



MTe Nautic

Installation Manual

English

MAEN983B, 2010-08

MTe Nautic Monitor Series Installation Manual

Foreword

The MTe Nautic Monitor series affords excellent quality displays of nautical charts or machine data. The series operates with or without touch, features non-reflective glass for easy daylight viewing and offers infinitely adjustable dimming to zero while delivering the specific functions to enable automation and navigational tasks.

Dimming can be carried out by buttons on the front, or remotely via a serial, USB or optionally via a LAN port.

Video out signal is available through VGA, DVI, USB or optionally via LAN.

With shallow depth for easy installation, the MTe Nautic can be utilized in combination with the EPC-box Nautic or third party computers. All models are fully certified according to all major nautical classification societies.

This manual describes each model and gives instructions on installation, operation and service.

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Please read the entire installation manual prior to installing and using this equipment. Only qualified personnel may install, operate or repair this equipment. Beijer Electronics AB, including all its group companies is not responsible for modified, altered or renovated equipment. Because the equipment has a wide range of applications, users must acquire the appropriate knowledge to use the equipment properly in their specific applications.

Persons responsible for the application and the equipment must themselves ensure that each application is in compliance with all relevant requirements, standards and legislation in respect to configuration and safety. Only parts and accessories manufactured according to specifications set by Beijer Electronics AB may be used.

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1 Safety Precautions

Both the installer and the owner and/or operator of the monitor must read and understand this installation manual.

1.1 Nautic Approvals and Certificates

The MTe Nautic Monitor series are certified according to the following list. Some approvals are in progress. Please visit our web site for the latest information.

Model	ABS	BV	CE	DNV	EN 60945	GL	LR	RS
MTe 150 Nautic AC	X	X	X	X	X*	X	X	X
MTe 150 Nautic DC	X	X	X	X	X*	X	X	X
MTe 150 E Nautic AC	X	X	X	X	X*	X	X	X
MTe 150 E Nautic DC	X	X	X	X	X*	X	X	X
MTe T150 Nautic AC	X	X	X	X	X*	X	X	X
MTe T150 Nautic DC	X	X	X	X	X*	X	X	X
MTe T150 E Nautic AC	X	X	X	X	X*	X	X	X
MTe T150 E Nautic DC	X	X	X	X	X*	X	X	X
MTe 170 Nautic AC	X	X	X	X	X*	X	X	X
MTe 170 Nautic DC	X	X	X	X	X*	X	X	X
MTe 170 E Nautic AC	X	X	X	X	X*	X	X	X
MTe 170 E Nautic DC	X	X	X	X	X*	X	X	X
MTe T170 Nautic AC	X	X	X	X	X*	X	X	X
MTe T170 Nautic DC	X	X	X	X	X*	X	X	X
MTe T170 E Nautic AC	X	X	X	X	X*	X	X	X
MTe T170 E Nautic DC	X	X	X	X	X*	X	X	X
MTe 190 Nautic AC	X	X	X	X	X*	X	X	X
MTe 190 Nautic DC	X	X	X	X	X*	X	X	X
MTe 190 E Nautic AC	X	X	X	X	X*	X	X	X
MTe 190 E Nautic DC	X	X	X	X	X*	X	X	X
MTe T190 Nautic AC	X	X	X	X	X*	X	X	X
MTe T190 Nautic DC	X	X	X	X	X*	X	X	X
MTe T190 E Nautic AC	X	X	X	X	X*	X	X	X
MTe T190 E Nautic DC	X	X	X	X	X*	X	X	X

* Also for bridge applications

Approval/Certificate	Abbreviation
American Bureau of Shipping	ABS
Bureau Veritas	BV
Conformité Européenne	CE
Det Norske Veritas	DNV
European Standard	EN 60945
Germanischer Lloyd	GL
Lloyd's Register	LR
Russian Maritime Register of Shipping	RS

1.2 General

- The monitor is intended for industrial use only.
- The monitor is constructed for naval applications and for indoor use according to IEC 60945.
- Read the safety precautions carefully.
- Check the delivery for transportation damage. If damage is found, notify the supplier as soon as possible.
- Do not use the monitor in an environment with high explosive hazards.
- The supplier is not responsible for modified, altered or reconstructed equipment.
- Use only parts and accessories manufactured according to specifications of the supplier.
- Read the installation and operating instructions carefully before installing, using or repairing the monitor.
- Never allow fluids, metal filings or wiring debris to enter any openings in the monitor. This may cause fire or electrical shock.
- Only qualified personnel may operate the monitor.
- Storing the monitor where the temperature is lower/higher than recommended in this manual can cause the LCD display liquid to congeal/become isotopic.
- The LCD display liquid contains a powerful irritant. In case of skin contact, wash immediately with plenty of water. In case of eye contact, hold the eye open, flush with plenty of water and get medical attention.
- The figures in this manual serves an illustrative purpose. Because of the many variables associated with any particular installation, the supplier cannot assume responsibility for actual use based on the figures.
- The supplier neither guarantees that the monitor is suitable for your particular application, nor assumes responsibility for your product design, installation or operation.

1.3 During Installation

- The monitor is designed for stationary installation on a plane surface, where the following conditions are fulfilled:
 - no high explosive risks
 - no strong magnetic fields
 - no direct sunlight
 - no large, sudden temperature changes
- Install the monitor according to the accompanying installation instructions.
- Ground the monitor according to the accompanying installation instructions.
- Only qualified personnel may install the monitor.
- Separate the high voltage, signal and supply cables.
- Make sure that the voltage and polarity of the power source is correct before connecting the monitor to the power outlet.
- Peripheral equipment must be appropriate for the application and location.
- The controlling transformer has to comply with EN60742.

1.4 During Use

- Keep the monitor clean.
- Emergency stop and other safety functions may not be controlled from the monitor.
- Do not use too much force or sharp objects when touching the keys, touch screen etc.

1.5 Service and Maintenance

- Only qualified personnel should carry out repairs.
- The agreed warranty applies.
- Before carrying out any cleaning or maintenance operations, disconnect the equipment from the electrical supply.
- Clean the display and surrounding front cover with a soft cloth and mild detergent.
- Replacing the battery incorrectly may result in explosion. Only use batteries recommended by the supplier.

1.6 Dismantling and Scrapping

- The monitor or parts thereof shall be recycled according to local regulations.
- The following components contain substances that might be hazardous to health and the environment: lithium battery, electrolytic capacitor and display.

2 Product Naming

The naming of the monitors is constructed with a number of parameters that indicate the characteristics of each model, for example *MTe T170 E Nautic DC* according to below:

MTe	T	170	E	Nautic	DC
Monitor series	Optional touch screen	Screen size	Optional Ethernet	Main usage	Type of power supply

3 Supplied Equipment

Part	Description
CD; driver software	Driver software CD for touch screen installation etc.
Power cable	Standard power cable (European or US standard) for units with 230 V AC power supply. Length: approximately 3.0 m. 24 V DC units are delivered without cable. A variety of cables are available separately.
Installation manual	This manual describes specific information about Beijer Electronics products only - not about third party components.
Mounting kit	Screws, nuts etc.
Sticker	Device sticker with device name and part number Note: Place the sticker on the front of the device when mounting, to identify device while installing and at startup.

4 Compass Safety Distance

The MTe Nautic Monitors are certified according to EN 60945 for bridge applications. The tests include a compass safety distance test.

Electrical devices, such as the MTe Nautic Monitor, must be kept in a safe distance to a compass in operation according to the following table:

Compass type	Minimum distance to MTe Nautic Monitor
Steering compass	1 meter in all directions
Emergency compass	
Standard compass	1.45 meter in all directions

5 Description of Parts

Monitor sizes 15", 17" and 19" are available.



The front includes a USB-port under hatch, a power button with a LED, and a set of dimmer buttons. The buttons are explained below:

Button	Instruction	Description
	Press the power button for more than one second	Turns the monitor off
	Press the power button for more than one second	Turns the monitor on
	Press - (brightness down) on the dimmer button (single step or automatic repeating after one second)	Makes the display darker
	Press + (brightness up) on the dimmer button (single step or automatic repeating after one second)	Makes the display brighter
	Press + and - simultaneously for more than one second	Turns on full brightness quickly (default - this may be configured according to RBC software manual MAEN986)

LED Description

The power LED can assume the following statuses in monitors with Ethernet:

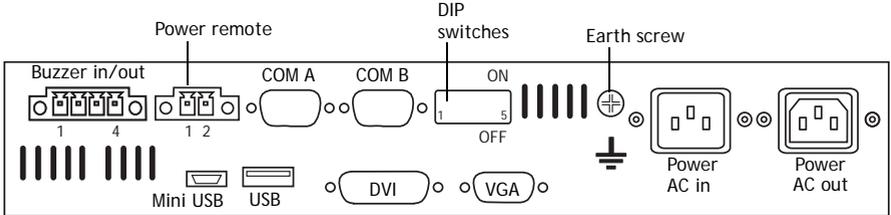
LED	Description
Green	Normal operation
-	The monitor is turned off

The power LED can assume the following statuses in monitors without Ethernet:

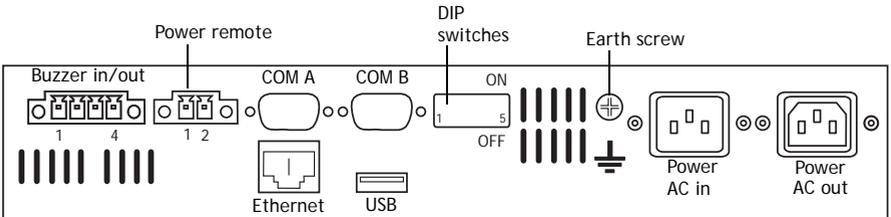
LED	Description
Green	Signal detected - normal operation
Blinking green/orange	Resolution out of range
Orange	No input signal available
Blinking orange	No input cable or signal detected
Red	Display refresh rate out of range

5.1 Communication Ports

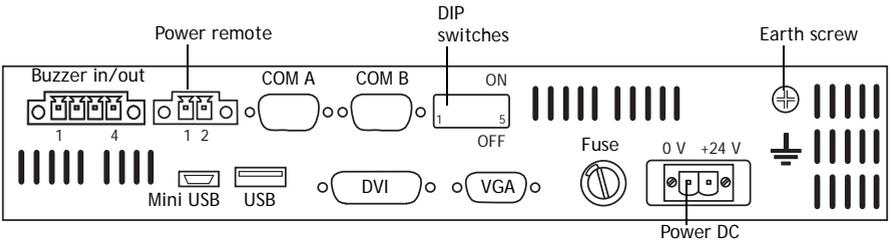
Communication Ports 230 V AC without Ethernet



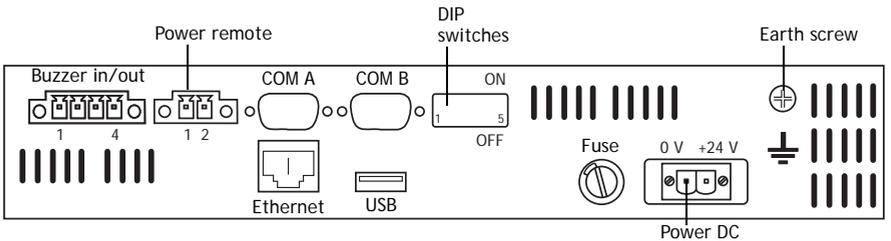
Communication Ports 230 V AC with Ethernet



Communication Ports 24 V DC without Ethernet



Communication Ports 24 V DC with Ethernet



5.2 Assembly

A free space of 100 mm, for air circulation, has to be provided around the appliance, to dissipate the heat generated during operation.

The monitor is assembled with hexagon nuts (included in the supplied mounting kit).

Note:

Possible risk of damage to the appliance!

Protection class IP65 for the front panel is only guaranteed with a perfect fitting seal.

Pay attention to the torque when fixing the front panel.

5.3 Power Supply

The MTe Nautic monitors are available with 230 V AC or 24 V DC power system.

The power supply for 24 V DC is carried out via a double-pole connector (Phoenix MST BT 2,5/2).

The monitors are certified for the connection to protective grounded power supply according to EN60950. The controlling transformer has to comply with EN60742.

Note:

Check the power supply system with the relevant data on the type plate.

5.4 Earthing System

The following items have to be observed to guarantee a safe dissipation of electronic interference:

- Appliance and switch board have to be connected to the nearest possible central earthing point.
- Make sure of a possibly low inductive connection between appliance and switch board.
- All data cables connected to the appliance have to be of the shield type.
- The screens have to be earthed on both sides. A low ohm connection between the connected systems is essential. Avoid high equalizing currents through the cable screen due to voltage fluctuations.
- The earthing connection is to be carried out with min. 4 mm² cross section.

5.5 Buzzer In/Out

There is a buzzer integrated in the front behind the front foil. The buzzer can be activated with a Beijer Electronics RBC software command or with a buzzer-in signal. Buzzer-out is a relay contact parallel to the integrated buzzer that can be used to switch an external signal device.

The buzzer-in and -out can be connected to the 4-pole Phoenix connector:

Buzzer	Connection	Comment
Buzzer-out	Pin 1 and pin 2	NO-contact, max. load 1 A @ 24 V DC
Buzzer-in	Pin 3 + 24 V DC / pin 4 ground	

Please see the RBC software manual MAEN986 for further information.

5.6 Remote Power Out

Remote power out is a relay contact that is closed after the power button on the front side is pressed for more than one second. It is opened after the button is released. With the remote power out signal, it is possible to switch an external Beijer Electronics EPC Nautic on and off. The EPC has a corresponding ATX power remote input. To use this function, connect the double-pole Phoenix connector to the corresponding connector on the EPC.

5.7 AC Power Out

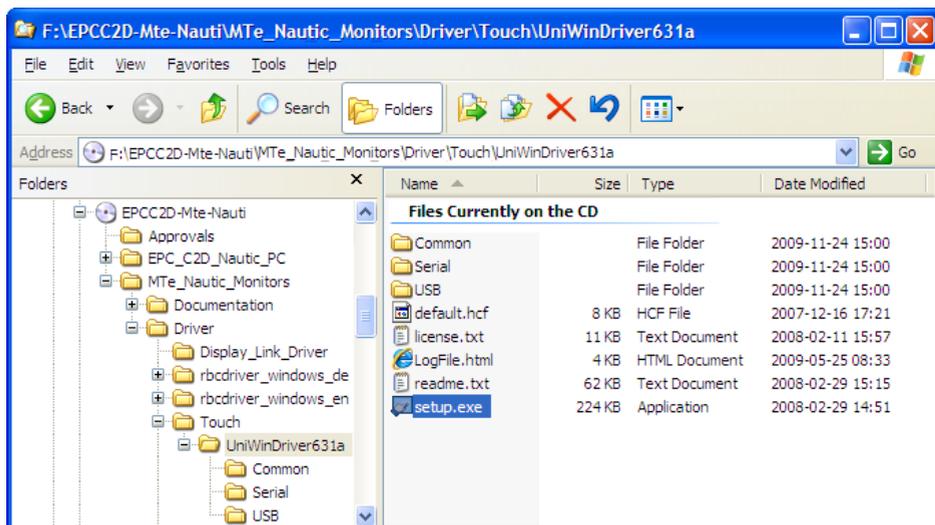
The AC power out terminal on the 230 V AC-models is internally connected to the AC power in terminal through a double-pole relay. This makes it possible to connect an external AC powered device such as a PC (max. 6 A). The AC power out is active only when the monitor is on.

6 Operation

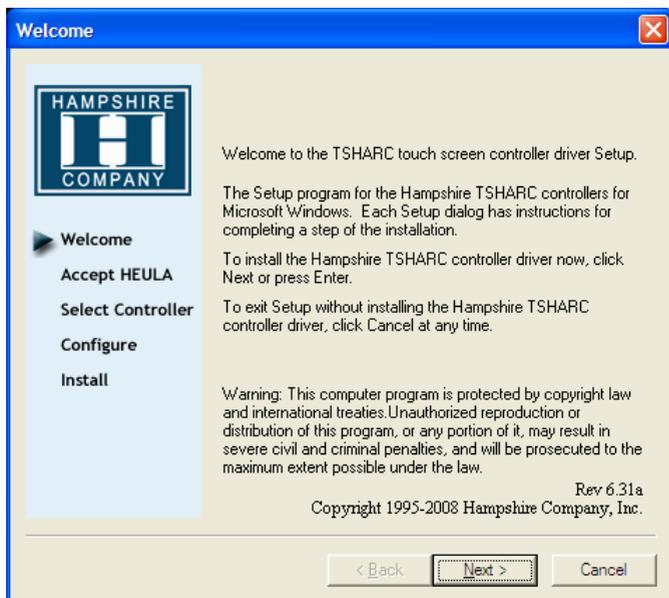
6.1 Touch Screen Installation

Perform the SETUP.EXE under:

- CD-ROM: \MTe_Nautic_Monitors\Driver\Touch\UniWinDriver631a.

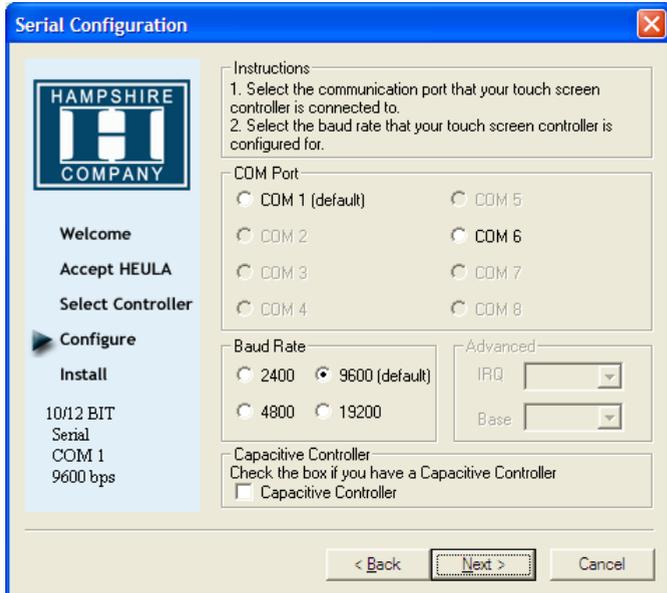
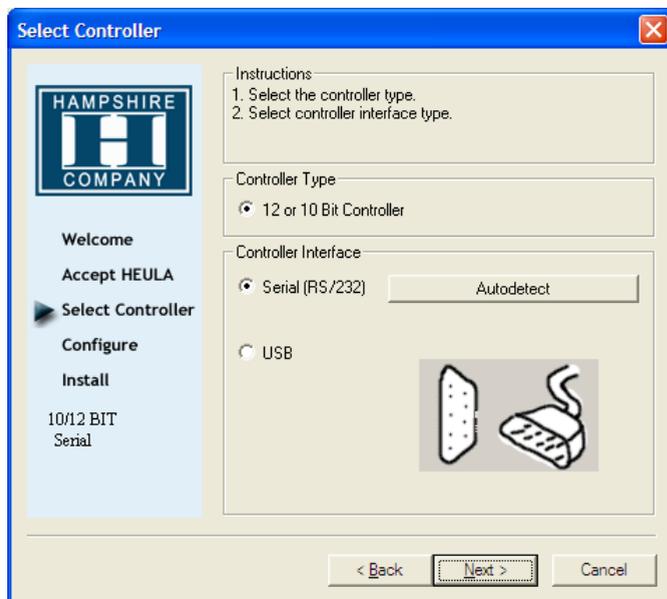


1. Follow the instructions on the screen and press **Next**.

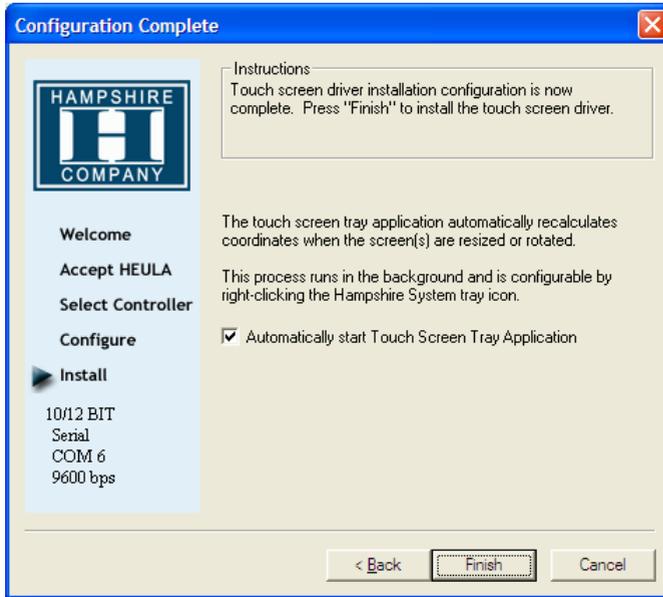


2. Accept the license provisions.



3. Select **Autodetect** or manually select the technical connection data.

4. Press **Finish** and follow the instructions for a re-start.



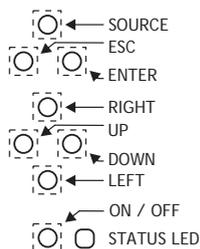
5. After a re-start of the operating system you will find *Hampshire Control Panel* among the programs.
6. Calibrate the touch screen with your finger or with a rounded pointed touch pen.

6.2 On Screen Display Menu

Note:

The On Screen Display menu is supported only for monitors without an Ethernet connection.

BUTTON



The On Screen Display (OSD) menu is controlled via the OSD buttons.

It is opened by the **Enter** button.

The following controls are available for selection from the OSD menu: **Input Selection**, **Brightness Control**, **Color Control**, **Image Adjustment** and **Tools**.

6.2.1 OSD Functionality

The following table describes differences in keypad functions with and without activating OSD:

Key	Function - OSD active	Function - OSD not active
POWER	Switch power on/off	Switch power on/off
LEFT	Decrease Value	Decrease Value
RIGHT	Increase Value	Increase Value
UP	Not used	Scroll up (Esc)
DOWN	Shortcut black level and brightness control	Scroll down (Enter)
ESCAPE	Not used	Escape
ENTER	Enter	Enter
SOURCE	Toggle Input Source	----

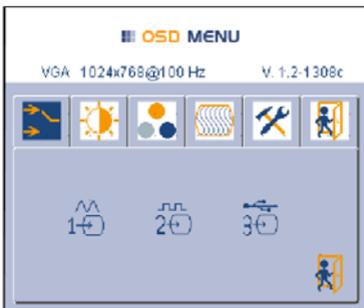
For a description of the power LED, see section [LED Description](#).

6.2.2 System Messages

The following system messages may be displayed:

System message	Description
	The system is booting up.
	There is no signal at DVI or RGB input. Reason: PC is off or in sleep mode or cable is not connected to graphics card
	There is no cable connected to the RGB input.
	There is no cable connected to the DVI input.
	There is no cable connected to the USB input.
	Provided signal/resolution at DVI or RGB input is not supported.

6.2.3 Input Selection Menu

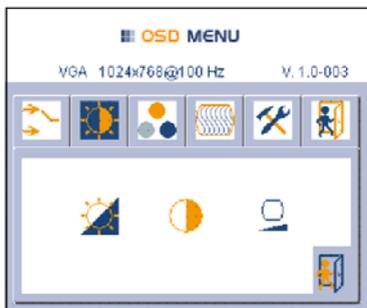


Press **Enter** or down to enter the **Input Selection** menu.

Use left or right buttons to select **RGB Analog**, **DVI** or **UGA (USB)** input.

Select **Exit** or up to return to the icon bar.

6.2.4 Brightness Control Menu



Press **Enter** or down to enter the **Brightness Control** menu.

Use left or right buttons to adjust **Blacklevel & Brightness**, **Contrast** or **Blacklevel**.

Select **Exit** or up to return to the icon bar.

Blacklevel & Brightness



Use left or right buttons to decrease or increase panel brightness.

- Blacklevel adjustment: 0-128
- Brightness adjustment: 128-256

Press **Enter** or down to confirm, or **Esc** to cancel.

Contrast



Use left or right buttons to decrease or increase display contrast.

Press **Enter** or down to confirm, or **Esc** to cancel.

Blacklevel

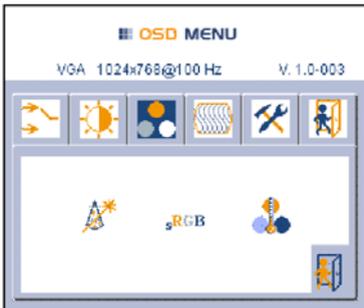


Use up or down buttons to select red, green or blue.

Use left or right buttons to decrease or increase the selected color value.

Press **Enter** or down to confirm, or **Esc** to cancel.

6.2.5 Color Control Menu



Press **Enter** or down to enter the **Color Control** menu.

Use left or right buttons to adjust **Color Auto-adjust**, **Color** or **Color Temperature**.

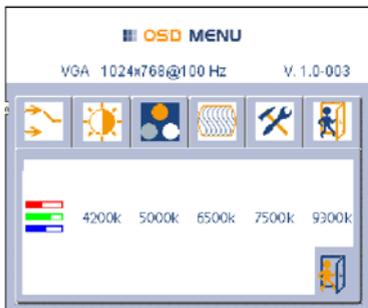
Select **Exit** or up to return to the icon bar.

Note:

Color Auto-adjust is available only if RGB analog is selected as input. This function adjusts the analog input interface to the used graphic board. The result has to be confirmed by selecting either **Yes** or **No** using the left or right buttons.



Color



Press **Enter** or down to enter the **Color** menu.

Use left or right buttons to select a value, or to enter the **Color Temperature** panel.

- Color Temperature panel
- 4200K
- 5000K
- 6500K
- 9300K

Select **Exit** or up to return to the icon bar.

Color Temperature



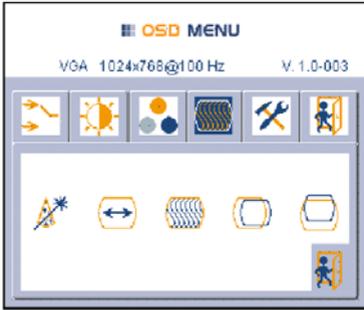
Use up or down buttons to select red, green or blue.

Use left or right buttons to decrease or increase the selected color value.

Press **Enter** or down to confirm, or **Esc** to cancel.

6.2.6 Image Adjustment Menu

The **Image Adjustment** settings are available only if RGB analog is selected as input.



Press **Enter** or down to enter the **Image Adjustment** menu.

Use left or right buttons to select **Image Auto-adjust**, **Horizontal Width**, **Phase**, **Horizontal Position** or **Vertical Position**.

Press **Enter** or down to confirm.

Select **Exit** or up to return to the icon bar.

Note:

Image Auto-adjust is available only if RGB analog is selected as input. This function adjusts the image on the display including phase and horizontal/vertical position. The result has to be confirmed by selecting either **Yes** or **No** using the left or right buttons.



Horizontal Width



Use left or right buttons to adjust the image size manually.

Press **Enter** or down to confirm, or **Esc** to cancel.

Phase



Use left or right buttons to adjust the phase manually.

Press **Enter** or down to confirm, or **Esc** to cancel.

Horizontal Position



Use left or right buttons to adjust the position manually.

Press **Enter** or down to confirm, or **Esc** to cancel.

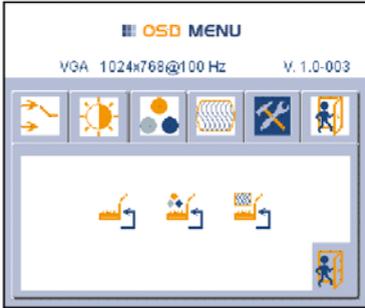
Vertical Position



Use left or right buttons to adjust the position manually.

Press **Enter** or down to confirm, or **Esc** to cancel.

6.2.7 Tools Menu



Press **Enter** or down to enter the **Tools** menu.

Use left or right buttons to select one of the factory default settings **Complete Reset**, **Color Reset** or **Image Reset**.

Press **Enter** or down to confirm.

Select **Exit** or up to return to the icon bar.

Factory Default Settings



Reset complete factory default settings

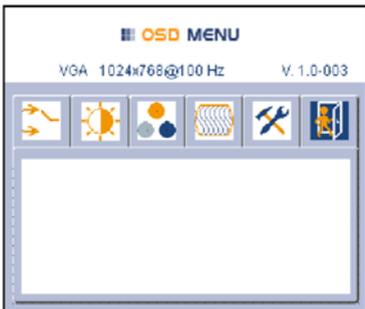


Reset color factory default settings



Reset image factory default settings

6.2.8 Exit



Use left or right buttons to select **Exit**.

Press **Enter** to save changes and close OSD.

6.3 USB Graphic Driver

The monitor can be configured either to mirror your primary screen, or to extend Windows. The USB to VGA driver used to control the extra screens uses little PC resource and offers a vast array of screen resolutions and color depths.

6.3.1 System Requirements

The d.client USB software can be installed on any desktop or laptop PC running one of the following operating systems:

Operating system	Service pack/driver requirement
Windows XP Home	Service Pack 2 and 3
Windows XP Professional	Service Pack 2 and 3
Windows 2000	Service Pack 4
Windows Vista Basic	Driver revision 4.3 or higher
Windows Vista Aero	Driver revision 4.3 or higher

Up to six monitors configured as d.client USB units can be connected to the PC at a time.

6.3.2 Software Installation

The following example is for Windows XP - there are some differences in terminology and user interface on Windows 2000/Vista, but the basic steps are the same. You can select to first connect the monitor to the PC, or to first install the software and then connect the monitor.

Installation of Connected Hardware

With this method, the monitor is connected prior to installing the drivers.

1. Insert the software installation CD, or if your software was downloaded, unzip it to a convenient folder.
2. Connect the monitor to the PC via USB. When the **Found New Hardware Wizard** starts, follow its instructions:



3. Select **No, not this time**.



4. Select **Install from a list or a specific location (Advanced)**, and point the wizard at the software.

Installation without Connected Hardware

With this method, the drivers are installed before connecting the monitor to the PC.

1. Navigate to the d.client USB installation directory on your PC or CD and double-click on **Setup.exe** to start installing the drivers.
2. Once the drivers are installed, connect the monitor to the PC via USB. The PC will automatically detect the new USB device and start the **Found New Hardware Wizard**. Follow the instructions of the wizard:



3. Select **No, not this time**.

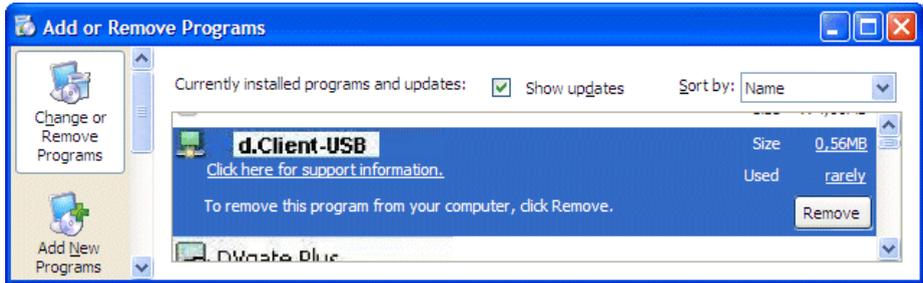


4. Select **Install the software automatically (Recommended)**.

6.3.3 Uninstalling the Graphics Software

The d.client USB software can be removed using the **Add or Remove Programs** utility in Windows control panel. In Windows Vista this is called **Programs and Features**.

1. Open **Add or Remove Programs**.
2. Locate the d.client USB entry and click **Remove**.



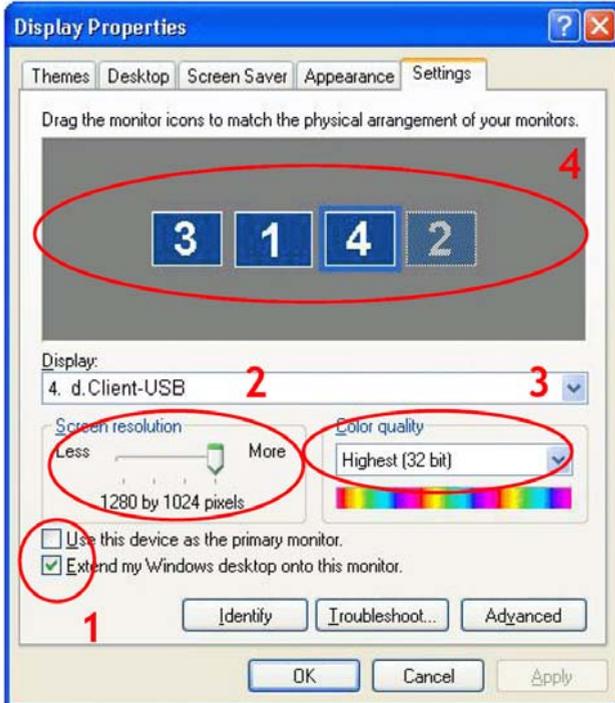
3. Click **Yes** to confirm that you want to remove it.

The software will then uninstall automatically.

6.3.4 Using the Software

The behavior of the d.client USB software is configured through Windows Display Properties dialog box.

1. To access the **Display Properties** dialog, right-click on the desktop and select **Properties**.
2. Select the **Settings** tab.



3. Locate **d.client USB** in the Display drop-down list. Its mode, resolution, color quality and position can all be controlled from here.

Setting the Display in Extended Mode

In extended mode, the d.client USB forms part of the extended Windows desktop.

1. To set the display in this mode, check the **Extend my Windows desktop onto this monitor** box (marked 1 in previous figure).
2. Configure screen resolution and color quality using the appropriate controls (2 and 3), and arrange its position with respect to the other monitors on the extended desktop in using the drag area (4).
3. For more detailed mode settings, including the refresh rate, click on the **Advanced** button, then the **Adapter** tab and finally the **List all modes...** button. All valid combinations of resolution, color quality and refresh rate are listed.

Setting the Display in Mirror Mode

In mirror mode, the d.client USB simply copies what is on the main (primary) display.

1. To set the display in this mode, uncheck the **Extend my Windows desktop onto this monitor** box (marked 1 in previous figure).

The resolution, color depth and refresh rate of the primary screen are replicated on the d.client USB.

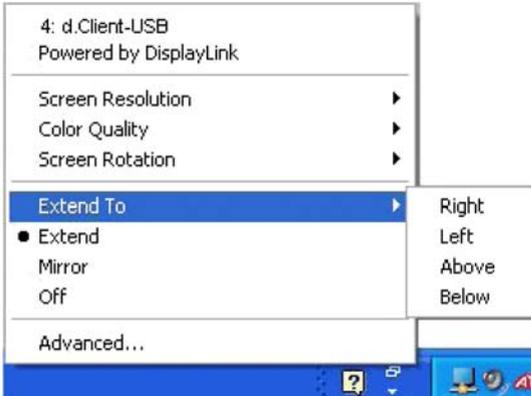
If the d.client USB display unit supports a lower resolution than the primary display, the on board scaling engine will downscale the image to the native panel resolution.

Setting the Display as the Primary Display

To make the d.client USB unit the primary display, check the **Use this device as the primary monitor** (marked 1 in previous figure). On some PCs it is necessary to disable the main display (i.e. unchecking the box marked **Extend my Windows desktop onto this monitor** for the main display) as part of the same settings change. The d.client USB display stays primary if the PC enters hibernate or suspend mode or is rebooted. If the d.client is detached, the main display becomes primary again.

6.3.5 Controlling the Display

The d.client unit can also be configured from the d.client Icon application. When devices are attached, an icon in the notification area indicates that the program is running. Clicking on it displays a menu to control attached devices:



The menu contains many of the settings that can be configured via Windows Display Properties, in addition to some other settings:

Menu item	Description
Screen Rotation	Rotates Windows desktop (90, 180 or 270 degrees)
Extend To	Changes the device to extended mode, and places it to the left of/right of/above/below the primary monitor
Off	Switches the display off on an adapter
Advanced	Opens the Windows Display Properties dialog

6.3.6 General Characteristics

Standby and Hibernate, Shut Down and Restart

If the PC that the d.client USB is connected to is set in standby or hibernate mode, the display goes blank. When the PC is powered up again (and unlocked if necessary), the connected display returns to the same mode as before standby or hibernation.

If the PC is shut down, restarted and logged in to, the connected display returns to the same mode as before shutdown.

d.client USB with Multiple Users

d.client USB work with multiple users on the PC. The mode settings are saved for each user, thus allowing individual desktop configuration.

Disconnecting the d.client USB

If the d.client USB is powered off or the USB cable is removed from the PC, the display goes blank. All windows and icons move to the primary screen. On reconnection or powering up of the d.client USB, the display returns to the same mode as before disconnection.

However, windows and icons that were previously on the screen will not be moved back.

6.4 USB Server Driver

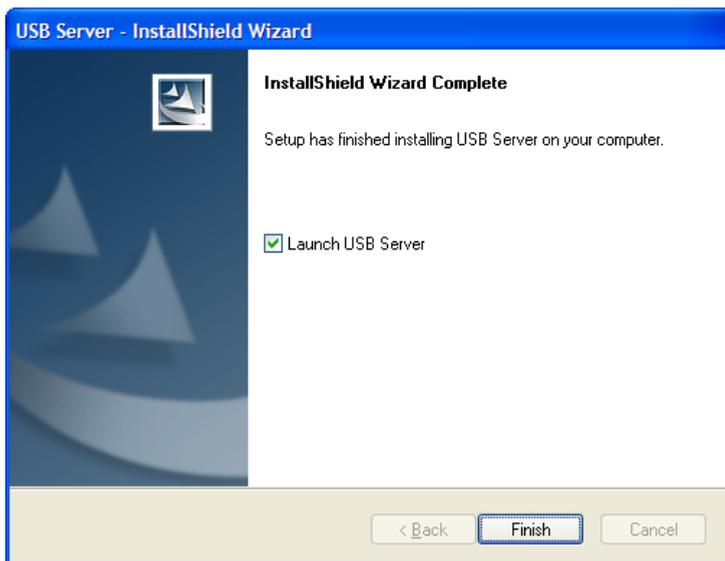
6.4.1 Software Installation

Note:

The USB Server driver is supported only for monitors with an Ethernet connection. The default IP address of the monitor is 192.168.0.1; the default subnet mask is 255.255.255.0.

1. Navigate to the USB server installation directory `MTe_Nautic_Monitors\Driver\USB_Server_Driver` on your PC or CD and double-click on the USB Server setup file to start the installation.

The installation starts automatically.



2. Click **Finish** when the installation is complete.

6.4.2 Using the Software

The USB Server program starts automatically in the background. An icon in the notification area indicates that the program is running.

If you have disabled the autostart option, double-click on the **Launch USB Server** shortcut on the desktop to start running the program in the background.



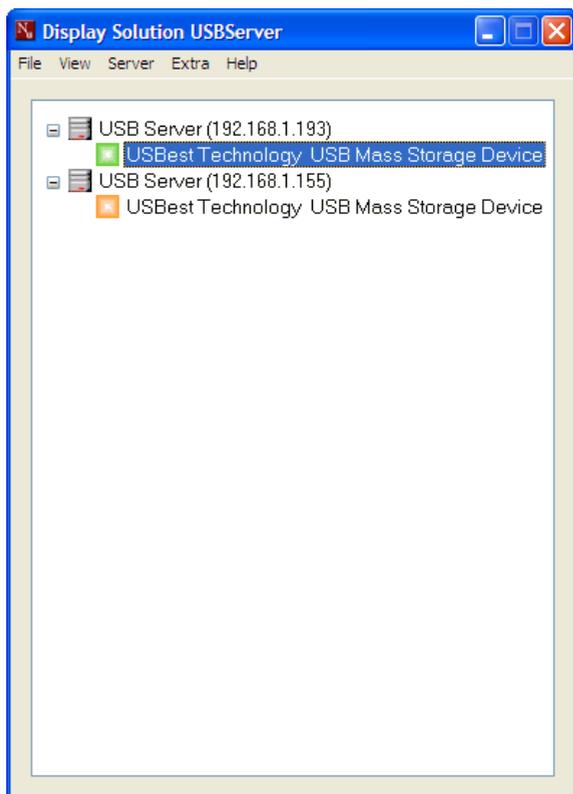
Main Menu

Right-click on the USB Server icon in the notification area and select **Open Display Solution USB Server** to display the main menu.



Status of USB Servers and Devices

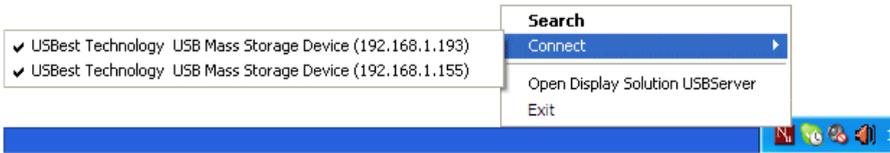
The tree view displays the status of all USB servers and devices that you can access. A USB Server is either accessible or inaccessible. An inaccessible server is either disconnected from the network, powered off or suffers other technical difficulties that prevent it from being accessed by your PC. An inaccessible server will not show up on the tree view.



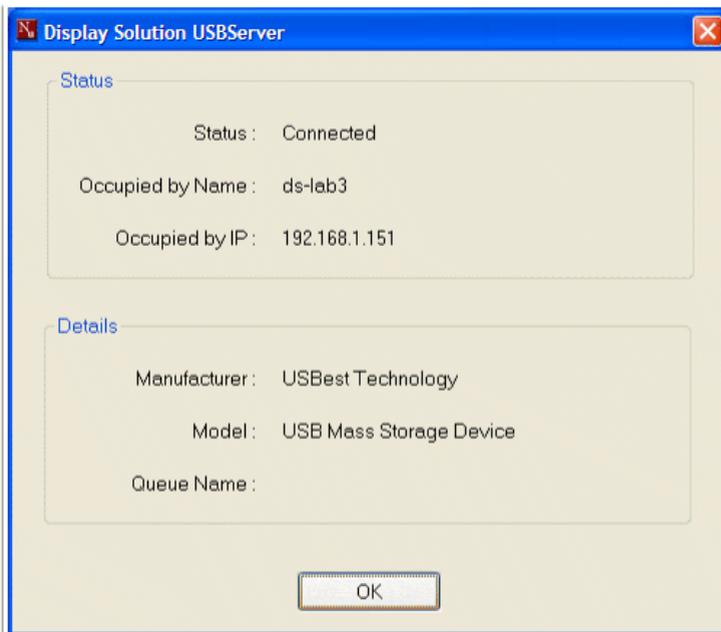
Each status is represented by an icon of different color:

Color	Status	Comment
Green	Ready	The device is unoccupied and ready for connection
Orange	Connected	Connection established
Red	Occupied by Others with Error	A problem has occurred for the device that is occupied by another user

It is also possible to see all connected devices by right-clicking on the USB Server icon in the notification area and selecting **Connect**.



Right-clicking on a device in the tree view, and selecting **Details**, displays additional information about the selected device:



Manual Disconnect and Connect

You can disconnect or connect to a device manually, by clicking on its icon in the tree view.

Exit Program

The program is stopped by right-clicking on the USB Server icon in the notification area and selecting **Exit**.

This will shut down the server. If devices are connected, you must confirm disconnecting them.



6.5 Dimming

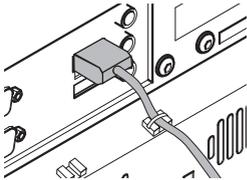
The monitor can be dimmed in different ways:

- Local, using the dimmer buttons on the front panel
- Remote, using the serial port, a USB port or Ethernet

Please see the RBC software manual MAEN986 for further information about remote dimming.

6.6 Cable Fixing Points

When connecting interface cables such as RS232, USB, LAN or VGA, the cables must be fixed at the cable fixing points, to avoid that the cables loosen because of vibrations.



7 Technical Data

Please see chapter [2 Product Naming](#) for a description of how products are named.

Parameter	MTe 150 Nautic MTe T150 Nautic MTe 150 E Nautic MTe T150 E Nautic	MTe 170 Nautic MTe T170 Nautic MTe 170 E Nautic MTe T170 E Nautic	MTe 190 Nautic MTe T190 Nautic MTe 190 E Nautic MTe T190 E Nautic
Size, W x H x D	412 x 351 x 81 mm	430 x 390 x 81 mm	483.2 x 444 x 81 mm
Mounting depth	80 mm (130 mm including clearance)		
Front panel seal	IP65		
Rear panel seal	IP20		
Weight	6.5 kg	7.5 kg	10.0 kg
USB port	1 x USB 2.0 on front side behind hatch 1 x USB 2.0 on back side		
Graphic port	VGA/DVI/USB or Ethernet		
Power consumption at rated voltage	45 W		
Fuse	1 AT (230 V AC) / 4 AT (24 V DC)		
Power supply options	115-230 V AC \pm 15%. 1 A max (switch on peak 30 A).		
	24 V DC \pm 15%. 2.4 A max (switch on peak 12 A).		
Active area of display	304.1 x 228.1 mm	337.9 x 270.3 mm	376.3 x 301.1 mm
Pixels	1024 x 768	1280 x 1024	1280 x 1024
Pixel pitch (RGB)	0.297 x 0.297 mm	0.264 x 0.264 mm	0.294 x 0.294 mm
Max. number of colors	16.7 million		
View angle (up/down/left/right) (typical)	50/60/75/75 °	89/89/89/89 °	

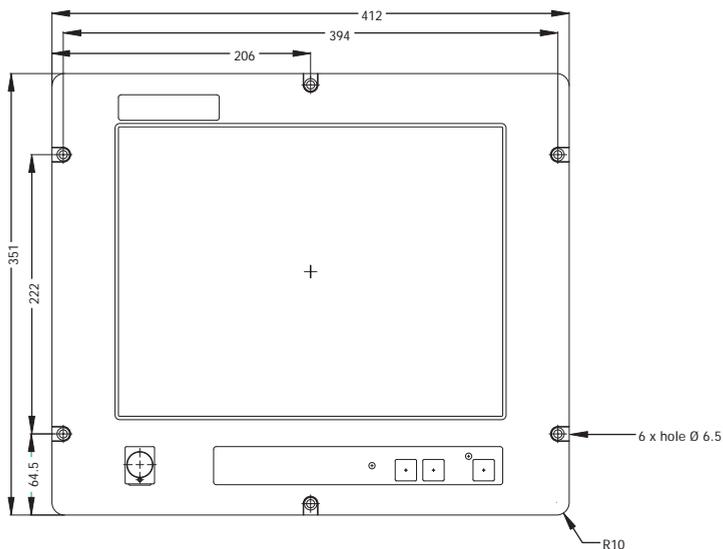
Technical Data

Parameter	MTe 150 Nautic MTe T150 Nautic MTe 150 E Nautic MTe T150 E Nautic	MTe 170 Nautic MTe T170 Nautic MTe 170 E Nautic MTe T170 E Nautic	MTe 190 Nautic MTe T190 Nautic MTe 190 E Nautic MTe T190 E Nautic
Light intensity (typical)	250 cd/m ²		
Contrast ratio	450:1	1500:1	1000:1
Response time	6 ms / 19 ms	15 ms / 10 ms	13 ms / 7 ms
Display technology	TN	PVA	SPVA
Touch screen technology	Resistive*		
Touch screen resolution	4096 x 4096 points*		
Supported signal resolution	640 x 480 to 1600 x 1200		
Ambient temperature	-15 ° to +55 °C		
Relative ambient humidity	30% to 90% non-condensed		
Storage temperature	-20 ° to +70 °C		
Relative storage humidity	10% to 90% non-condensed		
Basic RBC software version	V0003 May 28, 2009 Please contact Beijer Electronics/Elektronik-Systeme Lauer for information about current version.		

* Only applies to MTe T150/T170/T190 Nautic and MTe T150/T170/T190 E Nautic

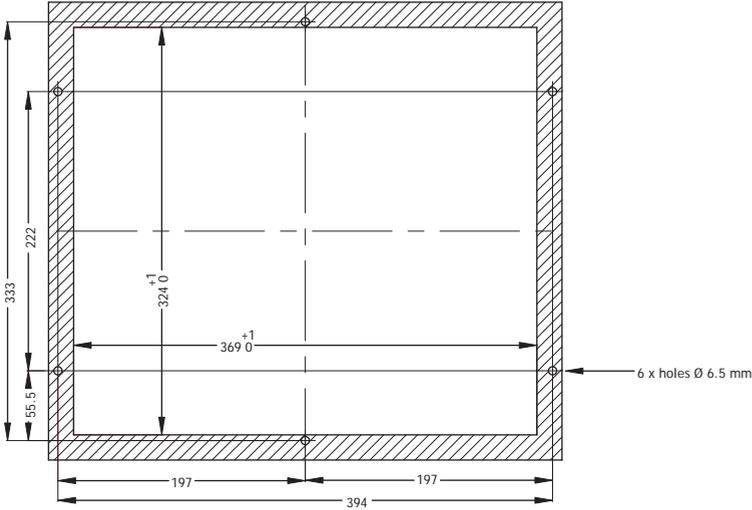
8 Drawings

8.1 MTe 150/T150 Nautic Front View



8.2 MTe 150/T150 Nautic Cut Out Drawing

Cut out dimensions: 369.0 x 324.0 mm, tolerance +1 mm. 15 mm is required for mounting screws on all sides = 399.0 x 354.0 mm.



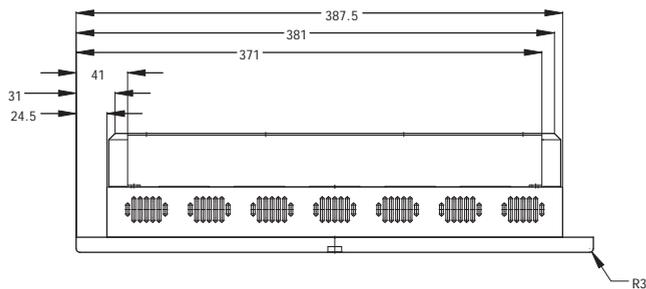
Front plate dimensions: 412.0 x 351.0, tolerance ± 0.2 mm.

Mounting method: 6 x M6x25 steel screws DIN 6912. Screws and o-ring seals are included.

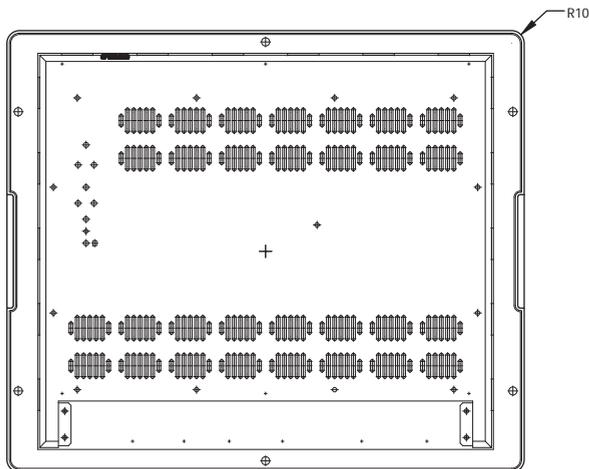
Max. 8 mm thick mounting frame.

8.3 MTe 150/T150 Nautic Outline Drawings

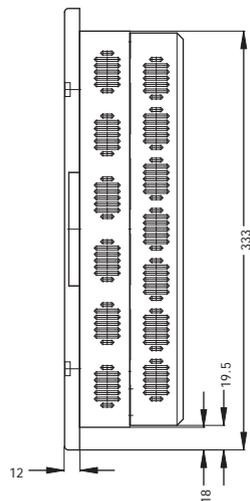
Bottom view



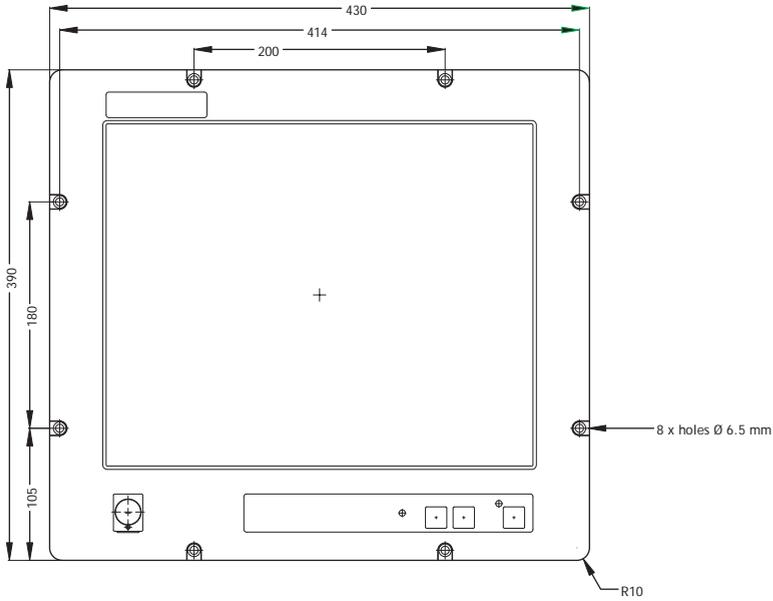
Rear view



Side view

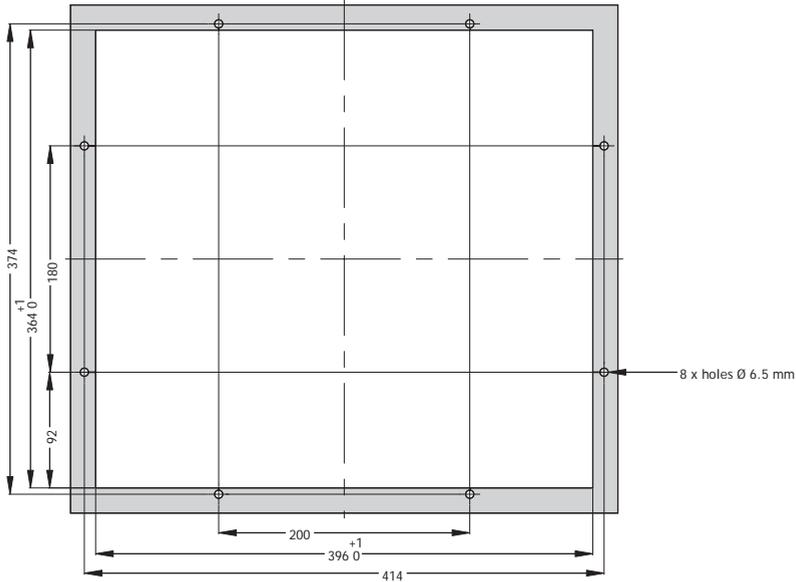


8.4 MTe 170/T170 Nautic Front View



8.5 MTe 170/T170 Nautic Cut Out Drawing

Cut out dimensions: 396.0 x 364.0 mm, tolerance +1 mm. 15 mm is required for mounting screws on all sides = 426.0 x 394.0 mm



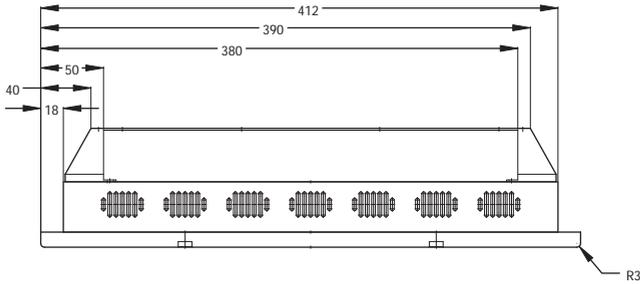
Front plate dimensions: 430.0 x 390.0, tolerance ± 0.2 mm.

Mounting method: 8 x M6x25 steel screws DIN 6912. Screws and o-ring seals are included.

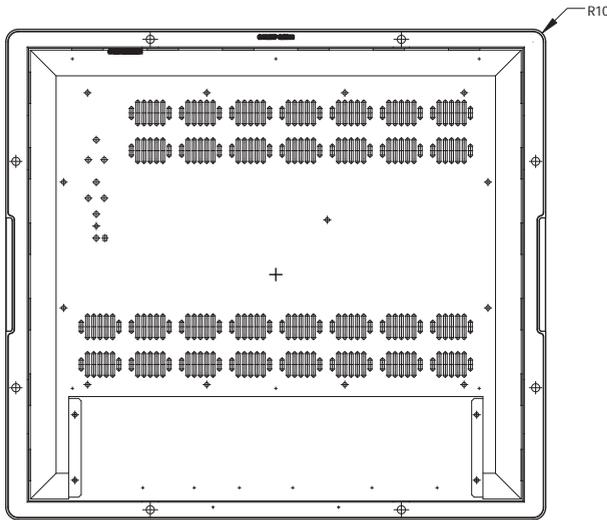
Max. 8 mm thick mounting frame.

8.6 MTe 170/T170 Nautic Outline Drawings

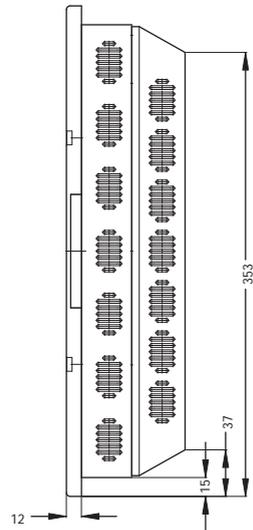
Bottom view



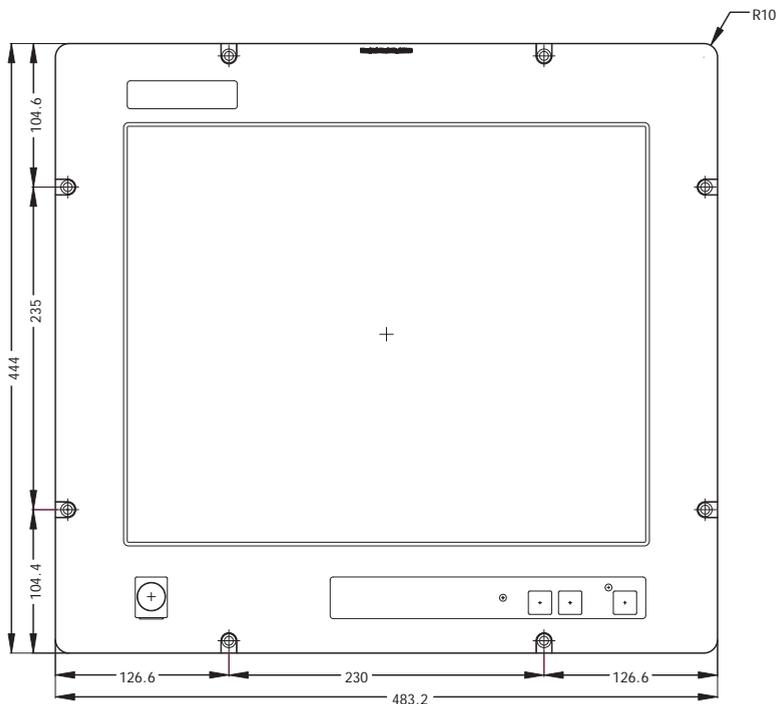
Rear view



Side view

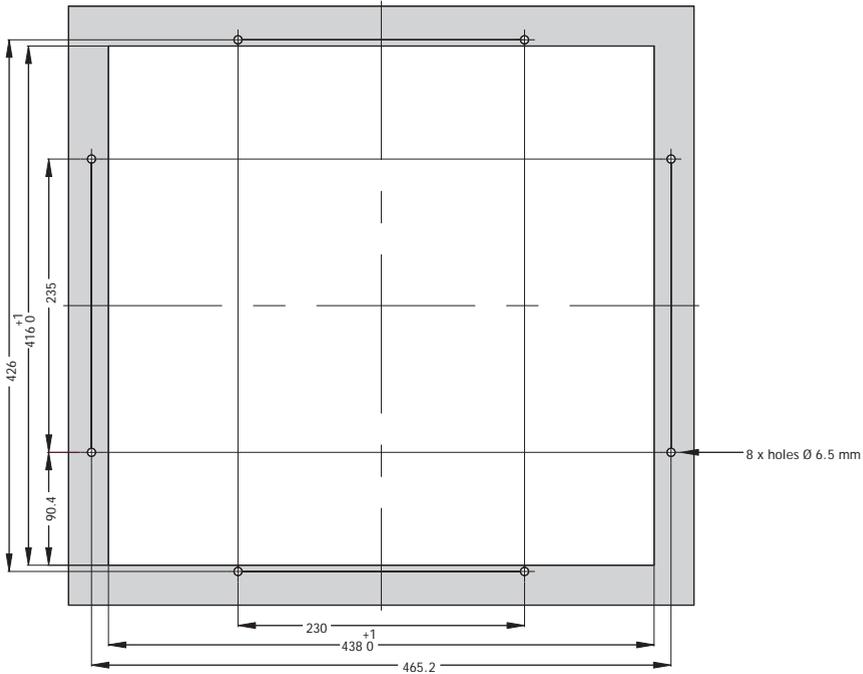


8.7 MTe 190/T190 Nautic Front View



8.8 MTe 190/T190 Nautic Cut Out Drawing

Cut out dimensions: 438.0 x 416.0 mm, tolerance +1 mm. 15 mm is required for mounting screws on all sides = 468.0 x 446.0 mm



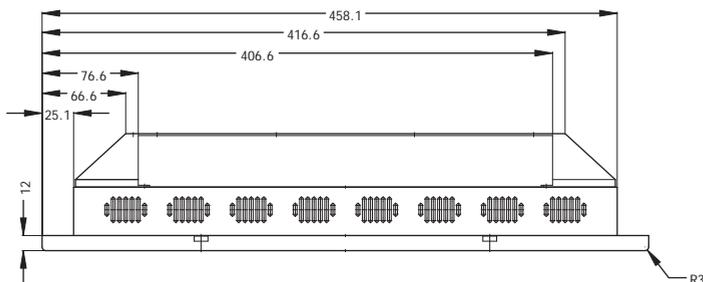
Front plate dimensions: 483.2 x 444.0, tolerance ± 0.2 mm.

Mounting method: 8 x M6x25 steel screws DIN 6912. Screws and o-ring seals are included.

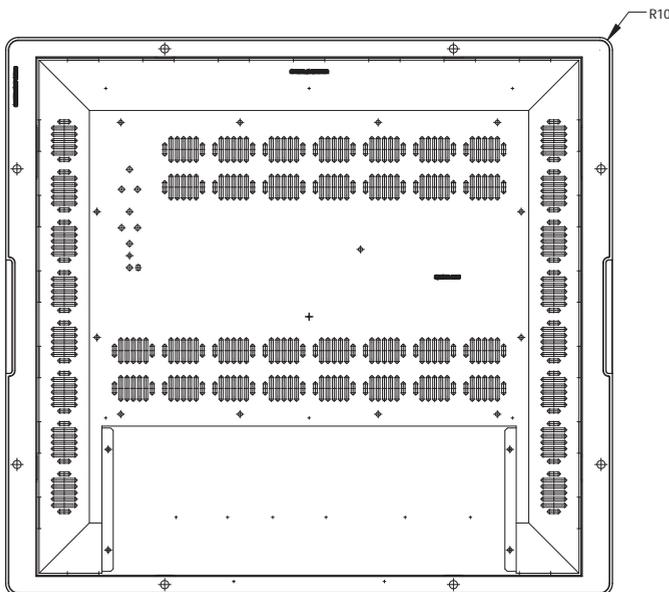
Max. 8 mm thick mounting frame.

8.9 MTe 190/T190 Nautic Outline Drawings

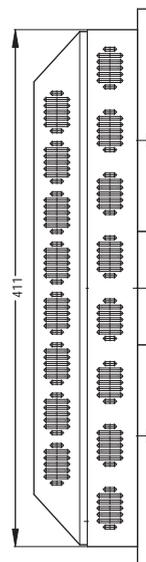
Bottom view



Rear view



Side view



Mounting method: 8 x M6x25 V2A-screws DIN 6912. Screws and o-ring seals are included.

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