20
51/64	.7969	20.241
13/16	.8125	20.638
—	.8268	21
53/64	.8281	21.034
27/32	.8438	21.431
55/64	.8594	21.828
—	.8661	22
7/8	.875	22.225
57/64	.8906	22.622
—	.9055	23
29/32	.9062	23.019
59/64	.9219	23.416
15/16	.9375	23.812
—	.9449	24
61/64	.9531	24.209
31/32	.9688	24.606
—	.9842	25
63/64	.9844	25.003
1	1.000	25.400
—	—	—

To convert millimeters to inches, multiply by 0.0394.

To convert inches to millimeters, multiply by 25.4.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Temperature Conversion

Celsius°	Fahrenheit°
-62	-80
-57	-70
-51	-60
-46	-50
-40	-40
-34	-30
-29	-20
-23	-10
-17.8	0
-17.2	1
-16.7	2
-16.1	3
-15.6	4
-15.0	5
-14.4	6
-13.9	7
-13.3	8
-12.8	9
-12.2	10
-11.7	11
-11.1	12
-10.6	13
-10.0	14
-9.4	15
-8.9	16
-8.3	17
-7.8	18
-7.2	19
-6.7	20
-6.1	21
-5.6	22
-5.0	23
-4.4	24
-3.9	25
-3.3	26
-2.8	27
-2.2	28
-1.7	29
-1.1	30
-0.6	31

Celsius°	Fahrenheit°
0.0	32
0.6	33
1.1	34
1.7	35
2.2	36
2.8	37
3.3	38
3.9	39
4.4	40
5.0	41
5.6	42
6.1	43
6.7	44
7.2	45
7.8	46
8.3	47
8.9	48
9.4	49
10.0	50
10.6	51
11.1	52
11.7	53
12.2	54
12.8	55
13.3	56
13.9	57
14.4	58
15.0	59
15.6	60
16.1	61
16.7	62
17.2	63
17.8	64
18.3	65
18.9	66
19.4	67
20.0	68
20.6	69
21.1	70
21.7	71

Celsius°	Fahrenheit°
22.2	72
22.8	73
23.3	74
23.9	75
24.4	76
25.0	77
25.6	78
26.1	79
26.7	80
27.2	81
27.8	82
28.3	83
28.9	84
29.4	85
30.0	86
30.6	87
31.1	88
31.7	89
32.2	90
32.8	91
33.3	92
33.9	93
34.4	94
35.0	95
35.6	96
36.1	97
36.7	98
37.2	99
37.8	100
43	110
49	120
54	130
60	140
66	150
71	160
77	170
82	180
88	190
93	200
100	212

Temperature Scale	Water Boiling Point	Water Freezing Point	Conversion Formula
° F (Fahrenheit)	212° F	32° F	° F = (° C x 9/5) + 32
° C (Celsius or Centigrade)	100° C	0° C	° C = (° F - 32) x 5/9

NOTE: For temperatures not given in the table, use the conversion formula above.

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

North America



UNITED STATES

More than 150 representatives and distributors covering all states. For a complete listing, go to bannerengineering.com and find your local Banner Representative by ZIP code search.

CANADA

E. B. Horsman & Son Ltd.
13055 80th Avenue
Surrey, British Columbia V3W 3B1
Tel: 1-604-596-7111
Fax: 1-604-596-3139
http://www.ebhorsman.com

Landel Controls Ltd.
610-70th Ave SE
Suite 5
Calgary, Alberta T2H-2J6
Tel: 1-403-254-8900
Fax: 1-403-254-8903
email: email@landelcontrols.com
http://www.landelcontrols.com

Le Groupe Rotalec
900 McCaffrey
Ville St-Laurent, Quebec H4T 2C7
Tel: 1-514-341-3685
Fax: 1-514-341-5205
email: atlantic@rotalec.com
http://www.rotalec.com

Le Groupe Rotalec Atlantic
122 Driscoll Cresent
Moncton, New Brunswick E1E 3R8
Tel: 1-506-858-9884
Fax: 1-506-853-4185
email: atlantic@rotalec.com
http://www.rotalec.com

Shelley Industrial Automation, Inc.
41 Coldwater Road
Toronto, Ontario M3B 1Y8
Tel: 1-877-SHELLEY
Fax: (416) 447-9313
email: info@shelley.com
http://www.shelley.com

Latin America



CORPORATE OFFICE:

Banner Engineering Latin America
9714 10th Ave. N.
Plymouth, MN 55436 USA
Tel: 763-544-3164
Fax: 763-417-7459
email: brasil@bannerengineering.com
ventas@bannerengineering.com
http://www.bannerengineering.com

Banner Engineering de Mexico
Edificio VAO Av. David Alfaro Siqueiros No.103 Piso 2 Col. Valle Oriente
C.P.66269 San Pedro Garza Garcia, Nuevo Leon Mexico
Phone: 52-81-8363-2714

Banner Engineering do Brasil
Rua Barão de Tefé nº 1000, sala 54
Campos Elíseos
Jundiaí – SP
CEP: 13208-761
email: brasil@bannerengineering.com
http://www.bannerengineering.com.br

ARGENTINA

Aumecon S.A.
Acassusso 4768
1605 Munro
Buenos Aires CP B1605BFP
Tel: 54-11-4756-1251
Fax: 54-11-4762-6331
email: ventas@aumecon.com.ar
http://www.aumecon.com.ar

BRAZIL

Banner Engineering do Brasil
Rua Barão de Tefé nº 1000, sala 54
Campos Elíseos
Jundiaí – SP
CEP: 13208-761
email: brasil@bannerengineering.com
http://www.bannerengineering.com.br

Sensor do Brasil
Rua Jordão Schiavetto, 436
Parque Ortolandia
Hortolândia – SP CEP:13184-080
Tel: 55-19-3897-9400
Fax: 55-19-3897-9426
email: sensor@sensordobrasil.com.br
http://www.sensordobrasil.com.br

Movimatic
Rua Vigário Albernaz, 226
Vila Mariana
São Paulo - SP CEP 04134 020
Tel: 55-11-5062-5222
Fax: 55-11-5062-5222
email: movimatic@movimatic.com.br
http://www.movimatic.com.br

Sensorpar Eletro Eletronica E Automacao Ltda
Rua Leonardo da Vinci, 185
Guabirotuba
CEP: 81510-390 - Curitiba - PR
Tel: 55-41-3284-6660
Fax: 55-41-3284-6660
email: sensorpar@sensorpar.com.br
http://www.sensorpar.com.br

E-Service Rio
Rua do Arroz, 90, lj. D
Penha - RJ
CEP: 21.011-056
Tel: 55-21-2584-9137
Fax: 55-21-2584-9137
email: comercial@e-Servicerio.com.br
http://www.e-servicerio.com.br

B2B Tecnologia
Rua Gerino de Souza Filho, 1735, Galpão 1
Lauro de freitas, Bahia
CEP: 42700-000
Tel: 55-71-3379-5733
email: comercial@b2btecnologia.com
http://www.b2btecnologia.com

Sensorville
Rua Evaristo da Veiga, 193
Bairro Gloria
Joinville-SC- CEP:89216.215
Tel: 55-47-3422-5111
Fax: 55-47-3433-5298
email: sensorville@sensorville.com.br
http://www.sensorville.com.br

Spheric Componentes Óticos
Rua Imperatriz Leopoldina, 355, Sala 03
Novo Hamburgo – RS CEP:93310-060
Tel: 55-51-3594-8036
Fax: 55-51-3594-8036
email: spheric@spheric.com.br
http://www.spheric.com.br

Techway Comércio e Representação Ltda
Rua Fernando Pessoa 22A, Bairro Japiim II
Manaus, Amazonas CEP: 69076-790
Tel: 55-92-3613-6613
Fax: 55-92-3613-2161
email: marivaldo@techwaybr.com.br
http://www.techwaybr.com.br

Weber Automação e Controle Industrial Ltda
Rua Bicas, 215 – Bairro Sagrada Família
Belo Horizonte – Minas Gerais BR
CEP:31030-160
Tel: 55-31-3461-4222
Fax: 55-31-3481-7925
email: vendas@webercom.com.br
http://www.webercom.com.br

Ztech Sensores Ltda.
Avenida Marechal Juares Távra, 785
SQ Morumbi
São Paulo, SP - CEP: 05750-001
Tel: 55-11-5031-7777
Fax: 55-11-5031-7777
email: vendas@ztechsensores.com.br
http://www.ztechsensores.com.br

TOP Automação
Rua 9-A, Qd 46-A, Lt 28
Nº 717 St Aeroporto
CEP: 74075-250
Goiânia - GO
Tel: 55-62-3215-2582
email: topautomacao@topautomacao.com.br
http://www.topautomacao.com.br

BOLIVIA

Control Experto
Oficina Principal
Av America E-435
Edificio Jaque, Piso # 2 ofic #2
Cochabamba
Tel: 591-441-7090
Fax: 591-412-3950
email: wayaviri@controlexperto.com
http://www.controlexperto.com

Control Experto
Av. Pasos Kanki N 1665
Edificio San Martín de Porres
Zona Miraflores
La Paz
Tel: 591-(2)-222-2597
Fax: 222-6923 – 212-9247
email: wayaviri@controlexperto.com
http://www.controlexperto.com

Control Experto
Condominio Colombo Oficina N#3
4 Anillo entre Av Paragua y Mutualista
Santa Cruz
Tel: 591-(3)–364-4753
Fax: 591-(3)–364-4753
email: wayaviri@controlexperto.com
http://www.controlexperto.com

CHILE

Electromática Ltda
Avda. Manuel Rodriguez 843
Concepción CP 406-1192
Tel: 56-41-229-4000
Fax: 56-41-229-4001
email: ventas@electromatica.cl
http://www.electromatica.cl

Veset
Lincoyán #1262
Concepción
Tel: 56-(0)41-2739443
email: jcroa@veset.cl
http://www.veset.cl

COLOMBIA

Dakora S.A.S
Kra. 1A # 11-130 Of. 507-508
Centro Empresarial OfiChia P.H
Chia
Tel: 57-1-863-0669
email: ventas@dakora.com.co
www.dakora.com.co

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

COSTA RICA

Tecnologia Interactiva
Residencial Hacienda del Rey Casa 24C
Cartago CP: 1461-7050
Tel: 506-2572-1102
Fax: 506-2573-5664
email: info@tecnologiainteractiva.com
http://www.tecnologiainteractiva.com

DOMINICAN REPUBLIC

Wech Autocontroles, S.A.
Ave. Rómulo Betancourt 2158
Edificio WECH, Urb. Renacimiento
Santo Domingo
Tel: 809-531-0550
Fax: 809-531-9175
email: wech02@codetel.net.do
http://www.wechautocontroles.com.do

ECUADOR

Bracero & Bracero Ingenieros
Gonzalo Martín
E5-251 y Ana
Paredes de Alfaro
Tel: +593-2-2655601
email: alexisbracero@bracero-ingenieros.com
http://www.bracero-ingenieros.com

Equipamiento Electro Industrial SA
Km 7.5 Via Daule
Parque Comercial California #2
Bloque J
Guayaquil
Tel: 593-42-100134
email: eeinsa@on.net.ec

INGUIBRA
Rodolfo Baquerizo Nazur
(Principal de la Alborada)
Mz.454 F10 V11 y Princesa Quil
Tel: +593 4 5118554
email: ventas@inguibra.com
http://www.inguibra.com

GUATEMALA

Enersys Co.
5 Calle 35-01, Zona 11
Utatlán II
Guatemala City
Tel: 502-2439-4622
Fax: 502-2434-6876
email: info@enersys-control.com

MEXICO

Banner Engineering de Mexico Monterrey Head Office:
Edificio VAO
Av. David Alfaro Siqueiros No.103
Col. Valle Oriente C.P.66269
San Pedro Garza Garcia, Nuevo Leon
Tel: 52-81-8363-2714/ 800 BANNERE
email: mexico@bannerengineering.com
http://www.bannerengineering.com.mx

Mexico City Office:
Sucursal Mexico DF
Rio Lerma #196 Bis, Oficina 301
Col Cuauhtemoc, CP06500
Mexico DF
Tel: 52-55-5533-6241
email: mexico@bannerengineering.com
http://www.bannerengineering.com.mx

AEECSA - Automatización Especializada y Elementos de Control S.A. de C.V.
Trípoli 221-5 Col. Portales
C.P 03300
Delg. Benito Juárez
Tel: 55-5605-1772, 55-5605-1794
email: aeecsa@prodigy.net

ABC Suministro Industrial S.A. DE C.V.
Calle Del Molino No.393
Residencial La Hacienda
Torreon, COAH.
Tel: 52-871-763-7500
email: gerencia@abcsuministro.com
www.abcsuministro.com

ATD - Alta Tecnologia Digital
Boszues de Durango 85,
Col. Jardines de Santa Monica
C.P. 54050
Tlalnepantla, Edo. de Mexico
Tel: 52-55-5240-8000
Fax: 52-55-53-98-7159
email: ventas@atdsensores.com.mx
http://www.atdsensores.com.mx

Calvek S.A. de C.V. - San Luis Potosi
Carretera 57, km 423, local 7
Col. Talleres
San Luis Potosi, S.L.P.
C.P. 78699
Tel: 52-444-127-5533
Fax: 52-444-128-6122
email: joel.castaneda@calvek.com / sarai.castillo@calvek.com
http://www.calvek.com

Calvek S.A. de C.V. - Queretaro
Qro Onix No. 155
Col. Satélite
C.P. 76110
Querétaro, Qro.
Tel: 52-442-298-0031
email: hector.velazquez@calvek.com / iris.salazar@calvek.com
http://www.calvek.com

Calvek S.A. de C.V. - Celeya
Av. Franciso Juarez # 1605 PB
Col. Del Parque
Celaya, Gto.
C.P. 38097
Tel: 52-461-615-4764
email: jaime.navarro@calvek.com / monica.ortega@calvek.com
http://www.calvek.com/

Control Sensors, S.A. de C.V.
Av. Tolteca # 2300-A
Col. Tolteca
Guadalupe, N.L. C.P. 67190
Tel: 818-030-73-07/09
email: control_sensors@prodigy.net.mx
http://www.controlsensors.com.mx

Goblin Control Industrial
Victoria no. 104 loc. b-Bis
Col. centro mexico d.F. c.P.06050
Tel: 52 (55) 5518-1788
Fax: 52 (55) 5510-1454
email: goblin@prodigy.net.mx
http://www.goblincontrol.com

IIPSA - Instrumentos Industriales del Pacifico, S.A. de C.V.
Juan Carrasco # 212 Pte.
Col. Centro
Los Mochis- Sinaloa 81200
Tel: 668-816-0140 Fax: 668-816-0144
email: info@iipsa.com
http://www.iipsa.com

INASA: Ingenieria y Abastecimiento, S.A. de C.V.
Villagran 1423 Nte., Postal 526
Monterrey, NL 64440
Tel: 81-8375-2377
Fax: 81-8372-7175
email: inasa@inasa.com.mx

Indicon
Himalaya 808, Fracc Panoramico
Chihuahua, CHIH 31107
Tel: 614-440-0120
Fax: 614-440-0130
email: ventas@indicon.com.mx
http://www.indicon.com.mx

Seguridad y Control
Av. Federalismo Sur # 765, Col. Moderna
Guadalajara, Jal. 44190
Tel: 33-3614-5554
Fax: 33-3614-1253
email: ventas@seguridadycontrol.com.mx
http://www.seguridadycontrol.com.mx

TESLA Internacional
Encinos Ote. 13 Arcos del Alba
Cuatitlán Izcalli, Edo. de México 54750
Tel: 55-5871-3468
Fax: 55-5871-5556
email: teslaintl@prodigy.net.mx

SCA Puebla
Prolongación diagonal defensores de la república No 64 Int. 6
Col: Corredor industrial la cienega
Puebla C.P. 72260
Tel: 52-222-5147900
Fax: 52-222-4059480
email: israel.chavez@scaautomatizacion.com
http://www.scaautomatizacion.com

SCA Mérida
Calle 15 #103 por 16 y 22
Col. Brisas
Mérida Yucatán
C.P. 97144
Tel: 52-999-9247811
email: concepcion.arce@scaautomatizacion.com
http://www.scaautomatizacion.com

SCA Hidalgo
Lirios No 11 Col. Jacarandas
C.P. 42730 Progreso de Obregón
Hidalgo
Tel: 52-173-8735-7049
email: rosalba.perez@scaautomatizacion.com
http://www.scaautomatizacion.com

SCA Orizaba, Veracruz
Sur 2 esquina poniente 9 No 14 Int. 4 Col. Centro
Orizaba, Verzacruz
Tel: 52-272-7250645
email: ivan.vazquez@scaautomatizacion.com
http://wwwscaautomatizacion.com

Electriciadad y Control Industrial de Saltillo, S.A. de C.V.
Lago Texcoco 757
Col. La Salle
Saltillo, Coahuila, C.P.25240
Tel: 52 (844) 416-3013
Fax: 52 (844) 415-3212
email: eci@ecidesaltillo.com

EACSA Matriz Distrito Federal
Simón Bolívar 826-3 Col. Álamos
C.P. 03400. Del. Benito Juárez
México, D.F.
Tel: 52-55-5696-7033
email: ruben_angeles@eacsamexico.com.mx
http://www.eacsamexico.com.mx

EACSA Sucursal Toluca
Blvd. Miguel Alemán Valdez 1663-5
Col. Reforma, C.P. 52120.
Toluca. Edo. de México
Tel: 52-722-327-8036
email: ventastoluca@eacsamexico.com.mx
http://www.eacsamexico.com.mx

Grupo CI Electric S.A. de C.V.
Laguna de Términos No.135
Col. Anahuac Del, Miguel Hidalgo
C.P. 11320
Tel: 55-5250-4130
Fax: 55-5250-1475
e-mail: leonardo.michaus@gcielectric.com carolina.hernandez@gcielectric.com
http://www.gcielectric.com

ECOSY ENGINEERING S.A. DE C.V.
Av. Jorge Jimenez Cantu No.3
Col. Rincon Colonial, Cuautitlan Izcalli
Estado de Mexico C.P. 54730
Tel: 52-55-5871-4800
email: rbautista@ecosy.com.mx
http://www.ecosy.com.mx

PRODASIS
Batallón de San Patricio # 109
Piso 11 col. Valle Oriente. 66260.
San Pedro Garza, García. N.L.
Tel: 52-81-19-67-88-51
email: info@prodasis.com
http:// www.prodasis.com

SINYC Corporation, S.A.de C.V.
Av. de los 50 metros No.50-35
Col. Civac
Jiutepec, Morelos
C.P. 62578
Tel: 52-777-319-6865
email: ventas.admin@sinyc.com.mx
http:// www.sinyc.com.mx

PERU

NPI Peru S.A.C.
Francisco Almenara 290
Urb. Sta. Catalina, La Victoria
Lima 13
Tel: (51-1) 265-6501
Fax: (51-1) 265-6381
email: npiperu@npiperu.pe
http://www.npiperu.pe

PUERTO RICO

PREMSCO
Calle Jordan 704
Santurce, PR 00909
Tel: 1-787-268-4040
Fax: 1-787-268-4182
email: sales@premsco.com
http://www.premsco.com

URUGUAY

Fidemar
Minas 1634-CP 11200
Montevideo
Tel: 59-82-402-1717
Fax: 59-82-402-1719
email: info@fidemar.com.uy
http://www.fidemar.com.uy

VENEZUELA

AmeTrade C.A.
Av. Henry Ford, Zona Industrial Norte
C.C. Paseo Las Industrias, 2da Etapa
Nivel 1, Ofic. 1-118 Valencia
Tel: 58-241-838-4250
Fax: 58-241-838-3143
email: valencia@ametrade.com
http://www.ametrade.com

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Europe



CORPORATE OFFICE:
Banner Engineering EMEA
Park Lane
Cullinganlaan 2F
Diegem
B-1831
Tel: 32-2-456-07-80
Fax: 32-2-456-07-89
email: mail@bannerengineering.com
http://www.bannerengineering.com/eu

Banner Engineering Turkey
Barbaros Mah. UpHill Court Towers A
Blok D:49 Batı Atasehir
Istanbul Turkey
Tel: 90 216 688 8282
Fax: 90 216 688 8181
email: turkey@bannerengineering.com.tr
http://www.bannerengineering.com.tr

AUSTRIA
Turck GmbH
GRAUMANNGASSE 7/A5-1
A-1150 WIEN
Tel: 431-48-61587
Fax: 431-48-6158723
email: austria@turck.com
http://www.turck.at

BELARUS
FEK Company
Pushkin ave, 29-B,
Minsk, Belarus, 220015
Tel: +375 17 210 21 89
Fax: +375 17 210 21 89
email: info@fek.by
http://www.fek.by

BELGIUM
Banner Engineering EMEA
Park Lane
Cullinganlaan 2F
Diegem
B-1831
Tel: 32-2-456-07-80
Fax: 32-2-456-07-89
email: mail@bannerengineering.com
http://www.bannerengineering.com/eu

Multiprox N.V.
Lion d'Orweg, 12
B-9300 Aalst
Tel: 32-53-766 566
Fax: 32-53-783 977
email: mail@multiprox.be
http://www.multiprox.be

BULGARIA
Sensomat Ltd.
VH V, App 11
Dr. Ivan Penakov Str. 15
BG-9300 Dobrich
Tel: 359 58 603 023
Fax: 359 58 603 033
email: info@sensomat.info
http://www.sensomat.info

Semsomat Ltd.
9300-Dobrich
Ul.Stratsin 4, vh.A, app.1
P.O.B. 116
Tel: 359 888 403 570
email: info@sensomat.info
http://www.sensomat.info

CZECH REPUBLIC
Turck s.r.o.
Hradecká 1151
CZ-50003 Hradec Králové 3
Tel: 420-495-518-766
Fax: 420-495-518-767
email: turck-cz@turck.com
http://www.turck.com

DENMARK
Hans Folsgaard AS
Theilgaards Torv 1
DK - 4600 Koge
Tel: 45-43-20-86-00
Fax: 45-43-96-88-55
email: hf@hf.net
http://www.hf.net

ESTONIA
Osaühing System Test
Pirita tee 20
EE-10127 Tallinn
Tel: 372-6-405-423
Fax: 372-6-405-422
email: systemtest@systemtest.ee
http//www.systemtest.ee

FINLAND
Sarlin Oy Ab
Kaivokselantie 3-5, 01610 Vantaa
PL 750, 00101 Helsinki
Tel: +358 (0)10 550 4000
Fax: 358 (0)10-550-4201
email: sales.automation@sarlin.com
http://www.sarlin.com

FRANCE
Turck Banner S.A.S.
3, Rue de Courtalin
Magny - Le - Hongre
77703 Marne - La - Vallée Cedex 4
Tel: 33-1-60-43-60-70
Fax: 33-1-60-43-10-18
email: info@turckbanner.fr
http://www.turckbanner.fr

GERMANY
Hans Turck GmbH & Co KG
Witzlebenstrasse 7
45472 Mülheim an der Ruhr
Tel: 49-208-49-520
Fax: 49-208-49-52-264
email: more@turck.com
http://www.turck.com

GREECE
2KAPPA Ltd.
Stadiou 40
57009 Thessaloniki (Kalohori)
Tel: +30 2310 775512
Fax: +30 2310 775514
email: info@2kappa.gr
http://www.2kappa.gr

HUNGARY
Turck Hungary Kft.
Neumann János u. 1 / E.
1117 Budapest
Tel: 36-1-477-0740
Fax: 36-1-477-0741
email: turck@turck.hu
http://www.turck.hu

ICELAND
K M Stál ehf.
Bíldshöfða 16
110 Reykjavik
Tel: 354-56-78-939
Fax: 354-56-78-938
email: kalli@kmstal.is
http://www.kmstal.is

IRELAND
Tektron
Tramore House
Tramore Road
Cork
Tel: 353 21-4313331
Fax: 353-21-4313371
email: sales@tektron.ie
http://www.tektron.ie

ITALY
Turck Banner s.r.l.
Via San Domenico, 5
20010 Bareggio
Milano
Tel: 39 2 90 36 42 91
Fax: 39-2-90 36 48 38
email: info@turckbanner.it
http://www.turckbanner.it

KAZAKHSTAN
Turck Rus OOO
Altufyevskoe Shosse 1/7
Moscow 127106
Tel: 7-495-2342661
Fax: 7-495-2352665
email: russia@turck.com
http://www.www.turck.ru

LITHUANIA
Hidroteka
Chemijos g. 29E
LT-51333 Kaunas
Tel: 370-37 352195
Fax: 370-37-760500
email: hidroteka@hidroteka.lt
http://www.hidroteka.lt

NETHERLANDS/HOLLAND
Turck B.V.
Ruiterlaan 7
NL-8019 BN Zwolle
Tel: 31-38-42-27-750
Fax: 31-38-42-27-451
email: info@turck.nl
http://www.turck.nl

NORWAY
Danyko A.S.
Bark Silas Vei 8
4876 Grimstad
Tel: 47-37 090 940
Fax: 47-37 090 941
email: danyko@hf.net
http://www.hf.net

POLAND
Turck Sp. z o.o.
ul. Wroclawska 115
45-836 Opole
Tel: 48-77 443 48 00
Fax: 48-77 443 48 01
email: poland@turck.com
http://www.turck.pl

PORTUGAL
Bresimar Automação
Quinta do Simao- EN109
Esqueira Apartado 3080
Aveiro 3801-101
Tel: 351 234 303 320 x 25
Fax: 351-234-303-328/9
email: comercial@bresimar.pt
http://www. bresimar.pt

ROMANIA
TURCK Automation Romania SRL
Str. Siriului nr. 6-8
RO-014354 Bucharest
Tel: 40-21-230 02 79
Fax: 40-21-231 40 87
email: romania@turck.com
http://www.turck.ro

RUSSIA AND CIS
Turck Rus OOO
Altufyevskoe Shosse 1/7
Moscow 127106
Tel: +7 4952342661
Fax: +7 4952342665
email: russia@turk.com
http://www.turk.ru

Turck Rus OOO
192012, Saint-Petersburg
prospect Obuxovskoi oboroni
dom 271 lit. A, office 1007
Tel: +7-812-6333509
email: andrey.papsuev@turk.com

SLOVAKIA
Marpex, s.r.o.
Športovcov 672
018 41 Dubnica nad Váhom
Tel: +421 42 44269 86
Fax: 421 42 44400 10-11
email: marpex@marpex.sk
http://www.marpex.sk

SPAIN
Elion, S.A.
Farell, 5
E-08014 Barcelona
Tel: 34-932-982-000
Fax: 34-934-311-800
email: elion@elion.es
http://www.elion.es

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

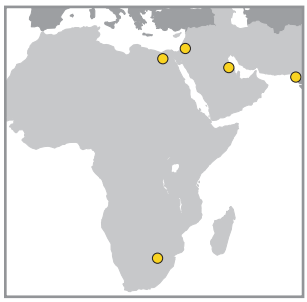
SWEDEN
Turck Sweden
EA Rosengrensgata 32
421 31 Västra Frölunda
Tel: 46 10 447 16 00
Fax: 46 10 447 16 20
email: sweden@turck.com
http://www.turck.se

SWITZERLAND
Bachofen AG
Ackerstrasse 42
8610 Uster
Tel: 41 44 944 11 11
Fax: 41 44 944 12 33
email: info@bachofen.ch
http://www.bachofen.ch

TURKEY
Banner Engineering Turkey
Barbaros Mah. UpHill Court
Towers A Blok D:49
Bati Atasehir - Istanbul, Turkey
Tel: 90 216 688 8282
Fax: 90 216 688 8181
email: turkey@bannereng.com.tr
http://www.bannerengineering.com.tr

UNITED KINGDOM
Turck Banner Ltd.
Blenheim House
Hurricane Way, Wickford
Essex SS11 8YT
Tel: 44-1268-578888
Fax: 44-1268-763648
email: info@turckbanner.co.uk
http://www.turckbanner.co.uk

Africa and Middle East



EGYPT
Electric Technology A.R.E.
5 Fawzy Moaaz Street
Alexandria, Semouha
Tel: 20-2-03-4248224
Fax: 20-2-03-4248522
email: electech@electech.com.eg
http://www.electech.com.eg

ISRAEL
Zivan LTD.
34 Batzri Street
P.O.Box 49
28100 Kiriat Ata
Tel: 972 4 8729 822
Fax: 972 4 8726 627
email: info@zivan.co.il
http://www.zivan.co.il

REP. OF SOUTH AFRICA
RET Automation Controls Pty. Ltd.
P.O. Box 8378
Edenglen 1613
Tel: 27-11-453 24 68
Fax: 27-11-453 24 06
email: info@retautomation.com
http://www.retautomation.com

SAUDI ARABIA
M.H. Sherbiny for Commerce
P.O. Box 3082
Alkhobar 31952
Tel: 966-3-89-44-298
Fax: 966-3-86-47-278
email: sales@sherbinyforcommerce.com
http://www.sherbinyforcommerce.com

KUWAIT
Kana Controls General Trading & Contracting Co. W.I.I.
Plot 28-30, Street No. 31,
Al-Rai Industrial Acre,
P.O. Box 25593, Safat 13116
Tel: 965-24741373
Fax: 965-24751437
email: info@kanacontrols.com
http://www.kanacontrols.com

LEBANON
itec INDUSTRIAL TECHNOLOGIES
Afrah Plaza Center,
Blvd. Fouad Chehab
Sin El Fil, Beirut
Tel: 961 1 491161
Fax: 961 1 491162
email: info@Iteclb.com
http://www.iteclb.com

UNITED ARAB EMIRATES
PCM FZC ME
X3-39 Saif Zone
Sharjah
Tel: 971-(0)6-5573351
http://www.pcmfzc.com

Sasco International Trading L.L.C.
Behind Al Ameer School
Al Jerf, Warehouse No. 1
Street No. 8
Ajman
Tel: 971 (0)6 7485482

Australia and New Zealand



AUSTRALIA
Micromax Sensors and Automation Pty Ltd (Headquarters)
Unit 2, 106-110 Beaconsfield Street
Silverwater NSW 2128
Tel: 1300 362 626 (National),
+61 287482800 (International)
Fax: 1300 017 100 (National),
+61296483245 (International)
email: info@micromaxsa.com.au
http://www.micromaxsa.com.au

Adelaide Office
Suite 1B, 267 Melbourne Street
North Adelaide SA 5006
email: orders@micromaxsa.com.au

Brisbane Office
2 / 35 Ethel Street
Yeerongpilly QLD 4105
email: orders@micromaxsa.com.au

Melbourne Office
Unit 117, 87 Turner Street
Port Melbourne VIC 3207
email: orders@micromaxsa.com.au

Perth Office
Unit 4, 765 Marshall Road
Malaga WA 6090
email: orders@micromaxsa.com.au

Wollongong Office
5 Orangegrove Ave
Unanderra NSW 2526
email: orders@micromaxsa.com.au

NEW ZEALAND
CSE-W. Arthur Fisher Ltd.
15 Polaris Place
East Tamaki, 2013
Auckland
Tel: 64-9-271 3810
Fax: 64-9 265 1362
email: sales@cse-waf.co.nz
http://www.cse-waf.co.nz

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Asia



CORPORATE OFFICE:

Banner Engineering China – Shanghai Rep Office
Xinlian Scientific Research Building
Level 12, Building 2
1535 Hongmei Road
Shanghai 200233
Tel: 86 21 24226888
Fax: 86 21 24226999
email: sensors@bannerengineering.com.cn
http://www.bannerengineering.com.cn

Banner Engineering India – Pune Head Office
Office No. 1001, 10th Floor
Sai Capital, Opp. ICC
Senapati Bapat Road
Pune 411016
Tel: 91 (0)20 66405624
Fax: 91 (0)20-66405623
email: salesindia@bannerengineering.com
http://www.bannerengineering.co.in

Banner Engineering Japan
Cent-Urban Building 305
3-23-15 Nishi-Nakajima
Yodogawa-Ku, Osaka 532-0011
Tel: 81 (0)6 6309 0411
Fax: 81-(0)6-6309-0416
email: mail@bannerengineering.co.jp
http://www.bannerengineering.co.jp

Banner Engineering Korea
8th Fl., CM Bldg, 32-7, Songpa-Dong
Songpa-Gu, Seoul 138-849
Tel: 82 (0)2 417 0285
Fax: 82 (0)2 413 0285
email: info@bannerengineering.co.kr
http://www.bannerengineering.co.kr

Banner Engineering Taiwan
8F-2, No. 308
Section 1, Neihu Road
Taipei 114
Tel: 886 (0)2 8751 9966
Fax: 886-2-8751-2966
email: info@bannerengineering.com.tw
http://www.bannerengineering.com.tw

CHINA

Banner Engineering Shanghai Rep Office
Xinlian Scientific Research Building
Level 12, Building 2
1535 Hongmei Road
Shanghai 200233
Tel: +86 21 24226888
Fax: +86 21 24226999
email: sensors@bannerengineering.com.cn
http://www.bannerengineering.com.cn

Banner Engineering Beijing
Rm 11C2, Tower 2, Xihuan Plaza
No.1, Xiwai Street, Xicheng District
Beijing 100044
Tel: 86-10-58301588/58301565
Fax: 86-10-58301566
email: sensors@bannerengineering.com.cn
http://www.bannerengineering.com.cn

Banner Engineering Chengdu
Rm. D-1, 14th Flr., Chuanxin Mansion
No.18, Sec.2, Renming South Rd.
Chengdu 610016
Tel: 86-28-86200616
Fax: 86-28-86200618
email: sensors@bannerengineering.com.cn
http://www.bannerengineering.com.cn

Banner Engineering Guangzhou
Room 2607/08
Huapu Plaza
No. 9 Huaming Road
Pearl River New City, Tianhe District
Guangzhou 510623
Tel: 86-20-28865171
Fax: 86-20-28865175
email: sensors@bannerengineering.com.cn
http://www.bannerengineering.com.cn

Banner Engineering Nanjing
Rm. B12, Flr. 10, New Century Plaza
No. 288 ZhongShan (E) Rd
Nanjing 210009
Tel: 86-25-86895893
Fax: 86-25-86895893
email: sensors@bannerengineering.com.cn
http://www.bannerengineering.com.cn

Banner Engineering Tianjin
Rm.15DE, Tower B,
Pingan Building
No.59, Machang Road
Hexi District, Tianjin
300203
Tel: 86-22-58852651
Fax: 86-22-58852652
email: sensors@bannerengineering.com.cn
http://www.bannerengineering.com.cn

Banner Engineering Shenzhen
Rm. 17ST, Building A, Fortune Plaza,
No. 7060 ShenNan Road
Shenzhen
Tel: 86-755-83022293
Fax: 86-755-83022291
email: sensors@bannerengineering.com.cn
http://www.bannerengineering.com.cn

Banner Engineering Suzhou
Building 49
Chuangtou District
He Shun Road, North of Loufeng
Suzhou Industry Park, Suzhou 215122
Tel: +86 512 6274 5997
Fax: +86 512 6274 5993
email: sensors@bannerengineering.com.cn
http://www.bannerengineering.com.cn

Banner Engineering Qingdao
Rm. 503A, Tower C, Tiantai Financial Plaza
No. 222 Shenzhen Road, Laoshan District
Qingdao 266061
Tel: 86-532-86128366
Fax: 86-532-86128369
email: sensors@bannerengineering.com.cn
http://www.bannerengineering.com.cn

Banner Engineering Shenyang
Rm 1310, HuFuTianDi Building, No.1
TuanJie Rd No.7-1, Shenyang District
Shenyang
Tel: 86-024-22598290/8291
Fax: 86-024-22598290/8291-804
email: sensors@bannerengineering.com.cn
http://www.bannerengineering.com.cn

Banner Engineering Wuhan
Room B1606, ZhongNan Intl City Building
Wuluo Road No.442, Wuchang District
Wuhan (430070)
Tel: 86-027-87737951/2/3
Fax: 86-027-87737950
email: sensors@bannerengineering.com.cn
http://www.bannerengineering.com.cn

Banner Engineering Wuxi
Rm. 1816, Wanda Plaza
No. 37 LiangXi Rd
Wuxi 214062
Tel: 86 510 85863056
Fax: 86 510 85863065
email: sensors@bannerengineering.com.cn
http://www.bannerengineering.com.cn

Banner Engineering Changsha
Rm. 1915, Unit 3, Block 11, JunYue Bldg
No. 19 WuJiaLing Rd
Changsha 410008
Tel: 86 731 84135195
Fax: 86 731 84130660
email: sensors@bannerengineering.com.cn
http://www.bannerengineering.com.cn

HONG KONG

Banner Engineering Hong Kong
Rm. 17ST, Building A, Fortune Plaza
No. 7060 ShenNan Rd
Shenzhen
Tel: 86-755-83022293
Fax: 86-755-83022291
email: sensors@bannerengineering.com.cn
http:/www.bannerengineering.com.cn

INDIA

Banner Engineering India Pvt. Ltd.
Office No. 1001, 10th floor,
Sai Capital, Opp. ICC
Senapati Bapat Road
Pune 411016
Tel: 91-(0)20-66405624
Fax: 91-(0)20-66405623
email: salesindia@bannerengineering.com
http://www.bannerengineering.co.in

Banner Engineering India – South
3rd Floor, Ashika Chambers, 22
Chamiers Road
Nandanam Chennai – 18
Tamil Nadu
Tel: 91-(0)9382105073
Fax: 91-(0)20-66405623
email: salesindia@bannerengineering.com
http://www.bannerengineering.co.in

Banner Engineering India - North
Office No 411, 4th Floor,
DLF Galleria Complex, DLF Enclave,
Gurgoan, Haryana 122001
Tel: 91 (0)9311141856
Fax: 91 (0)20-66405623
email: salesindia@bannerengineering.com
http://www.bannerengineering.co.in

Banner Engineering India – Mumbai
601, Raheja Arcade
Sector 11, CBD Belapur
Navi Mumbai - 400 614
Tel: 91-(0)22-41235303
Fax: 91-(0)20-66405623
email: salesindia@bannerengineering.com
http://www.bannerengineering.co.in

Banner Engineering India – Ahmedabad
24, third Floor, Advait complex,
Near Sandess Press,
Bodakdev, Ahmedabad - 380 054
Tel: 91 (0)9377643699
email: salesindia@bannerengineering.com
http://www.bannerengineering.co.in

INDONESIA

Pt. Unitama Sentosa Gemilang
Kompleks Permata Ancol Blok N, no. 32
Jl. R.E. Martadinata
Jakarta Utara 14420
Tel: 62-21-645-1132
Fax: 62-21-645-1130
email: sales@unitama.co.id
http://www.unitama.co.id

PT. RFID Indonesia
Mediterannia Lagoon #A-01-H
Jl. Puma 1
Kemayoran, Jakarta Pusat
10630
Tel: 62 21 9281 9968
Fax: 62 21 3004 4683
http://www.rfid-indonesia.com

JAPAN

Banner Engineering Japan
Cent-Urban Building 305
3-23-15 Nishi-Nakajima
Yodogawa-Ku, Osaka 532-0011
Tel: 81-6-6309-0411
Fax: 81-6-6309-0416
email: mail@bannerengineering.co.jp
http://www.bannerengineering.co.jp

Japan Machinery Company
Nakajima Shoji Building 8F
8-5-6 Ginza
Chuo-ku, Tokyo 104-0061
Tel: 81-3-3573-5421
Fax: 81-3-3574-9185
email: sales@japanmachinery.com
http://www.japanmachinery.com

Koyo Electronics Industries Co.
1-171 Tenjin-cho
Kodaira, Tokyo 187-0004
Tel: 81-42-341-3114
Fax: 81-42-341-3118
email: sales@koyoele.co.jp
http://www.koyoele.co.jp

Morimura Brothers Inc.
Morimura Building
1-3-1 Toranomon
Minato-ku, Tokyo 105-8451
Tel: 81-3-3502-6449
Fax: 81-3-3593-3376
http://www.morimura.co.jp
email: okai@morimura.co.jp

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Aiden Corporation
Yushima Ohta Bld. 3F
29-3, 2-chome, Yushima
Bunkyo-ku, Tokyo, 113-0034
Tel: 81-3-3813-8615
Fax: 81-3-3813-8698
email: easaoka@aiden-net.co.jp
http://www.aiden-net.co.jp

PTM Corporation
Palm View Bld. 3F
306-15 Nakayama-cho
Midori-Ku, Yokohama 226-0011
Tel: 81 (0)45 938 6322
email: sales@ptm-co.jp
http://www.ptm-co.jp

KOREA

Banner Engineering Korea
8th Floor CM Bldg 32-7
Songpa-Dong
Songpa-Gu, Seoul138-849
Tel: 82 02 417 0285
Fax: 82 02 413 0285
email: info@bannerengineering.co.kr
http://www.bannerengineering.co.kr

Turck Korea
B-509 Gwangmyeong Technopark
60 Haan-Ro, Gwangmyeong-si
Gyeonggi-Do 423-795
Tel: 82 (0)2 2083 1630
Fax: 82 (0)2 2083 1639
email: sensor@sensor.co.kr
http://www.turck-korea.com

K & S Korea Co., Ltd.
306 Office A-Dong, Chungan
Circulation Complex 1258
Gurobon-Dong, Guro-Gu
Seoul 152-727
Tel: 82-22-619-0244
Fax: 82-22-619-0243
email: koyo@koyo.co.kr
http://www.koyo.co.kr

MALAYSIA

Logic Builder Sdn. Bhd.
No. 43-1, Jalan USJ 21/11
47630 UEP Subang Jaya
Selangor
Tel: 603 8023 8287
Fax: 603 8023 3237
email: kennylee@logicbuilder.com.my
http://www.logicbuilder.com.my

ASI Instrumentation (M) Sdn. Bhd.
G10, Block Dahlia 2
Jalan Zahir 6, Taman Malim Jaya
75250 Malacca
Tel: 60 (0)6 335 5229
Fax: 60 (0)6-335 9868
email: sales@asi.com.my
http://www.asi.com.my

UST Technology Pte. Ltd.
998 Toa Payoh North
#5 - 25
Singapore 318993
Tel: 65-6252-2272
Fax: 65-6253-8773
email: info@ust.com.sg
http://www.ust.com.sg

PAKISTAN

Sunshine Corporation
5/12, Rimpa Plaza (Office Tower)
M.A.Jinnah Road
Karachi-74400
Tel: 92-21-32733289
Fax: 92-21-32734167
email: faisal@sunshine.com.pk
http:// www.sunshine.com.pk/industrial.htm

PHILIPPINES

UST Technology Pte. Ltd.
998 Toa Payoh North
#5 - 25
Singapore 318993
Tel: 65-6252-2272
Fax: 65-6253-8773
email: info@ust.com.sg
http://www.ust.com.sg

SINGAPORE

UST Technology Pte. Ltd.
998 Toa Payoh North
#5 - 25
Singapore 318993
Tel: 65-6252-2272
Fax: 65-6253-8773
email: info@ust.com.sg
http://www.ust.com.sg

TURCK Singapore Pte. Ltd.
25 International Business Park
#03-22/23 German Centre 609916
Tel: 65-6562-8716
Fax: 65-6562-8719
Email: alex.wong@turck.com
http://www.turck.com.sg

Powermatic Singapore
Block 26 Sin Ming Lane
#03-115
Midview City
573971
Tel: 65-6659-8638
http://www.powermatic.net

SRI LANKA

I.Q. Systems (PVT) Ltd.
35A 1/1, Sunethradevi Road
Kohuwala, Nugegoda
Tel: 0094-112-769-969
Fax: 0094-112-826-807
email: sales@iqsystems.lk or
iqsystems@itmin.net

TAIWAN

Banner Engineering Taiwan
8F-2, No. 308
Section 1, Neihu Road
Taipei 114
Tel: 886-2-8751-9966
Fax: 886-2-8751-2966
email: info@bannerengineering.com.tw
http://www.bannerengineering.com.tw

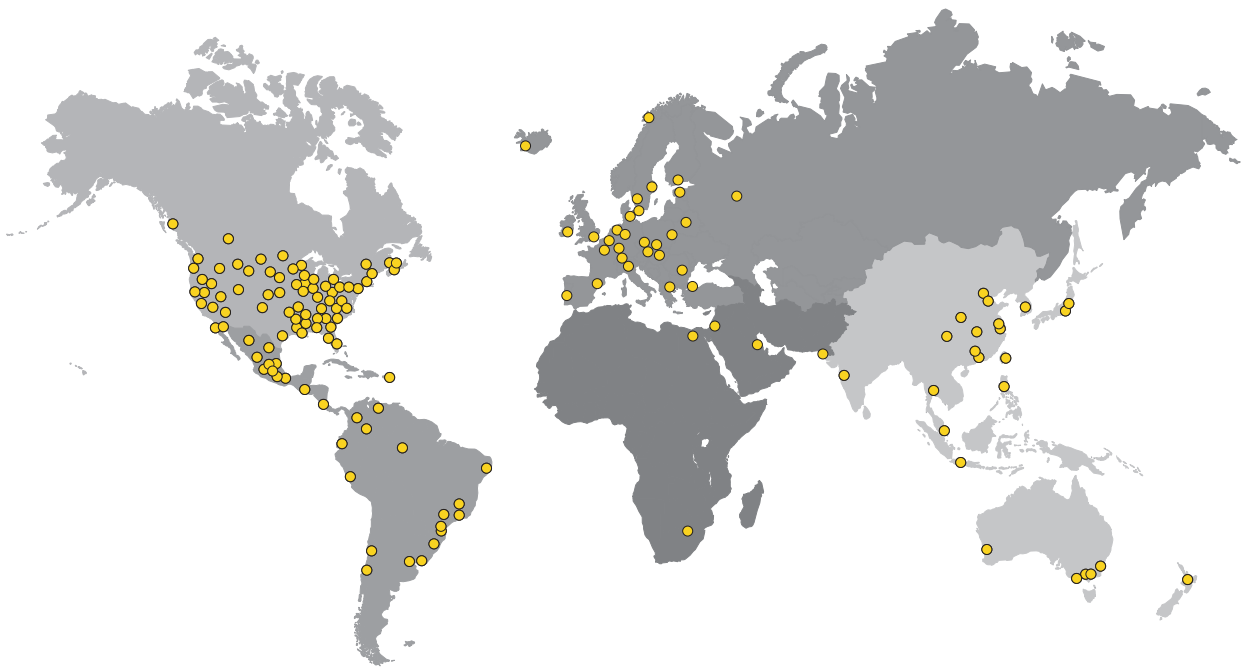
THAILAND

Compomax Company Limited
16 Soi Ekamai 4, Sukhumvit 63 Rd.
Prakanongnua, Vadhana
Bangkok 10110
Tel: 66-2-1050-555
Fax: 66-2-1050-556
email: info@compomax.co.th
http://www.compomax.co.th

VIETNAM

Hiep Luc Electrical Technology Company
32/1 Le Van Huan St
Ward 13, Tan Binh District
Ho Chi Minh City 70000
Tel: 84 8 6297 4701
Fax: 84 8 6297 4704
email: dienhiepluc@vnn.vn
http://www.dhlvn.com

Sistech Co., Ltd.
55/14 Le Thi Hong Gam Str.
Dist. 1
Ho Chi Minh City
Tel: 84 8 3914 3632
Fax: 84 8 3914 0389
email: info@sistech.com.vn
http://www.sistech.com.vn



Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

INDEX

Model Number	Page
11-BG00-31-A12060	972
11-BG00-31-D-024	972
11-BGX10-40	972
11-BGX77-048	972
11-BGX77-240	972
11-G318-48	972
11-G484-30	972
45LM58	89
45LM58D	89
45LMD	89
A	
AG4-4E	711
AG4-6E	711
AG4-MBK1	899
AP18SC	967
AP18SCN	967
AP18SR	967
AP18SRN	967
AP31-020	966
AP31-020H	966
AP31-020V	966
AP31-040	966
AP31-040H	966
AP31-040V	966
AP31-100	966
AP31-100H	966
AP31-100V	966
AP31-200H	966
AP31-200V	966
AP31-DVHX2	966
APG18S	967
APKQ12	967
APK-Q20	966
APQ12-.5	967
APQ12-.5H	967
APQ12-.5V	967
APQ12-1	967
APQ12-1.5	967
APQ12-1H	967
APQ12-1V	967
APQ12-2	967
APQ12-4S	967
APQ20-0.5	966
APQ20-0.5V	966
APQ20-1	966
APQ20-1V	966
APQ20-2	966
APQ20-2V	966
APQS18-020	966
APQS18-020H	966
APQS18-020V	966
APQS18-040	966
APQS18-040H	966
APQS18-040V	966
APQS18-100	966
APQS18-100H	966
APQS18-100V	966
APQS18-DVHX2	966
APQS30-040	967
APQS30-040H	967
APQS30-040V	967
APQS30-100	967
APQS30-100H	967
APQS30-100V	967
APQS30-200	967
APQS30-200H	967
APQS30-200V	967
APQS30-DVHX2	967
APVS2-0204	967
APVS2-02R	967
APVS2-04R	967
APVS2-0608	967
AT-FM-10K	834
AT-GM-13A	834
ATGMK-VP6	835
ATGMK-VP6Q	835
ATGMK-VP6Q5	835
AT-HM-13A	834
ATHMK-VP6	835
ATHMK-VP6Q	835
ATHMK-VP6Q5	835
ATK-VP6	835
ATK-VP6Q	835
ATK-VP6Q5	835
B	
BA1.53SMETA	311
BA1.53SMTA	311
BA23S	310
BAM.752S	310
BAT16.6ST5MTA	293
BAT23S	310
BF1801A-12060	972
BF1801L-024	972
BF23P	310
BFX77-240	972
BM.752S	310
BMEL1216A	386
BMEL1232A	387
BMEL1816A	386
BMEL1832A	387
BMEL2416A	386
BMEL2432A	387
BMEL3016A	386
BMEL3032A	387
BMEL3616A	386
BMEL3632A	387
BMEL4216A	386
BMEL4232A	387
BMEL4816A	386
BMEL4832A	387
BMEL6016A	386
BMEL6032A	387
BMEL616A	386
BMEL632A	387
BMEL7216A	386
BMEL7232A	387
BMHE4A/BMHL4G	961
BMHE4SS/BMHL4GSS	961
BMHE4SSN/BMHL4GSSN	961
BMHE5A/BMHL5G	961
BMHE5SS/BMHL5GSS	961
BMHE5SSN/BMHL5GSSN	961
BMHE6A/BMHL6G	961
BMHE6SS/BMHL6GSS	961
BMHE6SSN/BMHL6GSSN	961
BMHPS14	969
BMHPS15	969
BMHPS16	969
BMHPS4	969
BMHPS5	969
BMHPS6	969
BMP.753P	310
BMRL1216A	386
BMRL1232A	387
BMRL1816A	386
BMRL1832A	387
BMRL2416A	386
BMRL2432A	387
BMRL3016A	386
BMRL3032A	387
BMRL3616A	386
BMRL3632A	387
BMRL4216A	386
BMRL4232A	387
BMRL4816A	386
BMRL4832A	387
BMRL6016A	386
BMRL6032A	387
BMRL616A	386
BMRL632A	387
BMRL7216A	386
BMRL7232A	387
BMT.442P	310
BMT13SMVF	295
BMT16.6S-HT	293
BR2.53S	311
BR23S	311
BRT-T-100CC	952
BRT-THG-1-100	952
BRT-THG-18X36	952
BRT-THG-2-100	952
BRT-THG-3-100	952
BRT-THG-3X3-10	952
BRT-THG-4X4-5	952
BRT-THG-8.5X11-2	952
BRT-THT-100	952
BRT-TVHG-2X2	952
BRT-TVHG-8X10P	952
BT-1	966
BT13.5ST5	293
BT23S	310
BTA23S	310
BTETA1.53S	311
C	
CL50GXXNQ	564
D	
D10AFP	270
D10AFPG	270
D10AFPGQ	270
D10AFPGY	270
D10AFPGYQ	270
D10AFPQ	270
D10AFPY	270
D10AFPYQ	270
D10B2NFP	270
D10B2PFP	270
D10B5FP	270
D10BFP	270
D10BFPG	270
D10BFPGQ	270
D10BFPQ	270
D10DNCFP	271
D10DNCFPQ	271
D10DNFP	269
D10DNFPG	269
D10DNFPGQ	269
D10DNFPQ	269
D10DPCFP	271
D10DPCFPQ	271
D10DPFP	269
D10DPFPG	269
D10DPFPGQ	269
D10DPFPQ	269
D10INFP	269
D10INFPG	269
D10INFPGQ	269
D10INFPQ	269
D10IPFP	269
D10IPFPG	269
D10IPFPGQ	269
D10IPFPQ	269
D10UNFP	269
D10UNFPG	269
D10UNFPGQ	269
D10UNFPQ	269
D10UPFP	269
D10UPFPG	269
D10UPFPGQ	269
D10UPFPQ	269
D12DAB6FP	279
D12DAB6FPQ	279
D12DAB6FV	279
D12DAB6FVQ	279
D12E2N6FP	278
D12E2N6FV	278
D12E2P6FP	278
D12E2P6FV	278
D12EN6FP	278
D12EN6FV	278
D12EP6FP	278
D12EP6FV	278
D12SN6FP	279
D12SN6FPH	279
D12SN6FPHQ	279
D12SN6FPQ	279
D12SN6FPY	279
D12SN6FPY1	279
D12SN6FPY1Q	279
D12SN6FPYQ	279
D12SN6FV	279
D12SN6FVQ	279
D12SN6FVY	279
D12SN6FVY1	279
D12SN6FVY1Q	279
D12SN6FVYQ	279
D12SP6FP	279
D12SP6FPH	279
D12SP6FPHQ	279
D12SP6FPQ	279
D12SP6FPY	279
D12SP6FPY1	279
D12SP6FPY1Q	279
D12SP6FPYQ	279
D12SP6FV	279
D12SP6FVQ	279
D12SP6FVY	279
D12SP6FVY1	279
D12SP6FVY1Q	279
D12SP6FVYQ	279
DBQ5	968

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Model Number	Page
DF-G1-KS-2M	260
DF-G1-KS-Q5	260
DF-G1-KS-Q7	260
DF-G1-NR-2M	260
DF-G1-NR-Q7	260
DF-G1-NS-2M	260
DF-G1-NS-Q7	260
DF-G1-PR-2M	260
DF-G1-PR-Q7	260
DF-G1-PS-2M	260
DF-G1-PS-Q7	260
DIN-35...	854
DVFT-2.ONWQ50	295
DX80ER2M-H	664
DX80ER9M-H	664
DX80G2M6-B2Q	657
DX80G2M6-B2Q	658
DX80G2M6-Q	657
DX80G2M6-Q	658
DX80G2M6-QC	657
DX80G2M6-QC	658
DX80G2M6S-PB2	660
DX80G2M6S-PM2	654
DX80G2M6S-PM8	655
DX80G9M6S-PB2	660
DX80G9M6S-PM2	654
DX80N2Q45BL-RG	658
DX80N2Q45CV	93
DX80N2Q45D	92
DX80N2Q45F	93
DX80N2Q45LP	92
DX80N2Q45-RD	657
DX80N2X6S-PB2	660
DX80N2X6S-PM2	654
DX80N2X6S-PM8	655
DX80N2X6S-PM8L	655
DX80N9X6S-PB2	660
DX80N9X6S-PM2	654
DX80N9X6S-PM8	655
DX80N9X6S-PM8	655
DX80N9X6S-PM8L	655
DX80SR2M-H	662
DX80SR9M-H	662
DXER9	666
E	
EA5E1050Q	382
EA5E1050Q	382
EA5E1200Q	382
EA5E1200Q	382
EA5E1500Q	382
EA5E1500Q	382
EA5E150Q	382

Model Number	Page
EA5E150Q	382
EA5E1800Q	382
EA5E1800Q	382
EA5E2100Q	382
EA5E2100Q	382
EA5E2400Q	382
EA5E2400Q	382
EA5E300Q	382
EA5E300Q	382
EA5E450Q	382
EA5E450Q	382
EA5E600Q	382
EA5E600Q	382
EA5E750Q	382
EA5E750Q	382
EA5E900Q	382
EA5E900Q	382
EA5R1050NIXMODQ	382
EA5R1050NUXMODQ	382
EA5R1050PIXMODQ	382
EA5R1050PUXMODQ	382
EA5R1050XKQ	382
EA5R1200NIXMODQ	382
EA5R1200NUXMODQ	382
EA5R1200PIXMODQ	382
EA5R1200PUXMODQ	382
EA5R1200XKQ	382
EA5R1500NIXMODQ	382
EA5R1500NUXMODQ	382
EA5R1500PIXMODQ	382
EA5R1500PUXMODQ	382
EA5R1500XKQ	382
EA5R150NIXMODQ	382
EA5R150NUXMODQ	382
EA5R150PIXMODQ	382
EA5R150PUXMODQ	382
EA5R150XKQ	382
EA5R1800NIXMODQ	382
EA5R1800NUXMODQ	382
EA5R1800PIXMODQ	382
EA5R1800PUXMODQ	382
EA5R1800XKQ	382
EA5R2100NIXMODQ	382
EA5R2100NUXMODQ	382
EA5R2100PIXMODQ	382
EA5R2100PUXMODQ	382
EA5R2100XKQ	382
EA5R2400NIXMODQ	382
EA5R2400NUXMODQ	382
EA5R2400PIXMODQ	382
EA5R2400PUXMODQ	382
EA5R2400XKQ	382

Model Number	Page
EA5R300NIXMODQ	382
EA5R300NUXMODQ	382
EA5R300PIXMODQ	382
EA5R300PUXMODQ	382
EA5R300XKQ	382
EA5R450NIXMODQ	382
EA5R450NUXMODQ	382
EA5R450PIXMODQ	382
EA5R450PUXMODQ	382
EA5R450XKQ	382
EA5R600NIXMODQ	382
EA5R600NUXMODQ	382
EA5R600PIXMODQ	382
EA5R600PUXMODQ	382
EA5R600XKQ	382
EA5R750NIXMODQ	382
EA5R750NUXMODQ	382
EA5R750PIXMODQ	382
EA5R750PUXMODQ	382
EA5R750XKQ	382
EA5R900NIXMODQ	382
EA5R900NUXMODQ	382
EA5R900PIXMODQ	382
EA5R900PUXMODQ	382
EA5R900XKQ	382
ED9Z-GH1	901
EM-F-7G	830
EM-FD-7G2	830
EM-FD-7G3	830
EM-FD-7G4	830
EM-T-7A	830
ES-FA-11AA	812
ES-FA-6G	812
ES-FA-9AA	812
ESL-41/60-10	725
ESL-41/60-10	732
ESL-41/60-ENES-10	725
ESL-41/60-ENES-10	732
ESL-44/70-10	725
ESL-44/70-10	732
ES-UA-5A	812
ES-VA-5A	812
EZAC-E-QE5	971
EZAC-E-QE5-QS5	971
EZAC-E-QE8	971
EZAC-E-QE8-QS3	971
EZAC-R10N-QE8-QS53	971
EZAC-R11-QE8	971
EZAC-R15A-QE8-QS83	971
EZAC-R8N-QE8-QS53	971
EZAC-R9-QE8	971
EZA-LAT-1	965

Model Number	Page
EZA-LAT-2	965
EZA-MBK-1	894
EZA-MBK-11	894
EZA-MBK-12	894
EZA-MBK-2	894
EZA-MBK-20	895
EZA-MBK-21	895
EZA-MBK-3	895
EZA-MBK-4	895
EZA-MBK-5	896
EZA-MBK-9	896
EZA-S300	959
EZA-S300-M	959
EZA-S400	959
EZA-S400-M	959
EZA-S500	960
EZA-S500-M	960
EZA-S500-M45	960
EZA-S533	960
EZA-S533-M	960
EZA-S584	960
EZA-S584-M	960
EZA-S584-M45	960
EZA-TE-1050	958
EZA-TE-1200	958
EZA-TE-1350	958
EZA-TE-150	958
EZA-TE-1500	958
EZA-TE-1650	958
EZA-TE-1800	958
EZA-TE-300	958
EZA-TE-450	958
EZA-TE-600	958
EZA-TE-750	958
EZA-TE-900	958
EZA-USB485-01	969
EZS-1050	963
EZS-1084	964
EZS-1200	963
EZS-1251	964
EZS-1350	963
EZS-149	964
EZS-150	962
EZS-1500	963
EZS-150EA	962
EZS-1650	963
EZS-1800	963
EZS-300	962
EZS-450	962
EZS-600	962
EZS-684	964
EZS-750	962

Model Number	Page
EZS-768	964
EZS-900	962
EZS-984	964
EZSS-1050	963
EZSS-1200	963
EZSS-1350	963
EZSS-150	962
EZSS-1500	963
EZSS-150EA	962
EZSS-1650	963
EZSS-1800	963
EZSS-2100	963
EZSS-2400	963
EZSS-300	962
EZSS-450	962
EZSS-600	962
EZSS-750	962
EZSS-900	962
F	
FLX18-1212	553
FLX18-12M30	553
FLX18-DM30	553
FLX18-F12	553
FLX18-FM30	553
G	
GM-FA-10J	812
H	
HFFB12AC	525
HFFB12ACR	525
HFFB12DC	525
HFFB8AC110	525
HFFB8AC230	525
HFFB8ACR	525
HFFB8DC	525
HFFW12AC	525
HFFW12ACR	525
HFFW12DC	525
HFFW14DC	525
HFFW15AC110	525
HFFW15AC230	525
HFFW15ACR	525
HFFW24AC	525
HFFW24ACR	525
HFFW36AC	525
HFFW36ACR	525
HFFW48AC	525
HFFW48ACR	525
HFFW8AC110	525
HFFW8AC230	525
HFFW8ACR	525
HFFW8DC	525
HVFT-1.5NWQ40	295

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Model Number	Page
I	
IA.31.7ST5ETA	293
IA.82.5PT5	293
IA.83.3ST5ETA	293
IA1.53SMETA	309
IA1.53SMTA	309
IA23S	308
IAM.752S	308
IAT23S	308
IF23P	308
IM.752S	308
IMP.753P	308
IMT.442P	308
IMT.753SMVF	295
IMT.753SMVF	309
IMT.756.6S-HT	293
IM-T-11A	828
IM-T-9A	828
INTMOD485-LH	321
INTUSB485-1	969
INTUSB485-LH	321
INTUSB485-LH	969
IR2.53S	309
IR23S	309
IT23S	308
ITA23S	308
ITETA1.53S	309
IVUSIM	970
K	
K08LGRA1YPQ	597
K30LGRYA120Q	572
K30LGRYPQ	576
K30LIGRYPQ	579
K50BLGA120Q	574
K50FLGRYPQ	599
K50LDGA120Q	575
K50LDXGXPQ	575
K50LGRALSYPQ	573
K50LGRYPQ	572
K50LIGRYPQ	578
K80CLR	598
K80FDLGYRPQ	601
K80FLGYRPQ	600
K80L4GRYB1PQ	602
K80LGRYA120	596
L	
L10	311
L16F	309
L16FAL	309
L16FSS	309
L9	309
LAT-1	965
LAT1812	965
LAT-1-HD	965
LAT-1-LP	965
LAT-1-LS	965
LAT-1-SFP12	965
LAT-1-SFP30	965
LAT-1-SS	965
LAT-2	965
LAT3012	965
LC80R	970
LC80T	970
LE550I	318
LE550IQ	318
LE550IQP	318
LE550U	318
LE550UQ	318
LE550UQP	318
LEDBS50L11-XQ	523
LEDBS50L20-XQ	523
LEDBS50L5-XQ	523
LEDGS50L11-XQ	523
LEDGS50L20-XQ	523
LEDGS50L5-XQ	523
LEDIS50L14-XQ	523
LEDIS50L5-XQ	523
LEDRA70XD5-XM	516
LEDRA80X80W	517
LEDRB70X70M	518
LEDRB75X150PW2-XQ	518
LEDRI150M	524
LEDRLA290AD6-XQ	520
LEDRLA290XD6-XQ	520
LEDRLB145XW6-XQ	519
LEDRO100M	521
LEDRR80X80W	515
LEDRR90S-G	515
LEDRS50L11-XQ	523
LEDRS50L20-XQ	523
LEDRS50L5-XQ	523
LEDRSM	522
LEDUV395S50L11-XQ	523
LEDUV395S50L11-XQ	523
LEDUV395S50L5-XQ	523
LEDWS50L11-XQ	523
LEDWS50L20-XQ	523
LEDWS50L5-XQ	523
LG10A65NI	323
LG10A65NIQ	323
LG10A65NU	323
LG10A65NUQ	323
LG10A65PI	323
LG10A65PIQ	323
LG10A65PU	323
LG10A65PUQ	323
LG5A65NI	322
LG5A65NIQ	322
LG5A65NU	322
LG5A65NUQ	322
LG5A65PI	322
LG5A65PIQ	322
LG5A65PU	322
LG5A65PUQ	322
LG5B65NI	322
LG5B65NIQ	322
LG5B65NU	322
LG5B65NUQ	322
LG5B65PI	322
LG5B65PIQ	322
LG5B65PU	322
LG5B65PUQ	322
LH150IX485QP	320
LH30IX485QP	320
LH80IX485QP	320
LLG660P10A60II	524
LPA-LAT-1	965
LPA-MBK-11	896
LPA-MBK-12	896
LPA-MBK-120	897
LPA-MBK-135	897
LPA-MBK-180	897
LPA-MBK-20	897
LPA-MBK-21	898
LPA-MBK-22	898
LPA-MBK-90	898
LPA-MBK-PXXX	898
LPSS-1110	963
LPSS-1250	964
LPSS-1390	964
LPSS-1530	964
LPSS-1670	964
LPSS-1810	964
LPSS-270	963
LPSS-410	963
LPSS-550	963
LPSS-690	963
LPSS-830	963
LPSS-970	963
LSA-LAT-1	965
LSS-1050	964
LSS-1200	964
LSS-1350	964
LSS-150	964
LSS-1500	964
LSS-300	964
LSS-450	964
LSS-600	964
LSS-750	964
LSS-900	964
LT3BD	326
LT3BDLV	326
LT3BDLVQ	326
LT3BDQ	326
LT3NI	326
LT3NILV	326
LT3NILVQ	326
LT3NIQ	326
LT3NU	326
LT3NULV	326
LT3NULVQ	326
LT3NUQ	326
LT3PI	326
LT3PILV	326
LT3PILVQ	326
LT3PIQ	326
LT3PU	326
LT3PULV	326
LT3PULVQ	326
LT3PUQ	326
LT7PIDQ	330
LT7PLVQ	330
LX12E	233
LX12ESR	232
LX12R	233
LX12RSR	232
LX15E	233
LX15R	233
LX18E	233
LX18R	233
LX21E	233
LX21R	233
LX24E	233
LX24R	233
LX3E	233
LX3ESR	232
LX3R	233
LX3RSR	232
LX6E	233
LX6ESR	232
LX6R	233
LX6RSR	232
LX9E	233
LX9R	233
LXS12	964
LXS3	964
LXS6	964
M	
M12E	186
M12NFF25	187
M12NFF25Q8	187
M12NFF50	187
M12NFF50Q8	187
M12NFF75	187
M12NFF75Q8	187
M12NLP	186
M12NLPQ8	186
M12NLV	186
M12NLVQ8	186
M12NR	186
M12NRQ8	186
M12PFF25	187
M12PFF25Q8	187
M12PFF50	187
M12PFF50Q8	187
M12PFF75	187
M12PFF75Q8	187
M12PLP	186
M12PLPQ8	186
M12PLV	186
M12PLVQ8	186
M12PR	186
M12PRQ8	186
M12WQ8	186
M186E	204
M186E	450
M186EQ	204
M186EQ	450
M18GRXPQ	586
M18RGR5PNQ	973
M18SN6D	205
M18SN6D	450
M18SN6DL	205
M18SN6DL	450
M18SN6DLQ	205
M18SN6DLQ	450
M18SN6DQ	205
M18SN6DQ	450
M18SN6FF100	205
M18SN6FF100	450
M18SN6FF100Q	205
M18SN6FF100Q	450
M18SN6FF25	205
M18SN6FF25	450
M18SN6FF25Q	205
M18SN6FF25Q	450
M18SN6FF50	205
M18SN6FF50	450
M18SN6FF50Q	205
M18SN6FF50Q	450

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Model Number	Page
M18SN6L	204
M18SN6L	450
M18SN6LP	204
M18SN6LP	450
M18SN6LPQ	204
M18SN6LPQ	450
M18SN6LQ	204
M18SN6LQ	450
M18SN6R	204
M18SN6R	450
M18SN6RQ	204
M18SN6RQ	450
M18SP6D	205
M18SP6D	450
M18SP6DL	205
M18SP6DL	450
M18SP6DLQ	205
M18SP6DLQ	450
M18SP6DQ	205
M18SP6DQ	450
M18SP6FF100	205
M18SP6FF100	450
M18SP6FF100Q	205
M18SP6FF100Q	450
M18SP6FF25	205
M18SP6FF25	450
M18SP6FF25Q	205
M18SP6FF25Q	450
M18SP6FF50	205
M18SP6FF50	450
M18SP6FF50Q	205
M18SP6FF50Q	450
M18SP6L	204
M18SP6L	450
M18SP6LP	204
M18SP6LP	450
M18SP6LPQ	204
M18SP6LPQ	450
M18SP6LQ	204
M18SP6LQ	450
M18SP6R	204
M18SP6R	450
M18SP6RQ	204
M18SP6RQ	450
M18TB14	470
M18TB14Q	470
M18TB6E	470
M18TB6EQ	470
M18TB8	470
M18TB8Q	470
M18TIP14	471
M18TIP14Q	471

Model Number	Page
M18TIP6E	471
M18TIP6EQ	471
M18TIP8	471
M18TIP8Q	471
M18TUP14	471
M18TUP14Q	471
M18TUP6E	471
M18TUP6EQ	471
M18TUP8	471
M18TUP8Q	471
M25UEQ8	354
M25UEQ8	438
M25URBQ8	354
M25URBQ8	438
MAC-1	387
MAC16N-1	387
MAC16P-1	387
MACI-1	387
MACN-1	387
MACP-1	387
MACV-1	387
MAHCIN-1	393
MAHCIP-1	393
MAHCVN-1	393
MAHCVP-1	393
MAHE13A	392
MAHE19A	392
MAHE26A	392
MAHE32A	392
MAHE38A	392
MAHE45A	392
MAHE51A	392
MAHE58A	392
MAHE64A	392
MAHE6A	392
MAHE70A	392
MAHE77A	392
MAHR13A	392
MAHR19A	392
MAHR26A	392
MAHR32A	392
MAHR38A	392
MAHR45A	392
MAHR51A	392
MAHR58A	392
MAHR64A	392
MAHR6A	392
MAHR70A	392
MAHR77A	392
MI9E	120
MI9E	476
MI9EQ	120

Model Number	Page
MI9EQ	476
MIAD9CV	121
MIAD9CV	477
MIAD9CV2	121
MIAD9CV2	477
MIAD9CV2Q	121
MIAD9CV2Q	477
MIAD9CVQ	121
MIAD9CVQ	477
MIAD9D	121
MIAD9D	477
MIAD9DQ	121
MIAD9DQ	477
MIAD9F	121
MIAD9F	477
MIAD9FQ	121
MIAD9FQ	477
MIAD9LV	120
MIAD9LV	476
MIAD9LVAG	120
MIAD9LVAG	476
MIAD9LVAGQ	120
MIAD9LVAGQ	476
MIAD9LVQ	120
MIAD9LVQ	476
MIAD9R	120
MIAD9R	476
MIAD9RQ	120
MIAD9RQ	476
MIAD9W	121
MIAD9W	477
MIAD9WQ	121
MIAD9WQ	477
MMD-TA-11B	822
MMD-TA-12B	822
MSA-S105-1	953
MSA-S24-1	952
MSA-S42-1	952
MSA-S66-1	953
MSA-S84-1	953
MSA-TE-12	958
MSA-TE-20	958
MSA-TE-24	958
MSA-TE-28	958
MSA-TE-32	959
MSA-TE-36	959
MSA-TE-44	959
MSA-TE-48	959
MSA-TE-8	958
MSM12A	956
MSM16A	956
MSM20A	956

Model Number	Page
MSM24A	956
MSM28A	956
MSM32A	956
MSM36A	956
MSM40A	956
MSM44A	956
MSM48A	956
MSM4A	956
MSM8A	956
MSMB-3	878
MSMB-MSM-45	903
MSMMB	903
MSS12	963
MSS24	963
MSS36	963
MSS48	963
O	
OLM5	461
OLM8	461
OLM8M1	461
OPBA2	461
OPBA2QD	461
OPBAE	461
OPBAEQD	461
OPBB2	461
OPBB2QD	461
OPBBE	461
OPBBEQD	461
OPBT2	461
OPBT2QD	461
OPBT2QDH	461
OPBTE	461
OPBTEQD	461
OPBTEQDH	461
OSBLVAGC	460
OTBVP6QD	618
OUC-C	968
OUC-D	968
OUC-F	968
OUC-FP	968
OUC-L	968
OUC-LAG	968
P	
P12-C1	292
P22-C1	292
P32-C6	292
P4BCR-OC	408
P4D1	969
P4OR-BC	506
P4ORS-BC	507
P4RE67-G	961
P4RE67-P	961

Model Number	Page
PBAT43TMB5	300
PBAT43TMB5MTA	289
PBAT46U	301
PBAT46UHFMTA	290
PBCF46U	300
PBCFP46UMLR	295
PBCT23TMB5	289
PBCT23TMB5M4	289
PBCT23TMB5MTA	289
PBCT26U	299
PBCT26UM3	299
PBCT26UM4M2.5	299
PBCT26UMFR	299
PBCT46U	299
PBCT46UMFR	299
PBE46UTMLLP	294
PBE46UTMLLPHT1	294
PBE46UTMNL	294
PBEFP26U	300
PBF26U	299
PBF43TMB5	301
PBF46U	299
PBF46UHF	301
PBF46UM3MJ1.3	299
PBF66U	299
PBFM16U	301
PBFM1X43T5	291
PBFM46U	301
PBFM46UHF	301
PBFMP16UMP.2	301
PBP16U	301
PBP26U	299
PBP46U	299
PBP46UC	291
PBP46UHF	301
PBPF215U	300
PBPF26U	301
PBPF26UMB	301
PBPS26U	299
PBPS46U	299
PBR1X326U	300
PBRS1X326U	300
PBT16U	300
PBT26U	300
PBT26UHF	290
PBT26UHT2	293
PBT26UM6M.1	301
PBT26UMSSMFF	300
PBT415U	300
PBT43TMB5	289
PBT46U	300
PBT46UC	291

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Model Number	Page
PBT46UC	291
PBT46UHF	290
PBT66U	300
PBTP43TMB5	289
PD45VN6C100	146
PD45VN6C100Q	146
PD45VN6C200	146
PD45VN6C200Q	146
PD45VN6C300	146
PD45VN6C300Q	146
PD45VN6C50	146
PD45VN6C50Q	146
PD45VN6LLP	146
PD45VN6LLPQ	146
PD45VP6C100	146
PD45VP6C100Q	146
PD45VP6C200	146
PD45VP6C200Q	146
PD45VP6C300	146
PD45VP6C300Q	146
PD45VP6C50	146
PD45VP6C50Q	146
PD45VP6LLP	146
PD45VP6LLPQ	146
PD49VN6C100	146
PD49VN6C100Q	146
PD49VN6C200	146
PD49VN6C200Q	146
PD49VN6C300	146
PD49VN6C300Q	146
PD49VN6C50	146
PD49VN6C50Q	146
PD49VN6LLP	146
PD49VN6LLPQ	146
PD49VP6C100	146
PD49VP6C100Q	146
PD49VP6C200	146
PD49VP6C200Q	146
PD49VP6C300	146
PD49VP6C300Q	146
PD49VP6C50	146
PD49VP6C50Q	146
PD49VP6LLP	146
PD49VP6LLPQ	146
PDBF26T5	295
PDI46U-LLD	295
PDIS46UM12	288
PDISM46UM5MA	295
PFCVA-10X25-E	271
PFCVA-10X25-E	288
PFCVA-10X25-S	271
PFCVA-10X25-S	288

Model Number	Page
PFCVA-25X25-E	271
PFCVA-25X25-E	288
PFCVA-25X25-S	271
PFCVA-25X25-S	288
PFCVA-34X25-E	271
PFCVA-34X25-E	288
PFCVA-34X25-S	271
PFCVA-34X25-S	288
PIA16U	296
PIA26U	296
PIA46UHFMB8X12	297
PIA46UHFMBMPMS	290
PIAT16U	296
PIAT26U	296
PIAT43TMB5	289
PIAT46U	296
PIAT46UHF	298
PIAT46UHFMTA	290
PIAT46UM.4X.4MT	297
PIAT66U	296
PIE46UT	294
PIE66UTMNL	294
PIES46UT	294
PIF16U	298
PIF26U	296
PIF26UMLS	298
PIF43TMB5	289
PIF46U	296
PIF46UC	291
PIF46UHF	290
PIF66U	296
PIF66UM.52M.19D	298
PIF66UMVFA	295
PIFM1X46U	291
PIFM1X46U	297
PIFM46U	297
PIFM46UHF	290
PIL46U	292
PIP16U	298
PIP26U	298
PIP46U	298
PIP46UC	291
PIP46UHF	290
PIPS46U	297
PIPS66U	297
PIPS66UMSQMAP	295
PIR1X166U	288
PIRS1X166U	288
PIRS1X166UM.4	288
PIRS1X166UMP.75	288
PIRS1X166UMPM.75	298
PIRS1X166UMPMAL	288

Model Number	Page
PIT16U	297
PIT1X46U	291
PIT26U	297
PIT26UHF	290
PIT26UMFR	297
PIT415U	297
PIT43TMB5	289
PIT46U	297
PIT46UC	291
PIT46UHF	290
PIT46UHT1	293
PIT46UMFR	297
PIT615U	297
PIT66U	297
PITA43TMB5	298
PITP43TMB5	289
PLI-A10	292
PLIS-1	292
PPE4-G	962
PPE4-P	962
PPE-G	962
PPE-P	962
PPE-RG	962
PPE-RP	962
PPLIM	970
PPROCAMSC-G	503
PPROCTL-BC	502
PPSIM-NC	970
PPSIM-NT	970
PPSIM-PC	970
PPSIM-PT	970
PS115-1N	970
PS115-1P	970
PS24-1N	970
PS24-1P	970
PSDINA-24	969
PSDINA-24-4	969
PVA1006PEQ	634
PVD100Q	630
PVL225PQ	632
Q	
Q120RA-EU-AF	372
Q120RA-EU-AF2	372
Q120RA-UK-AF	372
Q120RA-UK-AF2	372
Q120RA-US-AF	372
Q120RA-US-AF2	372
Q126E	68
Q126EQ	68
Q126EQ3	68
Q12AB6FF15	69
Q12AB6FF15CR	69

Model Number	Page
Q12AB6FF15Q	69
Q12AB6FF30	69
Q12AB6FF30CR	69
Q12AB6FF30Q	69
Q12AB6FF50	69
Q12AB6FF50CR	69
Q12AB6FF50Q	69
Q12AB6LP	68
Q12AB6LPQ	68
Q12AB6LV	68
Q12AB6LVQ	68
Q12AB6R	68
Q12AB6RCR	69
Q12AB6RQ	68
Q12AN6FF15Q3	69
Q12AN6FF30Q3	69
Q12AN6FF50Q3	69
Q12AN6LPQ3	68
Q12AN6LVQ3	68
Q12AN6RQ3	68
Q12AP6FF15Q3	69
Q12AP6FF30Q3	69
Q12AP6FF50Q3	69
Q12AP6LPQ3	68
Q12AP6LVQ3	68
Q12AP6RQ3	68
Q12RB6FF15	69
Q12RB6FF15CR	69
Q12RB6FF15Q	69
Q12RB6FF30	69
Q12RB6FF30CR	69
Q12RB6FF30Q	69
Q12RB6FF50	69
Q12RB6FF50CR	69
Q12RB6FF50Q	69
Q12RB6LP	68
Q12RB6LPQ	68
Q12RB6LV	68
Q12RB6LVQ	68
Q12RB6R	68
Q12RB6RCR	69
Q12RB6RQ	68
Q12RN6FF15Q3	69
Q12RN6FF30Q3	69
Q12RN6FF50Q3	69
Q12RN6LPQ3	68
Q12RN6LVQ3	68
Q12RN6RQ3	68
Q12RP6FF15Q3	69
Q12RP6FF30Q3	69
Q12RP6FF50Q3	69
Q12RP6LPQ3	68

Model Number	Page
Q12RP6LVQ3	68
Q12RP6RQ3	68
Q20E	74
Q20EL	74
Q20ELQ5	74
Q20EQ5	74
Q20ND	75
Q20NDL	75
Q20NDLQ5	75
Q20NDQ5	75
Q20NDXL	75
Q20NDXLQ5	75
Q20NFF100	75
Q20NFF100Q5	75
Q20NFF150	75
Q20NFF150Q5	75
Q20NFF50	75
Q20NFF50Q5	75
Q20NLP	74
Q20NLPQ5	74
Q20NLV	74
Q20NLVQ5	74
Q20NR	74
Q20NRL	74
Q20NRLQ5	74
Q20NRQ5	74
Q20PD	75
Q20PDL	75
Q20PDLQ5	75
Q20PDQ5	75
Q20PDXL	75
Q20PDXLQ5	75
Q20PFF100	75
Q20PFF100Q5	75
Q20PFF150	75
Q20PFF150Q5	75
Q20PFF50	75
Q20PFF50Q5	75
Q20PLP	74
Q20PLPQ5	74
Q20PLV	74
Q20PLVQ5	74
Q20PR	74
Q20PRL	74
Q20PRLQ5	74
Q20PRQ5	74
Q253E	135
Q253EQ1	135
Q256E	134
Q256EQ	134
Q25AW3FF100	135
Q25AW3FF100Q1	135

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Model Number	Page
Q25AW3FF25	135
Q25AW3FF25Q1	135
Q25AW3FF50	135
Q25AW3FF50Q1	135
Q25AW3LP	135
Q25AW3LPQ1	135
Q25AW3R	135
Q25AW3RQ1	135
Q25RW3FF100	135
Q25RW3FF100Q1	135
Q25RW3FF25	135
Q25RW3FF25Q1	135
Q25RW3FF50	135
Q25RW3FF50Q1	135
Q25RW3LP	135
Q25RW3LPQ1	135
Q25RW3R	135
Q25RW3RQ1	135
Q25SN6FF100	134
Q25SN6FF100Q	134
Q25SN6FF25	134
Q25SN6FF25Q	134
Q25SN6FF50	134
Q25SN6FF50Q	134
Q25SN6LP	134
Q25SN6LPQ	134
Q25SN6R	134
Q25SN6RQ	134
Q25SP6FF100	134
Q25SP6FF100Q	134
Q25SP6FF25	134
Q25SP6FF25Q	134
Q25SP6FF50	134
Q25SP6FF50Q	134
Q25SP6LP	134
Q25SP6LPQ	134
Q25SP6R	134
Q25SP6RQ	134
Q26PXLPQ5	458
Q26PXLPQ7	458
Q403E	141
Q403EQ1	141
Q406E	140
Q406EQ	140
Q40AW3FF200	141
Q40AW3FF200Q1	141
Q40AW3FF400	141
Q40AW3FF400Q1	141
Q40AW3FF600	141
Q40AW3FF600Q1	141
Q40AW3LP	141
Q40AW3LPQ1	141

Model Number	Page
Q40AW3R	141
Q40AW3RQ1	141
Q40RW3FF200	141
Q40RW3FF200Q1	141
Q40RW3FF400	141
Q40RW3FF400Q1	141
Q40RW3FF600	141
Q40RW3FF600Q1	141
Q40RW3LP	141
Q40RW3LPQ1	141
Q40RW3R	141
Q40RW3RQ1	141
Q40SN6FF200	140
Q40SN6FF200Q	140
Q40SN6FF400	140
Q40SN6FF400Q	140
Q40SN6FF600	140
Q40SN6FF600Q	140
Q40SN6LP	140
Q40SN6LPQ	140
Q40SN6R	140
Q40SN6RQ	140
Q40SP6FF200	140
Q40SP6FF200Q	140
Q40SP6FF400	140
Q40SP6FF400Q	140
Q40SP6FF600	140
Q40SP6FF600Q	140
Q40SP6LP	140
Q40SP6LPQ	140
Q40SP6R	140
Q40SP6RQ	140
Q452E	84
Q452EQ	84
Q452EQ1	84
Q453E	86
Q453EQ	86
Q456E	82
Q456EQ	82
Q456EQ5	82
Q459E	90
Q459E	480
Q459EQ	90
Q459EQ	480
Q45AD9CV	91
Q45AD9CV	481
Q45AD9CV4	91
Q45AD9CV4	481
Q45AD9CV4Q	91
Q45AD9CV4Q	481
Q45AD9CVQ	91
Q45AD9CVQ	481

Model Number	Page
Q45AD9D	91
Q45AD9D	481
Q45AD9DL	91
Q45AD9DL	481
Q45AD9DLQ	91
Q45AD9DLQ	481
Q45AD9DQ	91
Q45AD9DQ	481
Q45AD9F	91
Q45AD9F	481
Q45AD9FP	91
Q45AD9FP	481
Q45AD9FPQ	91
Q45AD9FPQ	481
Q45AD9FQ	91
Q45AD9FQ	481
Q45AD9FV	91
Q45AD9FV	481
Q45AD9FVQ	91
Q45AD9FVQ	481
Q45AD9LP	90
Q45AD9LP	480
Q45AD9LPQ	90
Q45AD9LPQ	480
Q45AD9LV	90
Q45AD9LV	480
Q45AD9LVQ	90
Q45AD9LVQ	480
Q45AD9R	90
Q45AD9R	480
Q45AD9RQ	90
Q45AD9RQ	480
Q45BB6CV	83
Q45BB6CV4	83
Q45BB6CV4Q	83
Q45BB6CV4Q5	83
Q45BB6CVQ	83
Q45BB6CVQ5	83
Q45BB6D	83
Q45BB6DL	83
Q45BB6DLQ	83
Q45BB6DLQ5	83
Q45BB6DQ	83
Q45BB6DQ5	83
Q45BB6DX	83
Q45BB6DXQ	83
Q45BB6DXQ5	83
Q45BB6F	83
Q45BB6FP	83
Q45BB6FPQ	83
Q45BB6FPQ5	83
Q45BB6FQ	83

Model Number	Page
Q45BB6FQ5	83
Q45BB6FV	83
Q45BB6FVQ	83
Q45BB6FVQ5	83
Q45BB6LL	88
Q45BB6LLP	88
Q45BB6LLPQ	88
Q45BB6LLPQ6	88
Q45BB6LLQ	88
Q45BB6LLQ6	88
Q45BB6LP	82
Q45BB6LPQ	82
Q45BB6LPQ5	82
Q45BB6LV	82
Q45BB6LVQ	82
Q45BB6LVQ5	82
Q45BB6R	82
Q45BB6RQ	82
Q45BB6RQ5	82
Q45BW13CV	87
Q45BW13CV4	87
Q45BW13CV4Q	87
Q45BW13CVQ	87
Q45BW13D	87
Q45BW13DL	87
Q45BW13DLQ	87
Q45BW13DQ	87
Q45BW13DX	87
Q45BW13DXQ	87
Q45BW13F	87
Q45BW13FP	87
Q45BW13FPQ	87
Q45BW13FQ	87
Q45BW13FV	87
Q45BW13FVQ	87
Q45BW13LP	86
Q45BW13LPQ	86
Q45BW13LV	86
Q45BW13LVQ	86
Q45BW13R	86
Q45BW13RQ	86
Q45BW22CV	85
Q45BW22CV4	85
Q45BW22CV4Q	85
Q45BW22CV4Q1	85
Q45BW22CVQ	85
Q45BW22CVQ1	85
Q45BW22D	85
Q45BW22DL	85
Q45BW22DLQ	85
Q45BW22DLQ1	85
Q45BW22DQ	85

Model Number	Page
Q45BW22DQ1	85
Q45BW22DX	85
Q45BW22DXQ	85
Q45BW22DXQ1	85
Q45BW22F	85
Q45BW22FP	85
Q45BW22FPQ	85
Q45BW22FPQ1	85
Q45BW22FQ	85
Q45BW22FQ1	85
Q45BW22FV	85
Q45BW22FVQ	85
Q45BW22FVQ1	85
Q45BW22LP	84
Q45BW22LPQ	84
Q45BW22LPQ1	84
Q45BW22LV	84
Q45BW22LVQ	84
Q45BW22LVQ1	84
Q45BW22R	84
Q45BW22RQ	84
Q45BW22RQ1	84
Q45UBB63BC	358
Q45UBB63BCQ	358
Q45UBB63BCQ6	358
Q45UBB63DA	358
Q45UBB63DAC	358
Q45UBB63DACQ	358
Q45UBB63DACQ6	358
Q45UBB63DAQ	358
Q45UBB63DAQ6	358
Q45ULIU64ACR	359
Q45ULIU64ACRQ	359
Q45ULIU64ACRQ6	359
Q45ULIU64BCR	359
Q45ULIU64BCRQ	359
Q45ULIU64BCRQ6	359
Q45UR3BA63CK	362
Q45UR3BA63CKQ	362
Q45UR3BA63CKS	362
Q45UR3BA63CQ6K	362
Q45UR3BA63CQ6KQ	362
Q45UR3BA63CQ6KS	362
Q45UR3BA63CQK	362
Q45UR3BA63CQKQ	362
Q45UR3BA63CQKS	362
Q45UR3LIU64CK	363
Q45UR3LIU64CKQ	363
Q45UR3LIU64CKS	363
Q45UR3LIU64CQ6K	363
Q45UR3LIU64CQ6KQ	363
Q45UR3LIU64CQ6KS	363

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Model Number	Page
Q45UR3LIU64CQK	363
Q45UR3LIU64CQKQ	363
Q45UR3LIU64CQKS	363
Q45VR2CV	85
Q45VR2CV4	85
Q45VR2CV4Q	85
Q45VR2CVQ	85
Q45VR2D	85
Q45VR2DL	85
Q45VR2DLQ	85
Q45VR2DQ	85
Q45VR2DX	85
Q45VR2DXQ	85
Q45VR2F	85
Q45VR2FP	85
Q45VR2FPQ	85
Q45VR2FQ	85
Q45VR2FV	85
Q45VR2FVQ	85
Q45VR2LP	84
Q45VR2LPQ	84
Q45VR2LV	84
Q45VR2LVQ	84
Q45VR2R	84
Q45VR2RQ	84
Q45VR3CV	87
Q45VR3CV4	87
Q45VR3CV4Q	87
Q45VR3CVQ	87
Q45VR3D	87
Q45VR3DL	87
Q45VR3DLQ	87
Q45VR3DQ	87
Q45VR3DX	87
Q45VR3DXQ	87
Q45VR3F	87
Q45VR3FP	87
Q45VR3FPQ	87
Q45VR3FQ	87
Q45VR3FV	87
Q45VR3FVQ	87
Q45VR3LP	86
Q45VR3LPQ	86
Q45VR3LV	86
Q45VR3LVQ	86
Q45VR3R	86
Q45VR3RQ	86
Q60BB6AF2000	104
Q60BB6AF2000Q	104
Q60BB6AFV1000	104
Q60BB6AFV1000Q	104
Q60BB6LAF1400	104

Model Number	Page
Q60BB6LAF1400Q	104
Q60BB6LAF2000	104
Q60BB6LAF2000Q	104
Q60VR3AF2000	105
Q60VR3AF2000Q1	105
Q60VR3AFV1000	105
Q60VR3AFV1000Q1	105
Q60VR3LAF1400	105
Q60VR3LAF1400Q1	105
Q60VR3LAF2000	105
Q60VR3LAF2000Q1	105
QC50A3N6XDWQ	424
QC50A3P6XDWQ	424
QCX50A3N6XDWQ	424
QCX50A3P6XDWQ	424
QL56M6XD15BQ	426
QL56M6XD30BQ	426
QL56M6XD40BQ	426
QM26ENXLPCQ5	430
QM26EPXLPCQ5	430
QM26EQ5	430
QM26VNAF200Q5	430
QM26VNAF400Q5	430
QM26VNLPQ5	430
QM26VNRQ5	430
QM26VPAF200Q5	430
QM26VPAF400Q5	430
QM26VPLPQ5	430
QM26VPRQ5	430
QM426E	150
QM426EQ	150
QM42VN6AFV150	151
QM42VN6AFV150Q	151
QM42VN6D	150
QM42VN6DQ	150
QM42VN6FP	151
QM42VN6FPQ	151
QM42VN6LP	150
QM42VN6LPQ	150
QM42VN6R	150
QM42VN6RQ	150
QM42VP6AFV150	151
QM42VP6AFV150Q	151
QM42VP6D	150
QM42VP6DQ	150
QM42VP6FP	151
QM42VP6FPQ	151
QM42VP6LP	150
QM42VP6LPQ	150
QM42VP6R	150
QM42VP6RQ	150
QMH26ENXLPCQ7	434

Model Number	Page
QMH26EPXLPCQ7	434
QMH26VNAF200Q7	434
QMH26VNAF400Q7	434
QMH26VNLPQ7	434
QMH26VPAF200Q7	434
QMH26VPAF400Q7	434
QMH26VPLPQ7	434
QMT42VN6AFV400	152
QMT42VN6AFV400Q	152
QMT42VN6DX	152
QMT42VN6DXQ	152
QMT42VN6FF1000	152
QMT42VN6FF1000Q	152
QMT42VN6FF1500	152
QMT42VN6FF1500Q	152
QMT42VN6FF2000	152
QMT42VN6FF2000Q	152
QMT42VN6FF500	152
QMT42VN6FF500Q	152
QMT42VN6FF750	152
QMT42VN6FF750Q	152
QMT42VP6AFV400	152
QMT42VP6AFV400Q	152
QMT42VP6DX	152
QMT42VP6DXQ	152
QMT42VP6FF1000	152
QMT42VP6FF1000Q	152
QMT42VP6FF1500	152
QMT42VP6FF1500Q	152
QMT42VP6FF2000	152
QMT42VP6FF2000Q	152
QMT42VP6FF500	152
QMT42VP6FF500Q	152
QMT42VP6FF750	152
QMT42VP6FF750Q	152
QS186E	32
QS186EB	32
QS186EBQ8	32
QS186EQ8	32
QS186EV	32
QS186EVQ8	32
QS186LE	36
QS186LE10	36
QS186LE10Q8	36
QS186LE11	36
QS186LE11Q8	36
QS186LE12	36
QS186LE12Q8	36
QS186LE14	36
QS186LE14Q8	36
QS186LE2	37
QS186LE210	37

Model Number	Page
QS186LE210Q8	37
QS186LE211	37
QS186LE211Q8	37
QS186LE212	37
QS186LE212Q8	37
QS186LE214	37
QS186LE214Q8	37
QS186LE2Q8	37
QS186LEQ8	36
QS18AB6AF300	39
QS18AB6AF300Q5	39
QS18AB6AF40	39
QS18AB6AF40Q5	39
QS18AB6AFF200	38
QS18AB6AFF200Q5	38
QS18AB6AFF40	38
QS18AB6AFF40Q5	38
QS18ANWDL	41
QS18ANWDXL	41
QS18ANWLP	40
QS18ANWLV	40
QS18ANWR	40
QS18APWDL	41
QS18APWDXL	41
QS18APWLP	40
QS18APWLV	40
QS18APWR	40
QS18EN6CV15	34
QS18EN6CV15Q8	34
QS18EN6CV45	34
QS18EN6CV45Q8	34
QS18EN6D	35
QS18EN6DB	35
QS18EN6DBQ8	35
QS18EN6DQ8	35
QS18EN6DV	35
QS18EN6DVQ8	35
QS18EN6FP	35
QS18EN6FPQ8	35
QS18EN6LP	34
QS18EN6LPQ8	34
QS18EN6W	35
QS18EN6WQ8	35
QS18EP6CV15	34
QS18EP6CV15Q8	34
QS18EP6CV45	34
QS18EP6CV45Q8	34
QS18EP6D	35
QS18EP6DB	35
QS18EP6DBQ8	35
QS18EP6DQ8	35
QS18EP6DV	35

Model Number	Page
QS18EP6DVQ8	35
QS18EP6FP	35
QS18EP6FPQ8	35
QS18EP6LP	34
QS18EP6LPQ8	34
QS18EP6W	35
QS18EP6WQ8	35
QS18RNWDL	41
QS18RNWDXL	41
QS18RNWLP	40
QS18RNWLV	40
QS18RNWR	40
QS18RPWDL	41
QS18RPWDXL	41
QS18RPWLP	40
QS18RPWLV	40
QS18RPWR	40
QS18UNA	366
QS18UNAE	366
QS18UNAEQ8	366
QS18UNAQ8	366
QS18UPA	366
QS18UPAE	366
QS18UPAEQ8	366
QS18UPAQ8	366
QS18VN6AF100	39
QS18VN6AF100Q5	39
QS18VN6AF300	39
QS18VN6AF300Q5	39
QS18VN6AF40	39
QS18VN6AF40Q5	39
QS18VN6AFF200	38
QS18VN6AFF200Q5	38
QS18VN6AFF40	38
QS18VN6AFF40Q5	38
QS18VN6CV15	33
QS18VN6CV15Q8	33
QS18VN6CV45	33
QS18VN6CV45Q8	33
QS18VN6D	33
QS18VN6DB	33
QS18VN6DBQ8	33
QS18VN6DQ8	33
QS18VN6F	33
QS18VN6FF100	33
QS18VN6FF100Q8	33
QS18VN6FF50	33
QS18VN6FF50Q8	33
QS18VN6FP	33
QS18VN6FPQ8	33
QS18VN6FQ8	33
QS18VN6LAF	39

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Model Number	Page
QS18VN6LAF250	39
QS18VN6LAF250Q5	39
QS18VN6LAFQ5	39
QS18VN6LD	36
QS18VN6LDQ8	36
QS18VN6LLP	36
QS18VN6LLPQ8	36
QS18VN6LP	32
QS18VN6LPQ8	32
QS18VN6LV	32
QS18VN6LVQ8	32
QS18VN6R	32
QS18VN6RB	32
QS18VN6RBQ8	32
QS18VN6RQ8	32
QS18VN6W	33
QS18VN6WQ8	33
QS18VP6AF100	39
QS18VP6AF100Q5	39
QS18VP6AF300	39
QS18VP6AF300Q5	39
QS18VP6AF40	39
QS18VP6AF40Q5	39
QS18VP6AFF200	38
QS18VP6AFF200Q5	38
QS18VP6AFF40	38
QS18VP6AFF40Q5	38
QS18VP6CV15	33
QS18VP6CV15Q8	33
QS18VP6CV45	33
QS18VP6CV45Q8	33
QS18VP6D	33
QS18VP6DB	33
QS18VP6DBQ8	33
QS18VP6DQ8	33
QS18VP6F	33
QS18VP6FF100	33
QS18VP6FF100Q8	33
QS18VP6FF50	33
QS18VP6FF50Q8	33
QS18VP6FP	33
QS18VP6FPQ8	33
QS18VP6FQ8	33
QS18VP6LAF	39
QS18VP6LAF250	39
QS18VP6LAF250Q5	39
QS18VP6LAFQ5	39
QS18VP6LD	36
QS18VP6LDQ8	36
QS18VP6LLP	36
QS18VP6LLPQ8	36
QS18VP6LP	32

Model Number	Page
QS18VP6LPQ8	32
QS18VP6LV	32
QS18VP6LVQ8	32
QS18VP6R	32
QS18VP6RB	32
QS18VP6RBQ8	32
QS18VP6RQ8	32
QS18VP6W	33
QS18VP6WQ8	33
QS18WE	40
QS303E	59
QS30AF	58
QS30AF600	58
QS30AF600Q	58
QS30AFF400	58
QS30AFF400Q	58
QS30AFQ	58
QS30ARH2O	55
QS30ARH2OQ5	55
QS30ARX	54
QS30ARXH2O	55
QS30ARXH2OQ5	55
QS30ARXQ	54
QS30ARXSH2O	55
QS30ARXSH2OQ5	55
QS30D	55
QS30DQ	55
QS30E	54
QS30EDV	56
QS30EDVQ	56
QS30ELVC	57
QS30ELVC	456
QS30ELVCQ	57
QS30ELVCQ	456
QS30EQ	54
QS30EX	54
QS30EXH2O	55
QS30EXH2OQ5	55
QS30EXQ	54
QS30EXSH2O	55
QS30EXSH2OQ5	55
QS30FF200	55
QS30FF200Q	55
QS30FF400	55
QS30FF400Q	55
QS30FF600	55
QS30FF600Q	55
QS30LD	56
QS30LDL	56
QS30LDLQ	56
QS30LDQ	56
QS30LLP	57

Model Number	Page
QS30LLPC	57
QS30LLPCQ	57
QS30LLPQ	57
QS30LP	54
QS30LPQ	54
QS30LV	54
QS30LVQ	54
QS30R	54
QS30RQ	54
QS30RRH2O	55
QS30RRH2OQ5	55
QS30RRX	54
QS30RRXH2O	55
QS30RRXH2OQ5	55
QS30RRXQ	54
QS30RRXSH2O	55
QS30RRXSH2OQ5	55
QS30VR3FF200	59
QS30VR3FF400	59
QS30VR3FF600	59
QS30VR3LP	59
QS30VR3R	59
QT50R-EU-AF2W	374
QT50R-EU-AFH	373
QT50R-EU-AFS	373
QT50R-EU-RH	373
QT50R-UK-AF2W	374
QT50R-UK-AFH	373
QT50R-UK-RH	373
QT50R-US-AF2W	374
QT50R-US-AFH	373
QT50R-US-RH	373
QT50UDB	336
QT50UDBQ	336
QT50UDBQ6	336
QT50ULB	336
QT50ULBQ	336
QT50ULBQ6	336
QT50UVR3F	336
QT50UVR3FQ	336
QT50UVR3FQ1	336
QT50UVR3W	336
QT50UVR3WQ	336
QT50UVR3WQ1	336
R	
R55F	284
R55F	422
R55FP	284
R55FP	422
R55FPB	284
R55FPB	422
R55FPBQ	284

Model Number	Page
R55FPBQ	422
R55FPG	284
R55FPG	422
R55FPGQ	284
R55FPGQ	422
R55FPQ	284
R55FPQ	422
R55FPW	284
R55FPW	422
R55FPWQ	284
R55FPWQ	422
R55FQ	284
R55FQ	422
R55FV	284
R55FV	422
R55FVB	284
R55FVB	422
R55FVBQ	284
R55FVBQ	422
R55FVG	284
R55FVG	422
R55FVGQ	284
R55FVGQ	422
R55FVQ	284
R55FVQ	422
R55FVW	284
R55FVW	422
R55FVWQ	284
R55FVWQ	422
R58ACG1	420
R58ACG1D	420
R58ACG1DQ	420
R58ACG1Q	420
R58ACG2	420
R58ACG2D	420
R58ACG2DQ	420
R58ACG2Q	420
R58ACR1	420
R58ACR1D	420
R58ACR1DQ	420
R58ACR1Q	420
R58ACR2	420
R58ACR2D	420
R58ACR2DQ	420
R58ACR2Q	420
R58BNCRGB1	419
R58BNCRGB1	419
R58BNCRGB1Q	419
R58BNCRGB2Q	419
R58BPCRGB1	419
R58BPCRGB1Q	419
R58BPCRGB2	419

Model Number	Page
R58BPCRGB2Q	419
R58ECRGB1	418
R58ECRGB1Q	418
R58ECRGB2	418
R58ECRGB2Q	418
RMB100	902
RMB50	902
RMB85	902
RPAK-C2SBP-1	749
RPAK-CH2-10	749
RPAK-CH2-10-TA	749
RPAK-CH2-20	749
RPAK-CH2-20-TA	749
RPAK-CH2-40	749
RPAK-CH2-40-TA	749
RPAK-CH2-50	749
RPAK-CH2-50-TA	749
RPAK-CH2-80	749
RPAK-CH2-80-TA	749
RPAK-CHP2-10	749
RPAK-CHP2-10-TA	749
RPAK-CHP2-20	749
RPAK-CHP2-20-TA	749
RPAK-CHP2-40	749
RPAK-CHP2-40-TA	749
RPAK-CHP2-50	749
RPAK-CHP2-50-TA	749
RPAK-CHP2-80	749
RPAK-CHP2-80-TA	749
S	
S12-2ANRL-2M	193
S12-2APRL-2M	193
S12-2NAEJ-2M	193
S12-2NAEL-2M	193
S12-2RNRL-2M	193
S12-2RPRL-2M	193
S126E	192
S12SN6R	192
S12SP6R	192
S18-2NAEJ-2M	198
S18-2NAEJ-2MQ5	198
S18-2NAEL-2M	198
S18-2NAEL-2MQ5	198
S18-2NAES-2M	198
S18-2NAES-2MQ5	198
S18-2VNDL-2M	198
S18-2VNDL-2MQ5	198
S18-2VNLP-2M	198
S18-2VNLP-2MQ5	198
S18-2VNLPC-2M	198
S18-2VNLPC-2MQ5	198
S18-2VNLV-2M	198

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Model Number	Page
S18-2VNLV-2MQ5	198
S18-2VNRL-2M	198
S18-2VNRL-2MQ5	198
S18-2VNRS-2M	198
S18-2VNRS-2MQ5	198
S18-2VPDL-2M	198
S18-2VPDL-2MQ5	198
S18-2VPLP-2M	198
S18-2VPLP-2MQ5	198
S18-2VPLPC-2M	198
S18-2VPLPC-2MQ5	198
S18-2VPLV-2M	198
S18-2VPLV-2MQ5	198
S18-2VPRL-2M	198
S18-2VPRL-2MQ5	198
S18-2VPRS-2M	198
S18-2VPRS-2MQ5	198
S183E	202
S183EQ1	202
S186E	200
S186EQ	200
S18AW3D	203
S18AW3DL	203
S18AW3DLQ1	203
S18AW3DQ1	203
S18AW3FF100	203
S18AW3FF100Q1	203
S18AW3FF25	203
S18AW3FF25Q1	203
S18AW3FF50	203
S18AW3FF50Q1	203
S18AW3L	202
S18AW3LP	202
S18AW3LPQ1	202
S18AW3LQ1	202
S18AW3R	202
S18AW3RQ1	202
S18DLGRYP	584
S18LGRYP	584
S18RW3D	203
S18RW3DL	203
S18RW3DLQ1	203
S18RW3DQ1	203
S18RW3FF100	203
S18RW3FF100Q1	203
S18RW3FF25	203
S18RW3FF25Q1	203
S18RW3FF50	203
S18RW3FF50Q1	203
S18RW3L	202
S18RW3LP	202
S18RW3LPQ1	202

Model Number	Page
S18RW3LQ1	202
S18RW3R	202
S18RW3RQ1	202
S18SN6D	201
S18SN6DL	201
S18SN6DLQ	201
S18SN6DQ	201
S18SN6FF100	201
S18SN6FF100Q	201
S18SN6FF25	201
S18SN6FF25Q	201
S18SN6FF50	201
S18SN6FF50Q	201
S18SN6L	200
S18SN6LP	200
S18SN6LPQ	200
S18SN6LQ	200
S18SN6R	200
S18SN6RQ	200
S18SP6D	201
S18SP6DL	201
S18SP6DLQ	201
S18SP6DQ	201
S18SP6FF100	201
S18SP6FF100Q	201
S18SP6FF25	201
S18SP6FF25Q	201
S18SP6FF50	201
S18SP6FF50Q	201
S18SP6L	200
S18SP6LP	200
S18SP6LPQ	200
S18SP6LQ	200
S18SP6R	200
S18SP6RQ	200
S18UBA	342
S18UBAQ	342
S18UBAR	342
S18UBARQ	342
S18UIA	342
S18UIAQ	342
S18UIAR	342
S18UIARQ	342
S18UUA	342
S18UUAQ	342
S18UUAR	342
S18UUARQ	342
S22DLGRYP	585
S22LGRYP	585
S303E	213
S303EQ1	213
S306E	212

Model Number	Page
S306EQ	212
S30AW3FF200	213
S30AW3FF200Q1	213
S30AW3FF400	213
S30AW3FF400Q1	213
S30AW3FF600	213
S30AW3FF600Q1	213
S30AW3LP	213
S30AW3LPQ1	213
S30AW3R	213
S30AW3RQ1	213
S30RW3FF200	213
S30RW3FF200Q1	213
S30RW3FF400	213
S30RW3FF400Q1	213
S30RW3FF600	213
S30RW3FF600Q1	213
S30RW3LP	213
S30RW3LPQ1	213
S30RW3R	213
S30RW3RQ1	213
S30SN6FF200	212
S30SN6FF200Q	212
S30SN6FF400	212
S30SN6FF400Q	212
S30SN6FF600	212
S30SN6FF600Q	212
S30SN6LP	212
S30SN6LPQ	212
S30SN6R	212
S30SN6RQ	212
S30SP6FF200	212
S30SP6FF200Q	212
S30SP6FF400	212
S30SP6FF400Q	212
S30SP6FF600	212
S30SP6FF600Q	212
S30SP6LP	212
S30SP6LPQ	212
S30SP6R	212
S30SP6RQ	212
SA-30DRL55X93C	955
SA-30RL55X93	955
SA-30RL55X93C	955
SA-DIN-BRACKET	854
SA-E12M30	954
SA-K50A18	889
SA-M22M22-50	955
SA-M30E12	954
SA-M30M30-75	955
SA-M30TE12	954
SB12ANR	196

Model Number	Page
SB12APR	196
SB12E1	196
SB12RNR	196
SB12RPR	196
SB12TANR	196
SB12TAPR	196
SB12TE1	196
SB12TRNR	196
SB12TRPR	196
SC22-3-C	805
SC22-3-CU1	805
SC22-3E-C	805
SC22-3E-CU1	805
SC22-3E-S	805
SC22-3E-SU1	805
SC22-3-S	805
SC22-3-SU1	805
SC26-2	800
SC26-2D	800
SC26-2DE	800
SC26-2E	800
SFA-LAT-12	965
SFA-LAT-30	965
SIM-525T	970
SI-PL3A-G	973
SI-PL3A-R	973
SI-PL3T-G	973
SI-PL3T-R	973
SL10VB6V	229
SL10VB6VQ	229
SL10VB6VY	229
SL10VB6VYQ	229
SL30VB6V	228
SL30VB6VQ	228
SL30VB6VY	228
SL30VB6VYQ	228
SLE10B6V	229
SLE10B6VQ	229
SLE10B6VY	229
SLE10B6VYQ	229
SLE30B6V	228
SLE30B6VQ	228
SLE30B6VY	228
SLE30B6VYQ	228
SLM10B6	224
SLM10B6N	225
SLM10B6QPMA	224
SLM10B6QPMAN	225
SLM10N6Q	224
SLM10N6QN	225
SLM10P6Q	224
SLM10P6QN	225

Model Number	Page
SLM120B6	224
SLM120B6N	225
SLM120B6QPMA	224
SLM120N6Q	224
SLM120N6QN	225
SLM120P6Q	224
SLM120P6QN	225
SLM180B6	224
SLM180B6N	225
SLM180B6QPMA	224
SLM180N6Q	224
SLM180N6QN	225
SLM180P6Q	224
SLM180P6QN	225
SLM20B6	224
SLM20B6N	225
SLM20B6QPMA	224
SLM20B6QPMAN	225
SLM20N6Q	224
SLM20N6QN	225
SLM20P6Q	224
SLM20P6QN	225
SLM220B6	224
SLM220B6N	225
SLM220B6QPMA	224
SLM220N6Q	224
SLM220N6QN	225
SLM220P6Q	224
SLM220P6QN	225
SLM30B6	224
SLM30B6N	225
SLM30B6QPMA	224
SLM30B6QPMAN	225
SLM30N6Q	224
SLM30N6QN	225
SLM30P6Q	224
SLM30P6QN	225
SLM50B6	224
SLM50B6N	225
SLM50B6QPMA	224
SLM50B6QPMAN	225
SLM50N6Q	224
SLM50N6QN	225
SLM50P6Q	224
SLM50P6QN	225
SLM80B6	224
SLM80B6N	225
SLM80B6QPMA	224
SLM80B6QPMAN	225
SLM80N6Q	224
SLM80N6QN	225
SLM80P6Q	224

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Model Number	Page
SLM80P6QN	225
SLO30VB6	228
SLO30VB6Q	228
SLO30VB6Y	228
SLO30VB6YQ	228
SM2A30PRL	218
SM2A30PRL	441
SM2A30PRLNC	218
SM2A30PRLNC	441
SM2A30PRLNCQD	218
SM2A30PRLNCQD	441
SM2A30PRLQD	218
SM2A30PRLQD	441
SM2A30SRL	218
SM2A30SRL	441
SM2A30SRLNC	218
SM2A30SRLNC	441
SM2A30SRLNCQD	218
SM2A30SRLNCQD	441
SM2A30SRLQD	218
SM2A30SRLQD	441
SM2A312C	117
SM2A312C2	117
SM2A312C2QD	117
SM2A312CQD	117
SM2A312CV	117
SM2A312CV2	117
SM2A312CV2QD	117
SM2A312CVQD	117
SM2A312D	117
SM2A312DBZ	117
SM2A312DBZQD	117
SM2A312DQD	117
SM2A312F	117
SM2A312FP	117
SM2A312FPQD	117
SM2A312FQD	117
SM2A312FV	117
SM2A312FVQD	117
SM2A312LP	116
SM2A312LPQD	116
SM2A312LV	116
SM2A312LVAG	116
SM2A312LVAGQD	116
SM2A312LVQD	116
SM2A312W	117
SM2A312WQD	117
SM2A31R	116
SM2A31RL	116
SM2A31RLQD	116
SM2A31RPD	116
SM2A31RPDQD	116

Model Number	Page
SM2A31RQD	116
SM30PRL	218
SM30PRL	440
SM30PRLQD	218
SM30PRLQD	440
SM30SRL	218
SM30SRL	440
SM30SRLQD	218
SM30SRLQD	440
SM312C	115
SM312C2	115
SM312C2QD	115
SM312CQD	115
SM312CV	115
SM312CV2	115
SM312CV2QD	115
SM312CVQD	115
SM312D	115
SM312DBZ	115
SM312DBZQD	115
SM312DQD	115
SM312F	115
SM312FP	115
SM312FPQD	115
SM312FQD	115
SM312FV	115
SM312FVQD	115
SM312LP	114
SM312LPQD	114
SM312LV	114
SM312LVAG	114
SM312LVAGQD	114
SM312LVQD	114
SM312W	115
SM312WQD	115
SM31E	114
SM31EL	114
SM31ELQD	114
SM31EPD	114
SM31EPDQD	114
SM31EQD	114
SM31R	114
SM31RL	114
SM31RLQD	114
SM31RPD	114
SM31RPDQD	114
SM31RQD	114
SMA30PEL	218
SMA30PEL	440
SMA30PELQD	218
SMA30PELQD	440
SMA30SEL	218

Model Number	Page
SMA30SEL	440
SMA30SELQD	218
SMA30SELQD	440
SMA31E	116
SMA31EL	116
SMA31ELQD	116
SMA31EPD	116
SMA31EPDQD	116
SMA31EQD	116
SMB30A	869
SMB30FA..	869
SMB30MM	869
SMB30Q	869
SMB30RAVK	870
SMB30UR	872
SMB42F	872
SMB42L	872
SMB42T	873
SMB42U	873
SMB50RFA..	902
SMB55A	878
SMB55F	878
SMB55RA	879
SMB55S	879
SMBABM	885
SMBACM	886
SMBAMS18P	864
SMBAMS18RA	864
SMBAMS30PL52R	888
SMBAMS30RA	871
SMBAMS30RLJ	888
SMBAMS30RLS	888
SMBAMS70A	886
SMBAMSQ60IP	873
SMBAMSQ60P	873
SMBAMSR85P	903
SMBAMSRAB	870
SMBARP..30	889
SMBASCM	885
SMBBSSM	885
SMBC18	889
SMBDX80DIN	854
SMBE12USS	954
SMBF	854
SMBIVUB	879
SMBIVURAL	880
SMBIVURAR	880
SMBIVUU	880
SMBLASRA	887
SMBLAXRA	887
SMBLAXU	887
SMBLBCZB	878

Model Number	Page
SMBLG	875
SMBLGA	876
SMBLH..	875
SMBLH1	875
SMBLSTDLQ26	868
SMBLSTQ26	868
SMBLT31	876
SMBLT32	876
SMBLT3IP	876
SMBLT7	877
SMBLT7F	877
SMBLX	874
SMBLXR	874
SMBM25A	877
SMBM25B	877
SMBP42ASM	883
SMBP4ASM	883
SMBP4OAL100	883
SMBP4OAL50	884
SMBP4RAB	880
SMBP4RAS	881
SMBP4SRAF	881
SMBPMPRHI	884
SMBPPDE	882
SMBPPDH	883
SMBPPEA	962
SMBPPEF	962
SMBPPES	962
SMBPPF1	954
SMBPPFB	954
SMBPPK	954
SMBPPK3	954
SMBPPK6	954
SMBPPKB	954
SMBPPKE3	954
SMBPPKE6	954
SMBPPLK	954
SMBPPLU	881
SMBPPOAL100	884
SMBPPOAL50	884
SMBPPRA	881
SMBPPRHI	885
SMBPPROMRA	882
SMBPPSU	882
SMBPPU	882
SMBPVA..	890
SMBPVA..C	891
SMBPVA1	889
SMBPVA11	890
SMBPVA2	890
SMBPVA6	891
SMBPVA7	891

Model Number	Page
SMBPVA8	891
SMBPVA9	892
SMBPVL1	892
SMBPVL2-225	893
SMBPVL2-500	893
SMBPVL3-225	893
SMBPVL3-500	893
SMBPVL4	892
SMBPVL5	892
SMBQ20LV	867
SMBQ20U	868
SMBQ60	874
SMBQC50	879
SMBQMH26-SS-150	868
SMBQS30L	871
SMBQS30LT	871
SMBQS30Y	871
SMBQS30YL	872
SMBR55F01	855
SMBR55FRA	855
SMBT18Y	867
SMBVLA62X62RA	888
SMBVS1S	855
SMBWFTLR	887
SMBWFTLS	886
SME312CV	118
SME312CV2	118
SME312CV2QD	118
SME312CVQD	118
SME312D	119
SME312DQD	119
SME312DV	119
SME312DVQD	119
SME312F	119
SME312FP	119
SME312FPQD	119
SME312FQD	119
SME312FV	119
SME312FVQD	119
SME312LP	118
SME312LPC	118
SME312LPC	464
SME312LPCQD	118
SME312LPCQD	464
SME312LPQD	118
SME312LV	118
SME312LVQD	118
SME312W	119
SME312WQD	119
SM-GA-5A	820
SM-HA-5A	820
SMI306EQ	484

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Model Number	Page
SMI306EYQ	484
SMI30AN6RQ	484
SMI30AN6RYQ	484
SMI30RN6RQ	484
SMI30RN6RYQ	484
SOP-E12-150A	954
SOP-E12-150SS	954
SOP-E12-300A	954
SOP-E12-300SS	954
SP150GYRPQ	603
SSA-EB1MLGRP-12ED1Q8	722
SSA-EB1MLP-12ED1Q8	722
SSA-EB1MLXRP-12ED1Q8	722
SSA-EB1MLYRP-12ED1Q8	722
SSA-EB1MP-02	730
SSA-EB1MP-04	730
SSA-EB1MP-11	730
SSA-EB1MP-13	730
SSA-EB1MP-22	730
SSA-EB1P-02	730
SSA-EB1P-02ED1Q4	721
SSA-EB1P-02ED1Q5A	721
SSA-EB1P-02ED1Q5B	721
SSA-EB1P-04	730
SSA-EB1P-11	730
SSA-EB1P-11ED1Q4	721
SSA-EB1P-13	730
SSA-EB1P-22	730
SSA-EB1P-22ED1Q8	721
SSA-EB1PL-02ED1Q5A	719
SSA-EB1PL-02ED1Q5B	719
SSA-EB1PL1-02	730
SSA-EB1PL1-04	730
SSA-EB1PL1-11	730
SSA-EB1PL1-13	730
SSA-EB1PL1-22	730
SSA-EB1PL-12ED1Q8	719
SSA-EB1PL1P-02	730
SSA-EB1PL1P-04	730
SSA-EB1PL1P-11	730
SSA-EB1PL1P-13	730
SSA-EB1PL1P-22	730
SSA-EB1PL2-12	731
SSA-EB1PL2-12ED1Q8	721
SSA-EB1PL2P-12	731
SSA-EB1PLGR-12ED1Q8	719
SSA-EB1PLXR-02ED1Q5A	719
SSA-EB1PLXR-02ED1Q5B	719
SSA-EB1PLXR-12ED1Q8	719
SSA-EB1PLYR-02ED1Q5A	719
SSA-EB1PLYR-02ED1Q5B	719
SSA-EB1PLYR-12ED1Q8	719

Model Number	Page
SSA-EB2P-02	730
SSA-EB2P-04	730
SSA-EB2P-11	730
SSA-EB2P-13	730
SSA-EB2P-22	730
SSA-MBK-EEC1	899
SSA-MBK-EEC2	899
SSA-MBK-EEC3	899
SSA-ML-A	973
SSA-ML-W	973
SSM-100	957
SSM-100-S	957
SSM-1100	957
SSM-1100-S	957
SSM-1175	957
SSM-1175-S	957
SSM-1275	957
SSM-1275-S	957
SSM-1400	957
SSM-1400-S	957
SSM-1475	957
SSM-1475-S	957
SSM-150	957
SSM-150-S	957
SSM-1550	957
SSM-1550-S	957
SSM-1675	957
SSM-1675-S	957
SSM-1750	957
SSM-1750-S	957
SSM-1900	957
SSM-1900-S	957
SSM-200	957
SSM-200-S	957
SSM-250	957
SSM-250-S	957
SSM-375	957
SSM-375-S	957
SSM-475	957
SSM-475-S	957
SSM-550	957
SSM-550-S	957
SSM-675	957
SSM-675-S	957
SSM-825	957
SSM-825-S	957
SSM-875	957
SSM-875-S	957
SSM-975	957
SSM-975-S	957
SSM-FM-11A10	826
SSM-FM-11A20	826

Model Number	Page
SS-XPE-32	960
SS-XPE-43	960
STBA-RB1-MB1	900
STBA-RB1-MB2	900
STBA-RB1-MB3	900
STBA-RB1-S1	953
STBA-RB1-S2	953
STBA-RB2-S1	953
STBA-RB2-S2	953
STBVP6	838
STBVP6Q	838
STBVP6Q5	838
STBVP6-RB1	842
STBVP6-RB1E02	842
STBVP6-RB1Q8	842
STBVP6-RB2	842
STBVP6-RB2E02	842
STBVP6-RB2Q8	842
STBVR81	838
STBVR81Q	838
STBVR81Q6	838
T	
T183E	165
T183EQ1	165
T186E	164
T186EQ	164
T186UE	356
T186UEQ	356
T18AW3D	165
T18AW3DQ1	165
T18AW3FF100	165
T18AW3FF100Q1	165
t18aw3ff25	165
T18AW3FF25Q1	165
T18AW3FF50	165
T18AW3FF50Q1	165
T18AW3L	165
T18AW3LP	165
T18AW3LPQ1	165
T18AW3LQ1	165
T18AW3R	165
T18AW3RQ1	165
T18GRXPQ	591
T18RW3D	165
T18RW3DQ1	165
T18RW3FF100	165
T18RW3FF100Q1	165
T18RW3FF25	165
T18RW3FF25Q1	165
T18RW3FF50	165
T18RW3FF50Q1	165
T18RW3L	165

Model Number	Page
T18RW3LP	165
T18RW3LPQ1	165
T18RW3LQ1	165
T18RW3R	165
T18RW3RQ1	165
T18SN6D	164
T18SN6DQ	164
T18SN6FF100	164
T18SN6FF100Q	164
T18SN6FF25	164
T18SN6FF25Q	164
T18SN6FF50	164
T18SN6FF50Q	164
T18SN6L	164
T18SN6LP	164
T18SN6LPQ	164
T18SN6LQ	164
T18SN6R	164
T18SN6RQ	164
T18SP6D	164
T18SP6DQ	164
T18SP6FF100	164
T18SP6FF100Q	164
T18SP6FF25	164
T18SP6FF25Q	164
T18SP6FF50	164
T18SP6FF50Q	164
T18SP6L	164
T18SP6LP	164
T18SP6LPQ	164
T18SP6LQ	164
T18SP6R	164
T18SP6RQ	164
T18VN6UR	356
T18VN6URQ	356
T18VP6UR	356
T18VP6URQ	356
T303E	179
T303EQ1	179
T306E	178
T306EQ	178
T30AW3FF200	179
T30AW3FF200Q1	179
T30AW3FF400	179
T30AW3FF400Q1	179
T30AW3FF600	179
T30AW3FF600Q1	179
T30AW3LP	179
T30AW3LPQ1	179
T30AW3R	179
T30AW3RQ1	179
T30GRYPQ	590

Model Number	Page
T30RW3FF200	179
T30RW3FF200Q1	179
T30RW3FF400	179
T30RW3FF400Q1	179
T30RW3FF600	179
T30RW3FF600Q1	179
T30RW3LP	179
T30RW3LPQ1	179
T30RW3R	179
T30RW3RQ1	179
T30SN6FF200	178
T30SN6FF200Q	178
T30SN6FF400	178
T30SN6FF400Q	178
T30SN6FF600	178
T30SN6FF600Q	178
T30SN6LP	178
T30SN6LPQ	178
T30SN6R	178
T30SN6RQ	178
T30SP6FF200	178
T30SP6FF200Q	178
T30SP6FF400	178
T30SP6FF400Q	178
T30SP6FF600	178
T30SP6FF600Q	178
T30SP6LP	178
T30SP6LPQ	178
T30SP6R	178
T30SP6RQ	178
T30UDNA	350
T30UDNAQ	350
T30UDNB	350
T30UDNBQ	350
T30UDPA	350
T30UDPAQ	350
T30UDPB	350
T30UDPBQ	350
T30UHNA	350
T30UHNAQ	350
T30UHNB	350
T30UHNBQ	350
T30UHPA	350
T30UHPAQ	350
T30UHPB	350
T30UHPBQ	350
T30UINA	350
T30UINAQ	350
T30UINB	350
T30UINBQ	350
T30UIPA	350
T30UIPAQ	350

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Model Number	Page
T30UIPB	350
T30UIPBQ	350
T30UUNA	351
T30UUNAQ	351
T30UUNB	351
T30UUNBQ	351
T30UUPA	351
T30UUPAQ	351
T30UUPB	351
T30UUPBQ	351
T30UXDA	346
T30UXDAQ8	346
T30UXDB	346
T30UXDBQ8	346
T30UXDC	346
T30UXDCQ8	346
T30UXIA	346
T30UXIAQ8	346
T30UXIB	346
T30UXIBQ8	346
T30UXIC	346
T30UXICQ8	346
T30UXUA	346
T30UXUAQ8	346
T30UXUB	346
T30UXUBQ8	346
T30UXUC	346
T30UXUCQ8	346
T86EV	160
T86EVQ	160
T8AN6D100	160
T8AN6D100Q	160
T8AN6D50	160
T8AN6D50Q	160
T8AN6R	160
T8AN6RQ	160
T8AP6D100	160
T8AP6D100Q	160
T8AP6D50	160
T8AP6D50Q	160
T8AP6R	160
T8AP6RQ	160
T8RN6D100	160
T8RN6D100Q	160
T8RN6D50	160
T8RN6D50Q	160
T8RN6R	160
T8RN6RQ	160
T8RP6D100	160
T8RP6D100Q	160
T8RP6D50	160
T8RP6D50Q	160

Model Number	Page
T8RP6R	160
T8RP6RQ	160
TCNM-AD-1200	412
TCNM-AD-1204	412
TCNM-AD-1210	412
TCNM-AD-1214	412
TCNM-AD-2200	412
TCNM-AD-2204	412
TCNM-AD-2210	412
TCNM-AD-2214	412
TCNM-EX-0200	412
TCNM-EX-0210	412
TCNM-EX-1200	412
TCNM-EX-1210	412
TCNM-EX-2200	412
TCNM-EX-2210	412
TL30FGYRQ	604
TL50BLG2YR1Q	560
TL50HGYRQ	856
TL50WQ	973
TL50YQ	973
TM186E	172
TM186EQ8	172
TM18AN6DV	173
TM18AN6DVQ8	173
TM18AN6FF100	173
TM18AN6FF100Q8	173
TM18AN6FF25	173
TM18AN6FF25Q8	173
TM18AN6FF50	173
TM18AN6FF50Q8	173
TM18AN6LP	172
TM18AN6LPQ8	172
TM18AN6R	172
TM18AN6RQ8	172
TM18AP6DV	173
TM18AP6DVQ8	173
TM18AP6FF100	173
TM18AP6FF100Q8	173
TM18AP6FF25	173
TM18AP6FF25Q8	173
TM18AP6FF50	173
TM18AP6FF50Q8	173
TM18AP6LP	172
TM18AP6LPQ8	172
TM18AP6R	172
TM18AP6RQ8	172
TM18RN6DV	173
TM18RN6DVQ8	173
TM18RN6LP	172
TM18RN6LPQ8	172
TM18RN6R	172

Model Number	Page
TM18RN6RQ8	172
TM18RP6DV	173
TM18RP6DVQ8	173
TM18RP6LP	172
TM18RP6LPQ8	172
TM18RP6R	172
TM18RP6RQ8	172
TM18VN6DV	173
TM18VN6DVQ8	173
TM18VN6FF100	173
TM18VN6FF25	173
TM18VN6FF25Q8	173
TM18VN6FF50	173
TM18VN6FF50Q8	173
TM18VN6FF5100Q8	173
TM18VN6LP	172
TM18VN6LPQ8	172
TM18VN6R	172
TM18VN6RQ8	172
TM18VP6DV	173
TM18VP6DVQ8	173
TM18VP6FF100	173
TM18VP6FF100Q8	173
TM18VP6FF25	173
TM18VP6FF25Q8	173
TM18VP6FF50	173
TM18VP6FF50Q8	173
TM18VP6LP	172
TM18VP6LPQ8	172
TM18VP6R	172
TM18VP6RQ8	172
U	
UC-300AG	968
UC-300BZ	968
UC-300C.7	968
UC-300C2	968
UC-300E	968
UC-300EL	968
UC-300EPD	968
UC-300F	968
UC-300FP	968
UC-300FP2	968
UC-300L	968
UC-300LP	968
UC-300RPD	968
UC-45C	968
UC-45C4	968
UC-45D	968
UC-45F	968
UC-45FP	968
UC-45L	968
UC-45LL	968

Model Number	Page
UC-45LLP	968
UC-45LP	968
UC-R55	968
UM-FA-11A	818
UM-FA-9A	818
USCMB-..	900
USMB-1	901
USMB-6	901
USMB-8	901
UWG18-5.0	967
UWG18-6.4	967
V	
VFT-1.3MRWM8	294
VFT-1.3MVSA	295
VFT-M8MVS	294
VS1AN5C10	244
VS1AN5C10Q	244
VS1AN5C20	244
VS1AN5C20Q	244
VS1AN5CV10	244
VS1AN5CV10Q	244
VS1AN5CV20	244
VS1AN5CV20Q	244
VS1AP5C10	244
VS1AP5C10Q	244
VS1AP5C20	244
VS1AP5C20Q	244
VS1AP5CV10	244
VS1AP5CV10Q	244
VS1AP5CV20	244
VS1AP5CV20Q	244
VS1RN5C10	244
VS1RN5C10Q	244
VS1RN5C20	244
VS1RN5C20Q	244
VS1RN5CV10	244
VS1RN5CV10Q	244
VS1RN5CV20	244
VS1RN5CV20Q	244
VS1RP5C10	244
VS1RP5C10Q	244
VS1RP5C20	244
VS1RP5C20Q	244
VS1RP5CV10	244
VS1RP5CV10Q	244
VS1RP5CV20	244
VS1RP5CV20Q	244
VS25E	248
VS25EQ	248
VS25EV	248
VS25EVQ	248
VS2AN5CV15	248

Model Number	Page
VS2AN5CV15Q	248
VS2AN5CV30	248
VS2AN5CV30Q	248
VS2AN5R	248
VS2AN5R	248
VS2AN5RQ	248
VS2AN5RQ	248
VS2AP5CV15	248
VS2AP5CV15Q	248
VS2AP5CV30	248
VS2AP5CV30Q	248
VS2AP5R	248
VS2AP5R	248
VS2AP5RQ	248
VS2AP5RQ	248
VS2RN5CV15	248
VS2RN5CV15Q	248
VS2RN5CV30	248
VS2RN5CV30Q	248
VS2RN5R	248
VS2RN5R	248
VS2RN5RQ	248
VS2RN5RQ	248
VS2RP5CV15	248
VS2RP5CV15Q	248
VS2RP5CV30	248
VS2RP5CV30Q	248
VS2RP5R	248
VS2RP5R	248
VS2RP5RQ	248
VS2RP5RQ	248
VS3AN5XLP	252
VS3AN5XLPQ	252
VS3AN5XLV	252
VS3AN5XLVQ	252
VS3AP5XLP	252
VS3AP5XLPQ	252
VS3AP5XLV	252
VS3AP5XLVQ	252
VS3RN5XLP	252
VS3RN5XLPQ	252
VS3RN5XLV	252
VS3RN5XLVQ	252
VS3RP5XLP	252
VS3RP5XLPQ	252
VS3RP5XLV	252
VS3RP5XLVQ	252
VSM46E	239
VSM46E	444
VSM46EQ7	239
VSM46EQ7	444
VSM4AN6CV10	239

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es

Model Number	Page
VSM4AN6CV10	444
VSM4AN6CV10Q7	239
VSM4AN6CV10Q7	444
VSM4AN6CV20	239
VSM4AN6CV20	444
VSM4AN6CV20Q7	239
VSM4AN6CV20Q7	444
VSM4AN6CV50	239
VSM4AN6CV50	444
VSM4AN6CV50Q7	239
VSM4AN6CV50Q7	444
VSM4AP6CV10	239
VSM4AP6CV10	444
VSM4AP6CV10Q7	239
VSM4AP6CV10Q7	444
VSM4AP6CV20	239
VSM4AP6CV20	444
VSM4AP6CV20Q7	239
VSM4AP6CV20Q7	444
VSM4AP6CV50	239
VSM4AP6CV50	444
VSM4AP6CV50Q7	239
VSM4AP6CV50Q7	444
VSM4RN6R	239
VSM4RN6R	444
VSM4RN6RQ7	239
VSM4RN6RQ7	444
VSM4RP6R	239
VSM4RP6R	444
VSM4RP6RQ7	239
VSM4RP6RQ7	444
VSM56E	239
VSM56E	445
VSM56EQ7	239
VSM56EQ7	445
VSM5AN6CV10	239
VSM5AN6CV10Q7	239
VSM5AN6CV20	239
VSM5AN6CV20Q7	239
VSM5AN6CV50	239
VSM5AN6CV50Q7	239
VSM5AP6CV10	239
VSM5AP6CV10Q7	239
VSM5AP6CV20	239
VSM5AP6CV20Q7	239
VSM5AP6CV50	239
VSM5AP6CV50Q7	239
VSM5RN6R	239
VSM5RN6R	445
VSM5RN6RQ7	239
VSM5RN6RQ7	445
VSM5RP6R	239
VSM5RP6R	445
VSM5RP6RQ7	239
VSM5RP6RQ7	445
VSMQAN6CV20	239
VSMQAN6CV20	445
VSMQAN6CV50	239
VSMQAN6CV50	445
VSMQAN6CV90	239
VSMQAN6CV90	445
VSMQAP6CV20	239
VSMQAP6CV20	445
VSMQAP6CV50	239
VSMQAP6CV50	445
VSMQAP6CV90	239
VSMQAP6CV90	445
W	
WL50-2	548
WL50-2PB	548
WL50-2PBQ	548
WL50-2Q	548
WL50F-2	548
WL50F-2PB	548
WL50F-2PBQ	548
WL50F-2Q	548

Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es