MARINE PRODUCT CATALOG

LAUER
A Beijer Electronics Group Company

Beijer
ELECTRONICS

Your partner for intuitive marine HMI-solutions

Experience for your success

As a leading developer of marine HMI technology, the Beijer Electronics Group knows the industry inside out. We are constantly upgrading our complete premium offer, to meet the specific needs of the maritime market. When in 2007 the German HMI specialist Lauer came to the group, the experience in marine HMI technology jumped to a higher level. We now even more offer customer oriented technology and expertise in the marine HMI field.

Our solutions are the result of over 30 years of experience navigating the waters where people and technology meet. In the Beijer Electronics Group you'll find all the competence and dedication to both high product quality and excellent customer relations that you'd expect from a first class partner.

The right information with the right equipment

There is no room for error at sea. A single mistake can mean dire consequences for ship cargo, passengers and crew alike. That's why you need accurate and reliable information at your fingertips, helping you to make the right decision. Beijer Electronics HMI solutions monitor and control maritime applications on a daily basis across the globe. They are future-proof affording you an intuitive interface that will always be reliable and geared to your needs. Approved by all major marine classification societies our state-of-the-art technology fulfills the specific maritime demands. Developed in collaboration with maritime partners and customers it builds an interface that facilitates a true crew-to-vessel connection.

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EASY INTEGRATION EVERYWHERE

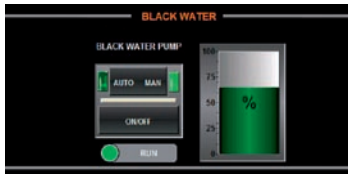
The EXTER operator panel series is designated for sophisticated marine applications. No matter whether they are used as sun-readable control panels on fly-bridges or installed into a diesel generator to display all machine data – the various models in the EXTER series are easily integrated.

A typical application is realized by Onyx Marine, an Italian system solution provider for motor yachts and sailing boats between 14 and 50 meters. The strength of Onyx is to offer an exclusive all-in-one package which includes control and monitoring needs.

The systems from Onyx manage any technical subsystem onboard; electrical switchboard, power management system, air conditioning, tank system, navigation lights, etc.

Customers focus on design and quality

Though Onyx Marine's expertise lies within marine automation, it is the final result that is critical to their customers. The look-and-feel and the overall quality of the whole concept is an essential aspect. The boat owners and their crews are not really interested in the technical details of the Onyx solutions. On the other hand they really know how to value a



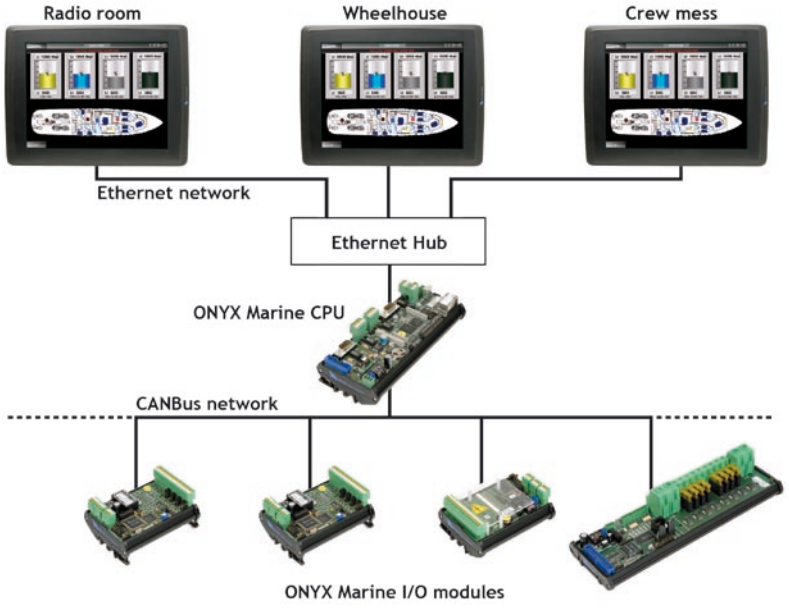
Ready-made objects in the configuration tool, such as meters, bar graphs and switches, make it easy for Onyx Marine to create an intuitive interface.

solution that gives a nice visual impression, is easy to operate and runs flawlessly.

High demands on the user interface

During the evaluation process, Onyx made an extra effort when selecting operator panels for their solutions. They evaluated most of the panels available on the market, comparing them against their selection criteria which are: aesthetic design, reliability, display visibility, available functions, support, and ease of use of the designer tool. In these disciplines the EXTER panels scored the best result.

Typical locations for the operator panels include wheelhouse, engine room and the crew mess. The EXTER design is appreciated by the interior designers as it can be integrated smoothly in any hi-tech environment. And thanks to their compact size, the panels are easy to integrate and install in any place. The current application connects the panels via an Ethernet hub with Onyx' own-developed marine CPU. It's a controller which operates a variety of I/O modules, connected in a Can-Bus network. In this manner the skipper is able to control the ship status from different places and gets all the relevant signals in a clearly arranged format.



Overview of a typical installation.

Saves valuable time

The other important part of the system decision was the configuration tool, Information Designer. The possibility to simulate the application on a PC saves a lot of time during development. It is a very quick process to download the application from the PC to the EXTER panel. This saves valuable time when debugging and testing. The download possibility via a USB device is another timesaving element during maintenance. Information Designer is very powerful and easy to use, which keeps the development time at a minimum.

The electronic components delivered by Onyx Marine can monitor and control any technical subsystem onboard. Crew members navigate between the systems using EXTER's touch screen interface.

EXTER BLACK

Robust yet slim lightweight operator panel

The appealingly designed black, powder-coated aluminum frame and casing provides protection and affords a timeless look. The front enclosure is IP66 classified, which means that it is waterproof even when exposed to high pressure washing. The operator panel is configured with the user-friendly Information Designer software tool.

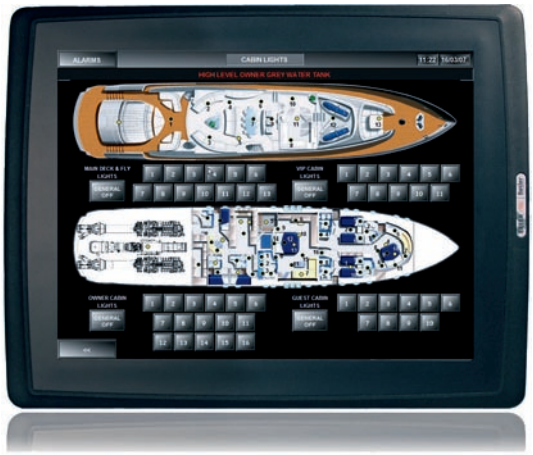
The high-resolution TFT touch display ensures optimal viewing in all conditions and large viewing angles.

- 100 % dimmable backlight preserves optimal night vision
- Reliable resistive touch panel
- Appealing black design with powder-coatetd aluminum
- Clear high-resolution screens
- High level of detail on images, charts, meters and alarms
- Various certifications for major classification societies
- Rugged and reliable design for the specifics of maritime requirements
- Compass safe distance defined
- IP66-classified front resistant to dust and high pressure water jets

TECHNICAL DATA
Display
Size in inches
WxH resolution in pixels
Coloration
Type of data entry
Degree of protection
Voltage supply
Operating voltage
Power consumption
System
Processor
Main memory
External storage media (CFC)
Operating system
Interfaces
Serial
Ethernet
USB
Communication modules
General information
Frame material
Front foil
Outer dimensions in mm WxHxD
Panel profile in mm WxH
Weight
Certifications
Operating temperature
Storage temperature
Order information
Description of item
Order number Lauer
Order number Beijer Electronics

EXTER T70-bl

EXTER T100-bl



EXTER T150-bl

6.5"	10.4"	15"
640 x 480	800 x 600	1024 x 768
64K color TFT		
Resistive Touch		
IP66 / NEMA 4		
24 VDC (20 – 30 V)		
max. 0.9 A	max. 1 A	max. 1.7 A
XScale		
12 MB		
yes		
Windows CE		
RS232/422/485		
10/100 Mbit/s RJ45		
USB Host		
Profibus DP, MPI, CAN		
Aluminum		
acid-resistant polyester foil		
219 x 154 x 61	302 x 228 x 64	398 x 304 x 66
189 x 138	265 x 206	356 x 279
ca. 1.3 kg	ca. 2.5 kg	ca. 4 kg
GL, ABS, DNV, LR, RINA, Acc. EN 60945		
0 to 50° C		
-20 to 60° C		
EXTER T70-bl	EXTER T100-bl	EXTER T150-bl
926.200.0010	926.210.0010	926.220.0010
601000033	601000034	601000035

EXTER SUN-READABLE BLACK

Optimal view with sun-readable displays

Unpredictable light conditions at sea often limit the effective visibility at operator panels. The EXTER sun-readable black panels make operational tasks easy. Regardless of dark night or in the glare of direct sunlight, the high resolution TFT-displays ensure optimal viewing in all conditions.

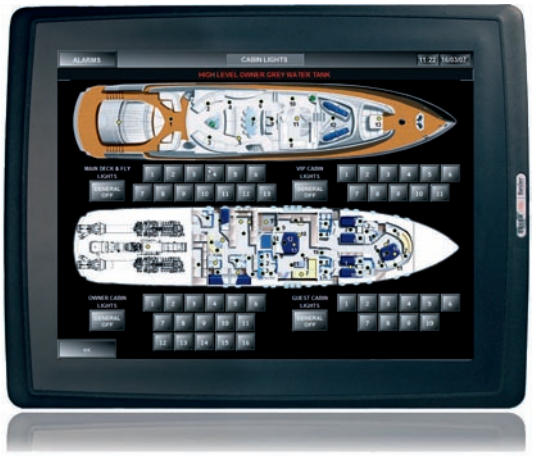
Specific filters help to absorb distracting sun reflections, and dimmable backlight preserves perfect night vision.

- Indicators, bar graphs and switches presented clearly on the display
- Reliable resistive touch panel
- Dimmable backlight preserves optimal night vision
- Sun-readable models fully operable even in glare of direct sunlight
- Clear high-resolution screens
- High level of detail on images, charts, meters and alarms
- Various certifications for major classification societies

TECHNICAL DATA
Display
Size in inches
WxH resolution in pixels
Coloration
Type of data entry
Degree of protection
Voltage supply
Operating voltage
Power consumption
System
Processor
Main memory
External storage media (CFC)
Operating system
Interfaces
Serial
Ethernet
USB
Communication modules
General information
Frame material
Front foil
Outer dimensions in mm WxHxD
Panel profile in mm WxH
Weight
Certifications
Operating temperature
Storage temperature
Order information
Description of item
Order number Lauer
Order number Beijer Electronics

EXTER T70 sr-bl

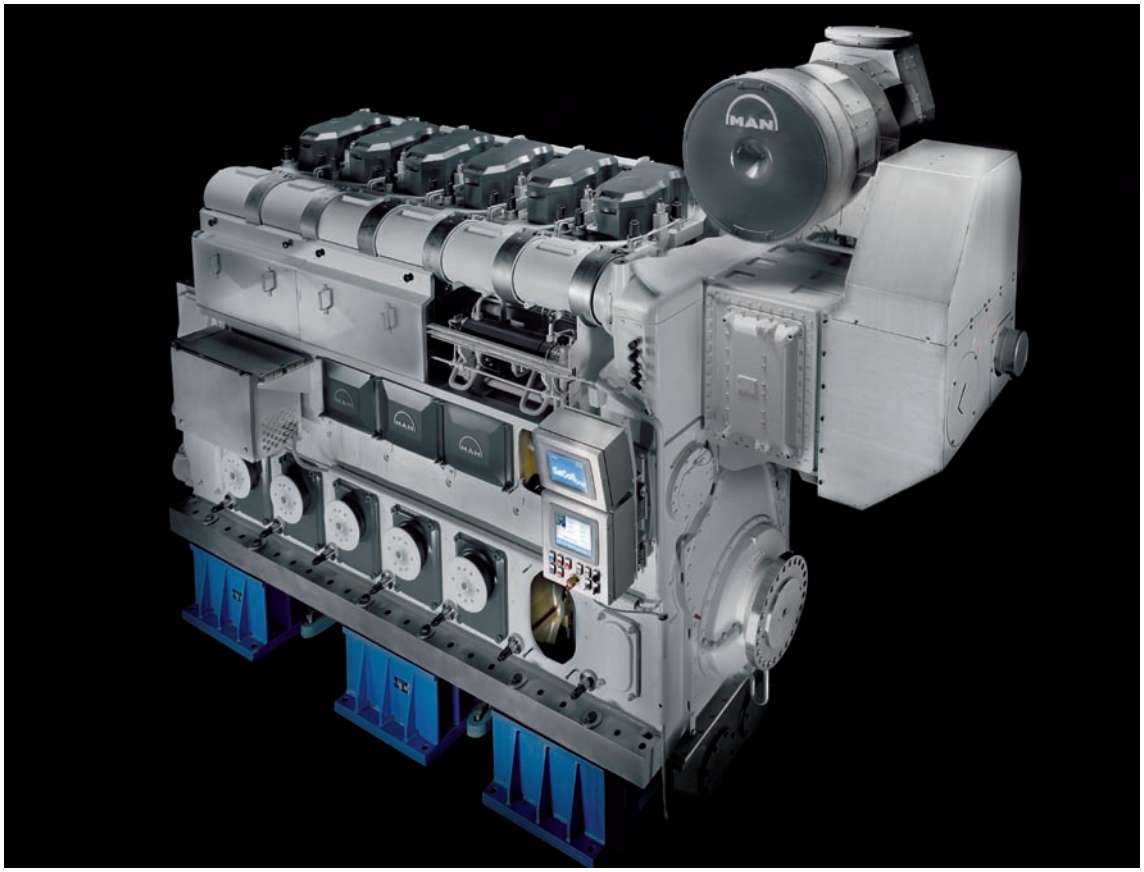
EXTER T100 sr-bl



EXTER T150 sr-bl

6.5"	10.4"	15"
640 x 480	800 x 600	1024 x 768
64K color TFT		
Resistive touch		
IP66 / NEMA 4		
24 VDC (20 – 30 V)		
max. 0.9 A	max. 1 A	max. 1.7 A
XScale		
12 MB		
yes		
Windows CE		
RS232/422/485		
10/100 Mbit/s RJ45		
USB Host		
Profibus DP, MPI, CAN		
Aluminum		
acid-resistant polyester foil		
219 x 154 x 61	302 x 228 x 64	398 x 304 x 66
189 x 138	265 x 206	356 x 279
ca. 1.3 kg	ca. 2.5 kg	ca. 4 kg
GL, ABS, DNV, LR, RINA [1]		
0 to 50° C		
-20 to 60° C		
EXTER T70 sr-bl	EXTER T100 sr-bl	EXTER T150 sr-bl
926.200.0020	926.210.0020	926.220.0020
601000063	601000064	601000065

[1] in progress



VIBRATION-PROOFED IN ANY LOCATION

The EXTER operator panel series is designated for sophisticated industrial and marine applications. Sometimes it is necessary to install the panel right into a machine, which generates dangerous low frequent vibrations. Due to its robust design and high quality components, EXTER is easy to integrate - even in extraordinary environments.

A good example of a turbulent location with particular requirements is given by the installation in a diesel generator.

Dangerous low frequent vibrations

A typical MAN Diesel generator for on-board-power has an output of 450 KW. The dimensions reach the size of a small car. The engine rotary speed of the 2-stroke engines is for sure lower than a car propulsion, but the vibrations are much stronger. Especially the low frequent vibrations of a generator compromise the electronic connections. This was the main reason for MAN Diesel to choose operator panels that are intuitive, robust and vibration resistant. The solution is EXTER.

MAN Diesel supplies engines or complete generating sets to secure reliable and economical power generation. The robust and vibration-resistant EXTER operating panel can be placed directly on the machine itself. The operator panel facilitates regulation and monitoring of vital temperature levels, insuring alarm and shut-down function reliability.

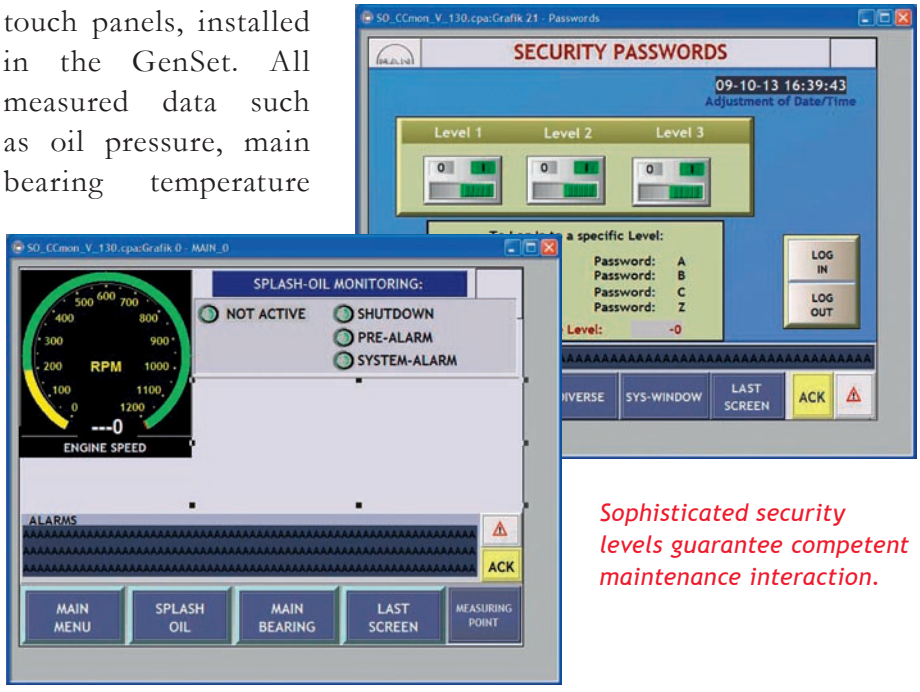
Lubricating extends lifetime

A long propulsion operating time mainly depends on well lubricated and maintained moving parts. In order to control the conditions all the time, various parameters are measured and displayed assembled into the generator. The GenSets provide regulation and monitoring of the lubricating oil temperature, as well as of the temperature in the different chambers. An alarm is linked to a shut-down function, with a PLC shutting down the unit in the event of parameters exceeding safety levels, thus avoiding potentially dangerous incidents.

Robust and user-friendly touch panel

The machine operator easily understands all relevant data on two 5.7 inch EXTER touch panels, installed in the GenSet. All measured data such as oil pressure, main bearing temperature and rotary speed is gathered by an ABB PLC type AC500. The controller is connected with the EXTER panels via Ethernet. The complete operating concept contains a vital damage security, realized by an automatic system check and failure indicator, combined with a shut-down mechanism. Furthermore a dependable alarm function is vital. The EXTER panels allow the process to be halted and the alarm logged, offering the machine operator an incident record. This is especially important in domestic power plants, in order for the GenSets to run at optimum output 24 hours a day without constant supervision.

The programming software Information Designer matches the MAN Diesel demands perfectly. The easy-to-place predefined objects provide a user-friendly environment, which fulfills strict marine guidelines.



Sophisticated security levels guarantee competent maintenance interaction.

OPERATOR PANEL EXTER

The products of the EXTER series are used when intuitive operation and ergonomic design is needed. Typical applications are production and control processes as well as machine visualization networked to the control system.

The operator panels are used for operating and monitoring of process data and messages. Different interfaces allow connecting the panel to control systems such as a PLC or a superior host computer. A multiplicity or communication drivers reduces the need of additional PLC programming. The operator panels are equipped with resistive touch that meets high industrial demands.

- 100% dimmable
- Narrow mounting depth
- Compass safe distance defined
- Choice between touch panel or keyboard operation
- Easy-to-clean powder-coated aluminum frame and casing
- IP66-classified front resistant to dust and high pressure water jets
- Rugged and reliable design for the specifics of maritime requirements
- Seamless operational compatibility with all major brands of control equipment

EXTER K10m

EXTER K20m

TECHNICAL DATA		
Display		
Size in inches	-	-
WxH resolution in pixels	160 x 32	240 x 64
Coloration	FSTN monochrome	
Type of data entry	Alpha-numeric keypad	
Degree of protection	IP66 / NEMA 4 front	
Voltage supply		
Operating voltage	24 VDC (20 – 30 V)	
Power consumption	max. 0.3 A	
System		
Processor	XScale	
Main memory	500 kB	
External storage media (CFC)	-	
Operating system	Windows CE	
Interfaces		
Serial	2 x RS232/422/485	
Ethernet	10 Mbit/s RJ45 *	
USB	-	
Communication modules	Profibus DP	
General information		
Frame material	Aluminum	
Front foil	acid-resistant polyester foil	
Outer dimensions in mm WxHxD	155 x 114 x 49	155 x 155 x 50
Panel profile in mm WxH	121 x 80	120 x 138
Weight	ca. 0.9 kg	ca. 0.9 kg
Certifications		
Operating temperature	0 to 50° C	
Storage temperature	-20 to 60° C	
Order information		
Description of item	EXTER K10m	EXTER K20m
Order number Lauer	926.010.0010	926.020.0010
Order number Beijer Electronics	601110201	601110202

* Available as an add-on module

EXTER K30m

EXTER T40

TECHNICAL DATA		
Display		
Size in inches	-	3.5"
WxH resolution in pixels	240 x 64	320 x 240
Coloration depending on display	FSTN monochrome	64K color TFT / B/W
Type of data entry	Alpha-numeric keypad	Resistive touch
Degree of protection	IP66 / NEMA 4 front	
Voltage supply		
Operating voltage	24 VDC (20 – 30 V)	
Power consumption	max. 0.35 A	
System		
Processor	XScale	
Main memory	12 MB	
External storage media (CFC)	-	
Operating system	Windows CE	
Interfaces		
Serial	2 x RS232/422/485	
Ethernet	10/100 Mbit/s RJ45	
USB	USB Host	
Communication modules	Profibus DP, MPI, CANopen	
General information		
Frame material	Aluminum	
Front foil	acid-resistant polyester foil	
Outer dimensions in mm WxHxD	202 x 187 x 63	155 x 119 x 63
Panel profile in mm WxH	166 x 149	139 x 105
Weight	ca. 0.9 kg	ca. 0.6 kg
Certifications		
Operating temperature	0 to 50° C	
Storage temperature	-20 to 60° C	
Order information		
Description of item	EXTER K30m	EXTER T40 / EXTER T40m
Order number Lauer	926.030.0010	926.040.0020 / 926.040.0010
Order number Beijer Electronics	601000101	601110103 / 601000102

EXTER K60

EXTER T60

EXTER K70

5.7"	5.7"	6.5"
320 x 240		640 x 480
64K color TFT	64K color TFT / B/W	64K color TFT
Alpha-numeric keypad	Resistive touch	Alpha-numeric keypad
IP66 / NEMA 4 front		
24 VDC (20 – 30 V)	24 VDC (20 – 30 V)	24 VDC (20 – 30 V)
max. 0.5 A	max. 0.45 A	max. 0.9 A
XScale		
12 MB		
-		yes
Windows CE		
2 x RS232/422/485		
10/100 Mbit/s RJ45		
USB Host		
Profibus DP, MPI, CANopen		
Aluminum		
acid-resistant polyester foil		
275 x 168 x 63	201 x 152 x 63	285 x 177 x 62
240 x 130	180 x 130	246 x 139
ca. 1.1 kg	ca. 0.9 kg	ca. 1.5 kg
0 to 50° C		
-20 to 60° C		
EXTER K60 / EXTER K60m	EXTER T60 / EXTER T60m	EXTER K70
On demand / On demand	926.050.0050 / On demand	926.070.0010
601110109 / On demand	601110108 / 601110107	601110001

EXTER T70

EXTER K100

TECHNICAL DATA		
Display		
Size in inches	6.5"	10.4"
WxH resolution in pixels	640 x 480	800 x 600
Coloration	64K color TFT	
Type of data entry	Resistive touch	Alpha-numeric keypad
Degree of protection	IP66 / NEMA 4	
Voltage supply		
Operating voltage	24 VDC (20 – 30 V)	
Power consumption	max. 0.9 A	max. 1 A
System		
Processor	XScale	
Main memory	12 MB	
External storage media (CFC)	yes	
Operating system	Windows CE	
Interfaces		
Serial	2 x RS232/422/485	
Ethernet	10/100 Mbit/s RJ45	
USB	USB Host	
Communication modules	Profibus DP, MPI, CANopen	
General information		
Frame material	Aluminum	
Front foil	acid-resistant polyester foil	
Outer dimensions in mm WxHxD	219 x 154 x 61	382 x 252 x 64
Panel profile in mm WxH	189 x 138	343 x 208
Weight	ca. 1.3 kg	ca. 2.5 kg
Certifications		
Operating temperature	0 to 50° C	
Storage temperature	-20 to 60° C	
Order information		
Description of item	EXTER T70	EXTER K100
Order number Lauer	926.080.0010	926.090.0010
Order number Beijer Electronics	601110002	601110003

EXTER T100

EXTER T150

10.4"	15"
800 x 600	1024 x 768
64K color TFT	
Resistive touch	
IP66 / NEMA 4	
24 VDC (20 – 30 V)	
max. 1 A	max. 1.7 A
XScale	
12 MB	
yes	
Windows CE	
2 x RS232/422/485	
10/100 Mbit/s RJ45	
USB Host	
Profibus DP, MPI, CANopen	
Aluminum	
acid-resistant polyester foil	
302 x 228 x 64	398 x 304 x 66
265 x 206	356 x 279
ca. 2.5 kg	ca. 4 kg
0 to 50° C	
-20 to 60° C	
EXTER T100	EXTER T150
926.100.0010	926.110.0010
601110004	601110005

RADICALLY DECENTRALIZED

Automation in a luxurious environment

Lauer marine automation PCs are used in several sophisticated applications. Depending on the designated use they are equipped with passive cooled low power consumption CPUs or powerful C2D processors, to fulfill high-end navigation tasks. Display sizes between 8.4 and 21" are available. All the computers conform with the quality requirements of all major classification societies and are perfectly dedicated for specific marine automation applications.

A typical case is monitoring of a luxury yacht, built by Lürssen boatyard. The project was realized by besecke Automation, a company based in Bremen, Germany. besecke is one of the leading automation companies among luxury yachts, and a manufacturer and service provider of Lürssen boat yard.

The current yacht has a length of just 60 meters and carries the project name "Bounty Hunter". The luxury yacht is powered by two Caterpillar engines, each rated 1,440 kW (1958 HP), which can accelerate the craft up to 16 knots (about 30 km/h). The bunker tanks hold up to 150,000 liters of fuel and 28,000 liters of fresh water.

High-level monitoring

The complete machine control system ALLVIU-MCS® permits monitoring of all parameters that are relevant on board a yacht such as the Bounty Hunter. Engine speeds, room temperatures, oil pressures and levels, status of doors, slides and ventilation flaps, as well as pump activities and exhaust gas temperatures are collected by the system and presented in a visualization display. The entire data from the drive machinery is fed directly into the monitoring system via an interface in the engine management controller.

Monitoring even when un-manned

The entire system is based on Microsoft .NET and runs on special box PCs from Lauer. The units in the EPC Txxx nautic range have been awarded many certificates for marine applications, thereby satisfying the first preconditions for use on ocean-going yachts. In addition they glitter with further features such as specially shock-resistant mounted hard disks which absorb the low-frequency vibrations on board ships that may

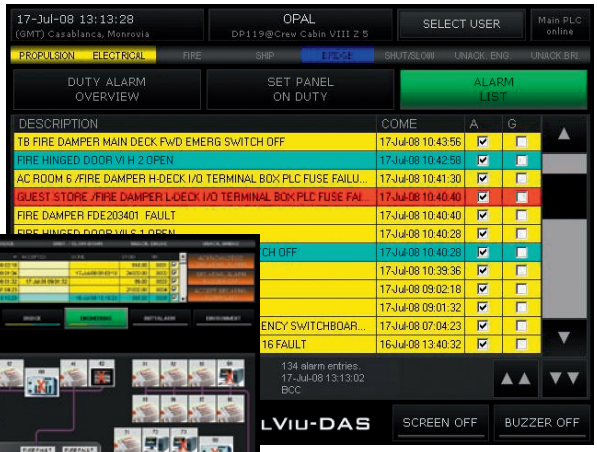
The Lürssen yacht type Bounty Hunter

damage electronic components. Besides the unit in the machine control room, there are three additional box PCs on the bridge, connected to external 19" touch monitors. One computer is dedicated exclusively to controlling the entire automation of the boat; the two others are responsible for displaying and controlling the fire-tight flaps and external hatches. The class regulations for the various maritime certification agencies require that the closure status is displayed constantly.

The Lauer PCs are linked to the other decentralized controls by means of marine approved hyperring switches. A further function of the Besecke monitoring system is the facility to forward alarm messages from the machine room to the "Duty Alarm Panels". These are 8 and 10" Lauer PCs mounted in the chief engineer's cabin or the captain's cabin, which display details of current alarms in plain text. Touching an alarm message on the screen presents the status of the current alarm, without having to be present in the machine control room.

Decentralization brings results

There is a total of more than 1,000 measurement points to be networked. To achieve optimized cabling of this constellation, a sophisticated concept of decentralized control is employed. The current project is implemented using intelligent I/O controllers from WAGO, which monitor all actuator/sensor areas such as door statuses, temperatures, tank levels and flap controls as decentralized controllers.



All relevant information is shown together with the network topology by besecke monitoring system.

With up to 2,000 alarm and status messages, some of which have safety-relevant consequences, clear user management is absolutely necessary. For this purpose the ALLVIA-MCS® has a user panel for authorization (CONTROL AUTH) which ensures from first principles that message acknowledgements or engine control commands cannot be issued simultaneously by both the bridge and the machine control room.

The reason for decentralized interrogation of actuators and sensors is actually quite far-reaching. The network wiring forwards all data to the monitoring system. There is no actual server as a central unit, which entails a second advantage: In case of a fault, virtually all systems continue to operate without restriction. This eliminates the need for a redundant server structure and its attendant expense. Finally, this decentralized control intelligence delivers significant advantages at the Factory Acceptance Test (FAT) stage, long before commissioning. In this way individual components such as fire-break bulkheads and loading hatches are thoroughly tested before installation into the boat. Decentralized controllers easily lend themselves to such testing, which greatly reduces the work required for subsequent installation into the overall concept.

The 8.4" LAUER Nautic-PC is used as a Duty Alarm Panel in the Chief Engineer's cabin

EPC LX NAUTIC

The marine automation PCs EPC LX T80 and EPC LX T100 are compact embedded touch panel computers, based on an AMD LX 800 processor. Regarding the CPUs low power consumption the units are passive cooled without any rotating parts. Especially designed for marine application, they are mainly used on vessels for automation tasks as control or monitoring client PCs. They are equipped with a special alarm signal buzzer (75 dB) and a fully dimming functionality. Its black powder-coated aluminium frame gives a timeless design, which matches modern fly-bridges as well as cabins perfectly.

The PC architecture is completely open and will be available with Windows XP Embedded, Windows CE, VxWorks and Linux. The powerful HMI-Software WOP-iT is optionally available to control important machine data in a user-friendly way.

- Open PC platform
- Reliable resistive touch panel
- Vibration resistance due to exclusion of rotating parts
- Compact design for space-saving installation
- Rugged design for specifics of marine requirements
- Dimmable backlight preserves optimal night vision
- Various certifications for major classification societies

EPC T80 LX Nautic

EPC T100 LX Nautic

TECHNICAL DATA		
Front panel		
Size in inches	8.4"	10.4"
WxH resolution in pixels	640 x 480	800 x 600
Contrast ratio	500:1	1500:1
Luminous intensity	320 cd/m² (typical)	320 cd/m² (typical)
Angle of vision	130° (H) /110° (V)	176° (H/V)
Type of data entry	Resistive touch	
Degree of protection	IP65 on the front according to DIN EN60529	
Power supply		
Operating voltage	24 VDC +/- 20%	
Power consumption	ca. 500 mA	
System		
Processor	AMD LX 800	
Main memory	256 MB / 1024 MB	
External storage media (CFC)	128 MB - 16 GB	
Internal mass memory	128 MB - 16 GB	
Operating system	Windows CE.NET, Windows XP Embedded	
Interfaces		
Serial	RS232	
Ethernet	2 x 10/100 Mbps	
Keypad / mouse	1 x PS/2	
Printer	-	
Monitor		
USB	2 x USB 2.0	
Slots	PC/104	
Communication modules	MPI, DUAL-CAN	
General information		
Frame material	Aluminum	
Front foil	acid-resistant polyester foil	
Outer dimensions in mm WxHxD	252 x 190 x 77	318 x 244 x 85
Panel profile in mm WxH	232 x 170	303 x 228
Weight	ca. 1.9 kg	ca. 2.3 kg
Certification	GL [2]	
Operating temperature	0 to 55° C	
Storage temperature	-20 to 60° C	
Order information		
Description of item	EPC T80 LX Nautic	EPC T100 LX Nautic
Order number Lauer	950.502.0040	950.502.0030
Order number Beijer Electronics	603001039	603001040

[2] in progress

EPC PM NAUTIC

The marine touch panel PC range EPC Txxx Nautic has been approved in many different marine applications during the last years. The series is developed for long term availability. Due to its modular concept, the units are assembled as box and Panel-PC with different display sizes. Based on the Pentium® Mobile platform the units are especially designed for direct mounting into vessels without using additional anti-vibration kits. Modular memory structures enable pure flash-based systems without hard disks. In case of mass memory necessity special hard disk drives with high temperature range and anti-vibration mounting are available.

The units are equipped with a lot of interfaces such as serial, USB and Ethernet ports, as well as idle PCI slots.

- Well-approved and open PC platform
- Reliable resistive touch panel
- Long life components for long term availability
- Rugged design for specifics of marine requirements
- Various certifications for major classification societies

EPC T150 Nautic

EPC T170 Nautic

TECHNICAL DATA

Front panel		
Size in inches	15" TFT	17" TFT
WxH resolution in pixels	1024 x 768	1280 x 1024
Contrast ratio	450:1	600:1
Luminous intensity	250 cd/m² (typical)	
Angle of vision	150° (H) /110° (V)	178° (H/V)
Type of data entry	Resistive touch [1] (Option: anti-reflective glass)	
Degree of protection	IP65 front end; IP20 back end	
Power supply		
Operating voltage	24 VDC +/- 15% or 110-230 +/- 15% VAC	
Power consumption	ca. 4.0 / 1.0 A	
System		
Processor	Intel Celeron-M 1.3 GHz / Pentium-M 1.8 GHz	
Main memory	1 GB / 2 GB	
External storage media (CFC)	128 MB - 16 GB	
Internal mass memory	CFC 128 MB - 16 GB / HDD automotive 40 GB	
Operating system	Windows XP Embedded / Windows XP Professional	
Interfaces		
Serial	2 x RS232, RS232/485	
Ethernet	2 x 10/100 Mbps	
Keypad / mouse	2 x PS/2	
Printer	LPT1	
Monitor	VGA	
USB	4 x USB 2.0	
Slots	2 x PCI (max 220 mm)	
Communication modules	-	
General information		
Frame material	Aluminum	
Front foil	acid-resistant polyester foil	
Outer dimensions in mm WxHxD	412 x 351 x 145	430 x 390 x 145
Panel profile in mm WxH	369 x 324	396 x 364
Weight	ca. 9 kg	ca. 10 kg
Certifications	GL, ABS, DNV, BV, LR	
Operating temperature	0 to 55° C	
Storage temperature	-20 to 70° C	
Order information		
Description of item	EPC T150 Nautic DC / EPC T150 Nautic AC	EPC T170 Nautic DC / EPC T170 Nautic AC
Order number Lauer	950.516.0360 / 950.516.0380	950.516.0030 / 950.516.0310
Order number Beijer Electronics	603000011 / 603000014	603000012 / 603000015

[1] also available with anti-reflection glass without touch screen feature.

EPC T190 Nautic

EPC T210 Nautic

TECHNICAL DATA

Front panel		
Size in inches	19" TFT	21" TFT
WxH resolution in pixels	1280 x 1024	1600 x 1200
Contrast ratio	1000:1	
Luminous intensity	250 cd/m² (typical)	
Angle of vision	178° (H/V)	
Type of data entry	Resistive touch [1] (Option: anti-reflective glass)	
Degree of protection	IP65 front end; IP20 back end	
Power supply		
Operating voltage	24 VDC +/- 15% or 110-230 +/- 15% VAC	
Power consumption	ca. 4.0 / 1.0 A	
System		
Processor	Intel Celeron-M 1.3 GHz / Pentium-M 1.8 GHz	
Main memory	1 GB / 2 GB	
External storage media (CFC)	128 MB - 16 GB	
Internal mass memory	CFC 128 MB - 16 GB / HDD automotive 40 GB	
Operating system	Windows XP Embedded / Windows XP Professional	
Interfaces		
Serial	2 x RS232, RS232/485	
Ethernet	2 x 10/100 Mbps	
Keypad / mouse	2 x PS/2	
Printer	LPT1	
Monitor	VGA	
USB	4 x USB 2.0	
Slots	2 x PCI (max 220 mm)	
Communication modules	-	
General information		
Frame material	Aluminum	
Front foil	acid-resistant polyester foil	
Outer dimensions in mm WxHxD	483 x 444 x 145	534 x 481 x 144
Panel profile in mm WxH	438 x 416	498 x 441
Weight	ca. 13.0	ca. 18.5
Certifications	GL, ABS, DNV, BV, LR	
Operating temperature	0 to 55° C	
Storage temperature	-20 to 70° C	
Order information		
Description of item	EPC T190 Nautic DC / EPC T190 Nautic AC	EPC T210 Nautic DC / EPC T210 Nautic AC
Order number Lauer	950.516.0050 / 950.516.0330	On demand
Order number Beijer Electronics	603000013 / 603000016	On demand

[1] also available with anti-reflection glass without touch screen feature.

EPC Box Nautic

TECHNICAL DATA	
Front panel	
Size in inches	-
WxH resolution in pixels	-
Contrast ratio	-
Luminous intensity	-
Angle of vision	-
Type of data entry	-
Degree of protection	IP20 on all sides
Power supply	
Operating voltage	24 VDC +/- 15% or 115-230 +/- 15% VAC
Power consumption	ca. 4.0 / 1.0 A
System	
Processor	Intel Celeron-M 1.3 GHz / Pentium-M 1.8 GHz
Main memory	1 GB / 2 GB
External storage media (CFC)	128 MB - 16 GB
Internal mass memory	CFC 128 MB - 16 GB / HDD automotive 40 GB
Operating system	Windows XP Embedded / Windows XP Professional
Interfaces	
Serial	2 x RS232, RS232/485
Ethernet	2 x 10/100 Mbps
Monitor	VGA
Graphic	2 x PS/2
USB	4 x USB 2.0
General information	
Frame material	-
Front foil	-
Outer dimensions in mm WxHxD	389 x 276 x 114
Panel profile in mm WxH	-
Weight	ca. 5.5 kg
Certifications	GL, ABS, DNV, BV, LR
Operating temperature	0 to 55° C
Storage temperature	-20 to 70° C
Order information	
Description of item	EPC Box Nautic DC / EPC Box Nautic AC
Order number Lauer	950.516.0010 / 950.516.0300
Order number Beijer Electronics	603000023 / 603000024

EPC T150 C2D Nautic

EPC C2D NAUTIC

The marine touch panel PC range EPC C2D Nautic has been developed with a particular focus on usability and operation in typical marine environments. They are used in all types of vessels, where high PC performance and a long lifetime is mandatory.

The dimming function which allows a seamless backlight dimming from 100% to 0% qualifies for perfect night vision on fly bridges. The user can dim the backlight via buttons on the front of the PC, or remotely via serial, USB or LAN interface. This ensures an equal view level of all back-lighted displays, connected in a dimming network.

The utilization of specific industrial electronic components, e.g. storage media and cooling systems, guarantees a much better robustness and system lifetime, compared with common used COTS devices (Components of the shelf).

- Powerful open PC platform
- Reliable resistive touch panel
- Rugged design for specifics of marine requirements
- Network dimming function preserves optimal night vision
- Various certifications for major classification societies
- Long life components for long term availability

TECHNICAL DATA

Front panel	
Size in inches	15" TFT
WxH resolution in pixels	1024 x 768
Contrast ratio	450:1
Luminous intensity	250 cd/m² (typical)
Angle of vision	150° (H) / 110° (V)
Type of data entry	Resistive touch [1] (Option: anti-reflective glass)
Degree of protection	IP65 front end; IP20 back end
Power supply	
Operating voltage	24 VDC +/- 15% or 115-230 +/- 15% VAC
Power consumption	ca 4.0 A / 1.0 A
System	
Processor	Intel Core2Duo 2.2 GHz
Main memory	2 GB / 4 GB
External storage media (CFC)	2 GB - 16 GB
Internal mass memory	CFC 2 GB - 16 GB / HDD automotive 80 GB
Operating system	Windows XP Embedded / Windows XP Professional
Interfaces	
Serial	2 x RS232
Ethernet	2 x 10/100/1000 Mbps
Keypad / mouse	2 x PS/2
Printer	-
Monitor	VGA + DVI-I
USB	4 x USB 2.0
Slots	2 x PCI (max 220 mm)
Communication modules	-
General information	
Frame material	Aluminum
Front foil	acid-resistant polyester foil
Outer dimensions in mm WxHxD	412 x 351 x 142.5
Panel profile in mm WxH	369 x 324
Weight	ca. 9 kg
Certifications	GL, ABS, DNV, BV, LR [2]
Operating temperature	0 to 55° C
Storage temperature	-20 to 70° C
Order information	
Description of item	EPC T150 C2D Nautic DC / EPC T150 C2D Nautic AC
Order number Lauer	950.522.0020 / 950.522.0040
Order number Beijer Electronics	603001030 / 603001029

EPC T170 C2D Nautic

EPC T190 C2D Nautic

EPC Box C2D Nautic

17" TFT	19" TFT	-
1280 x 1024	1280 x 1024	-
600:1	1000:1	-
250 cd/m² (typical)		-
178° (H/V)		-
Resistive touch [1] (Option: anti-reflective glass)		-
IP65 front end; IP20 back end		IP 20 on all sides
24 VDC +/- 15% or 115-230 +/- 15% VAC		
ca 4.0 A / 1.0 A		
Intel Core2Duo 2.2 GHz		
2 GB / 4 GB		
2 GB - 16 GB		
CFC 2 GB - 16 GB / HDD automotive 80 GB		
Windows XP Embedded / Windows XP Professional		
2 x RS232		
2 x 10/100/1000 Mbps		
2 x PS/2		
-		
VGA + DVI-I		
4 x USB 2.0		
2 x PCI (max 220 mm)		
-		
Aluminum		-
acid-resistant polyester foil		-
430 x 390 x 142.5	483.2 x 444 x 142.5	389 x 276 x 114
396 x 364	438 x 416	-
ca. 10 kg	ca. 13 kg	ca. 5.5 kg
GL, ABS, DNV, BV, LR [2]		GL, ABS, DNV, BV, LR [2]
0 to 55° C		
-20 to 70° C		
EPC T170 C2D Nautic DC / EPC T170 C2D Nautic AC	EPC T190 C2D Nautic DC / EPC T190 C2D Nautic AC	EPC Box C2D Nautic DC / EPC Box C2D Nautic AC
950.522.0060 / 950.522.0080	950.522.0100 / 950.522.0120	950.522.0160 / 950.522.0010
603001034 / 603001033	603001038 / 603001037	603001026 / 603001025

[1] also available with anti-reflection glass without touch screen feature.
[2] in progress

MTe – MONITORS FOR MARINE APPLICATIONS

The first generation of MT marine monitors was developed in 2004. From this time, the product technology has constantly improved. Today the Lauer marine monitor range is equipped with "enhanced" functionality. The video signal transmission can be realized via USB or LAN interface. Additionally, seamless backlight dimming from 0 to 100% is possible.

The MTe monitor range has been developed for automation applications on bridges, motor control rooms and different other PC-based applications on vessels and offshore environments. Three different display sizes between 15 and 19" are available.

The "e" stands for "enhanced"

Compared with an ordinary monitor which receive its video signal via VGA or DVI cable, the MTe series offers two alternative opportunities; transmission of the video signal via USB or LAN.

The result is an open network structure with connection of up to 8 different monitors without any VGA or DVI converter. It is possible to use an existing LAN to save inflexible VGA-cabling and expensive multimode graphic cards.

Dimming in several ways

At bridges it is mandatory to use a dimming functionality for all back-lighted devices. MTe displays can be dimmed infinitely variable to 0% brightness, which ensures a non-dazzling control for the crew.

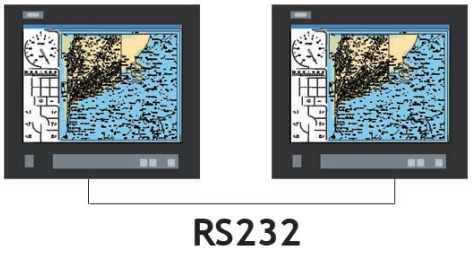
There are several ways to adjust the display brightness. One way is to adjust dimming for every monitor individually, using the front buttons. But it some cases it might be useful, to dim the whole range of monitors at once. For this case the Remote Dimming feature allows building local networks of connected monitors where any monitor can control the backlight brightness of any other.

If the Remote Control feature of a single monitor is not enabled, this monitor cannot control other monitors, but may still be controlled by other monitors. This feature is realized with a serial protocol, which is called "SCOM" and originally developed by Hatteland. This way, network dimming can be realized easily without additional equipment.

There are several ways of remote dimming available :

Point-to-Point

Two monitors can control each other, if they are connected via RS232.



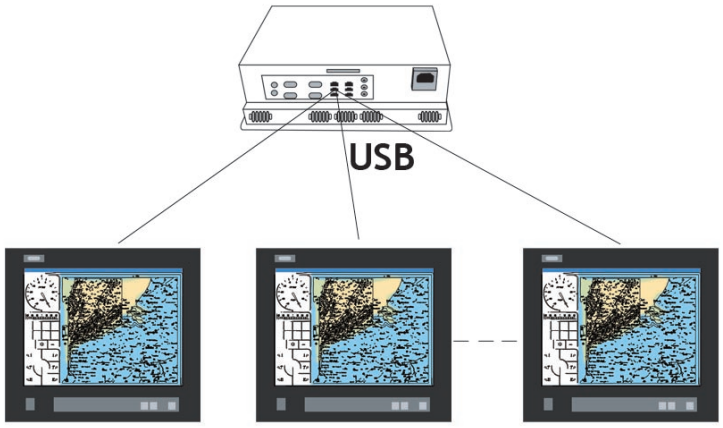
Multiple Monitors

More than two monitors can be connected and control each other via an RS485 bus.

Other remote dimming features are available via USB or Ethernet connection with the Lauer RBC Router. The RBC Router is a service that handles SCOM commands. It is a part of the Monitor Control Center.

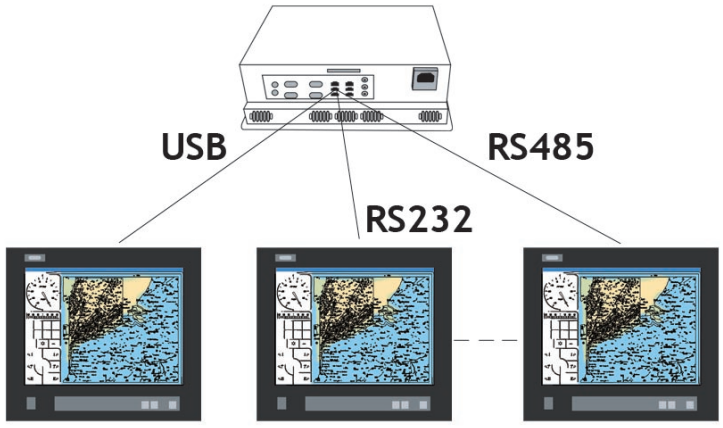
USB Network

Several monitors can control each other if they have a USB connection to the same PC. To enable this feature, the RBC Router must run on the PC, and USB output must be enabled.



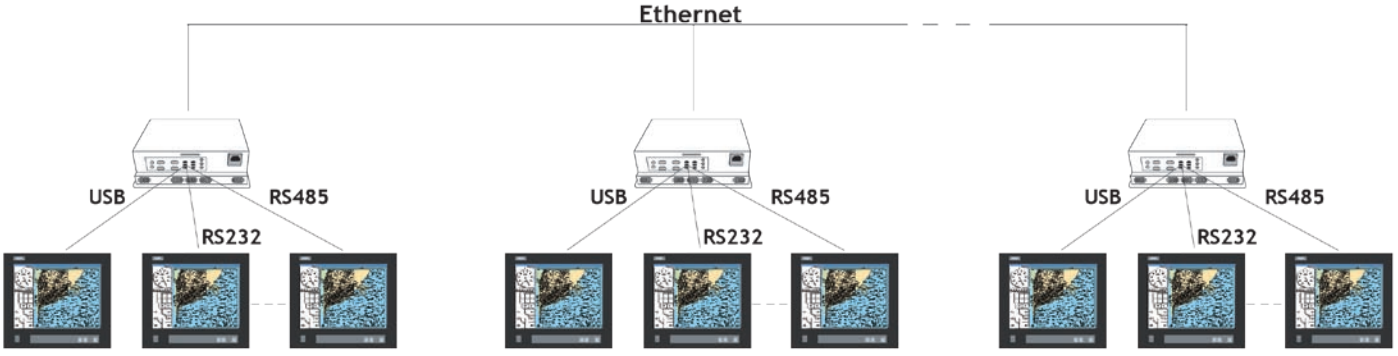
Local Universal Network

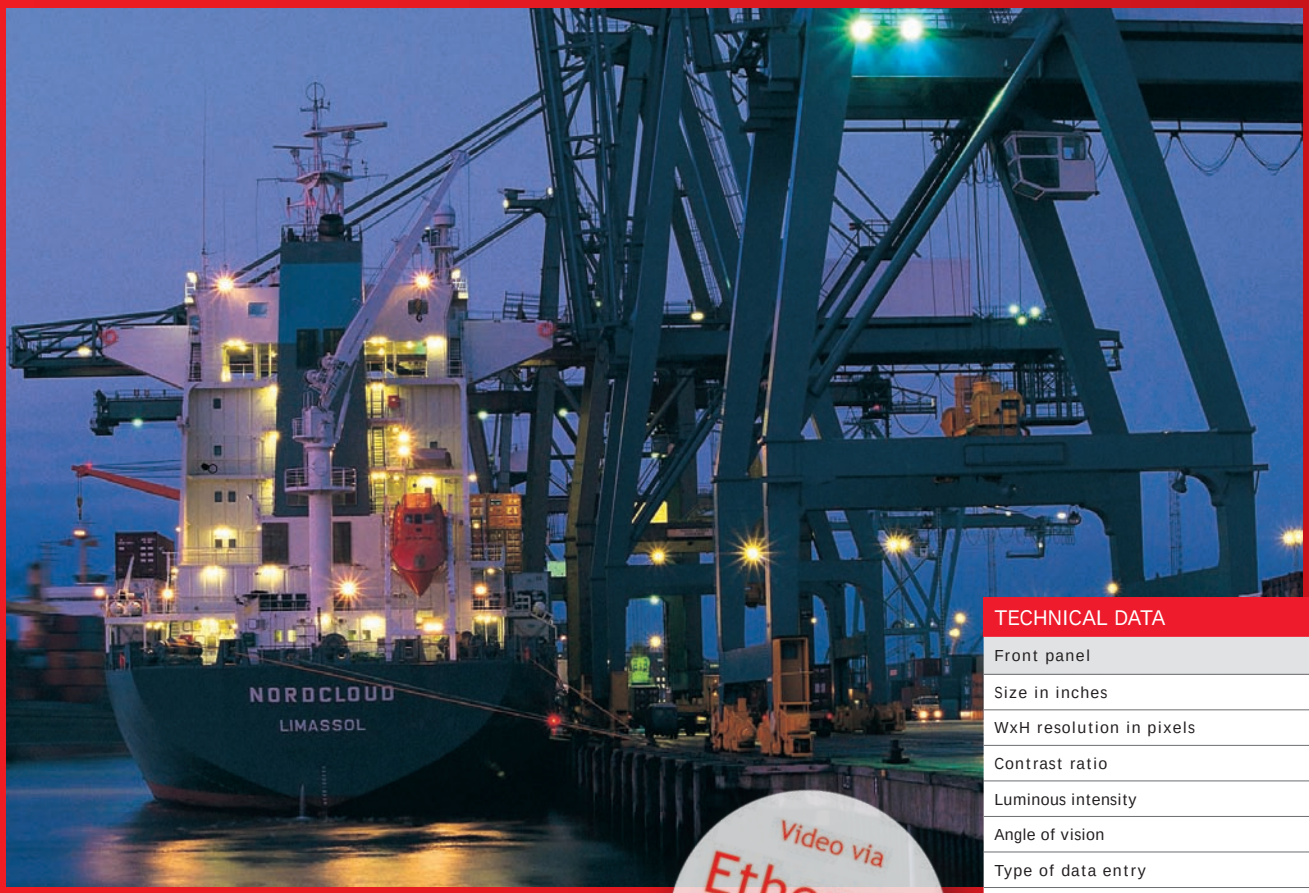
Several monitors can control each other if they have any of the supported connections RS232, RS485 or USB to the same PC. To enable this feature, the RBC Router must run on the PC, and RS232 output, RS485 output or USB output must be enabled.



Global Universal Network

Several monitors in different local networks can control each other if they are connected via Ethernet, RS232 (only two PCs per connection) or RS485. To enable this feature, the RBC Router must run on every PC, and RS232 output, RS485 output, USB output and Ethernet input must be enabled.





Video via Ethernet + USB

NAUTIC MONITORS E SERIES

The e series (enhanced) nautic monitors excel with extended functionality. The brightness can be steplessly dimmed to zero via 1) the illuminated front buttons 2) the serial interface 3) the USB interface. Optionally, remote dimming is possible via Ethernet.

For various voltage requirements a selection of monitors is available, equipped with 24VDC or a 110-230 VAC wide-range power supply.

- Reliable resistive touch panel
- Rugged design for specifics of marine requirements
- Network dimming functionality
- Various certifications for major classification societies

TECHNICAL DATA
Front panel
Size in inches
WxH resolution in pixels
Contrast ratio
Luminous intensity
Angle of vision
Type of data entry
Degree of protection
Power supply
Operating voltage
Power consumption
System
Processor
Main memory
External storage media (CFC)
Internal mass memory (CFC)
Operating system
Interfaces
Serial
Ethernet
Graphics
Input
General information
Frame material
Front foil
Outer dimensions in mm WxHxD
Panel profile in mm WxH
Weight
Certifications
Operating temperature
Storage temperature
Order information
Description of item
Order number Lauer
Order number Beijer Electronics

MTe T150 Nautic

MTe T170 Nautic

MTe T190 Nautic

15"	17"	19"
1024 x 768	1280 x 1024	1280 x 1024
450:1	600:1	1000:1
250 cd/m² (typical)		
150° (H) / 110° (V)	178° (H/V)	178° (H/V)
Resistive touch [1] (Option: anti-reflective glass)		
IP65 front end; IP20 back end		
24 VDC +/- 15% or 115-230 +/- 15% VAC		
ca. 4.0 / 1.0 A		
-		
-		
-		
-		
-		
RS232 /485		
Option 10/100 Mbps		
VGA / DVI / USB (Option: Ethernet)		
USB		
Aluminum		
acid-resistant polyester foil		
412 x 351 x 81	430 x 390 x 81	483,2 x 444 x 81
369 x 324	396 x 364	438 x 416
ca. 6.5 kg	ca. 7.5 kg	ca. 10.0 kg
GL, ABS, DNV, BV, LR [2]		
0 to 55°C		
-20 to 70°C		
MTe T150 Nautic DC / MTe T150 Nautic AC	MTe T170 Nautic DC / MTe T170 Nautic AC	MTe T190 Nautic DC / MTe T190 Nautic AC
950.700.0060 / 950.700.0050	950.700.0070 / 950.700.0080	950.700.0030 /950.700.0040
603001006 / 603001005	603001014 / 603001013	603001022 / 603001021

[1] also available with anti-reflection glass without touch screen feature
[2] In progress

MT T150 Nautic

MT NAUTIC

The MT Nautic Monitor series operates with or without touch, offering the specific functions to enable automation and navigational tasks and featuring narrow depth for easy installation. Utilized in combination with the EPC box or third party computers, the MT Nautic Monitors afford excellent quality displays of nautical charts or machine data and offer infinitely adjustable dimming.

- Reliable resistive Touch panel[1]
- Anti-reflective glass front
- Narrow depth for easy installation
- Can be combined with all computer types

TECHNICAL DATA	
Front panel	
Size in inches	15"
WxH resolution in pixels	1024 x 768
Contrast ratio	450:1
Luminous intensity	250 cd/m² (typical)
Angle of vision	150° (H) / 110° (V)
Type of data entry	Resistive touch [1] (Option: anti-reflective glass)
Degree of protection	IP65 front end; IP20 back end
Power supply	
Operating voltage	24 VDC +/- 15% or 115-230 +/- 15% VAC
Power consumption	ca. 4.0 / 1.0 A
System	
Processor	-
Main memory	-
External storage media (CFC)	-
Internal mass memory (CFC)	-
Operating system	-
Interfaces	
Serial	-
Ethernet	-
Graphics	VGA
Input	USB
General information	
Frame material	Aluminum
Front foil	acid-resistant polyester foil
Outer dimensions in mm WxHxD	412 x 351 x 81
Panel profile in mm WxH	369 x 324
Weight	ca. 6 kg
Certifications	GL, ABS, DNV, BV, LR
Operating temperature	0 to 55° C
Storage temperature	-20 to 70° C
Order information	
Description of item	MT T150 Nautic DC / MT T150 Nautic AC
Order number Lauer	950.516.0400 / 950.516.0390
Order number Beijer Electronics	603000025 / 603000028

[1] also available with anti-reflection glass without touch screen feature

MT T170 Nautic

MT T190 Nautic

MT T210 Nautic

17"	19"	21"
1280 x 1024	1280 x 1024	1600 x 1200
600:1	1000:1	1000:1
250 cd/m² (typical)		
178° (H/V)		
Resistive touch [1] (Option: anti-reflective glass)		
IP65 front end; IP20 back end		
24 VDC +/- 15% or 115-230 +/- 15% VAC		
ca. 4.0 / 1.0 A		
-		
-		
-		
-		
-		
-		
-		
VGA		
USB		
Aluminum		
acid-resistant polyester foil		
430 x 390 x 81	483.2 x 444 x 81	534 x 481 x 80
396 x 364	438 x 416	498 x 441
ca. 8 kg	ca. 10 kg	ca. 15 kg
GL, ABS, DNV, BV, LR		
0 to 55° C		
-20 to 70° C		
MT T170 Nautic DC / MT T170 Nautic AC	MT T190 Nautic DC / MT T190 Nautic AC	MT T210 Nautic DC / MT T210 Nautic AC
950.516.0100 / 950.516.0110	950.516.0120 / 950.516.0130	950.516.0220 / 950.516.0210
603000026 / 603000029	603000027 / 603000030	On demand

NAVIGATION MONITOR

The MT Nautic navigation monitors are mainly used on ship bridges, including applications with RADAR and ECDIS features. All the monitors in the MT Nautic series conform with the demands according to ECDIS (EN 60xxx) and general bridge usage (EN 60945). The series meets high navigation visualization requirements and includes a number of useful functions, for example intelligent web-based configuration and a communication centre.

The brightness can be steplessly dimmed to zero via the illuminated front keypad, or via a serial interface. Additionally, the monitors include a LAN interface, which allows dimming via Ethernet. An integrated web browser ensures smooth dimming configuration. The stepless brightness adjustment is an important prerequisite for ECDIS and RADAR licenses.

A special type of anti-reflective glass guarantees optimum readability in daylight. The shallow installation depth makes the monitors ideal for easy installation on ship bridges. The MT Nautic monitors are available in different sizes with a side ratio of 4:3 and 16:10. The wide-range power supply of 115 to 230 VAC ensures error-free operation for various supply voltages.

- Anti-reflective glass front
- Network dimming functionality
- Rugged design for specific marine requirements
- Various certifications for major classification societies
- Standardized display size for ECDIS/RADAR applications

MT 230 NAV

TECHNICAL DATA

Front panel	
Size in inches	23.1"
WxH resolution in pixels	1600 x 1200
Contrast ratio	500:1
Luminous intensity	0-220 cd/m²
Angle of vision	170° (V/H)
Type of data entry	anti-reflection glass
Degree of protection	IP65 front end; IP20 back end
Power supply	
Operating voltage	115-230 +/- 15% VAC
Power consumption	ca. 1.0 A
System	
Processor	-
Main memory	-
External storage media (CFC)	-
Internal mass memory (CFC)	-
Operating system	-
Interfaces	
Serial	RS232 / 485
Ethernet	10/100 Mbps
Graphics	VGA / DVI
Input	USB front
General information	
Frame material	Aluminum
Front foil	acid-resistant polyester foil
Outer dimensions in mm WxHxD	584 x 534 x 98
Panel profile in mm WxH	543 x 505
Weight	ca. 18 kg
Certification	BSH[1]
Operating temperature	-15 to 55° C
Storage temperature	-20 to 70° C
Order information	
Description of item	MT 230 Nautic AC
Order number Lauer	950.701.0010
Order number Beijer Electronics	603000037

[1] In progress
Wide screen monitor in progress

MARITIME CERTIFICATIONS

Panel/System	CE	LR	BV	GL	DNV	ABS	RS	RINA	BSH (Modul B)	Acc.[1] EN 60945
MT 150 Nautic DC *	✓			✓			✓			✓
MT 150 Nautic AC *	✓			✓			✓			✓
MT 170 Nautic DC *	✓	✓	✓	✓	✓	✓	✓			✓
MT 170 Nautic AC *	✓	✓	✓	✓	✓	✓	✓			✓
MT 190 Nautic DC *	✓	✓	✓	✓	✓	✓	✓			✓
MT 190 Nautic AC *	✓	✓	✓	✓	✓	✓	✓			✓
MT 210 Nautic DC *	✓	✓	✓	✓	✓	✓	✓			✓
MT 210 Nautic AC *	✓	✓	✓	✓	✓	✓	✓			✓
MT 230 Nav AC (only with glass)	✓								✓	✓
MTe T150 Nautic DC *	✓	✓	✓	✓	✓	✓	✓			✓
MTe T150 Nautic AC *	✓	✓	✓	✓	✓	✓	✓			✓
MTe T170 Nautic DC *	✓	✓	✓	✓	✓	✓	✓			✓
MTe T170 Nautic AC *	✓	✓	✓	✓	✓	✓	✓			✓
MTe T190 Nautic DC *	✓	✓	✓	✓	✓	✓	✓			✓
MTe T190 Nautic AC *	✓	✓	✓	✓	✓	✓	✓			✓
EPC Box C2D Nautic DC	✓	✓	✓	✓	✓	✓	✓			✓
EPC Box C2D Nautic AC	✓	✓	✓	✓	✓	✓	✓			✓
EPC 150 C2D Nautic DC *	✓	✓	✓	✓	✓	✓	✓			✓
EPC 150 C2D Nautic AC *	✓	✓	✓	✓	✓	✓	✓			✓
EPC 170 C2D Nautic DC *	✓	✓	✓	✓	✓	✓	✓			✓
EPC 170 C2D Nautic AC *	✓	✓	✓	✓	✓	✓	✓			✓
EPC 190 C2D Nautic DC *	✓	✓	✓	✓	✓	✓	✓			✓
EPC 190 C2D Nautic AC *	✓	✓	✓	✓	✓	✓	✓			✓
EPC Box Nautic DC	✓	✓	✓	✓	✓	✓	✓			✓
EPC Box Nautic AC	✓	✓	✓	✓	✓	✓	✓			✓
EPC T150 Nautic DC *	✓			✓			✓			✓
EPC T150 Nautic AC *	✓			✓			✓			✓
EPC T170 Nautic DC *	✓	✓	✓	✓	✓	✓	✓			✓
EPC T170 Nautic AC *	✓	✓	✓	✓	✓	✓	✓			✓
EPC T190 Nautic DC *	✓	✓	✓	✓	✓	✓	✓			✓
EPC T190 Nautic AC *	✓	✓	✓	✓	✓	✓	✓			✓
EPC T210 Nautic DC *	✓	✓	✓	✓	✓	✓	✓			✓
EPC T210 Nautic AC *	✓	✓	✓	✓	✓	✓	✓			✓
EPC T80 LX Nautic	✓			✓						✓
EPC T100 LX Nautic	✓			✓						✓

LEGEND

Lloyd's Register (LR)

Bureau Veritas (BV)

Germanischer Lloyd (GL)

Det Norske Veritas (DNV)

American Bureau of Shipping (ABS)

Panel/System	CE	LR	BV	GL	DNV	ABS	RS	RINA	BSH (Modul B)	Acc.[1] EN 60945
EXTER T70-bl	✓	✓		✓	✓	✓		✓		✓
EXTER T100-bl	✓	✓		✓	✓	✓		✓		✓
EXTER T150-bl	✓	✓		✓	✓	✓		✓		✓
EXTER T70sr-bl	✓	✓		✓	✓	✓		✓		
EXTER T100sr-bl	✓	✓		✓	✓	✓		✓		
EXTER T150sr-bl	✓	✓		✓	✓	✓		✓		
EXTER K10m	✓				✓	✓				
EXTER K20m	✓				✓	✓				
EXTER K30m	✓			✓	✓	✓				
EXTER T40	✓			✓	✓	✓				
EXTER K60	✓				✓	✓				
EXTER T60	✓				✓	✓				
EXTER K70	✓				✓	✓				
EXTER T70	✓	✓		✓	✓	✓		✓		✓
EXTER K100	✓			✓	✓	✓				
EXTER T100	✓	✓		✓	✓	✓		✓		✓
EXTER T150	✓	✓		✓	✓	✓		✓		✓

***** **Panels available with anti-reflective glass**

in progress

[1] for Bridge Applications

Russian Maritime Register of Shipping (RS)

Register Italiano Navale (RINA)

Bundesamt für Seeschifffahrt

und Hydrographie (BSH)

References

National and international companies build on the products, the know-how and support from LAUER. LAUER's innovative products are used by, among others, the following:

ABB marine

Aker Yards Elektro

Besecke

Blom & Voss

Burnvoll

Callenberg Engineering

Converteam

Frank Mohn

Hoppe Bordmesstechnik

Interschalt

L3-COM

MAN Diesel

Pleiger

Rolls-Royce Marine

Scandinavian Electric

STX

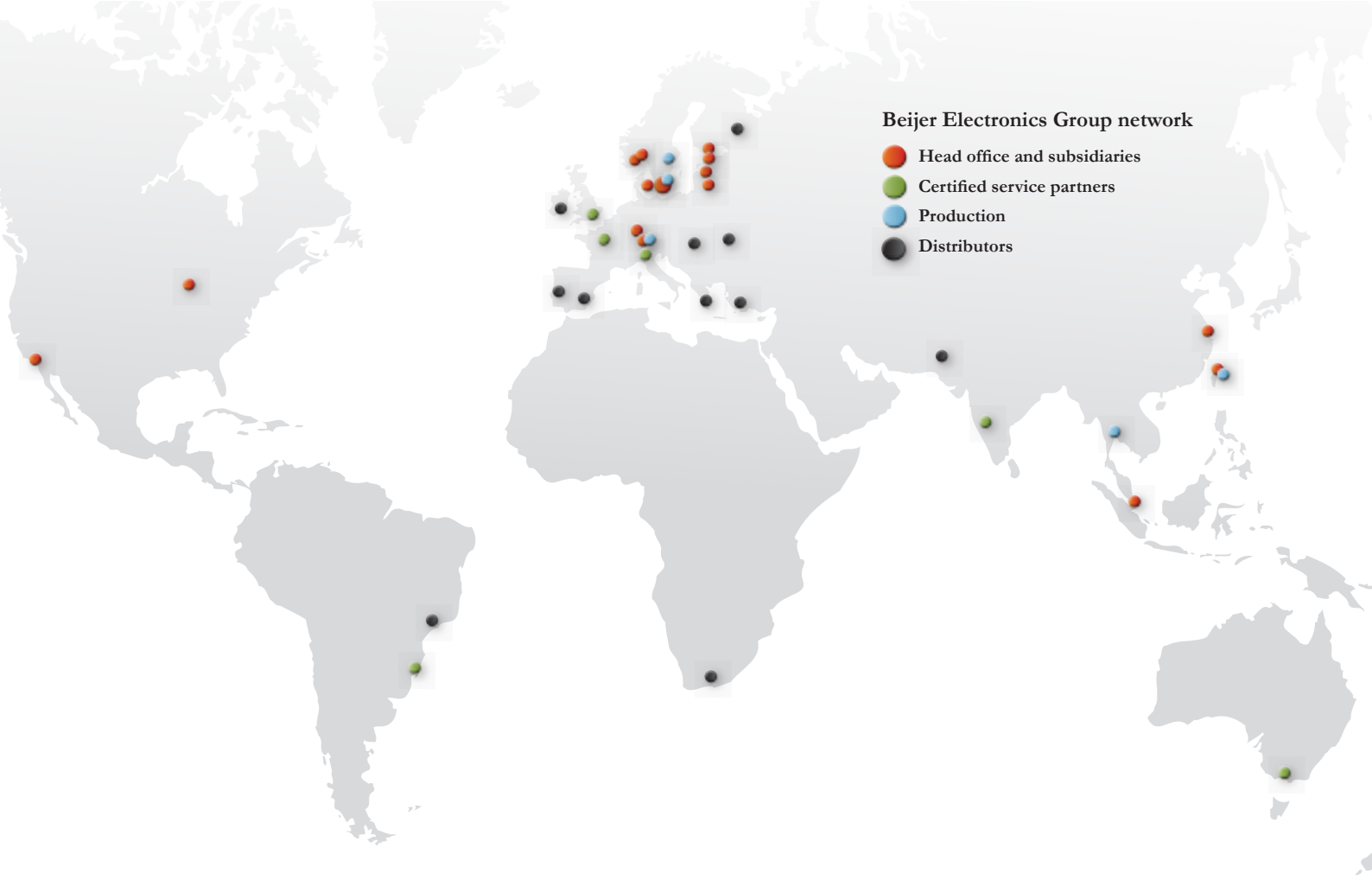
Team Italia

Ulstein Elektro

Volvo Penta

Wiska CCTV

Wärtsilä Propulsion



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