



KONGSBERG

Simrad Marine Computer

Installation manual

This manual provides you with the basic information required to install the Simrad ES70/PI50 Marine Computer.

The Marine Computer is provided as an option for the Simrad ES70 Echo Sounder System, and the Simrad PI50 Catch Monitoring System.

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Disclaimer

Kongsberg Maritime AS endeavours to ensure that all information in this document is correct and fairly stated, but does not accept liability for any errors or omissions.

Warning

The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment and/or injury to personnel. The user must be familiar with the contents of the appropriate manuals before attempting to install, operate or work on the equipment.

Kongsberg Maritime AS disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.

Support information

If you require maintenance or repair, contact your local dealer. You can also contact us using the following address: simrad.support@simrad.com. If you need information about our other products, visit our web site. On the web site you will also find a list of our dealers and distributors.

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About this manual

Purpose

The purpose of this manual is to provide the information and basic drawings required for installation of the Simrad Marine Computer.

For more detailed information about the practical use of the host product, refer to the relevant echo sounder or catch monitoring system documentation.

Installation drawings

Detailed vessel specific mechanical drawings for the installation must be provided by the customer, or any shipyard contracted to perform the installation.

Kongsberg Maritime AS may, on special order, provide assistance to these drawings. Drawings must be approved by the appropriate vessel certification authority prior to installation of the system.

Applicable outline dimension and production drawings are provided in the *Drawing file* chapter. Drawings may also be downloaded in PDF and/or DWG formats from <http://www.simrad.com>.

About the technical descriptions and the target audience

This manual describes the installation of the Simrad Marine Computer

The manual is intended for technical personnel; qualified maintenance engineers and technicians. It is assumed that the personnel is conversant with the general principles of maritime electronic equipment, in particular sonar, echo sounder and catch monitoring systems. The personnel must also be familiar with computer hardware, signal processing, interface technology and traditional troubleshooting on electronic and mechanical products.

Installation procedure

This chapter describes how to do the physical installation of the computer and the power supply, as well as the display setup.

Topics

- *Physical installation* on page 7
- *Display setup* on page 8
 - *Single display* on page 8
 - *Dual display* on page 9

Physical installation

The ES70/PI50 Marine Computer is an industrial computer. It is small, rugged, and contains no moving parts. This means that fans, hard disks and CD drives are omitted. The computer provides Ethernet sockets, RS-232 serial lines, and a number of USB connectors. The hard disk is replaced with a solid state drive (SSD).

The Marine Computer is easily mounted with the brackets supplied with the unit.

A small external power supply is provided, and must be placed near the computer.

Figure 1 ES70/PI50 Marine Computer



Preparations

Two brackets and eight bolts enclosed. Mount the two brackets at the bottom of the computer.

Procedure

To make sure that the procedure is followed correctly, and in the right order, tick off each task after you have done it.

- 1 Locate the most convenient location for the computer.

In order to allow for future maintenance, we strongly advice that you mount the computer with its rear panel available for immediate access.

Note _____

Make sure that you can access both the rear and front side of the computer after it has been installed.

- 2 Observe the outline dimension drawing.
- 3 Mark the location of the six holes provided on the two brackets.
- 4 Mount the unit using six bolts or screws.
- 5 Find a suitable location for the power supply.
- 6 Secure the power supply with wire straps, velcro, brackets, or any other means appropriate.
- 7 Connect the cables.

Note _____

When you connect the cables, make sure that they are all secured, and able to withstand the vibration and movements of the vessel.

Display setup

Topics

- *Single display* on page 8
- *Dual display* on page 9

Single display

The ES70/PI50 Marine Computer is provided with Windows 7® operating system, and all operational software installed. This includes the display setup. However, the computer will automatically sense the display you connect during system installation, and which video output you use. Depending on these choices, you may need to set up the display resolution to fit your requirements.

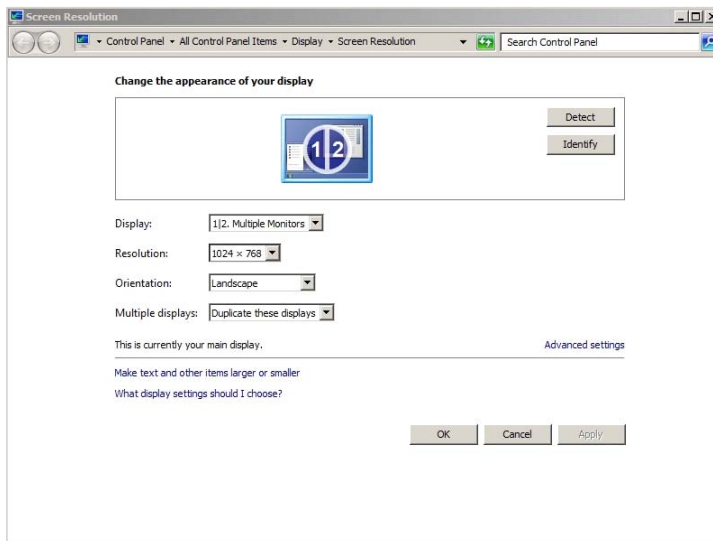
Two procedures are provided. One is used if you wish to use a single display. The other is used if you wish to set up the computer with two displays providing the same information.

Note that the Marine Computer appears to have three video outputs. This is not the case. Output 1 does not exist, and must not be used.

This procedure is used if you wish to use a single computer. It can be connected to either the VGA or DVI output.

- 1 Place the cursor on the computer desktop, and right-click to open the short-cut menu.
- 2 Select **Screen Resolution** on the menu.
- 3 Observe the default configuration:
 - **Displays:** 1|2 Multiple Monitors
 - **Resolution:** 1024 x 768
 - **Orientation:** Landscape
 - **Multiple displays:** Duplicate these displays

Figure 2 *Screen Resolution dialog with default parameters shown*



- 4 Set **Multiple displays** to *Show desktop only on 2*, then click **Apply**.
- 5 Observe message dialog: Do you want to keep these display settings?
- 6 Click **Keep change**.
- 7 Set **Resolution** to *1280 x 1024*, then click **Apply**.
- 8 Observe message dialog: Do you want to keep these display settings?
- 9 Click **Keep change**.
- 10 Click **OK** to save the current settings and close the dialog.

Dual display

The ES70/PI50 Marine Computer is provided with Windows 7® operating system, and all operational software installed. This includes the display setup. However, the computer will automatically sense the display you connect during system installation, and which video output you use. Depending on these choices, you may need to set up the display resolution to fit your requirements.

Two procedures are provided. One is used if you wish to use a single display. The other is used if you wish to set up the computer with two displays providing the same information.

Note that the Marine Computer appears to have three video outputs. This is not the case. Output 1 does not exist, and must not be used.

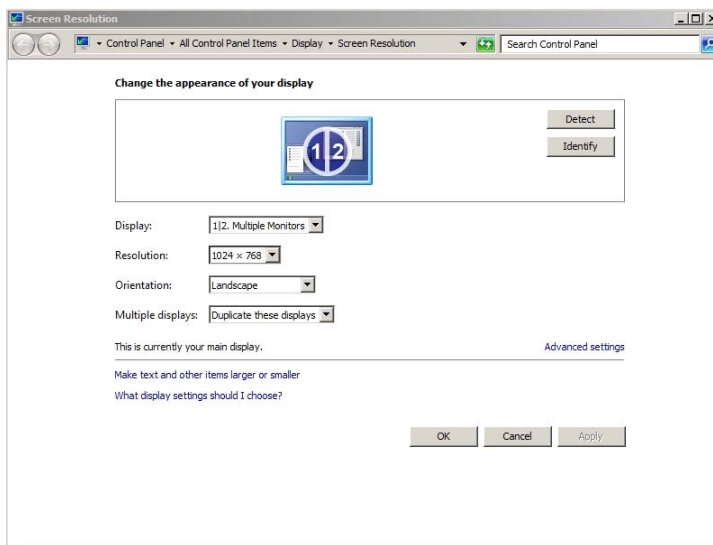
This procedure is used when you wish to use two displays. You must then connect one display to the VGA output, and one display to the DVI output.

Note

The video output stream on the VGA output can be inhibited before the display setup has been done. This will cause the display screen to turn black. The image will return when the setup procedure has been completed.

- 1 Place the cursor on the computer desktop, and right-click to open the short-cut menu.
- 2 Select **Screen Resolution** on the menu.
- 3 Observe the default configuration:
 - **Displays:** 1|2 Multiple Monitors
 - **Resolution:** 1024 x 768
 - **Orientation:** Landscape
 - **Multiple displays:** Duplicate these displays

Figure 3 *Screen Resolution dialog with default parameters shown*



- 4 At the top of the **Screen Resolution** dialog, observe that two display icons are shown; [1|2] and [3].
If this is not the case, click **Detect** to allow the computer to detect the displays connected to the two video outputs.
- 5 At the top of the **Screen Resolution** dialog, click the icon to select display [3].
- 6 Set **Multiple displays** to *Duplicate desktop on 2 and 3*, then click **Apply**.
- 7 Observe message dialog: Do you want to keep these display settings?
- 8 Click **Keep change**.
- 9 Set **Resolution** to *1280 x 1024*, then click **Apply**.
- 10 Observe message dialog: Do you want to keep these display settings?
- 11 Click **Keep change**.
- 12 Click **OK** to save the current settings and close the dialog.

Software procedures

This chapter provides procedures for software installation, backup restore, and activation of the operating system.

Topics

- *Software installation, upgrade and removal* on page 12
 - *How to install the ES70/PI50 software* on page 12
 - *How to obtain the ES70/PI50 license* on page 13
 - *How to upgrade the ES70/PI50 software* on page 14
 - *How to remove the ES70/PI50 software* on page 14
- *Restoring system from backup image* on page 14
- *Windows 7 activation* on page 16

Software installation, upgrade and removal

If the ES70/PI50 system is provided with a computer, it is delivered with all necessary software installed, configured and tested. If you use your own computer, you must do this yourself.

Software upgrades are useful if your ES70/PI50 fails, and you suspect a software error. An upgrade is also required whenever the ES70/PI50 software is modified.

To check which software version you have, observe the **About** dialog opened from the **Display** menu.

If you experience problems during a software installation or upgrade, write down the installation parameters. Remove the ES70/PI50 software entirely, then reinstall from scratch.

Topics

- *How to install the ES70/PI50 software* on page 12
- *How to obtain the ES70/PI50 license* on page 13
- *How to upgrade the ES70/PI50 software* on page 14
- *How to remove the ES70/PI50 software* on page 14

How to install the ES70/PI50 software

Use this procedure if you need to install the software on a new computer. Note that minimum hardware and software requirements must be met by the computer.

- 1 Power up the computer.
- 2 Insert the ES70/PI50 CD-ROM.
If your computer is not fitted with a CD or DVD drive, copy the files from the CD to a USB memory stick.
- 3 Observe that the installation program opens.
If the installation program does not start automatically, use a file manager to access the CD or USB memory stick. Double-click on the **Setup.exe** file to start the installation.
- 4 Allow the installation program to run. Follow the instructions provided.
- 5 Once the installation has been completed, double-click the program icon on the desktop to start the application.

When the ES70/PI50 starts, you may see a dialog requesting permission to upgrade the firmware on the transceiver. This happens if the firmware on the transceiver is older than the firmware provided as a part of the ES70/PI50 software. Since functionality on the ES70/PI50 may depend on the firmware in the transceiver, click **Yes** to upgrade the transceiver.

- 6 If you use **Windows 7** operating system:
 - a Observe that **Windows 7 Firewall** will open a dialog requesting information about the network.
 - b Select *Public*, and click **Allow access**.

- 7 Observe the start-up procedure in the *Getting started* chapter.

This chapter is provided in the *ES70/PI50 Operator manual* and *ES70/PI50 Reference manual*.

How to obtain the ES70/PI50 license

The ES70/PI50 requires a valid license to operate. Without a license you will not be able to communicate with the transceiver.

The ES70/PI50 requires a valid license to operate. Without a license you will not be able to communicate with the Receiver Unit.

Note

If you replace your computer, or if you replace major components inside your computer, you will need a new license code.

- 1 Double-click the ES70/PI50 icon on the desktop to start the application.
- 2 Click the **Setup** icon under the **Main** menu to open the **Setup** sub-menu.



→ on page

- 3 Click **Installation** to open the **Installation** sub-menu.



On the sub-menu, click **Software License** to open the **Software License** dialog.



- 4 Write down the **Hardware ID** provided by the **Software License** dialog.
- 5 Contact your dealer to order the software license.
Your dealer will need the following information from you to place the order:
 - Vessel name and call sign
 - Vessel type (trawler, purse seiner, etc.)
 - Vessel owner's name, address and contact information
 - Serial number on all transceivers
 - Hardware ID
- 6 When the software license is returned, start the ES70/PI50, open the **Software License** dialog, and click **Enter Licence String**.
- 7 Write down the code, and click **Ok**.
- 8 Click **OK** to save the current settings and close the dialog.

How to upgrade the ES70/PI50 software

Use this procedure if you wish to reinstall the software, or receive a new CD-ROM with a software upgrade.

- 1 Observe the procedure for software installation.
→ *How to install the ES70/PI50 software* on page 12
Unless you have made any hardware changes on your computer, the existing software license will be used.

How to remove the ES70/PI50 software

- 1 Observe the operating system's functionality for software removal.

Restoring system from backup image

This procedure explains how to restore the Marine Computer operating system software from an image USB memory stick. The entire hard disk will be erased. A 20 Gb C-partition and a 10 Gb D-partition will be established. The **image.wim** file will then be saved on the "D" disk.

Note

All content on the hard disk will be erased.

This system restore procedure will take approximately 15 minutes.

- 1 Connect a keyboard and a mouse to the computer.
- 2 Insert the USB memory stick (containing the **image.wim** file).
- 3 Power up the computer.
- 4 Observe that the computer boots from the USB memory stick, and that it copies files from the stick to the hard drive.
- 5 After approximately three minutes, observe that the computer restarts automatically when all the files have been copied over.
- 6 Observe that a restore program is started, and that the following messages appear:

```
You are about to install image: r:\image\image.wim  
WARNING THIS WILL ERASE ALL DATA ON HARD DRIVE!!  
Press any key to continue...
```
- 7 Press any key on the keyboard to continue.
- 8 Observe that the **Imagex** tool starts, and that the counter reaches 100%.
- 9 After approximately five minutes, observe the following messages:

```
Remove USB stick and press a key to reboot system.  
Press any key to continue...
```
- 10 Press any key on the keyboard to continue.

- 11 Observe that the computer restarts automatically.
- 12 After approximately four minutes, observe the following message:
Type your windows product key
- 13 Enter the license key.
The license key is located on a small sticker under the computer chassis.
- 14 Make sure that **Automatically activate windows when I'm on-line** is selected.
- 15 Click **Next**.
- 16 Observe that the restore finishes automatically.

Note

The Windows license must be activated within 30 days.

The echo sounder or catch monitoring program to be run on the Marine Computer must be installed separately. See How to install the ES70/PI50 software on page 12.

Windows 7 activation

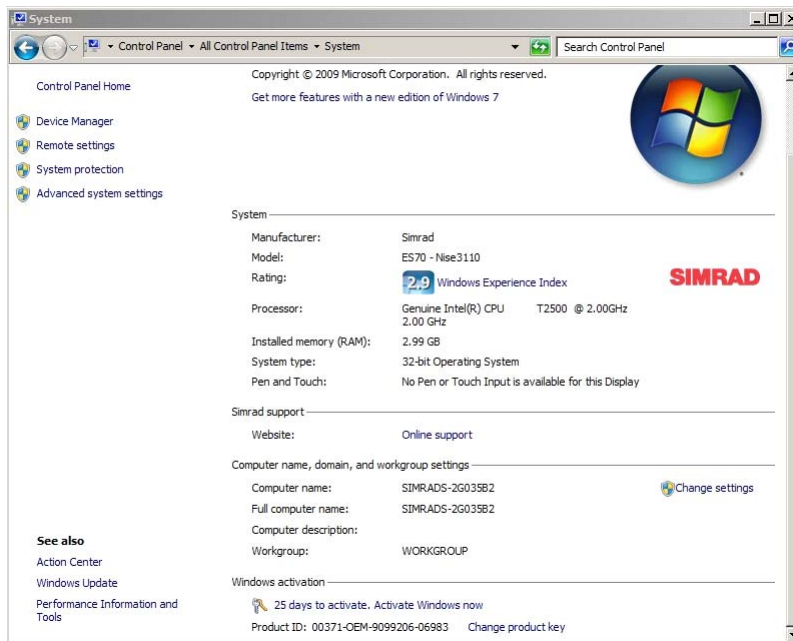
Once the Windows 7® operating system has been installed, either from scratch, or from a restore disk or USB memory stick, it must be activated.

You must activate Windows within 30 days of installation. Activation helps verify that Windows on your computer is genuine and that it hasn't been used on more computers than the Microsoft Software License Terms allow. In this way, activation helps prevent software counterfeiting. You can activate either online or by phone. To activate online, you'll need an Internet connection. Activating by phone requires interacting with an automated phone system.

— <http://windows.microsoft.com>

- 1 Click **Start** in the bottom left corner, then **Control Panel**. Select **System**.
- 2 At the bottom of the **System** dialog, observe the link for Windows activation.

Figure 4 System dialog



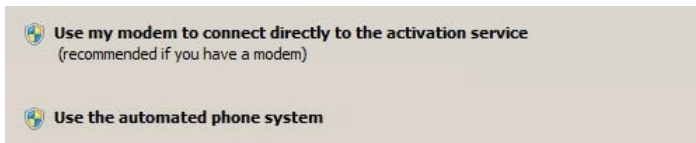
- 3 Click the link to start the activation process.
- 4 Observe the first dialog.
It provides three options.

Figure 5 Activation options



- 5 If your computer is connected to the Internet, click **Activate Windows online now**. This process is automatic. Sit back and wait, and follow the instructions provided.
- 6 If your computer is not connected to the Internet, click **Show me other ways to activate**.
- 7 In the next dialog, click **Use the automated phone system**.

Figure 6 Second option dialog



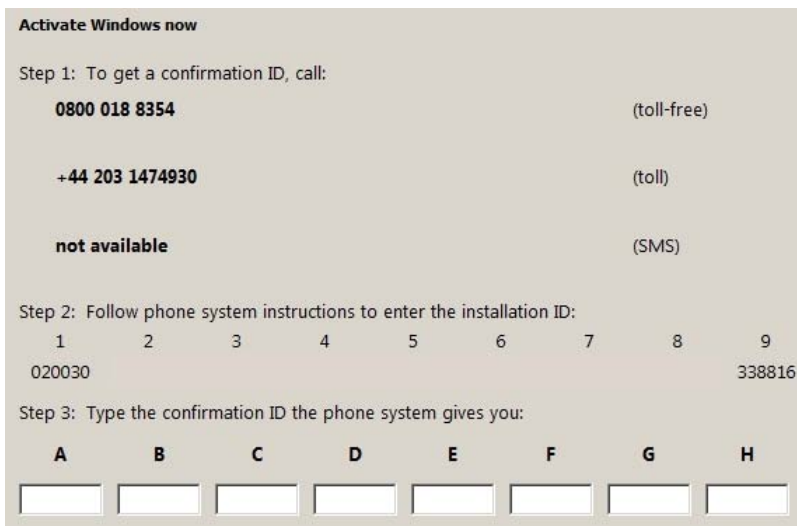
- 8 Locate your country on the list, then click **Next**.

Figure 7 Identify your geographical location



- 9 Call the phone number provided by the dialog, and follow the instructions to enter the installation ID.

Figure 8 Enter installation ID



Note that the phone number shown in this screen capture only applies for United Kingdom.

- 10 Type in the confirmation ID the phone system gives you.
- 11 Click **Next**
- 12 Follow the instructions provided to finalize the activation.

Cable layout

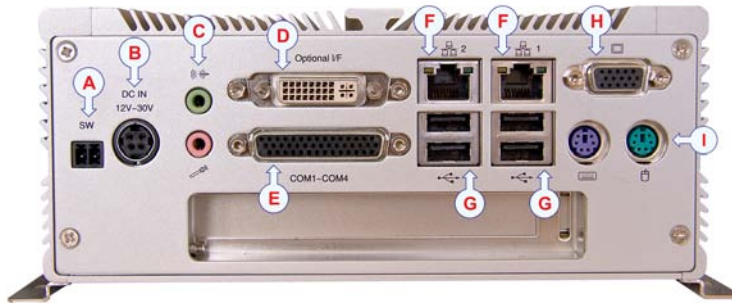
For information about the cabling of the entire system, refer to the applicable installation manual.

Topics

- *Rear panel connectors* on page 19
- *Connector wiring* on page 20
 - *Generic RS-232 Serial line* on page 21
 - *Generic RS-422 Serial line* on page 22
 - *Serial line adapter* on page 23

Rear panel connectors

Figure 9 Marine Computer, rear connectors



- A** Switch for remote on/off control of external devices. The internal switch is closed when the computer is powered up.
- B** DC input from power supply (12 to 30 Vdc)

Note _____

Supply voltage ground is also computer chassis ground.

- C** Top: Audio output (use stereo mini-jack plug)
Bottom: Microphone input (use stereo or mono mini-jack plug)
- D** DVI output to display
- E** Serial inputs and outputs. Use the adapter cable included.

Note _____

All serial lines are RS-232 except port "B".

Serial port "B" is RS-422.

→ *Generic RS-232 Serial line on page 21*

→ *Generic RS-422 Serial line on page 22*

→ *Serial line adapter on page 23*

- F** Ethernet communication
- G** USB communication
- H** SVGA output to display
- I** Keyboard (left) and mouse (right) connectors

Connector wiring

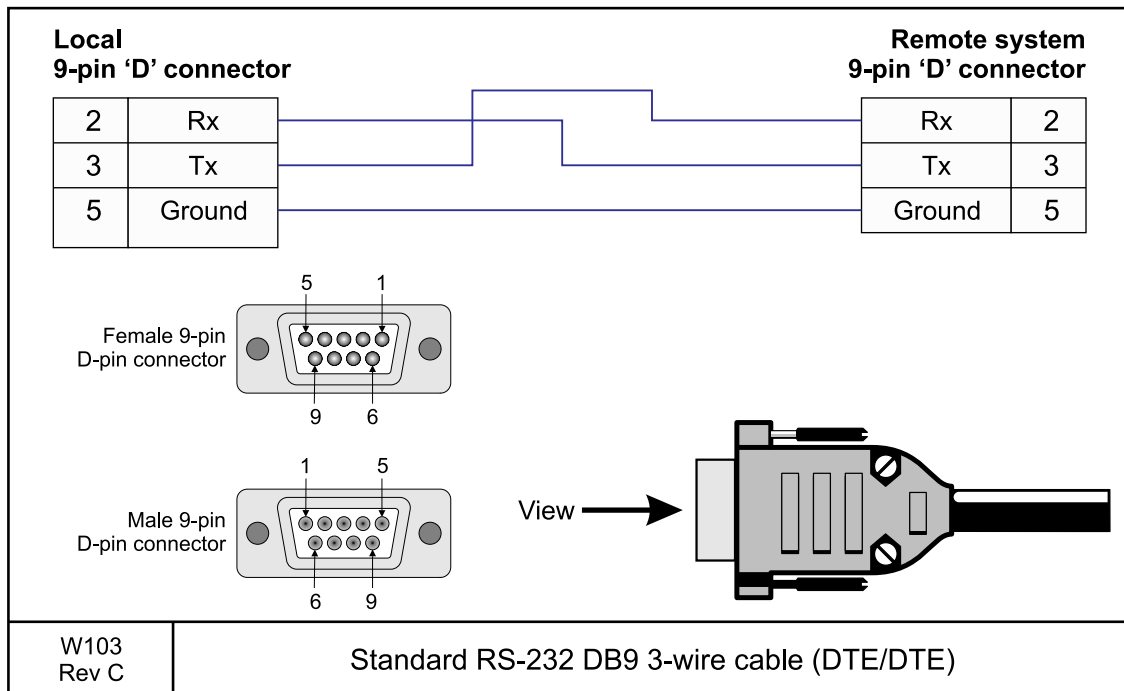
This section only holds the cable drawings directly related to the Marine Computer. For the remaining cable drawings for the PI50 or ES70 system, refer to the applicable installation manual.

Topics

- *Generic RS-232 Serial line* on page 21
- *Generic RS-422 Serial line* on page 22
- *Serial line adapter* on page 23

Generic RS-232 Serial line

This cable holds a multi purpose serial line. It provides interface with any peripheral unit. One end of the cable connects to the local unit (DTE) with a 9-pin D-connector, while the other connects to the peripheral (DCE) as described in the peripheral unit's documentation. Note that this cable does not support all the signals in the standard RS-232 specification.

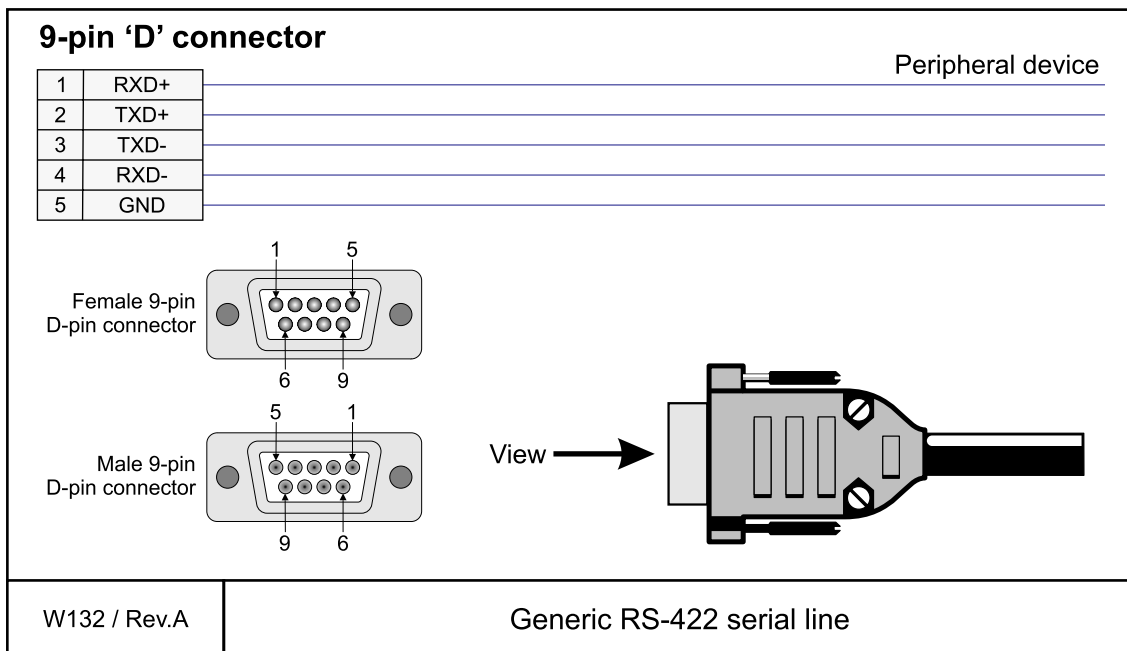


Cable specifications

- **Conductors:** 3 x 0.5 mm²
- **Screen:** Overall braided
- **Voltage:** 60 V
- **Maximum diameter:** Limited by the plugs

Generic RS-422 Serial line

This cable holds a multi purpose RS-422 balanced serial line. It provides interface with any peripheral unit. One end of the cable connects to the local unit (DTE) with a 9-pin D-connector, while the other connects to the peripheral (DCE) as described in the peripheral unit's documentation.



More information

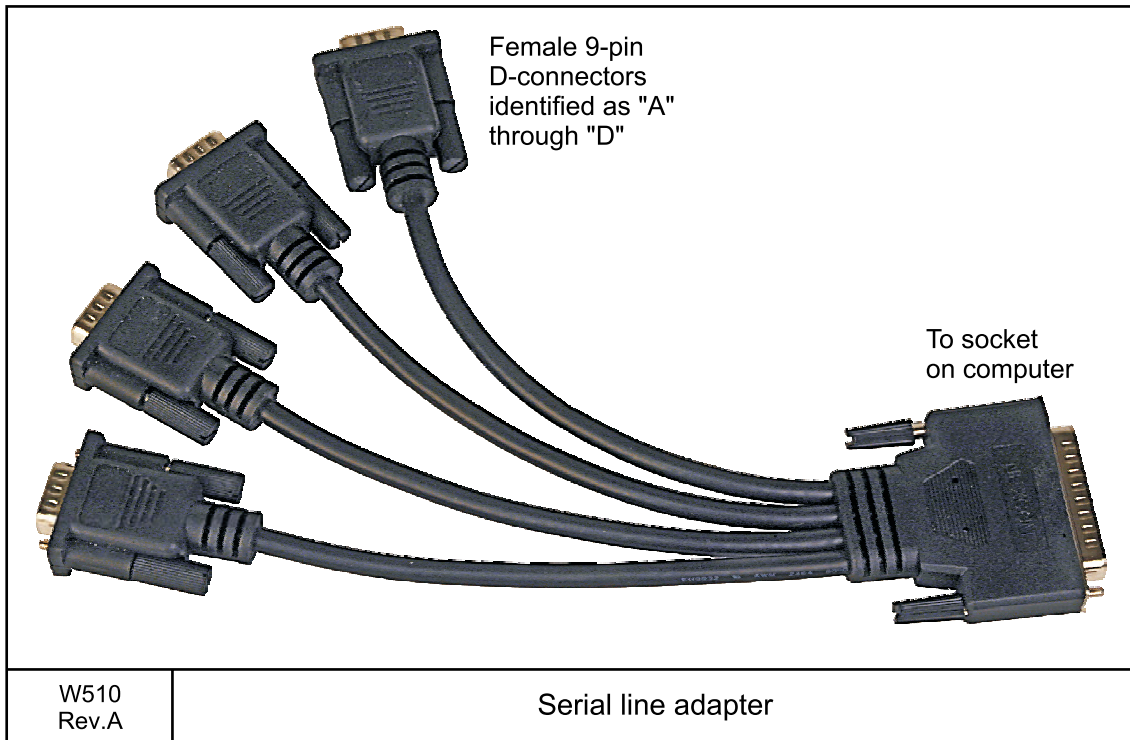
- <http://en.wikipedia.org/wiki/Rs422>

Cable specifications

- **Conductors:** 5 x 2 x 0.5 mm²
- **Screen:** Screened twisted pairs and overall braided
- **Voltage:** 60 V
- **Maximum diameter:** Limited by the plugs

Serial line adapter

This is a commercial adapter. It allows you to connect four RS-232 serial lines to a common socket on the computer.



Cable specifications

- Not applicable

Drawing file

This chapter contains the installation and outline dimension drawings for the Simrad Marine Computer.

Note

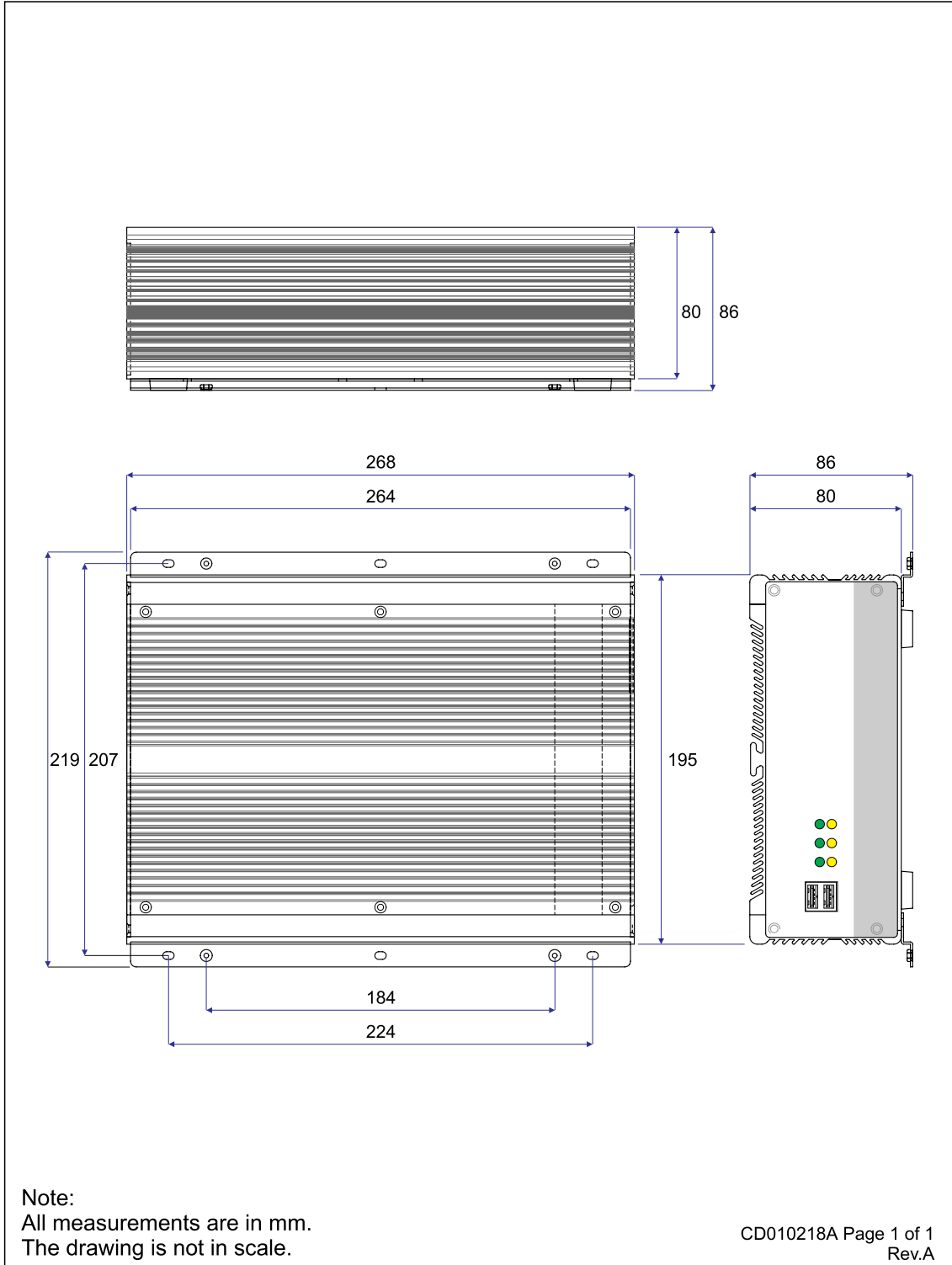
The mechanical drawings are for information and guidance only. They are not in scale. All dimensions are in mm unless otherwise is noted.

The original installation drawings are available on PDF and/or AutoCad's DWG format. Visit www.simrad.com to download.

Topics

- *Marine computer outline dimensions on page 25*

Marine computer outline dimensions



APPENDIX A — GENERAL SAFETY RULES

The Simrad ES70/PI50 Marine computer system operates on 230 Vac 50/60 Hz.

WARNING

This voltage is lethal!

The following safety precautions must be followed at all times during installation and maintenance work

- Always switch off all power before installation or maintenance. Use the main circuit breaker, and label the breaker with a warning sign that informs others that maintenance or installation work is being carried out on the system.
- Do not open the rack or cabinet doors while in rough seas. It may swing open suddenly and cause damage or injury.
- For safety reasons during troubleshooting on the equipment with power ON, two persons must always be present.
- Read and understand the applicable first aid instructions for electric shock.
- Whenever maintenance is carried out, it is essential that a first aid kit is available, and that the maintenance personnel are familiar with the first aid instructions for electrical shock.
- The various parts of the system may be heavy. Make sure that the appropriate tools and certified lifting equipment are available, and that the personnel are trained in installation and maintenance work.

APPENDIX B — EQUIPMENT HANDLING

This section provides the basic rules for transportation, storage and handling of units. In this context, a unit may be any large or small part of the system. It can be supplied as part of the initial delivery, or as a spare part.

Transportation

Unless otherwise stated in the accompanying documentation, electronic, electro-mechanical and mechanical units supplied by Simrad can be transported using all methods approved for delicate equipment; (by road, rail, air or sea). The units are to be transported in accordance with general or specific instructions for the appropriate unit(s), using pallets, transport cases, or carton boxes as appropriate.

Note

Special local restrictions concerning air transportation may be applied to units containing certain types of batteries. These units must be checked properly, and the regulations must be investigated by the packer/shipper before the unit is dispatched.

All local transportation must be carried out according to the same specifications as for the initial delivery. In general, all units must be handled with care.

The carton or case containing the unit must be kept dry at all times, and must be sheltered from the weather. It must not be subjected to shocks, excessive vibration or other rough handling. The carton or case will normally be marked with text or symbols indicating which way it is to be placed. Follow any instructions given, and ensure the case is always placed with its “top” uppermost.

The carton or case must not be used for any purpose for which it was not intended (step, table, etc.), and in the absence of other information, no other cartons or cases must be stacked on top of it.

Lifting

A heavy crate will normally be marked with its weight, and the weights of other cartons or crates will normally be entered on the packing list.

- You must always check the weight of a crate before you attempt to lift it.
- You must always use lifting apparatus that is approved and certified for the load.

Heavy units may be equipped with lifting lugs for transportation by crane within the workshop or installation area. Before you use a crane:

- You must check the applicable weight certificate for the crane.
- You must check the security of the lifting lugs.

Ensure that all available lifting lugs are used. Ensure the unit remains under control during the operation to avoid damage to the unit, equipment or personnel.

Heavy units may be transported using a forklift truck. Special attention must then be paid to the position of the unit's centre of gravity. The units must be properly secured to the truck.

Storage prior to installation or use

When a system, a unit or a spare part has been delivered to the customer, it may be subject to long time storage prior to installation and use. During this storage period, certain specifications must be met. The equipment must be preserved and stored in such a way that it does not constitute any danger to health, environment or personal injury.

- 1 The equipment must be stored in its original transportation crate.
- 2 Ensure that the units are clearly separated in the shelves and that each unit is easily identifiable.
- 3 The crate must not be used for any purpose for which it was not intended (eg. work platform etc.).
- 4 The crates must not be placed on top of each other, unless specific markings permit this.
- 5 The crates must not be placed directly on a dirt-floor.
- 6 Do not open the crate for inspection unless special circumstances permit so.
 - “Special circumstances” may be suspected damage to the crate and its content, or inspections by civil authorities.
 - If any units are damaged, prepare an inspection report stating the condition of the unit and actions taken. Describe the damage and collect photographic evidence if possible. Re-preserve the equipment.
 - If the units are not damaged, check the humidity absorbing material. If required, dry or replace the bags, then re-pack the unit(s) according to the packing instructions.
- 7 If the crate has been opened, make sure that it is closed and sealed after the inspection. Use the original packing material as far as possible.
- 8 The storage room/area must be dry, with a non-condensing atmosphere. It must be free from corrosive agents.
- 9 The storage area's mean temperature must not be lower than -30° C, and not warmer than +70° C. If other limitations apply, the crates will be marked accordingly.
- 10 The crate must not be exposed to moisture from fluid leakages.
- 11 The crate must not be exposed to direct sunlight or excessive warmth from heaters.
- 12 The crate must not be subjected to excessive shock and vibration.

- 13 If the unit contains normal batteries, these may have been disconnected/isolated before the unit was packed. These must only be reconnected before the installation starts. Units containing batteries are marked.

Caution

Units containing lithium or alkaline batteries must be handled separately and with care. Such units are marked accordingly. Do not attempt to recharge such batteries, open them or dispose of them by incineration. Refer to the applicable product data sheets.

Inspection

An inspection must be carried out immediately after the unit(s) have arrived at their destination.

- 1 Check all wooden or cardboard boxes, plastic bags and pallets for physical damage. Look for signs of dropping, immersion in water or other mishandling.
- 2 If damage is detected externally, you will have to open the packaging to check the contents. Request a representative of the carrier to be present while the carton is opened, so any transportation damage can be identified.
- 3 If any units are damaged, prepare an inspection report stating the condition of the unit and actions taken. Describe the damage and collect photographic evidence if possible. Send the inspection report to Simrad as soon as possible.
- 4 If the units are not damaged, check the humidity absorbing material. If required, dry or replace the bags, then re-pack the unit(s) according to the packing instructions.

Unpacking

General unpacking procedure

Normal precautions for the handling, transportation and storage of fragile electronic equipment must be undertaken.

Note

If the unit is not to be prepared for immediate use, you may consider storing it unopened in its original packing material. However, it may be useful to open the case to check its contents for damage and retrieve any accompanying documentation.

Do not use a knife to open cardboard cartons - the contents may lie close to the surface, and may be damaged by the blade.

- 1 Check the carton before opening it to ensure it shows no signs of dropping, immersion in water or other mishandling. If the carton shows signs of such damage, refer to the paragraph covering Inspection on receipt.
- 2 Place the carton on a stable work bench or on the floor with the top of the carton uppermost.
- 3 In the absence of other instructions, always open the top of the carton first. The contents will normally have been lowered into the carton from above, so this will usually be the easiest route to follow. Care must be used when opening the carton to ensure the contents are not damaged. Do not use a knife to open cardboard cartons
- 4 If the carton has been closed using staples, remove the staples from the carton as you open it. This will reduce the possibilities of scratch injury to yourself and damage to the contents.
- 5 If a wooden crate has been closed using screws, always remove them using a screwdriver. Do not attempt to prise the lid off with a crowbar or similar.
- 6 Once the carton is open, carefully remove all loose packing and insulation material. Check for manuals and other documents that may have been added to the carton during packing, and put these to one side. Check also for special tools, door keys etc.

Unpacking electronic and electromechanical units

Electronic and electromechanical units will normally be wrapped in a clear plastic bag. Lift the unit, in its bag, out of the carton and place it in a stable position on the floor/work bench.

Inspect the unit for damage before opening the plastic bag.

Note

Beware of the dangers of Electro-Static Discharge (ESD) both to yourself and to the equipment, when handling electronic units and components.

*Cables must **never** be used as carrying handles or lifting points.*

Do not break the seal to open a circuit board package before the board is to be used. If the board package is returned to the manufacturer with the seal broken, the contents will be assumed to have been used and the customer will be billed accordingly.

Assuming all is well, open the bag and remove the unit.

Open the unit and check inside. Remove any packing and desiccant material that may be inside.

Unpacking mechanical units

Mechanical units may be heavy. Using a suitably certified lifting apparatus, lift the unit out of the crate and place it in a stable position on the floor/work bench.

Inspect the unit for damage and remove any packing material that may be inside the unit.

Unpacking transducers

Transducers may be supplied mounted to a hull unit (if any), or packed separately. Crates are normally identified by the order number and the serial number.

The transducer face must be protected by a rigid, padded cover (e.g. a wooden box lined with foam rubber) all the time it is exposed to the risk of physical damage.

Caution

Once transducer is unpacked, great care must be taken to ensure that transducer body and cabling is not exposed to any mechanical stress.

Storage after unpacking

The unit must whenever possible be stored in its original transportation crate until ready for installation. The crate must not be used for any purpose for which it was not intended (eg. work platform etc.).

Once unpacked, the equipment must be kept in a dry, non condensing atmosphere, free from corrosive agents and isolated from sources of vibration.

Note

Do not break the seal to open a circuit board package before the board is to be used. If the board package is returned to the manufacturers with the seal broken, the contents will be assumed to have been used and the customer will be billed accordingly.

The unit must be installed in its intended operating position as soon as possible after unpacking. If the unit contains normal batteries, these may have been disconnected/isolated before the unit was packed. These must then be reconnected during the installation procedure. Units containing batteries are marked.

Note

Units containing lithium or alkaline batteries must be handled separately and with care. Such units are marked accordingly. Do not attempt to recharge such batteries, open them or dispose of them by incineration. Refer to the applicable product data sheets.

Storage after use

If a unit is removed from its operating location and placed into storage, it must be properly cleaned and prepared before packing.

Cleaning cabinets

If a cabinet has been exposed to salt atmosphere while it was in use, it must be thoroughly cleaned both internally and externally to prevent corrosion.

- 1 Wipe the cabinet externally using a damp cloth and a little detergent. Do not use excessive amounts of water as the unit may not be water tight. On completion, dry the unit thoroughly.
- 2 All surfaces must be inspected for signs of corrosion, flaking/bubbling paint, stains etc. Damaged or suspect areas must be cleaned, prepared and preserved using the correct preservation mediums for the unit. The mediums to be used will usually be defined in the units' maintenance manual.
- 3 Open the unit, and using a vacuum cleaner, remove all dust etc. from the unit. Great care must be taken to ensure the circuit boards and modules are not damaged in the process.

Mechanical units

If a mechanical unit may has been exposed to a salt atmosphere while it was in use, it must be thoroughly cleaned both internally and externally to prevent corrosion.

- 1 If the construction materials and type of unit permits, wash the unit using a high-pressure hose and copious amounts of fresh water. Examples are the lower parts of hull units (outside the hull) or subsea units
- 2 Ensure that all traces of mud and marine growth are removed. Use a wooden or plastic scraper to remove persistent growth, barnacles etc. On completion, dry the unit thoroughly.

Caution

*Do not use a high pressure hose in the vicinity of cables or transducers.
Do not use sharp or metal tools on a transducer face.*

- 3 If the materials or type of unit prevents the use of a high-pressure hose, wipe the unit using a cloth dampened with water containing a little detergent. Examples are the upper parts of hull units (inside the hull) and hydraulic systems
- 4 Do not use excessive amounts of water as some components on the unit may not be water tight. Wipe off the detergent with a damp cloth, then dry the unit thoroughly.
- 5 All surfaces must be inspected for signs of corrosion, flaking/bubbling paint, stains etc. Damaged or suspect areas must be cleaned, prepared and preserved using the correct preservation mediums. The mediums to be used will normally be defined in the unit's maintenance manual.

Cables

Wipe clean all exposed cables, and check for damage. If a cable shows signs of wear or ageing, contact Simrad for advice.

Internal batteries

If the unit contains batteries, these may discharge slowly during storage. If the unit is to be stored for an extended period, disconnect or remove all internal batteries.

A suitable piece of insulating material can be placed between the battery and the electrical contacts to prevent electrical discharge. The battery can then remain in the unit, reducing the risk of it being misplaced during the storage period.

Caution

Units containing lithium or alkaline batteries must be handled separately and with care. Such units are marked accordingly. Do not attempt to recharge such batteries, open them or dispose of them by incineration. Refer to the applicable product data sheets.

Dehumidifier

Place a suitably sized bag of desiccant material (silica gel or similar) into the unit to keep the electronic components as dry as possible.

Coatings

Spray the unit externally with a corrosion inhibitor (e.g. a light oil) before packing.

Re-packaging

Whenever possible, the unit must be stored and transported in its original packing material and/or crate. In the event that this material is not available, proceed as follows:

- Small units must be protected from damp by being placed within a plastic bag at least 0.15 mm thick. An appropriate quantity of desiccant material should be placed inside this bag, and the bag sealed. The sealed unit must then be placed in an appropriate carton or crate, and supported in the container by appropriate shock-absorbing insulation (polystyrene foam chips etc.).
- Large units must be placed in a suitable cardboard box or wooden crate. The unit must be protected against physical damage by means of shock-absorbing insulation mats. The box must be clearly marked with its contents, and must be stored in a dry and dust-free area.

Temperature protection

If the unit must be protected against extremes of temperature, the carton/crate must be lined on all walls, base and lid with 5 cm thick polyurethane or polystyrene foam. These units will be identified as delicate in the applicable documentation.

The package must then be clearly marked:

Must not be transported or stored in temperatures below -5 degrees Celsius.

Other units can normally be stored in temperatures between -30° C and +70° C, refer to the system's technical specifications for details.

Unless otherwise specified, transducers must not be stored in temperatures below -20° C and above +60° C.

Circuit board handling and packaging

Circuit boards are delicate items. They may work year after year in an advanced product, but then fail due to a small spark of static electricity. For this reason, it is very important that they are properly handled and protected during shipping.

Beware of ESD!

When you handle electronic circuit boards, you must beware of the dangers of electrostatic discharge (ESD), both to yourself and to the equipment. In order to ensure safe transport and storage, circuit boards and other electronic units will always be wrapped in a clear plastic protective bag, and the bag will be sealed. See also section *Electro-Static Discharge (ESD)* on page 35.

Unpacking and handling circuit boards

To unpack a circuit board:

- Wherever possible, prepare a suitable workbench. It must have an approved conductive service mat, and it must be connected directly to a reliable earth point via its earthing cord. You must wear a wristband in direct contact with the skin, and the wristband must be connected to the service mat.
- Lift the circuit board, in its protective bag, out of the carton and place it in a stable position on the a floor/work bench.
- Inspect the unit for damage before you open the plastic bag.
- Do not break the seal to open a circuit board package before the board shall to be used. If the board package is returned with the seal broken, we will assume that the content has been used, and we will bill you accordingly.
- Assuming all is well, open the bag and remove the unit.
- Take out and keep the documentation. You will need it if the circuit board shall be returned to us. Also, remove any packing and desiccant material that may be inside.
- Keep the protective plastic bag for future use.

Unpacking on board the vessel

When you are working on board a vessel, an “approved conductive service mat” is often far away. As you still need to unpack circuit boards, make sure that you do it in the instrument room, or at another location where you have a steel deck. Keep far away from the bridge or any other rooms with wall-to-wall carpets! If possible, bring a wristband and ground yourself.

Returning a circuit board

If you wish to return a circuit board to us, observe the following rules.

- Place the circuit board to be returned in the same protective plastic bag as you originally received it in - or a protective bag of similar ESD protection quality.
- DO NOT use standard plastic bags, such as commercial bubble wrap.
- Fill in all the necessary information on the applicable documentation and place it inside the bag.
- Seal the bag.
- Place the circuit board in a suitable carton, and secure it for shipping.

Note

Failure to follow these rules may result in unserviceable circuit boards.

Electro-Static Discharge (ESD)

What is ESD?

Electro-Static Discharge (ESD) is the transfer of an electrostatic charge between two bodies at different electrostatic levels, caused either by direct contact or induction by an electrostatic field. The passing of a charge through an electronic device can cause localised overheating, and it can also “puncture” insulating layers within the structure of the device. This may deposit a conductive residue of the vaporised metal on the device, and thus create a short circuit. This may result in a catastrophic failure, or degraded performance of the device.

ESD protection

Sensitive electronic circuit boards must be transported and stored in protective packing bags. The circuit boards must not be transported or stored close to strong electrostatic, electro-magnetic or radioactive fields.

If it is necessary to open and touch the circuit board inside the protective bag, then the following precautions must be taken:

- 1 The working area must be covered by an approved conductive service mat that has a resistance of between 50 k Ω and 2 M Ω , and is connected directly to a reliable earth point via its earthing cord.

- 2 The service personnel involved must wear a wristband in direct contact with the skin, connected to the service mat.
- 3 Printed circuit boards must be placed on the conductive service mat during installation, maintenance etc.
- 4 If, for any reason, it is necessary to move the circuit board from the conductive service mat, it must be placed in an approved antistatic transportation container (e.g. static shielding bag) before transportation.
- 5 During installation and servicing, all electrical equipment (soldering irons, test equipment etc.) must be earthed.

APPENDIX C — BASIC CABLE REQUIREMENTS

This chapter provides general information related to the installation of system cables.

Topics

- *Cable trays* on page 37
- *Radio Frequency interference* on page 38
- *Physical protection* on page 38
- *Grounding* on page 38
- *Cable connections* on page 39
- *Cable terminations* on page 39
- *Cable identification* on page 39

Cable trays

All permanently installed cables associated with the system must be supported and protected along their entire lengths using conduits and/or cable trays. The only exception to this rule is over the final short distance (maximum. 0,5 meters) as the cables run into the cabinets/units to which they are connected. These short service loops are to allow the cabinets to move on their shock mounts, and to allow maintenance and repair.

- Wherever possible, cable trays must be straight, accessible and placed so as to avoid possible contamination by condensation and dripping liquids (oil, etc.). They must be installed away from sources of heat, and must be protected against physical damage. Suitable shields must be provided where cables are installed in the vicinity of heat sources.
- Unless it is absolutely unavoidable, cables should not be installed across the vessel's expansion joints. If the situation is unavoidable, a loop of cable having a length proportional to the possible expansion of the joint must be provided. The minimum internal radius of the loop must be at least twelve times the external diameter of the cable.
- Where a service requires duplicate supply lines, the cables must follow separate paths through the vessel whenever possible.
- Signal cables must not be installed in the same cable tray or conduit as high-power cables.
- Cables containing insulation materials with different maximum-rated conductor temperatures should not be bunched together (that is, in a common clip, gland, conduit or duct). When this is impractical, the cables must be carefully arranged such that the maximum temperature expected in any cable in the group is within the specifications of the lowest-rated cable.
- Cables with protective coverings which may damage other cables should not be grouped with other cables.
- Cables having a copper sheath or braiding must be installed in such a way that galvanic corrosion by contact with other metals is prevented.

- To allow for future expansion of the system, all cables should be allocated spare conductor pairs. Also, space within the vessel should be set aside for the installation of extra cables.

Radio Frequency interference

All cables that are to be permanently installed within 9 m (30 ft) of any source of Radio Frequency (RF) interference such as a transmitter aerial system or radio transmitters, must, unless shielded by a metal deck or bulkhead, be adequately screened by sheathing, braiding or other suitable material. In such a situation flexible cables should be screened wherever possible.

It is important that cables, other than those supplying services to the equipment installed in a radio room, are not installed through a radio room, high power switch gear or other potential sources of interference. Cables which must pass through a radio room must be screened by a continuous metal conduit or trunking which must be bonded to the screening of the radio room at its points of entry and exit.

Physical protection

Cables exposed to the risk of physical damage must be enclosed in a steel conduit or protected by a metal casing unless the cable's covering (e.g. armour or sheath) is sufficient to protect it from the damage risk.

Cables exposed to an exceptional risk of mechanical damage (for example in holds, storage-spaces and cargo-spaces) must be protected by a suitable casing or conduit, even when armoured, if the cable covering does not guarantee sufficient protection for the cables.

Metallic materials used for the physical protection of cables must be suitably protected against corrosion.

Grounding

All metallic cable coverings (armour, metallic sheathing etc.) must be electrically connected to the vessel's hull at both ends except in the case of final sub-circuits where they should be connected at the supply end only.

Grounding connections should be made using a conductor which has a cross-sectional area appropriate for the current rating of the cable, or with a metal clamp which grips the metallic covering of the cable and is bonded to the hull of the vessel. These cable coverings may also be grounded by means of glands specially intended for this purpose

and designed to ensure a good ground connection. The glands used must be firmly attached to, and in good electrical contact with, a metal structure grounded in accordance with these recommendations.

Electrical continuity must be ensured along the entire length of all cable coverings, particularly at joints and splices. In no case should the shielding of cables be used as the only means of grounding cables or units.

Metallic casings, pipes and conduits must be grounded, and when fitted with joints these must be mechanically and electrically grounded locally.

Cable connections

All cable connections are shown on the applicable cable plan and interconnection diagrams.

Where the cable plan shows cable connections outside an equipment box outline, the connections are to be made to a plug or socket which matches the plug or socket on that particular item of equipment.

Where two cables are connected in series via a junction box or terminal block, the screens of both cables must be connected together but not grounded.

Cable terminations

Care must be taken to ensure that the correct terminations are used for all cable conductors, especially those that are to be connected to terminal blocks. In this case, crimped sleeve-terminations must be fitted to prevent the conductor core from fraying and making a bad connection with the terminal block. It is also of the utmost importance that where crimped terminations are used, the correct size of crimp and crimping tool are used. In addition, each cable conductor must have a minimum of 15 cm slack (service loop) left before its termination is fitted.

Cable identification

Cable identification codes corresponding to the cable number shown in the cable plan must be attached to each of the external cables. These identification codes should be positioned on the cable in such a way that they are readily visible after all panels have been fitted. In addition, each cable conductor should be marked with the terminal board number or socket to which it is connected.

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