# MARINE PRODUCT CATALOG







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



# Your partner for intuitive marine HMI-solutions

Experience for your success As a leading developer of marine technology, HMI 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-ofthe-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.

The information provided here corresponds to the most up-to-date information at the time of print. Elektronik-Systeme LAUER reserves the right to change

any information without updating this publication. Elektronik-Systeme LAUER shall assume no responsibility for errors or omissions in this publication.

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Operator panels with keypad and touchscreen design for the
simple and intuitive operation of demanding marine processes.

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equipped for particularly tough environments with all	
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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 allin-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-andfeel 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.

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

High demands on the user interface

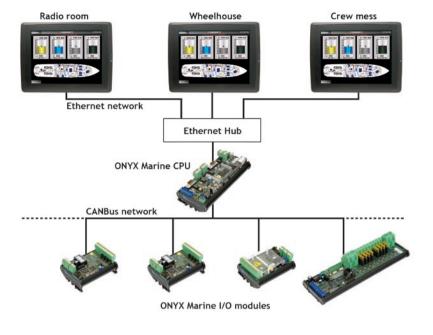
During the evaluation process, Onyx made an extra effort when selecting operator panels for their solutions. They evaluated most the of panels available on the

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

the interior by designers as it can be integrated smoothly in any hitech environment. And thanks to their compact size, the panels are easy to integrate install in and place. The any current application connects the panels

via an Ethernet hub with Onyx' own-developed marine CPU. It's a controller which operates a variety



Overview of a typical installation.

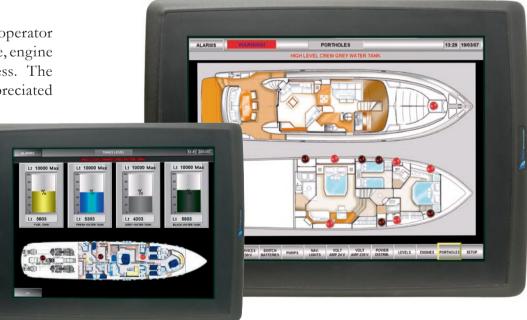
of I/O modules, connected in a Can-Bus network. In this manner the skipper is able to control the ship status from different places and gets all the relevant signals in a clearly arranged format.

# Saves valuable time

The other important part of the system decision was the configuration Information tool, The Designer. 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.

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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



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		
	R\$232/422/485		
	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 TFTdisplays 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



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 $^{\scriptscriptstyle 1}$	
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

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## 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 vibrationresistant 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

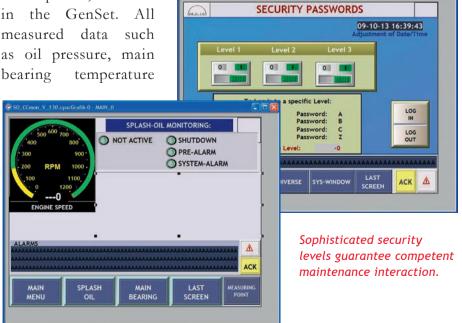
The machine operator easily understands all relevant data on

two 5.7 inch EXTER touch panels, installed in the GenSet. All measured data such as oil pressure, main

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

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# 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





TECHNICAL DATA

Size in inchesVisit evolution in pixels240 x.4With evolution in pixels240 x.4Suboration240 x.4Type of distorityDype of protectionOperating voltage1964 / IVU / IvonOperating voltageOperating voltageOperating voltageOperating voltageSystemProcessorSuborationSystemExternal storage media (CfC)Operating voltageSystemExternal storage media (CfC)SystemExternal storage media (CfC)SystemExternal storage media (CfC)SystemSystemExternal storage media (CfC)System	Display			
Coloration         FNN monochrome           Type of data entry         Alpha-numoric keyped           Begree of protection         OBC/000000000000000000000000000000000000	Size in inches	-	-	
Type of data entryImage: Alpha-numeric keyandBegree of protectionIP66 / NEMA 4 frontVoltage supplyOperating voltage2 4 VOC (20 - 30 V)Operating voltage2 4 VOC (20 - 30 V)Processormax. 0.3 ASystemProcessorMax. memoryOperating systemSO KBExternal storage media (CFC)Min memoryOperating systemMin MonocInterfacesSorialSigned CInterfacesSigned CInterfacesSigned CInterfacesSigned CSorialSigned CInterfacesSigned C <td>WxH resolution in pixels</td> <td>160 x 32</td> <td>240 x 64</td>	WxH resolution in pixels	160 x 32	240 x 64	
Degree of protection         P66 / MEMA 4 front           Voltage supply            Operating voltage         24 VDC (20 - 50 V)           Power consumption         24 VDC (20 - 50 V)           Power consumption         3           System         memory           Processor         Sicale           Nain memory         Sicale           System         Sicale           External storage media (CFC)            Operating system            Interfaces            Serial         2 x R522/42/485           Ethernet         10 Mbit/s J45 -           US8            Communication modules            General Information            Frame Marchal         Alexande	Coloration	FSTN mor	nochrome	
Operating voltage         24 VDC (20 - 20 V)           Dewor consumption         24 VDC (20 - 30 V)           Powor consumption         max. 0.3 A           System	Type of data entry	Alpha-nume	eric keypad	
Operating voltage24 VDC (20 - 30 V)Power consumptionmax. 0.3 ASystem	Degree of protection		MA 4 front	
Power consumption         max.0.3 A           System         Processor           Processor         Six=	Voltage supply			
System           Processor         XScale           Main memory         S00 KB           Strenal storage media (CFC)         S00 KB           Operating system         Windows CE           Interfaces         Windows CE           Strial         2 x R523/427/485           Ethernet         10 Mbil/x RJAs <sup>+</sup> USB         Communication modules           General information         Profibus DP           Frame material         Aluminum           Frame material         Aluminum           Outer dimensions in mm WxHxD         155 x 114 x 49         155 x 155 x 50           Panel profile in mm WxH         Ca. 0.9 kg         ca. 0.9 kg           Certifications         Query Communication         20 v C           Operating temperature         0 lo 5.0° C         Cortifications           Order information         Cortifications         Ca. 0.9 kg         Ca. 0.9 kg           Certifications         Cater Communication         Cater Communication         Cater Communication	Operating voltage	24 VDC (2	20 - 30 V)	
Processor         SGale           Main memory         S00 kB           External storage media (CFC)            Operating system         Windows CE           Interfaces            Serial         2 x RS327427485           Ethernet         10 Mbit/s RJ45 *           USB            Communication modules         Proteinest           General information            Frame material         Auminum           Front foil         acid-resister foil           Outer dimensions in mm WxHxD         155 x 114 x 49         155 x 155 x 50           Panel profile in mm WxHxD         2 x 0 x 0 x 0 x 0         2 x 138           Weight         ca. 0.9 kg         ca. 0.9 kg           Certifications             Operating temperature             Operating temperature             Order information             Certifications             Operating temperature             Operating temperature             Order information	Power consumption	max.	0.3 A	
Main memory500 kBExternal storage media (CFC).Operating system.Interfaces.Serial.Ethernet.USB.Communication modules.Operating interfaces.Communication modules.Frame material.Front foll.Outer dimensions in mm WxHxD.125 Arait (State State S	System			
External system         .           Operating system         Windows C           Interfaces         Serial           Serial         0.2 x RS232/427485           Ethernet         10.0 bit/s RJS -           USB         0.0 C           Comunication modules         Profibus P           General information         -           Frame material         Aluminut P           Fort foil         acid-resist           Outer dimensions in mm WXHXD         155 x 114 x 49           Panel profile in mm WXHXD         155 x 114 x 49           Quer dimensions in mm WXHXD         121 x 80           Panel profile in mm WXH         Ca. 0.9 kg           Certifications	Processor	XSc	ale	
Operating systemWindows CEInterfacesSerial2 x R523/42/485Ethernet0 Mbi/x RA4 °USB	Main memory	500	kB	
Interfaces           Serial         2 x RS232/422/485           Ethernet         10 Mbit/s RJ45 *           USB         -           Communication modules         Profibus DP           General information         -           Frame material         Aluminut           Front foil         acid-resister foil           Outer dimensions in mm WxHxD         155 x 114 x 49           Panel profile in mm WxH         120 x 138           Weight         ca. 0.9 kg           Certifications         -           Operating temperature         -           Operating temperature         -           Post profile formation         -           Operating temperature	External storage media (CFC)			
Serial2 x RS232/422/485Ethernet10 Mbit/s RJ45 *USB·Communication modules•General Information•Frame materialFront foilacl-resistar-wester foilOuter dimensions in mm WxHxD155 x 114 x 49Panel profile in mm WxHxD121 x 80Veightca. 0.9 kgCertifications0 to 5° CStorage temperature-20 to 6° COrder informationEXTER K10mExtER K20m926.00.0010Order number Lauer926.00.0010	Operating system	Windo	ws CE	
Ethernet       10 Mbit/s RJ45 ·         LSB       .         Communication modules       0         General information       Promotion         Frame material       .         Front foil       acid-resister foil         Outer dimensions in mm WxHxD       155 x 114 x 49         Panel profile in mm WxH       155 x 150 x 50         Panel profile in mm WxH       121 x 80         Veight       ca. 0.9 kg         Certifications	Interfaces			
USB	Serial	2 x R\$232/422/485		
Communication modulesProfibus DPGeneral informationFrame materialAluminurFront foilacid-resistant pubseter foilOuter dimensions in mm WxHxD155 x 114 x 49Dater dimensions in mm WxH155 x 155 x 50Panel profile in mm WxH121 x 80Weightca. 0.9 kgCertificationsca. 0.9 kgOperating temperature0 to 50° CStorage temperature-20 to °COrder informationEXTER K10mDescription of itemEXTER K20mOperating temperature0 to 50° COrder number Lauer926.020.0010	Ethernet	10 Mbit/s RJ45 *		
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       0 to 50° C         Operating temperature       0 to 50° C         Storage temperature       -20 to 60° C         Order information       EXTER K10m       EXTER K20m         Pacer unuber Lauer       926.010.0010       926.020.0010	USB			
Frame materialAluminFront foilacid-resistant polyester foilOuter dimensions in mm WxHxD155 x 114 x 49Panel profile in mm WxH125 x 155 x 50Panel profile in mm WxH121 x 80Weightca. 0.9 kgCertificationsca. 0.9 kgOperating temperature0 to 50° CStorage temperature-20 to 60° COrder informationEXTER K10mDescription of ItemMEXTER K20mOperating Lauer926.010.0010Oter information926.020.0010	Communication modules	Profib	Profibus DP	
Front foilacid-resistant Uyester foilOuter dimensions in mm WxHxD155 x 154 x 49155 x 155 x 50Panel profile in mm WxH121 x 80120 x 138Weightca. 0.9 kgca. 0.9 kgCertificationsca. 0.9 kgOperating temperature0 to 5° CStorage temperature-20 to 6° COrder informationEXTER K10mEXTER K20mDescription of itemEXTER K10mEXTER K20mOrder number Lauer926.010.0010926.020.0010	General information			
Outer dimensions in mm WxHxD155 x 114 x 49155 x 155 x 50Panel profile in mm WxH121 x 80120 x 138WeightCa. 0.9 kgCa. 0.9 kgCertificationsCertificationsOperating temperature0 to 50° CStorage temperature0 to 50° COrder information-20 to 60° CDescription of itemEXTER K10mEXTER K20mOrder number Lauer926.010.0010926.020.0010	Frame material	Aluminum		
Panel profile in mm WxH121 x 80120 x 138WeightCa. 0.9 kgCa. 0.9 kgCertificationsCertificationsCertificationsOperating temperature0 to 50° CStorage temperature-20 to 60° COrder informationEXTER K10mEXTER K20mOrder number Lauer926.010.0010926.020.0010	Front foil	acid-resistant	acid-resistant polyester foil	
Weight     ca. 0.9 kg       Certifications       Operating temperature       Oto 50° C       Storage temperature       Order information       Description of item     EXTER K10m       Order number Lauer     926.010.0010	Outer dimensions in mm WxHxD	155 x 114 x 49	155 x 155 x 50	
Certifications     Operating temperature     0 to 50° C       Storage temperature     0 to 50° C       Order information       Description of item     EXTER K10m       Order number Lauer     926.010.0010	Panel profile in mm WxH	121 x 80	120 x 138	
Operating temperature     0 to 50° C       Storage temperature     -20 to 60° C       Order information     -20 to 60° C       Description of item     EXTER K10m       Order number Lauer     926.010.0010	Weight	ca. 0.9 kg	ca. 0.9 kg	
Storage temperature     -20 to 60° C       Order information     EXTER K10m     EXTER K20m       Description of item     926.010.0010     926.020.0010	Certifications			
Order information       Description of item     EXTER K10m       Order number Lauer     926.010.0010	Operating temperature	0 to 50° C		
Description of item     EXTER K10m     EXTER K20m       Order number Lauer     926.010.0010     926.020.0010	Storage temperature	-20 to 60° C		
Order number Lauer         926.010.0010         926.020.0010	Order information			
	Description of item	EXTER K10m	EXTER K20m	
Order number Beijer Electronics 601110201 601110202	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 / NE	/A 4 front	
Voltage supply			
Operating voltage	24 VDC (2	20 - 30 V)	
Power consumption	max. (	D.35 A	
System			
Processor	XSc	ale	
Main memory	12	MB	
External storage media (CFC)	-		
Operating system	Windows CE		
Interfaces			
Serial	2 x R\$232/422/485		
Ethernet	10/100 Mb	pit/s RJ45	
USB	USB	Host	
Communication modules	Profibus DP, N	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		





### TECHNICAL DATA

Display			
Size in inches	6.5"	10.4"	
WxH resolution in pixels	640 x 480	800 x 600	
Coloration	64К со	lor TFT	
Type of data entry	Resistive touch	Alpha-numeric keypad	
Degree of protection	IP66 /	NEMA 4	
Voltage supply			
Operating voltage	24 VDC (2	20 - 30 V)	
Power consumption	max. 0.9 A	max. 1 A	
System			
Processor	XSc	ale	
Main memory	12	MB	
External storage media (CFC)	yı yı	es	
Operating system	Windows CE		
Interfaces	ierfaces		
Serial	2 x R\$232/422/485		
Ethernet	10/100 Mbit/s RJ45		
USB	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	



10.4"	15"	
800 x 600	1024 x 768	
64К со	lor TFT	
Resistiv	e touch	
IP66 / 1	NEMA 4	
24 VDC (2	20 - 30 V)	
max. 1 A	max. 1.7 A	
XSc	ale	
12	MB	
ye	25	
Windo	ws CE	
2 x RS232/422/485		
10/100 Mbit/s RJ45		
USB Host		
Profibus DP, MPI, CANopen		
Alum	inum	
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<sup>®</sup> 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 unmanned

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 oceangoing 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

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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 firetight 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 intelligent using I/O controllers from WAGO. which monitor all actuator/sensor areas

such as door statuses, temperatures, tank levels and flap controls decentralized as controllers.



OPAL DP119@Crew Cabin VIII Z 5

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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<sup>®</sup>hasauserpanelfor 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.

decentralized The reason for interrogation of actuators and



sensors is actually quite farreaching. 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 bulkheads such as fire-break

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 EPCLX T80 and EPCLX 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

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	Resistiv	re touch
Degree of protection	IP65 on the front acco	ording to DIN EN60529
Power supply		
Operating voltage	24 VDC	+/- 20%
Power consumption	ca. 50	00 mA
System		
Processor	AMD L	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, Wi	indows XP Embedded
Interfaces		
Serial	RS232	
Ethernet	2 x 10/100 Mbps	
Keypad / mouse	1 x PS/2	
Printer		-
Monitor		
USB		SB 2.0
Slots	PC/	/104
Communication modules	MPI, DU	JAL-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 <sup>2</sup>	
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
<sup>2</sup> in progress		21

<sup>2</sup> in progress Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



# **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<sup>®</sup> 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/m <sup>2</sup>	t (typical)	
Angle of vision	150° (H) /110° (V)	178° (H/V)	
Type of data entry	Resistive touch 1 (Optio	n: anti-reflective glass)	
Degree of protection	IP65 front end;	IP20 back end	
Power supply			
Operating voltage	24 VDC +/- 15% or 1	10-230 +/- 15% VAC	
Power consumption	ca. 4.0	/ 1.0 A	
System			
Processor	Intel Celeron-M 1.3 GH	z / 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 / H	HDD automotive 40 GB	
Operating system	Windows XP Embedded / Windows XP Professional		
Interfaces			
Serial	2 x R5232, R5232/485		
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 (ma	x 220 mm)	
Communication modules	-		
General information	eral 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	

also available with anti-reflection glass without touch screen feature. Comercial Andaluza de Técnicas y Suministros, S.L. (CATS, S.L.) Málaga (España). Telf: +(34) 952 24 61 37 www.cats.es comercial@cats.es



EPC T190 Nautic



### EPC T210 Nautic

### TECHNICAL DATA

Size in inches9 (19 ° FT2 1° FTWit resolution in pixels1600 × 1000	Front panel		
Contrast ratio         Initial           Luminous intensity         G         250 cd/m² (typica)           Angle of vision         G         760 cd/m² (typica)           Type of data ontry         G         760 cd/m² (typica)           Degreed for vision         IP65 front ent iP20 back and           Degreed for dent iP65 front ent iP20 back and         Power supply           Operating voltage         G         760 cd/m² (typica)           Power supply         G         760 cd/m² (typica)           Ideration Supply         G         760 cd/m² (typica)           Ideration Supply         G         760 cd/m² (typica)           Ideration Supply         G	Size in inches	19" TFT	21" TFT
Lumous intensity         Biological           Angie of vision         18° (H∠V)           Type of data entry         Gender Dire (Hy)           Degre of protection         P66 from (Hy) (Botton: anti-effective glass)           Degre of protection         P66 from (Hy) (Botton: anti-effective glass)           Dewer supple         P66 from (Hy) (Botton: anti-effective glass)           Operating voltage         P66 from (Hy) (Botton: IH) 200 xF (Hy)           Power soupplon         Comparing (Hy)           Processor         Gender Dire (Hy)           Main memory         Intel Celeron H1 3. GHZ / Pentium H1 8. GHZ           Nain memory         Gender Dire (Hy)           Storage media (CFC)         Gender Dire (Hy)           Operating system         Gender Dire (Hy)           Operating system         Gender Dire (Hy)           Strial         Gender Dire (Hy)           Keygad / moxie         Gender Dire (Hy)           Printer         Gender Dire (Hy)           Nonifor         Gender Dire (Hy)           USA         Gender Dire (Hy)           Gender Dire (Hy)         Gender Dire (Hy)           Gender Dire (Hy)         Gender Dire (Hy)           Striat         Gender Dire (Hy)           Striat         Gender Dire (Hy)	WxH resolution in pixels	1280 x 1024	1600 x 1200
Alge of vision         1%° (V/)           Type of data entry         Genetal Degree of protection           Degree of protection         Degree of protection           Power supply         Degree of protection           Operating voltage         Genetal Degree of Laboration           Power consumption         Genetal Degree of Laboration           System         Genetal Degree of Laboration           Processor         Genetal Degree of Laboration           Nain memory         Genetal Degree of Laboration           Internal mass memory         Genetal Degree of Laboration           Operating system         Genetal Degree of Laboration           Internal mass memory         Genetal Degree of Laboration           Operating system         Genetal Degree of Laboration           Striation Stratege media (CFC)         Genetal Degree of Laboration           Internal mass memory         Genetal Degree of Laboration           Operating system         Genetal Degree of Laboration           Strate Stratege media (CFC)         Genetal Degree of Laboration           Internal mass memory         Genetal Degree of Laboration           Strate Stratege media (CFC)         Genetal Degree of Laboration           Strate Stratege of Laboration         Genetal Degree of Laboration           Strate Stratege of Laboration <td>Contrast ratio</td> <td>100</td> <td>00:1</td>	Contrast ratio	100	00:1
Type of data entry         Image: Construction         Image: Construction           Degree of protection         IP65 front end: IP20 back end           Power supply         Image: Construction         IP20 back end           Operating voltage         Image: Construction         Image: Construction           Power supply         Image: Construction         Image: Construction           Operating voltage         Image: Construction         Image: Construction           System         Image: Construction         Image: Construction           Main memory         Image: Construction         Image: Construction           System         Image: Construction         Image: Construction           Operating system memory         Image: Construction         Construction           Operating system         Image: Construction         Construction           Operating system         Image: Construction         Construction           Staff         Image: Construction         Construction           Staff         Image: Construction         Construction           Staff         Image: Construction         Construction           Image: Construction         Image: Construction         Construction           Staff         Image: Construction         Construction         Construction	Luminous intensity	250 cd/m	² (typical)
Degree of protection         Peed Fornt ent: P20 back end           Power supply            Operating voltage            Power consumption            Power consumption            System            Processor         Intel Coleron. 41.3 GHz / Fentium. 41.8 GHz           Main memory            Main memory            System            External storage media (GFC)            Operating system            Operating system	Angle of vision	178°	(H/V)
Power supply         Power consumption         24 VDC +/- 15% or 110-230 +/- 15% VAC           Power consumption         6.4.0./- 1.0.A         2.4.0./- 1.0.A           System	Type of data entry	Resistive touch 1 (Option	on: anti-reflective glass)
Operating voltageQ VUC 4/. 1% volt - J - 3% VACPower consumptionQ VUC 4/. 1% volt - J - 3% VACPower consumptionQ Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q	Degree of protection	IP65 front end	IP20 back end
Power onsumption         Gate A J ⊥ 0 A           System         System           Processor         Intel Celeron-M 1.3 GHz / Pentium-M 1.8 GHz           Main memory         Gate A D A GB / SB           External storage media (CFC)         Gate A D A GB / SB           Internal mass memory         Gate A D A GB / SB           Operating system         Gate A D A GB / SB           Interfaces         Interfaces           Serial         Sate A GB A D A GB / SB           Keypad / nouse         Gate A G A C A SB / SB	Power supply		
SystemProcessorIntel Celeron-M1.3 GHz / Pertium-M1.8 GHzMain memoryIntel Celeron-M1.3 GHz / BKernal storage media (CFC)Intel Celeron-M1.3 GHz / GBExternal storage media (CFC)Internal mass memoryOperating systemInternal CEC 128 MB - 16 GB / HDD automotive 40 GBOperating systemInternal CEC 128 MB - 16 GB / HDD automotive 40 GBOperating systemInternal CEC 128 MB - 16 GB / HDD automotive 40 GBOperating systemInternal CEC 128 MB - 16 GB / HDD automotive 40 GBOperating systemInternal CEC 128 MB - 16 GB / HDD automotive 40 GBOperating systemInternal CEC 128 MB - 16 GB / HDD automotive 40 GBOperating systemInternal CEC 128 MB - 16 GB / HDD automotive 40 GBOperating systemInternal CEC 22 MSFrinterInternal CEC 22 MSStorage construction modulesInternal CEC 22 MSOutor dinorationInternal CEC 22 MSFrame materialInternal CEC 22 MSFrinterInternal CEC 22 MSOuter dimensions in mm WxHzDInternal Ala K44X 415Panel profile in mm WxHInternal Ala K44X 415Panel profile in mm WxHInternal K43X 446X 446Panel profile in mm WxHInternal K43X 446X 446Profile in mm WxHInternal K43X 446X 4465Profile in mm WxHXDInternal K43X 446X 4465 <t< td=""><td>Operating voltage</td><td>24 VDC +/- 15% or 1</td><td>10-230 +/- 15% VAC</td></t<>	Operating voltage	24 VDC +/- 15% or 1	10-230 +/- 15% VAC
Processor         Intel Celeron-M1.16 Hz           Main memory         0           External storage media (CFC)         108 / 2 B           External storage media (CFC)         0           Internal mass memory         0           Operating system         0           Operating system         0           Interfaces         0           Serial         0           Keypad / mouse         0           Monitor         2 x 10// 100 kg//	Power consumption	ca. 4.0	/ 1.0 A
Main memory1 GB / 2 BExternal storage media (CFC)C C C 128 MB - 16 GBInternal mass memoryC C C 128 MB - 16 GB / Undows XP EndesdomalOperating systemMindows XP EndesdomalOperating systemC C C 2 X S22 / KSExternalC C 2 X S22 / KSExternalC C C 2 X S22 / KSExternalC C C 2 X S22 / KSExternalC C C 2 X S22 / KSFriderC C C 2 X S22 / KSPrinterC C C 2 X S22 / KSMintorC C C 2 X S22 / KSUSBC C C 2 X S2 / KSStostC C C 2 X S2 / KSComunication modulesC C 2 X S2 / KSFrame materialC C C 2 X S2 / KSFront follC C C C C X S2 / KS A KA K X 145Otter dimensions in mm WxHzDA KA X A KA X 145Anal profile in mm WxHzA KA X A KA X 145Anal profile in mm WxHzA KA X A KA X 145Anal profile in mm WxHzA KA X A KA X 145Store Same Same Same Same Same Same Same Sam	System		
External sorage 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         Interfaces           Serial         C x RS23 x S22 v485           Ethernet         C x RS23 x S22 v485           Keypad / mouse         C x C x S23 x S22 v485           Printer         C x C x S23 x S22 v485           Nontor         C x C x S23 x S22 v485           VISB         C x C x S23 x S22 v485           Stots         C x C x X X X X X X X X X X X X X X X X	Processor	Intel Celeron-M 1.3 GH	z / Pentium-M 1.8 GHz
Internal mass memory         CFC 128 MB - 16 GB / HD automotive 40 GB           Operating system         0 Mindows XP Embedded / Windows XP Professional           Interfaces         Interfaces           Serial         2 x RS232 x285           Ethernet         2 x 10/100 Mbps           Keypad / mouse         0 GCCC 2 x D/2 x0/100 Mbps           Keypad / mouse         0 GCCC 2 x D/2 x0/100 Mbps           Keypad / mouse         0 GCCC 2 x D/2 x0/100 Mps           Keypad / mouse         0 GCCC 2 x D/2 x0/100 Mps           Keypad / mouse         0 GCCC 2 x D/2 x0/100 Mps           Keypad / mouse         0 GCCC 2 x D/2 x0/100 Mps           Keypad / mouse         0 GCCC 2 x D/2 x0/100 Mps           Keypad / mouse         0 GCCC 2 x0/100 Mps           Visite         0 GCCC 2 x0/100 Mps           Visite         0 GCCC 2 x0/100 Mps           Keypad / mouse         0 GCCC 2 x0/100 Mps           Visite         0 GCCC 2 x0/100 Mps           Stots         0 GCCC 2 x0/100 Mps           Communication modules         0 GCCC 2 x0/100 Mps           Frame material         MORITIC 2 X0/100 Mps           Front Gril         GCCC 2 x0/100 Mps           Guter dimensions im mW XHXD         MAB X444 X145           General information         GS14 x41	Main memory	1 GB .	/ 2 GB
Operating system         Windows XP Enbedded / Windows XP Professional           Interfaces           Serial         2 x R523 z X485           Ethernet         2 x R523 z X485           Keypad / mouse         2 x 10/// Umbps           Keypad / mouse         6           Printer         2 x PS/// Z           Monitor         LPTI           Monitor         G           US8         4 x US .0           Stots         3           Communication modules         6           General Information         -           Frame material         A           Fort foil         343 x 444 x 145           Quet dimensions in mm WxHzD         483 x 444 x 145           Panel profile in mm WxH         498 x 441	External storage media (CFC)	128 MB	- 16 GB
Interfaces           Serial         2 x R5232 / 485           Ethernet         2 x 10/100 Mbps           Keypad / mouse         2 x D/2           Printer         2 x D/2           Printer         LPT           Monitor         VGA           US8         3 C 2 x PC/ (max 20 mm)           Stots         2 x PCI (max 20 mm)           Communication modules         2 x PCI (max 20 mm)           General Information	Internal mass memory	CFC 128 MB - 16 GB /	HDD automotive 40 GB
Serial       2 x RS23 x RS23 x RS5         Ethernet       2 x NS23 x RS23 x RS5         Keypad / mouse       2 x S23 x RS5         Printer       2 x S23 x RS5         Printer       0 x S2 x S23 x RS5         Monitor       x S2 x S23 x RS5         USB       0 x S4 x S23 x RS5         Stots       0 x S4 x S23 x RS5         Communication modules       0 x S4 x S23 x RS5         Frame material       0 x S4 x S25 x S5         Front foil       0 x S4 x RS5 x S4 x S5         Outer dimensions in mm WxHxD       A S3 x 444 x 145         Page profile in mm WxH       4 x S4 x 6	Operating system	Windows XP Embedded / Windows XP Professional	
Ethernet       2 x 10// Whps         Keypad / mouse       2 x 10// Whps         Keypad / mouse       2 x P2         Printer       C         Printer       C         Monitor       C         Store       C         Store       C         Store       C         General information       C         Frame material       C         Front foil       C         Outer dimensions in mm WxHxD       A83 x 444 x 145         Page profile in mm WxH       483 x 446	Interfaces		
Keypad / mouse         2 x PS/           Keypad / mouse         2 x PS/           Printer         LPT           Monitor         LPT           Monitor         V           USB         G           Stots         2 x PCI (mouse)           Gommunication modules         G           Frame material         G           Front foil         acid-resist=roll           Four foil         S34 x 481 x 145           Panel profile in mm WxH         488 x 416	Serial	2 x R\$232, R\$232/485	
PrinterLPTMonitorIPTMonitorVGAUSBGStots2 x PCI (m x x x x x x x x x x x x x x x x x x	Ethernet	2 x 10/100 Mbps	
Monitor         Image: Constraint of the sector of the	Keypad / mouse	2 x PS/2	
USB         4 x US           Slots         2 x PCI (mt 20 mml)           Communication modules         2 x PCI (mt 20 mml)           General information	Printer	LPT1	
Slots         2 x PCl (>> 2 x PCl	Monitor	VGA	
Communication modules     Image: Communication modules       General information       Frame material     Alumit       Front foil     acid-resistart       Outer dimensions in mm WxHxD     483 x 444 x 145       Panel profile in mm WxH     438 x 416	USB	4 x USB 2.0	
General information         Alum           Frame material         Alum           Front foil         acid-resistar           Outer dimensions in mm WxHxD         A83 x 444 x 145           Panel profile in mm WxH         438 x 416	Slots	2 x PCI (max 220 mm)	
Frame material         Alum           From toil         Constraint of the second of the s	Communication modules		
Front foil         acid-resistant           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	General information		
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	Frame material	Aluminum	
Panel profile in mm WxH         438 x 416         498 x 441	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	Weight	ca. 13.0	ca. 18.5
Certifications GL, ABS, DNV, BV, LR	Certifications	GL, ABS, DNV, BV, LR	
Operating temperature 0 to 55° C	Operating temperature	0 to 55° C	
Storage temperature -20 to 70° C	Storage temperature	-20 to 70° C	
Order information	Order information		
Description of item         EPC T190 Nautic DC / EPC T190 Nautic AC         EPC T210 Nautic DC / EPC T210 Nautic AC	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 Lauer	950.516.0050 / 950.516.0330	On demand
Order number Beijer Electronics 603000013 / 603000016 On demand	Order number Beijer Electronics	603000013 / 603000016	On demand

<sup>1</sup> also available with anti-reflection glass without touch screen feature.

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### **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

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### 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

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 <sup>1</sup> (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 R\$232	
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 $^{\rm 2}$	
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	

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17171         191717            1200 x 1024             660.1             660.1             200 cd/m <sup>1</sup> (typia)             1200 cd/m <sup>1</sup> (typia)             24 00 cd/m <sup>1</sup> (typia)             24 00 cd/m <sup>1</sup> (typia)             1200 cd/m <sup>1</sup> (typia)             1200 cd/m <sup>1</sup> (typia)             1200 cd/m <sup>1</sup> (typia)             1200 cd/m <sup>1</sup> (typia)				
1280 x 1024				
b0:1         100:1         .           240 d/m² (synica)         0.0         .           Residve touch * Option: ant-effective glass)         0.         .           Residve touch * Option: ant-effective glass)         0.200 m.01         .           Residve touch * Option: ant-effective glass)         0.200 m.01         .           Residve touch * Option: ant-effective glass)         0.200 m.01         .           24 V0C +/ 15% vn 115-230 +/- 15% VnC         .         .           24 V0C +/- 15% vn 115-230 +/- 15% VnC         .         .           24 V0C +/- 15% vn 115-230 +/- 15% VnC         .         .           24 V0C +/- 15% vn 115-230 +/- 15% VnC         .         .           24 V0C +/- 15% vn 115-230 +/- 15% VnC         .         .           24 V0C +/- 15% vn 115-230 +/- 15% VnC         .         .           24 V0C +/- 15% vn 116-230 +/- 15% VnC         .         .           26 / 4.08         .         .         .           26 / 4.08         .         .         .           26 / 4.08         .         .         .           27 K PS23         .         .         .         .           28 K PS24         .         .         .         .           28 K	17" TFT	19" TFT	-	
260 cd/m <sup>1</sup> (typical)     .       178 <sup>1</sup> (4 / V)     .       Rusistive touch <sup>1</sup> (Opties: enti-reflective glass)	1280 x 1024	1280 x 1024	-	
178° (H/V)       .         Besistive touch ' (Option: anti-reflective glass)       .         1965 front end: IP20 back end       IP 20 on all sides         24 VDC +/- 15% kor 115-230 +/- 15% VAC       .         24 VDC +/- 15% kor 115-230 +/- 15% VAC       .         24 VDC +/- 15% kor 115-230 +/- 15% VAC       .         24 VDC +/- 15% kor 115-230 +/- 15% VAC       .         24 VDC +/- 15% kor 115-230 +/- 15% VAC       .         24 VDC +/- 15% kor 115-230 +/- 15% VAC       .         24 VDC +/- 15% kor 115-230 +/- 15% VAC       .         24 VDC +/- 15% kor 115-230 +/- 15% VAC       .         268 -/ 408       .         268 -/ 408       .         268 -/ 408       .         268 -/ 408       .         268 -/ 408       .         268 -/ 408       .         268 -/ 408       .         27 k0/100/1000 Mbps       .         2 x 10/100/1000 Mbps       .         2 x 10/2 (max)	600:1	1000:1	-	
Resistive touch ' (Option: anti-reflective glass)         .           IP65 Front end: IP20 back end         IP20 on all sides           24 VDC -/- 15k or 115-/20 +/- 15k VMC         .           24 VDC -/- 15k or 115-/20 +/- 15k VMC         .           c a. 4. 0. A / 10 A         .           Intel Core20uo 2.2 GHz           Intel Core20uo 2.2 GHz	250 cd/m	² (typical)	-	
P2 0 on all sides         P2 0 on all sides<	178°	(H/V)	-	
24 VDC +/- 15% or 115-230 +/- 15% MC       ca 4.0 A / 1:0 A       Intel Core2Duo 2.2 GHz       2 GB / 4 GB       2 GB / 4 GB       2 GB / 4 GB       2 GB / 16 GB       CFC 2 GB · 16 GB / HDD automotive 80 GB       Windows XP Endedded / Windows XP Professional       2 x R5232       2 x R5232       2 x R5232       2 x R5232       2 x R5/2       2 x R5/2       2 x R5/2       - <td colsp<="" td=""><td>Resistive touch 1 (Option</td><td>on: anti-reflective glass)</td><td>-</td></td>	<td>Resistive touch 1 (Option</td> <td>on: anti-reflective glass)</td> <td>-</td>	Resistive touch 1 (Option	on: anti-reflective glass)	-
د د د ۱۹۹۵ م (۲۰۰۵ م ) الجاف ال	IP65 front end; IP20 back end		IP 20 on all sides	
د د ۵ ۹ ۵ ۸ 1 0 ۸           intel Core20uo 2.2 GHz           2 GB / 4 GB           2 GB / 6 GB / B 00 Butomotive 80 GB           Windows XP Professional           Windows XP Professional           2 K 8522           2 K 8523           2 K 85/2           2 K 95/2           3 K 95/2				
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         VERCE         2 x 85/2         2 x 10/100/1000 Mbps         2 x 10/100/1000 Mbps </td <td></td> <td>24 VDC +/- 15% or 115-230 +/- 15% VAC</td> <td></td>		24 VDC +/- 15% or 115-230 +/- 15% VAC		
2 GB / 4 GB         2 GB / 16 GB         CFC 2 GB / 16 GB / HDD automotive 80 GB         Windows XP Embedded / Windows XP Professional         Vindows XP Embedded / Windows XP Professional         2 x R5232         2 x 10/100/1000 Mbps         3 x 10/100/1000 Mbps		ca 4.0 A / 1.0 A		
2 GB / 4 GB         2 GB / 16 GB         CFC 2 GB / 16 GB / HDD automotive 80 GB         Windows XP Embedded / Windows XP Professional         Vindows XP Embedded / Windows XP Professional         2 x R5232         2 x 10/100/1000 Mbps         3 x 10/100/1000 Mbps				
2 G8 - 16 G8         CF 2 G8 - 16 G8 / HDD automotive 80 G8         Windows XP Embedded / Windows XP Professional         2 x R5232         2 x R5232         2 x N5232         2 x N5232         2 x N523         2 x N523         C X N5232         2 x N523         2 x N523         C X N52 X N0/1000 Mbps         C X N52 X N2         VGA + DVI-1         4 x USB 2.0         2 x PCI (max 220 mm)         C         C X N2         C X N2         C X N2         X N2 X M4X X M2 X D         X N2 X M4X X M2 X S         X N2 X X M4X X M2 X S         X N2 X X M4X X M2 X S         X N2 X X M4X X M2 X S         X N2 X X M4X X M2 X S         X N2 X X M4X X M2 X S         X N2 X X M4X X M2 X S <td></td> <td>Intel Core2Duo 2.2 GHz</td> <td></td>		Intel Core2Duo 2.2 GHz		
CFC 2 GB - 16 GB / HDD automotive 80 GB         Windows XP Professional         V Stadows XP Professional         2 x RS232         2 x RS232         2 x NO/100/1000 Mbps         2 x PS/2         C         C         VGA + DVI-I         4 x USB 2.0         C		2 GB / 4 GB		
Windows XP Embedded / Windows XP Professional         Vindows XP Professional         2 x R522         2 x 10/1000 Mbps         2 x P5/2         C         VGA + DVI-I         VGA + DVI-I         2 x PCI (max 220 mm)         C				





EPC T190 C2D Nautic



EPC Box C2D Nautic



# MARINE MONITOR

# **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 applications automation on bridges, motor control rooms and different other PC-based applications on vessels and offshore Three environments. 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 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 " ЅСОМ" 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.



**RS232** 

### Multiple Monitors

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

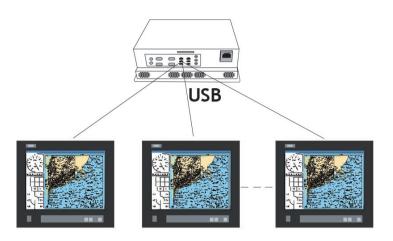
Other remote dimming features are available via USB or Ethernet connection with the Lauer RBC Router. The RBC Router is a service that handles SCOM commands. It is a part of the Monitor Control Center.



**RS485** 

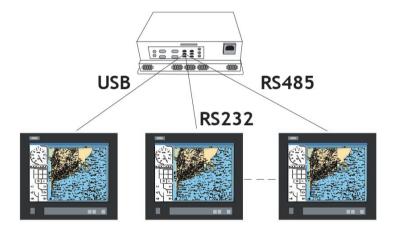
### **USB** Network

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

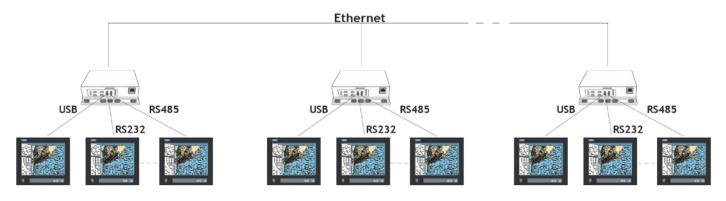
Several monitors can control each other if they have any of the supported connections RS232, RS485 or USB to the same PC. To enable this feature, the RBC Router must run on the PC, and RS232 output, RS485 output or USB output must be enabled.



### 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.



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# 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

npnrinii

- Network dimming functionality
- Various certifications for major classification societies

	TECHNICAL DATA
1	Front panel
	Size in inches
- 11	WxH resolution in pixels
	Contrast ratio
h	Luminous intensity
ų	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 <sup>1</sup> (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 <sup>2</sup>									
	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										
		4								

 $^{\rm 1}$  also available with anti-reflection glass without touch screen feature  $^{\rm 2}$  In progress





### MT T150 Nautic

### TECHNICAL DATA



# 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<sup>1</sup>
- Anti-reflective glass front
- Narrow depth for easy installation
- Can be combined with all computer types

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 <sup>1</sup> (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							
Order number Beijer Electronics	603000025 / 603000028							

<sup>1</sup> also available with anti-reflection glass without touch screen feature





# 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



### TECHNICAL DATA

Front panel	Front panel									
Size in inches	23.1"									
WxH resolution in pixels	1600 x 1200									
Contrast ratio	500:1									
Luminous intensity	0-220 cd/m <sup>2</sup>									
Angle of vision	170° (V/H)									
Type of data entry	anti-reflection glass									
Degree of protection	IP65 front end; IP20 back end									
Power supply	ower 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	R\$232 / 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	BSH1									
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									

<sup>1</sup> In progress Wide screen monitor in progress

### MARITIME CERTIFICATIONS

			110						5011	
Panel/System	CE	LR	BV	GL	DNV	ABS	RS	RINA	BSH (Modul	Acc.1 EN
									B)	60945
MT 150 Nautic DC *	~			~			×			✓
MT 150 Nautic AC *	×			~			×			✓
MT 170 Nautic DC *	<b>~</b>	~	~	~	<b>~</b>	~	<b>~</b>			✓
MT 170 Nautic AC *	~	~	~	~	1	1	<b>~</b>			✓
MT 190 Nautic DC *	~	~	~	~	~	~	<b>~</b>			✓
MT 190 Nautic AC *	<ul> <li>✓</li> </ul>	~	<ul> <li>✓</li> </ul>	✓	<ul> <li>Image: A start of the start of</li></ul>	<b>~</b>	~			✓
MT 210 Nautic DC *	<ul> <li></li> </ul>	~	<b>~</b>	~	<b>~</b>	~	~			✓
MT 210 Nautic AC *	~	~	~	~	1	~	~			✓
MT 230 Nav AC	~								✓	✓
(only with glass)										
MTe T150 Nautic DC *	~	✓	×	<b>~</b>	~	×	1			✓
MTe T150 Nautic AC *	~	~	×	~	×	~	<b>√</b>			✓
MTe T170 Nautic DC *	~	~	~	~	~	~	~			✓
MTe T170 Nautic AC *	~	✓	~	~	~	~	<b>~</b>			✓
MTe T190 Nautic DC *	~	✓	~	~	~	~	<b>~</b>			✓
MTe T190 Nautic AC *	✓	✓	✓	✓	✓	✓	✓			✓
EPC Box C2D Nautic DC	✓	<b>~</b>	<b>~</b>	✓	✓	~	✓			✓
EPC Box C2D Nautic AC		~		~	✓	✓	✓			✓
EPC 150 C2D Nautic DC *	~	✓	✓	✓	✓	~	✓			✓
EPC 150 C2D Nautic AC *	~	✓	✓	<ul> <li>✓</li> </ul>	~	~	<ul> <li>✓</li> </ul>			✓
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 *	1	~	~	~	1	~	<b>~</b>			~
EPC T190 Nautic DC *	~	~	~	~	×	~	✓			✓
EPC T190 Nautic AC *	✓	✓	✓	✓	×	<b>~</b>	✓			✓
EPC T210 Nautic DC *	~	~	~	~	~	~	1			✓
EPC T210 Nautic AC *	✓	✓	✓	✓	<ul> <li>Image: A start of the start of</li></ul>	✓	1			✓
EPC T80 LX Nautic	✓			✓						✓
EPC T100 LX Nautic	✓			✓						✓
	1	1	1	1	1	1		1		

### LEGEND

Lloyd's Register (LR)

Bureau Veritas (BV)

Germanischer Lloyd (GL)

Det Norske Veritas (DNV)

Panel/System	CE	LR	BV	GL	DNV	ABS	RS	RINA	BSH (Modul B)	Acc. <sup>1</sup> EN 60945
EXTER T70-bl		<b>√</b>		✓	✓	✓		✓		✓
EXTER T100-bl		✓		✓	✓	✓		✓		✓
EXTER T150-bl	✓	✓		~	✓	✓		✓		~
EXTER T70sr-bl	✓	✓		✓	✓	✓		✓		
EXTER T100sr-bl	✓	~		~	~	~		~		
EXTER T150sr-bl	~	✓		✓	✓	✓		✓		
EXTER K10m	✓				✓	✓				
EXTER K20m	✓				~	~				
EXTER K30m	~			~	~	~				
EXTER T40	<ul> <li>✓</li> </ul>			~	~	~				
EXTER K60	✓				<ul> <li>Image: A second s</li></ul>	~				
EXTER T60	✓				~	~				
EXTER K70	✓				<ul> <li>✓</li> </ul>	~				
EXTER T70	✓	~		1	~	~		~		~
EXTER K100	<ul> <li>✓</li> </ul>			~	<ul> <li>✓</li> </ul>	~				
EXTER T100	✓	~		~	~	~		~		~
EXTER T150	×	~		~	<ul> <li>✓</li> </ul>	~		<ul> <li>✓</li> </ul>		~

\* Panels available with anti-reflective glass

- in progress
- <sup>1</sup> 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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For more information, please visit www.marinehmi.com.

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