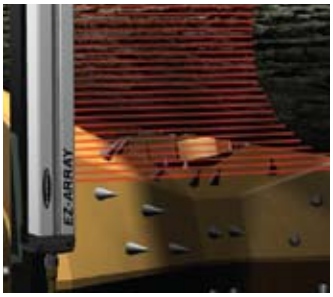
MEASURING ARRAYS

EZ-ARRAY™

High-Resolution MINI-ARRAY®

MINI-ARRAY®

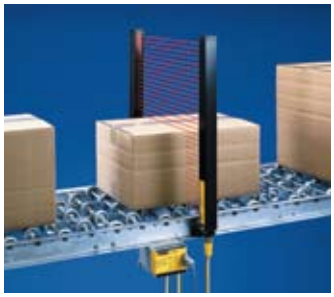


EZ-ARRAY™ page 341

- Applications include edge and center-guiding, loop tension control, hole sizing, parts counting and on-the-fly product sizing and profiling.
- Closely spaced infrared beams detect objects as small as 5 mm wide; edge resolution is 2.5 mm.
- Controller functionality is built into the receiver, so basic setup requires no controller, software or PC.
- Easy-to-use software is included for advanced configuration, using a PC.
- Configuration options include 14 measurement modes, three scanning methods, two analog and two discrete outputs and a serial output.
- Range is 4 meters.
- Array heights range from 150 to 2400 mm.

High-Resolution MINI-ARRAY® page 344

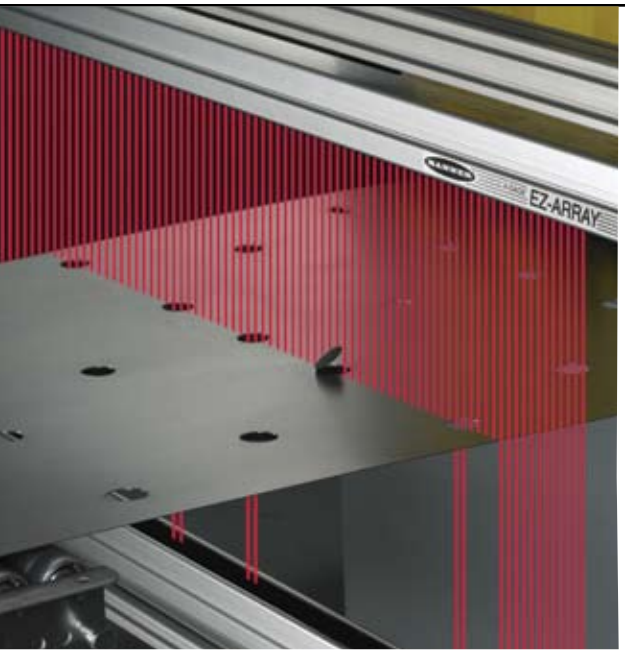
- High-resolution array excels at high-speed, precise process monitoring and inspection applications.
- Available heights range from 163 to 1951 mm.
- Closely spaced beams detect objects as small as 2.5 mm.
- Emitters and receivers can be up to 1.8 m apart.
- Controllers can be configured for a variety of measurement modes, scan modes and output configurations.



MINI-ARRAY® page 348

- Low-profile light screen pairs are designed for profiling and inspections.
- Available heights range from 133 to 1819 mm.
- Depending on the model's beam spacing, the array detects objects as small as 19 to 38 mm.
- Emitters and receivers can be up to 6 m apart or up to 17 m apart, depending on model.
- Configuration options include blanking, sensitivity and scanning mode.
- Controllers are available with DeviceNet™ -compatible output.

DeviceNet™ is a trademark of Open DeviceNet Vendor Association Inc.



A-GAGE® EZ-ARRAY™
Two-Piece Measuring Light Screens

- Applications include edge and center guarding, loop tension control, hole sizing, parts counting and on-the-fly product sizing and profiling.
- Two-piece design eliminates the needs for a separate controller.
- Two push buttons are provided for gain method selection and alignment/ blanking.
- High-excess-gain option for detecting opaque objects and maximizing range in dirty environments.
- Edge resolution of 2.5 mm on opaque objects in single and double edge scan mode.
- Low-contrast sensing of semi-transparent materials and objects as small as 5 mm.
- Seven Zone LED's provide instant alignment and beam blockage information.
- Remote TEACH-wire option is included for alignment, blanking, sensitivity, inverted display and DIP switch enabled/disabled.
- Aluminum housing is compact and rugged for demanding applications.

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Provides powerful configuration capabilities

- Straightforward applications can be configured using six-position DIP switch on front of the receiver.
- Easy-to-use graphic user interface software is included for advanced configuration using a PC (USB serial adapter required–sold separately).
- Integrated 3-digit diagnostic display indicates number of beams blocked, blanking configuration and troubleshooting codes.
- Bicolor LEDs indicate system and serial communication status.
- Array lengths range from 150 to 2400 mm.
- Standard working range is 0.4 to 4 m, with 5 mm beam spacing.
- Shorter range models with a 0.3 to 1.5 m working range are available.

EZ-ARRAY Light Screen	
W = 36.0 mm	D = 45.2 mm

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Specialty Application Solutions

Clear Object Detection

Clear plate glass profiling (Measure width of glass)

Clear plastic bottle detection (Detect presence/absence of bottle)

- Clear object models (0.3 m to 1.5 m) are designed to detect low-contrast, translucent objects in clean industrial environments.
- Short-range and low-contrast models are available for plate glass, clear film and bottle detection.

Carpet Edge Detection

Air-to-backing and backing-to-tufting monitoring

- Short-range models with carpet-specific algorithm automatically detect both the carpet tufting and backing edges.
- Kits are available with an emitter, short-range receiver and mounting bracket for ease of installation and alignment.

Contact Banner Engineering at 1-888-373-6767 or visit bannerengineering.com/ezarray for detailed application and ordering information.

A-GAGE® EZ-ARRAY™, 12-30V dc–5 mm Beam Spacing

Housing Length (L)	Array Length	Total Beams	Connection	Range*	Analog Output	Emitter Model	Receiver Model NPN Outputs	Receiver Model PNP Outputs
227 mm	150 mm	30	8-pin Euro QD	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

QD models: A model with a QD requires a mating cordset (see page 343).

* Models with a range of 100 mm to 1.5 m 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.

A-GAGE® EZ-ARRAY™ Specification

Supply Voltage (Limit Values)	Emitter: 12 to 30V dc Receiver Analog Current Models: 12 to 30V dc Receiver Analog Voltage Models: 15 to 30V 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 @ 30V dc PNP: less than 10 uA @ 30V dc ON-State Saturation Voltage: NPN: less than 1.6V @ 100 mA PNP: less than 2.0V @ 100 mA Protected against false pulse on power-up and continuous overload or short circuit.
Two Analog Outputs	Voltage Sourcing: 0 to 10V (maximum current load of 5 mA) Current Sourcing: 4 to 20 mA (maximum resistance load = $(V_{supply}-3)/0.020$)

More on next page

A-GAGE® EZ-ARRAY™ Specification (cont'd)

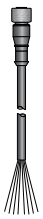
Serial Communication Interface	EIA-485 Modbus RTU (up to 15 nodes per communication ring) RTU binary format Baud Rate: 9600, 19.2K or 38.4K 8 Data Bits, 1 Stop Bit, and Even, Odd, or 2 Stop Bits and No Parity
Scan Time	Scan times depend on scan mode and sensor length. Straight scan times range from 2.8 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 343. 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 343.
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. 763) PNP models: MI24 (p. 763)

Cordsets

Euro QD (With Shield)

See page 689

Length	Threaded 8-Pin Straight
4.58 m	MAQDC-815
9.14 m	MAQDC-830
15.2 m	MAQDC-850

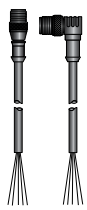


Additional cordset information available. See page 679.

Communication Cordsets

See page 703

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



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Brackets

EZ-ARRAY™

 pg. 629	 pg. 656
EZA-MBK-20	SMBLBCZB

Additional brackets and information available. See page 620.

Serial Adapters

See page 739		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

A-GAGE® High-Resolution MINI-ARRAY®

High-Resolution Inspection and Profiling Light Screen

- Excels at high-speed, precise monitoring and inspection applications, including on-the-fly sizing, profiling, precision edge and center guiding, and hole detection
- Requires a controller, emitter/receiver pair and interconnecting cordsets for a complete system
- Offers programmable controller with a selection of measurement modes, scan modes and output configurations
- Provides 120 sensing beams per foot, for reliable detection of objects as small as 2.5 mm
- Features a 1.8 m range with easy, forgiving alignment
- Offers programmable blanking, hysteresis and serial communications
- Includes advanced software for system configuration using a PC
- Makes status monitoring easy with indicators visible from three sides of emitter/receiver

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Emitters/Receivers

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AUTOCAD, STEP, IGES & PDF

High-Resolution MINI-ARRAY Sensors	
W = 38.1 mm	D = 38.1 mm

A-GAGE® High-Resolution MINI-ARRAY® Emitters/Receivers–2.5 mm Beam Spacing

Housing Length (L)	Array Length	Total Beams	Connection	Range	Minimum Object Size	Models*
236 mm	163 mm	64	5-pin Mini QD	0.4 - 1.8 m	2.5 mm	MAHE6A
						MAHR6A

More on next page

QD models: A model with a QD requires a mating cordset (see page 347).

* "E" and "R" in model numbers denotes "Emitter" and 'Receiver" respectively. Sold separately.

A-GAGE® High-Resolution MINI-ARRAY® Emitters/Receivers–2.5 mm Beam Spacing (cont'd)

Housing Length (L)	Array Length	Total Beams	Connection	Range	Minimum Object Size	Models*
399 mm	325 mm	128	5-pin Mini QD	0.4 - 1.8 m	2.5 mm	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

QD models: A model with a QD requires a mating cordset (see page 347).

* "E" and "R" in model numbers denotes "Emitter" and "Receiver" respectively. Sold separately.

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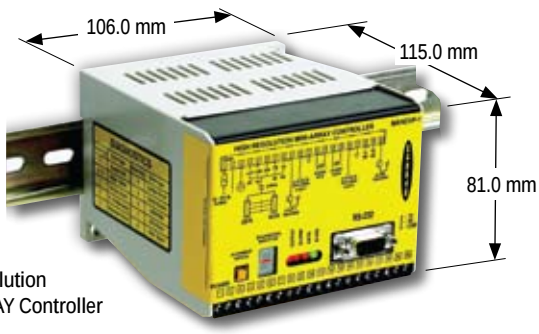
Controllers



High-Resolution MINI-ARRAY Controller

ONLINE
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A-GAGE® High-Resolution MINI-ARRAY® Controllers†, 16-30V dc

Inputs	Solid-State Discrete Outputs	Analog Outputs	Serial Output	Controller Models
1 Sensor pair & Trigger (Gate)	2 PNP	(2) 0-10V Sourcing	RS-232 & RS-485	MAHCVP-1
	2 NPN	(2) 0-10V 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.

A-GAGE® 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	12V 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 347.
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

A-GAGE® High-Resolution MINI-ARRAY® Controller Specifications

Power Requirements	16 to 30V dc @ 1.0 A (typical: 0.5 A @ 16V dc)
Inputs	Sensor input: Emitter and receiver wire in parallel to five terminals. Trigger (Gate) input: Optically isolated, requires 10 to 30V dc (7.5 kΩ impedance) for gate signal Remote alignment input: Optically isolated, requires 10 to 30V dc (7.5 kΩ impedance) for alignment sequence signal
Discrete (Switched) Outputs	NPN outputs: Open collector NPN transistor rated at 30V dc max., 150 mA max. PNP outputs: Open collector PNP transistor rated at 30V dc max., 150 mA max. All discrete outputs: OFF-state leakage current: less than 10 µA @ 30V dc ON-state saturation voltage: less than 1V @ 10 mA; less than 1.5V @ 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 10V dc (25 mA current limit) Current-sinking outputs: 4 to 20 mA (16 to 30V 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 0-10V voltage sourcing MAHCVN-1: Two NPN discrete (switched), two 0-10V 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	0-10V sourcing: MI25 (p. 764) 4 to 20 mA voltage: MI26 (p. 764)

Cordsets

Mini QD (Shielded with Twisted Pair)	
See page 702	
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 679.

DB9 Communication	
See page 704	
Length	9-Pin Straight
2.00 m	MASC

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Brackets

High-Resolution MINI-ARRAY®	
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DIN-35-..	MSMB-3

Additional bracket information available. See page 620.

A-GAGE® MINI-ARRAY®

Inspection and Profiling Light Screens

- Features low-profile, programmable measuring light screen systems for inspections and profiling
- Requires a controller, emitter/receiver pair and interconnecting cordsets for a complete system
- Offers programmable controller with a selection of measurement modes, scan modes and output configurations
- Offers emitters/receivers for detecting objects as small as 12.7 mm
- Available with 9.5 or 19 mm beam spacing
- Features ranges to 17 m, depending on length and beam spacing
- Includes advanced software for system configuration using a PC
- Available in models for central monitoring and control over a DeviceNet™ control network
- Features optional heated enclosures for outdoor applications
- Makes status monitoring easy with indicators visible from three sides of emitter/receiver

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Emitters/Receivers

ONLINE
AUTOCAD, STEP, IGES & PDF

MINI-ARRAY Sensors	
W = 38.1 mm	D = 38.1 mm

A-GAGE® MINI-ARRAY® Emitters/Receivers–19.1 mm Beam Spacing

Housing Length (L)	Array Length	Total Beams	Connection	Minimum Object Size	Range	Models*
201 mm	133 mm	8	5-pin Mini QD	38.1 mm Interlaced Mode: 25.4 mm	0.9 - 17 m	BMEL616A
						BMRL616A
356 mm	286 mm	16				BMEL1216A
						BMRL1216A
505 mm	438 mm	24				BMEL1816A
						BMRL1816A

More on next page

QD models: A model with a QD requires a mating cordset (see page 353).

* "E" and "R" in model numbers denotes "Emitter" and 'Receiver" respectively. Sold separately.

A-GAGE® MINI-ARRAY® Emitters/Receivers–19.1 mm Beam Spacing (cont'd)

Housing Length (L)	Array Length	Total Beams	Connection	Minimum Object Size	Range	Models*
659 mm	591 mm	32	5-pin Mini QD	38.1 mm Interlaced Mode: 25.4 mm	0.9 - 17 m	BMEL2416A
						BMRL2416A
810 mm	743 mm	40				BMEL3016A
						BMRL3016A
963 mm	895 mm	48				BMEL3616A
						BMRL3616A
1115 mm	1048 mm	56				BMEL4216A
						BMRL4216A
1267 mm	1200 mm	64	5-pin Mini QD	38.1 mm Interlaced Mode: 25.4 mm	0.9 - 14 m	BMEL4816A
						BMRL4816A
1572 mm	1505 mm	80				BMEL6016A
						BMRL6016A
1877 mm	1810 mm	96				BMEL7216A
						BMRL7216A

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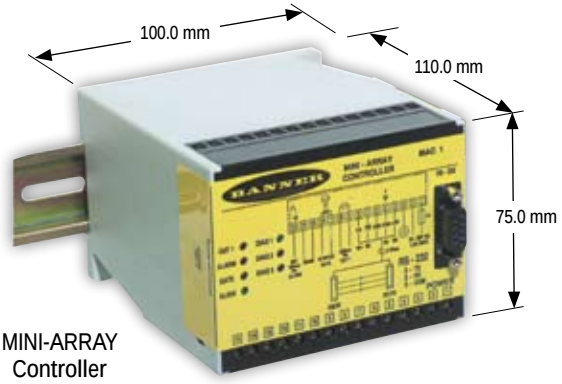
A-GAGE® MINI-ARRAY® Emitters/Receivers–9.5 mm Beam Spacing

Housing Length (L)	Total Beams	Array Length	Connection	Minimum Object Size	Range	Models*
201 mm	16	143 mm	5-pin Mini QD	19.1 mm Interlaced Mode: 12.7 mm	0.6 - 6.1 m	BMEL632A
						BMRL632A
356 mm	32	295 mm				BMEL1232A
						BMRL1232A
505 mm	48	448 mm				BMEL1832A
						BMRL1832A
659 mm	64	600 mm				BMEL2432A
						BMRL2432A
810 mm	80	752 mm				BMEL3032A
						BMRL3032A
963 mm	96	905 mm				BMEL3632A
						BMRL3632A
1115 mm	112	1057 mm				BMEL4232A
						BMRL4232A
1267 mm	128	1210 mm			0.6 - 4.6 m	BMEL4832A
						BMRL4832A
1572 mm	160	1514 mm				BMEL6032A
						BMRL6032A
1877 mm	192	1819 mm				BMEL7232A
						BMRL7232A

QD models: A model with a QD requires a mating cordset (see page 353).

* "E" and "R" in models numbers denotes "Emitter" and "Receiver" respectively. Sold separately.

Contollers



MINI-ARRAY Controller

ONLINE
AUTOCAD, STEP, IGES & PDF

A-GAGE® MINI-ARRAY® Controllers†, 16-30V 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) 0-10V 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
1 Sensor pair & Trigger (Gate)	2 NPN	–	–	MACNXDN-1*
	2 PNP	–	–	MACPXDN-1*

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* DeviceNet™ models

† One controller and an emitter/receiver pair (of matching length and resolution) required per system.

A-GAGE® 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 12V dc ±2%, supplied by controller Emitter: 0.10 A @ 12V dc Receiver: 0.75 A @ 12V dc†	19.1 mm beam spacing 12V dc ±2%, supplied by controller Emitter: 0.10 A @ 12V dc Receiver: 0.50 A @ 12V dc†

More on next page

A-GAGE® MINI-ARRAY® Emitter/Receiver Specifications (cont'd)

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 353.
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)

A-GAGE® MINI-ARRAY® Controller with DeviceNet™ Specifications

DeviceNet Configurations	Vendor code: 12 (Banner Corp.) Device type: 110 Product code: 1 (MACNXDN-1) 2 (MACPXDN-1) Connection types supported: Explicit Message, Poll, COS Network address: 0-63 (network configured), default = 63 Baud rate supported: 125K, 250K, 500K (network configured), default = 125K
Output Configurations	MACPXDN-1: Two PNP discrete (switched) MACNXDN-1: Two NPN discrete (switched)
Power Requirements*	Controller, emitter and receiver: 16 to 30V dc @ 1.2 A max. (typical: 0.5 A @ 16V dc)
DeviceNet Power*	11 to 25V dc - supplied by DeviceNet BUS Network
Inputs	Sensor input: Emitter and receiver wire in parallel to five terminals. Trigger (Gate) input: Optically isolated, requires 10 to 30V dc (7.5 kΩ impedance) for gate signal
Discrete Outputs	NPN outputs: Open collector NPN transistor rated at 30V dc max., 150 mA max. PNP outputs: Open collector PNP transistor rated at 30V dc max., 150 mA max. All discrete outputs: OFF-state leakage current: less than 10 µA @ 30V dc ON-state saturation voltage: less than 1V @ 10 mA; less than 1.5V @ 150 mA
System Programming	Via DeviceNet interface and supplied EDS files.
System Status Indicators	Output (steady red): Output #1 energized. Alarm (flashing red): Output #2 energized. Gate (steady red): Trigger (Gate) input status. Alignment (steady green): Proper emitter/receiver alignment and a clear, unblocked light screen (ON) when green or green/yellow receiver LEDs are ON. Diag 1 (Green), Diag 2 (Red), Diag 3 (Red): Used in combination to display System status
Network Status Indicator	Bicolored (Red/Green) LED visible on the control module front panel indicates network status: Steady Green: On-line, connected to master Flashing Green: On-line, address and baud rate OK Steady Red: Critical network fault or duplicate node address detected Flashing Red: Connection timeout OFF: No network power or off-line
Construction	Polycarbonate housing; mounts to flat surface or directly onto 35-mm DIN rail
Environmental Rating	NEMA 1; IP20
Operating Conditions	Temperature: -20° to +70° C Relative humidity: 95% @ 50° C (non-condensing)
*Application Note	The controller must be powered up before the DeviceNet connection in every power-up situation for proper operation
Hookup Diagrams	MI30 (p. 765)

DeviceNet™ is a trademark of the Open DeviceNet Vendor Association, Inc.