

# Installation manual

**Simrad EK80**

**Scientific wide band echo sounder**









# ***Simrad EK80***

## ***Scientific wide band echo sounder***

### ***Installation manual***

This manual provides you with the basic information required to install the Simrad EK80 Scientific wide band echo sounder. The information is intended for qualified personnel such as naval architects, shipyard engineers and skilled workers.

For information about the practical use of the product, refer to the Simrad EK80 *Quick start guide*, the Simrad EK80 *Reference manual*, or the context sensitive on-line help.

#### ***Caution***

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***You must never power up the EK80 when the ship is in dry dock. The transducers(s) will be damaged if the EK80 transmits in open air.***

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## Document information

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## 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 operate or work on the equipment.*

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

## Disclaimer

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## Support information

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# About this manual

## **Purpose of manual**

The purpose of this manual is to provide the information, procedures and basic drawings required for the physical installation of the Simrad EK80.

## **Target audience**

The manual is intended for technical personnel; such as skilled shipyard workers, electricians, qualified engineers and naval architects. It is assumed that you understand the general principles of maritime electronic equipment. You must also be familiar with computer hardware, interface technology and installation of electronic and mechanical products.

We assume that you are familiar with the basic acoustic principles of sound in water, and that you have some experience with scientific use of sonars and/or echo sounders.

## **Installation instructions**

You must follow the instructions in this manual to ensure optimal performance. As a guide, installation procedures are presented in the order they must be done.

The equipment described in this manual includes the complete system with relevant cabinets. Units provided locally by the customer, installation shipyard or local representative are not described.

The manual also defines the equipment responsibility, and provides applicable instructions for unpacking and storage of units.

### **Note**

---

*You must follow the instructions given in this manual. If not it may affect the warranty. Kongsberg Maritime AS will accept no responsibility for any damage or injury to the system, vessel or personnel caused by equipment that has been incorrectly installed or maintained, or by drawings, instructions or procedures that have not been prepared by us.*

---

## **Installation drawings**

The customer, or the shipyard contracted to do the installation, must provide relevant detailed vessel specific mechanical drawings.

## Note

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*If required, all drawings provided by the shipyard for the physical installation of the EK80 must be approved by the vessel's national registry and corresponding maritime authority and/or classification society. Such approval must be obtained before the installation can begin. The shipowner and shipyard doing the installation are responsible for obtaining and paying for such approval.*

---

Kongsberg Maritime AS may, on special order, provide assistance to these drawings.

Applicable generic outline dimension and/or productions drawings are provided in the *Drawing file* chapter. Drawings may also be downloaded in PDF and/or DWG formats from our website.

- <http://www.simrad.com/ek80>

## On-line information

All end user manuals provided for operation and installation of your Simrad EK80 can be downloaded from our website.

- <http://www.simrad.com/ek80>

Our website will also give you information about other Simrad products.

## License information

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# Simrad EK80

## Topics

[Important, page 12](#)

[System description, page 13](#)

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[Installation requirements, page 30](#)

[Network security, page 32](#)

[Support information, page 33](#)

## Important

As with all other advanced instruments, there are a few important things that you must be aware of.

### **Before you switch on the EK80**

Before you power up the EK80, make sure that the transducer is submerged in water!

#### **Caution**

---

*You must never power up the EK80 when the ship is in dry dock. The transducer will be damaged if it transmits in open air.*

---

### **When the EK80 is not used**

When you do not use the EK80, switch off the display and the Processor Unit.

If you know that you will not use the EK80 for a long time, we recommend that you also switch off the transceiver(s). Use the on/off switch on the power supply, or disconnect the power cable.

### **When you are docking your vessel**

If the transducer is activated when out of water it may be damaged beyond repair. It is therefore very important that the EK80 system remains switched off when the vessel is in dry dock, and that no one tries to use it.

To ensure that this can not happen, disconnect the power supply cable to the either the Processor Unit or the transceiver(s) - or both! You may also remove the circuit breakers on the AC mains supply to the EK80 transceiver(s). Do this before the vessel is placed in the dry dock!

As an extra safety measure, the EK80 is by default powered up with the transmit power disabled.

### **If something breaks down**

If you believe that something has broken down, contact your local dealer. They will be able to assist. A list of all our dealers is provided on our website.

- <http://www.simrad.com>

If you are unable to contact a dealer, observe the support information in this manual.

### **When you wish to switch off the EK80**

You must NEVER switch off the EK80 by means of the on/off switch on the Processor Unit. You must ALWAYS exit the EK80 program by clicking the **Exit** button on the top bar.

**WARNING**

---

***If you power down the EK80 by means of the power switch on the Processor Unit you may damage the software program and the interface parameters used to communicate with external devices.***

---

**Transducer handling**

A transducer must always be handled as a delicate item. Wrongful actions may damage the transducer beyond repair.

Observe these rules:

- **Do not** activate the transducer when it is out of the water.
- **Do not** lift the transducer by the cable.
- **Do not** step on the transducer cable.
- **Do not** handle the transducer roughly, avoid impacts.
- **Do not** expose the transducer to direct sunlight or excessive heat.
- **Do not** use high pressure water, sand blasting, metal tools or strong solvents to clean the transducer face.

**Related topics**

[Support information, page 33](#)

[Network security, page 32](#)

## System description

The Simrad EK80 is the most modern “high end” split beam scientific echo sounder in the scientific market. Based on more than 60 years of research and development in close collaboration with leading marine scientists this wide band echo sounder system has succeeded the famous EK60, which became an international standard for fish stock assessment.

The Simrad EK80 is the natural choice for modern research vessels and environmental monitoring installations requiring high quality scientific data for resource management and cutting edge research.

The EK80 supports hull mounting transducers, but it is also well suited for portable use. Pulses sweeping over a wide frequency band (FM) and the traditional discrete frequencies (CW) are available. Wide band sweeps provide long range without compromising target resolution. Continuous frequency responses over a wide band improve target identification and discrimination. Split beam calibration is implemented for both FM and CW modes.

Real time echo integration and target strength analysis in an unlimited number of layers is provided as well as storage of raw data for replay or analysis in one of several

post-processing software packages. Several post-processing alternatives are available for survey analysis and reporting.

By means of a common and well documented RAW data format, EK80 data can be collected and integrated across a variety of acoustic platforms.

The Simrad EK80 can operate a large number of frequencies simultaneously ranging from 10 to 500 kHz. A wide selection of high quality accurate transducers is available.

The EK80 uses Microsoft® Windows® operating system. It can operate with single and/or split beam transducers, and provides you with a dedicated built-in application for calibration. The EK80 is specifically suited for permanent installation onboard a research vessel. It is still compact and a natural choice for portable use.

The Simrad EK80 is well suited for a number of applications:

- Assessment of fish biomass and distribution
- Species identification and discrimination
- Plankton research
- Habitat mapping
- Behavioral studies
- Environmental research
- Oil and gas detection

The echo sounder system is modular, and you can assemble any combinations of transceivers and transducers to fit your research purposes. In a typical configuration, the EK80 will comprise:

- A Display
- B One Processor Unit
- C An Ethernet switch
- D One or more transceiver units
- E One or more single- or split beam transducers

The EK80 can work with the Simrad General Purpose Transceiver (GPT), the Wide Band Transceiver (WBT) and the EK15 Transceiver.

### **Related topics**

[Key features, page 15](#)

[System diagram, page 16](#)

## Key features

The Simrad EK80 is a high precision scientific echo sounder. It offers unique features for modern research vessels and environmental monitoring installations that require high quality scientific data.

- Split beam
- FM (linear) and CW pulse forms
- Real-time display of frequency responses, both volume backscatter (Sv) and target strength (TS)
- High dynamic range
- Raw data recording with network interface
- Low self noise
- High ping rate ( $> 40$  Hz)
- Multi frequency (10 to 500 kHz) and wideband application for species identification
- Simultaneous transmission of all frequencies
- More than ten transceivers can run simultaneously or sequentially
- Several frequencies covering same sampling volume
- Wide band frequency sweep ("chirp") in combination with advanced signal processing gives an exceptionally good signal to noise ratio and range resolution
- Remote control
- Store and reload personal settings
- Built-in FM and CW calibration

### Related topics

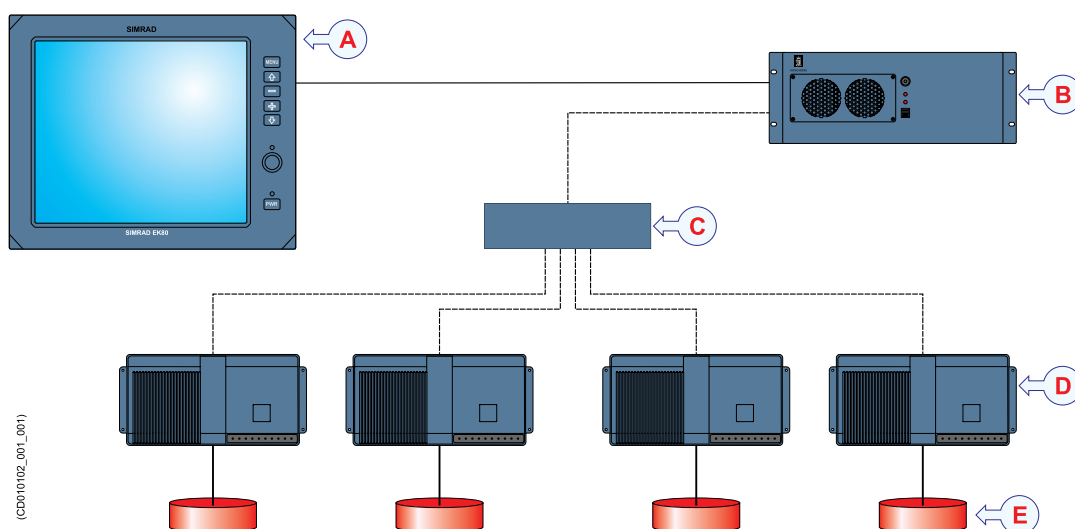
[System description, page 13](#)

## System diagram

The system diagram identifies the main components of a basic EK80 system, as well as the connections between the units. Interface capabilities and power cables are not shown.

The basic Simrad EK80 scientific echo sounder system consists of one transducer, one Wide Band Transceiver (WBT) and one Processor Unit (computer).

Additional transceivers and transducers can be added to meet your operational and functional requirements.



- A *Display*
- B *Processor Unit (computer)*
- C *Ethernet switch*
- D *Transceiver Unit (Wide Band Transceiver (WBT))*
- E *Transducer*

Post-processing software applications may be provided from third party suppliers. See our website for more information.

- <http://www.simrad.com>

### Note

*Unless otherwise specified in a contract, the display and the Ethernet switch are not included in the standard delivery from Kongsberg Maritime. These are commercial items that can be purchased locally.*

### Related topics

[System description, page 13](#)



# Main system units

## Topics

[Display description, page 17](#)

[Processor Unit description, page 18](#)

[Ethernet switch, page 19](#)

[Wide Band Transceiver \(WBT\) description, page 19](#)

[Transducers, page 20](#)

## Display description

A display is a required part of the Simrad EK80 Scientific wide band echo sounder system.

Any commercial display can be used with the EK80 Scientific wide band echo sounder, provided that the display meets the minimum requirements. If you intend to use many views simultaneously, we suggest that you purchase a large high-resolution display.

### Note

---

*The display is not a standard part of the EK80 delivery.*

---

The chosen display must be designed for maritime use, and it must meet the minimum performance specifications. You must also make sure that the chosen display supports the video formats provided by the Processor Unit.

### Tip

---

*If you wish to see several EK80 views simultaneously, you may wish to obtain a large display with high resolution. The EK80 software supports all display sizes. The fidelity of your presentations depends on the resolution and quality of the graphic adapter in the computer, as well as the quality of the display.*

---

## Related topics

[Minimum technical requirements for display, page 214](#)

## Processor Unit description

The Processor Unit is the computer that controls the EK80 system. It is a vital part of the Scientific wide band echo sounder system.

### Note

*The Processor Unit is not a standard part of the EK80 delivery.*



In this publication, the computer is referred to as the Processor Unit.

The operating system must be Microsoft Windows® 7.

The computer must be designed for rugged use, and the construction must be able to withstand the vibrations and movements of a vessel.

The computer must comply to the requirement specifications provided by Microsoft for their operating systems. It must also provide the necessary interface facilities (serial lines and Ethernet connections) that your EK80 will need to communicate with peripheral systems.

A high quality Ethernet adapter is required.

The Ethernet adapter communicating with the Wide Band Transceiver (WBT) must offer a **Receive Buffers** function. This parameter must be set to its maximum value if more than one Wide Band Transceiver (WBT) is used.

The Processor Unit is normally mounted on the bridge or in a scientific laboratory.

### Tip

*A suitable computer may be provided with the EK80 system.*

*The computer is designed for rugged use, and customized by Kongsberg Maritime. Except from the fans, it contains no moving parts. It is based on a commercial design, but the software and hardware has been specified and assembled by Kongsberg Maritime to suit the EK80 requirements.*

*It is set up with all necessary software.*

*The computer holds multiple USB ports for use with future software upgrades.*

*These USB ports will also allow you to export screen captures and recorded data from the EK80.*

*Consult your dealer or agent for more information.*

---

## Related topics

[Additional required items, page 26](#)

[Processor Unit outline dimensions, page 196](#)

[Minimum computer requirements, page 212](#)

## Ethernet switch

A high capacity Ethernet switch is a key component of the EK80 system.

If you use more than one Wide Band Transceiver (WBT) in your EK80 system, you must use an Ethernet switch to connect each Wide Band Transceiver (WBT) to the Processor Unit.

The Ethernet switch is by default not included in the EK80 delivery, but this is a commercial item that can be purchased locally.

### Note

---

*Make sure that your selected switch has a large bandwidth capacity. Minimum 1 Gb (1000BASE-T) is required. You must also make sure that all Ethernet cables are type Cat 5e or better. A slower switch - or low quality cables – will decrease the operational performance of the EK80.*

---

1000BASE-T (also known as IEEE 802.3ab) is a standard for gigabit Ethernet over copper wiring. Each 1000BASE-T network segment can be a maximum length of 100 meters (330 feet), and must use Category 5 cable or better (including Cat 5e and Cat 6).

*Wikipedia, April 2014*

### Related topics

[Additional required items, page 26](#)

## Wide Band Transceiver (WBT) description

The EK80 Wide Band Transceiver (WBT) is provided to transmit the acoustic energy into the water. To do this, the transceiver computes and generates the electric signals sent to the transducer to form a transmission - a 'ping'. After each transmission, it will receive the echoes from the objects in the water column and/or the seabed. These echoes are filtered and amplified, and then converted to digital format.

The EK80 Wide Band Transceiver (WBT) comprises a rugged box providing all necessary transmitter and receiver electronics.

The receiver is designed for low noise, and it can handle input signals spanning a very large instantaneous dynamic amplitude range. All targets are correctly measured and displayed.

The Wide Band Transceiver (WBT) is designed for applications where performance is the top priority. It has four 500 W channels that can either work independently with single beam transducers, or together with a split beam transducer.

The transceiver operates within a large frequency band, and supports single frequencies, frequency sweep (chirp) and user defined wave forms.



The design is optimized for applications where power consumption and physical size is not critical, typically on board a vessel or a platform with power and communication available through high speed Ethernet cable.

A high quality Ethernet cable connects the Wide Band Transceiver (WBT) to the Processor Unit. The distance between the Processor Unit and the transceiver can be extended up to maximum 70 meters. If a longer cable is required, cut it in half, and insert an Ethernet switch to provide buffer amplification.

If more than one Wide Band Transceiver (WBT) is used, a small high capacity Ethernet switch is required to connect the transceivers to the Processor Unit.

The EK80 WBT requires an external power supply offering 12 to 15 Vdc, minimum 5 A. A suitable power supply is provided with the delivery.

### **Related topics**

[Basic items provided with a standard delivery, page 25](#)

[Wide Band Transceiver \(WBT\) outline dimensions, page 194](#)

## **Transducers**

The EK80 Scientific wide band echo sounder can be used with all our single beam and split beam transducers.

Kongsberg Maritime can provide a large range of efficient and accurate Simrad transducers for fishery and fishery research applications.

A wide range of operational frequencies is available.

Simrad transducers are designed to work optimally across a large bandwidth and in demanding environments. For scientific echo sounders, we divide the features of the transducers into three main categories; split beam, wideband and depth rated. Several transducers will fit more than one category.

For more information about the transducers provided by Kongsberg Maritime, consult the Simrad website.

- <http://www.simrad.com>

The installation of the transducer (or transducers) is not described in detail in this manual. Please refer to the documentation provided with each transducer.



### **Related topics**

[Split beam transducers, page 21](#)

[Wideband transducers, page 22](#)

[Depth rated transducers, page 23](#)

[Physical dimensions versus beam opening, page 23](#)

## Split beam, wideband and depth rated transducers

Simrad transducers are designed to work optimally across a large bandwidth and in demanding environments. For scientific echo sounders, we divide the features of the transducers into three main categories; split beam, wideband and depth rated. Several transducers will fit more than one category.

### Topics

[Split beam transducers, page 21](#)

[Wideband transducers, page 22](#)

[Depth rated transducers, page 23](#)

[Physical dimensions versus beam opening, page 23](#)

### Split beam transducers

A split beam transducer is design to transmit the acoustic pulse using one beam, while receiving the echoes in three or four individual channels.

Variations in phase of the returned echoes enable us to locate the target within the acoustic beam. Once you know the location of a target you can make up for variations in the beam patterns, and in the end you can record calibrated target tracks within the acoustic beam.

Simrad commercialized this technology in the 1980's. Our split beam echo sounders are now used to record data for marine resource management worldwide.

For more information about the split beam transducers provided by Simrad, consult our website.

- <http://www.simrad.com>

The following split beam transducers are recommended for the Simrad EK80 Scientific wide band echo sounder.

| Model    | Order number | Nominal frequency (kHz) | Opening angle | Material  |
|----------|--------------|-------------------------|---------------|-----------|
| ES18     | KSV-088694   | 18                      | 11°           | Ceramic   |
| ES38-10  | KSV-202714   | 38                      | 10°           | Ceramic   |
| ES38-7   | 321842       | 38                      | 7°            | Ceramic   |
| ES70-7C  | KSV-203678   | 70                      | 7°            | Composite |
| ES120-7C | KSV-204580   | 120                     | 7°            | Composite |
| ES200-7C | KSV-203003   | 200                     | 7°            | Composite |
| ES333-7C | 322598       | 333                     | 7°            | Composite |

The installation of the transducer (or transducers) is not described in detail in this manual. Please refer to the documentation provided with each transducer.

**Related topics**

[Transducers, page 20](#)

[Additional required items, page 26](#)

## Wideband transducers

A wideband transducer can transmit and receive on a large frequency range, for example 45 to 90 kHz, 85 to 170 kHz or 150 to 300 kHz. This means you only need three transducers to cover the entire frequency range from 45 to 300 kHz.

In order to design a transducer that is capable of providing this frequency range, composite technology is our preferred production technique. All our wideband transducers are produced using composite material.

When a wideband transducer is combined with a wideband transceiver it is possible to make sweep transmissions. In these, the transmit frequency continuously increases throughout the transmitted pulse. This functionality is often referred to as a "chirp".

It is also possible to transmit on several discrete frequencies, one at a time.

If you are an advanced user, you can define an arbitrary signal, such as a dolphin's click. This opens up a whole new world in interpretation of the echo, taking a great step forward towards the goal of providing a species identification echo sounder, or "ecosounder".

For more information about the wideband transducers provided, consult the Simrad website.

- <http://www.simrad.com>

The following wideband transducers are recommended for the Simrad EK80 Scientific wide band echo sounder. Note that these are all split beam transducers.

| Model    | Order number | Frequency (kHz) | Opening angle | Material  |
|----------|--------------|-----------------|---------------|-----------|
| ES70-7C  | KSV-203678   | 50 - 90         | 7°            | Composite |
| ES120-7C | KSV-204580   | 85 - 170        | 7°            | Composite |
| ES200-7C | KSV-203003   | 160 - 300       | 7°            | Composite |
| ES333-7C | 322598       | 250 - 500       | 7°            | Composite |

The installation of the transducer (or transducers) is not described in detail in this manual. Please refer to the documentation provided with each transducer.

**Related topics**

[Transducers, page 20](#)

[Additional required items, page 26](#)

## Depth rated transducers

Sometimes collecting data from a vessel simply does not do the job for you. Perhaps you need to place the transducer in deeper waters closer to the target for better resolution. You must then use a transducer that can handle the increased water pressure.

If it is necessary to place the transducer in deeper waters, you can use a towed body. You can also place the transducer on the seabed for long term collection of data. We have for many years designed and built transducers for deep water applications like this. Our series of 7° depth rated transducers have standard depth rating to 1500 meters. We can also build transducers for greater depths.

For more information about the depth rated transducers provided, consult the Simrad website.

- <http://www.simrad.com>

The following depth rated transducers are recommended for the Simrad EK80 Scientific wide band echo sounder. Note that all these are also split beam transducers. Standard depth rating is 1500 meters. If you need to work on larger depths, feel free to contact us for advice.

| Model     | Order number | Nominal frequency (kHz) | Opening angle | Material  |
|-----------|--------------|-------------------------|---------------|-----------|
| ES38DD    | KSV-113392   | 38                      | 7°            | Ceramic   |
| ES70-7CD  | 335039       | 70                      | 7°            | Composite |
| ES70-18CD | 321637       | 70                      | 18°           | Composite |
| ES120-7CD | 324410       | 120                     | 7°            | Composite |
| ES200-7CD | KSV-207134   | 200                     | 7°            | Composite |
| ES333-7CD | 312902       | 333                     | 7°            | Composite |

The installation of the transducer (or transducers) is not described in detail in this manual. Please refer to the documentation provided with each transducer.

### Related topics

[Transducers, page 20](#)

[Additional required items, page 26](#)

## Physical dimensions versus beam opening

The physical dimensions of a transducer can be explained as a function of the beam opening at a given operating frequency.

Traditionally, a 7° opening angle has been the standard for marine surveys. However, for applications where the physical size and weight of the transducer is important, you can reduce the size by allowing a larger opening angle of the acoustic beam.

The effective circular area of the transducer face is calculated from the equation:

$$A \cong \left(\frac{\lambda}{2\beta}\right)^2 \times \pi$$

Where:

- A =effective transducer circular area
- $\lambda$  =wave length
- $\beta$  =beam width in radians (-3 dB points)

The transducer near field is the region right in front of the transducer face, where the sound waves are complicated and does not fall off spherically with range. Targets within the near field will not be detected correctly. The near field is calculated by the equation:

$$\text{Near field} \cong \frac{A}{\lambda}$$

Parameters from typical scientific transducers are given in the table. The maximum and minimum source level (SL) is calculated from the available power settings on the Simrad EK80 scientific echo sounder.

| Frequency | Wavelength | Beam width | Max/Min SL | Effective circular area | Near field |
|-----------|------------|------------|------------|-------------------------|------------|
| 18 kHz    | 83 mm      | 11°        | 225/215 dB | 1479 cm <sup>2</sup>    | 178 cm     |
| 38 kHz    | 39 mm      | 7°         | 229/219 dB | 820 cm <sup>2</sup>     | 208 cm     |
| 70 kHz    | 21 mm      | 7°         | 227/217 dB | 242 cm <sup>2</sup>     | 113 cm     |
| 120 kHz   | 13 mm      | 7°         | 222/212 dB | 82 cm <sup>2</sup>      | 66 cm      |
| 200 kHz   | 8 mm       | 7°         | 220/212 dB | 30 cm <sup>2</sup>      | 39 cm      |
| 333 kHz   | 5 mm       | 7°         | 212/209 dB | 11 cm <sup>2</sup>      | 24 cm      |

### Related topics

[Transducers, page 20](#)



## Scope of supply

### Topics

Basic items provided with a standard delivery, page 25

Additional required items, page 26

Additional optional items, page 27

### Basic items provided with a standard delivery

To assemble a complete EK80 system, you will need a set of system units. The main units required are provided with the standard delivery. Other required units may be purchased from Kongsberg Maritime or obtained locally. Some units are optional.

When you unpack the items provided with the Simrad EK80 system, verify that the following items are included.

#### Wide Band Transceiver (WBT)

One or more Wide Band Transceiver (WBT) units are provided.

| Product              | Order number | In the box                                                                                              |
|----------------------|--------------|---------------------------------------------------------------------------------------------------------|
| WBT (10 to 30 kHz)   | 402578       | Transceiver Unit<br>Power supply with cables<br>USB with software and documentation<br>Software license |
| WBT (25 to 50 kHz)   | 402579       |                                                                                                         |
| WBT (45 to 90 kHz)   | 402580       |                                                                                                         |
| WBT (85 to 170 kHz)  | 402581       |                                                                                                         |
| WBT (150 to 300 kHz) | 402582       |                                                                                                         |
| WBT (250 to 500 kHz) | 402583       |                                                                                                         |

#### Operational software

Operational software is provided on a suitable media. If the Processor Unit is purchased from Simrad, it is also installed on the computer.

#### End user documentation

End user documentation is provided on digital formats. All documentation related to operation and installation can also be downloaded from our website.

- <http://www.simrad.com/ek80>

#### Related topics

Wide Band Transceiver (WBT) description, page 19

Wide Band Transceiver (WBT) outline dimensions, page 194

## Additional required items

The EK80 delivery will contain the mains parts required for basic operation. Certain required items must be added to the EK80 for full operational functionality. Some of these can be ordered from Simrad, others may be purchased locally.

### Computer

The Simrad EK80 system is designed to be controlled by a maritime computer. This computer must be based on the Microsoft Windows® 7 operating system. It must further be designed for rugged use, and should be able to withstand the vibrations and movements of a vessel.

The computer must comply to the requirement specifications provided by Microsoft for their operating systems. It must also provide the necessary interface facilities (serial lines and Ethernet connections) that your EK80 will need to communicate with peripheral systems.

A suitable computer may be provided with the EK80 system.

Consult your dealer or agent for more information.

| Product              | Order number | In the box                                                         |
|----------------------|--------------|--------------------------------------------------------------------|
| <i>Enix</i> computer | 389845       | Software (readily installed)<br>Power cable<br>Serial line adapter |

### Transducer(s)

A large range of transducers is available for the different operational frequencies. For order numbers, see the Simrad website.

### Display

Any commercial display can be used with the EK80 Scientific wide band echo sounder, provided that the display meets the minimum requirements. If you intend to use many views simultaneously, we suggest that you purchase a large high-resolution display.

### Ethernet switch

If you use more than one transceiver, an Ethernet switch is required.

| Product               | Order number | In the box                      |
|-----------------------|--------------|---------------------------------|
| Black Box LBS209AE-R2 | 352527       | Ethernet switch<br>Power supply |

## Related topics

[Processor Unit description, page 18](#)

[Ethernet switch, page 19](#)

[Split beam transducers, page 21](#)

[Wideband transducers, page 22](#)

[Depth rated transducers, page 23](#)

[Processor Unit outline dimensions, page 196](#)

[Minimum technical requirements for display, page 214](#)

[Minimum computer requirements, page 212](#)

## Additional optional items

The EK80 delivery will contain the mains parts required for basic operation. Several optional items are also available. Some may be ordered from Simrad, others may be purchased locally. These optional items are not required for normal use, but may offer advantages related to installation, maintenance, or operational functionality.

### WBT Cabinet and drawers

The WBT Cabinet is a customized 19"-inch instrument rack fitted with powerful shock absorbers. The cabinet can contain maximum seven custom drawers, and each of these will hold one Wide Band Transceiver (WBT) and its power supply. An Ethernet switch and a power distributor panel are included the bottom of the cabinet.

The WBT Cabinet is delivered with six drawers. Each WBT Drawer will hold one Wide Band Transceiver (WBT).

The WBT Drawer is designed to fit into any commercial 19-inch rack.

| Product                     | Order number | In the box                                                                              |
|-----------------------------|--------------|-----------------------------------------------------------------------------------------|
| WBT Cabinet                 | 402244       | 24U 19-inch rack<br>Six WBT drawers<br>Ethernet switch<br>Power rail<br>Shock absorbers |
| WBT drawer for 19-inch rack | 400791       | Drawer<br>Mounting materials                                                            |

### Installation bracket for power supply

A dedicated bracket assembly may be ordered separately. This bracket can be used to install the WBT Power supply on a bulkhead or the side wall inside a cabinet.

| Product                   | Order number | In the box                              |
|---------------------------|--------------|-----------------------------------------|
| Wall bracket mounting kit | 393510       | The bracket<br>Velcro tape for mounting |

### **Uninterrupted Power Supply (UPS)**

In order to ensure continuous operation of the EK80 independent of varying quality of the vessel's mains supply, the use of uninterruptible power supplies is recommended.

Normally, a single uninterruptible power supply unit is enough to power the EK80system. An existing supply can also be used.

### **Related topics**

[WBT Cabinet outline dimensions, page 200](#)

## General safety rules

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

### **WARNING**

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***The Simrad EK80 operates on 230 Vac 50/60 Hz. This voltage is lethal!***

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- You must always switch off all power before installation or maintenance work on the EK80 system.  
Use the main circuit breaker, and label the breaker with a warning sign that informs others that maintenance or installation work is in progress on the system.
- For safety reasons, two persons must always be present during troubleshooting with power ON.
- Read and understand the applicable first aid instructions related to electric shock.
- Whenever maintenance is in progress, it is essential that a first aid kit is available, and that all personnel are familiar with the first aid instructions for electrical shock.

# Installation requirements

## Topics

[Supply power requirements, page 30](#)

[Uninterrupted Power Supply \(UPS\) requirements, page 30](#)

[Basic wiring requirements, page 30](#)

[Compass deviation requirements, page 31](#)

[Noise sources, page 31](#)

[Dry docking requirements, page 31](#)

[Classification approval requirements, page 31](#)

## Supply power requirements

Observe the general requirements related to the supply power.

The supply voltage to the equipment is to be kept within  $\pm 10\%$  of the installation's nominal voltage. Maximum transient voltage variations on the main switchboard's bus-bars are not to exceed  $-15\%$  to  $+20\%$  of the nominal voltage (except under fault conditions).

## Uninterrupted Power Supply (UPS) requirements

Observe these requirements related to an Uninterrupted Power Supply (UPS).

We recommend that the EK80 system is powered using an Uninterrupted Power Supply (UPS) with sine wave output.

The Uninterrupted Power Supply must have the capacity to independently maintain power to the system for a minimum of 10 minutes. This ensures that the EK80 can be switched off in a controlled manner in the event of a power failure.

## Basic wiring requirements

Correct wiring is crucial for the operational performance of the EK80.

All cables running between system cabinets located in different rooms and/or on different decks must be supported and protected along their entire lengths using conduits and/or cable trays. Note that the cables must not be installed in the vicinity of high-power supplies and cables, antenna cables or other possible sources of interference.

All transducer cables must be run in steel conduits.

For more detailed information about cables and wiring, refer to the basic cable requirements.

## Compass deviation requirements

EK80 system units that are installed on the bridge may have an effect on the compass.

Once the installation is complete, the vessel must be swung with the EK80 system in both operative and inoperative modes. The shipowner and captain are responsible for updating the compass deviation table accordingly with regard to the vessel's national registry and corresponding maritime authority.

## Noise sources

The operational performance of all hydroacoustic systems depend on the noise conditions.

The vessel's hull, rudder(s) and propeller(s) must be thoroughly inspected in dry dock prior to installation.

Roughness below the water-line deformities in the shell plating and protruding obstacles can create underwater noise. These sources of turbulence must be smoothed or removed as best as possible. It is especially important that the propeller(s) are not pitted or damaged.

## Dry docking requirements

Whenever devices for hydroacoustic use are mounted under the vessel's hull, special considerations must be made prior to dry docking.

Make sure that ample clearance under the transducer(s) and/or protection blister is provided when dry docking the vessel.

Avoid locating supporting blocks or structures in the vicinity of this equipment.

Prior to dry docking, power down all hydro-acoustic systems on the vessel, and label each system accordingly to prevent anyone from powering up the system(s) accidentally. Remove circuit breakers if necessary.

## Classification approval requirements

Classification approval is required for the EK80 installation.

The EK80 transducer installation must be approved by Det Norske Veritas (DNV) or another national classification society.

The shipowner and shipyard performing the installation are responsible for obtaining this installation approval.

## Network security

If a EK80 system is connected to the ship's local area network, data security is of vital importance.

Equipment manufactured by Kongsberg Maritime are frequently connected to the ship's local area network (LAN). Connecting any computer to a network will always expose the data on that computer to all other computers connected to the same network. Several threats may immediately occur:

- Remote computers can read the data.
- Remote computers can change the data.
- Remote computers can change the behaviour of the computer, for example by installing unwanted software.

Usually, two parameters are used to define the threat level:

- 1 The likelihood that any remote connection will do any of the above.
- 2 The damage done if a remote connection succeeds doing this.

Because Kongsberg Maritime has no information regarding the complete system installation on any vessel, we can not estimate the threat level and the need for network security. For this reason, we can not accept responsibility for network security. Systems provided by Kongsberg Maritime are regarded as stand-alone offline systems, even though they may be connected to a network for sensor interfaces and/or data distribution.

### Note

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*No network safety applications are installed on any Kongsberg Maritime computers. The computers are thus not protected against viruses, malware or unintentional access from external users.*

---

Securing the EK80 system itself has no meaning unless there is a policy in place that secures all computers in the network. This policy must include physical access by trained and trusted users. The customer/end user of the EK80 system will always be in charge of defining and implementing a security policy, and providing the relevant network security applications.

### Note

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*Kongsberg Maritime will not accept any responsibility for errors and/or damages caused by unauthorized use or access to the EK80.*

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## Related topics

[Important, page 12](#)



## Support information

If you need technical support for your Simrad EK80 you must contact your local dealer, or one of our support departments. A list of all our offices and dealers is provided on our website. You can also contact our main support office in Norway.

### Norway (Main office)

- **Company name:** Kongsberg Maritime AS / Simrad
- **Address:** Strandpromenaden 50, 3190 Horten, Norway
- **Telephone:** +47 33 03 40 00
- **Telefax:** +47 33 04 29 87
- **Website:** <http://www.simrad.no>
- **E-mail address:** [simrad.support@simrad.com](mailto:simrad.support@simrad.com)

### France

- **Company name:** Simrad France
- **Address:** 2 Rue Saint Jacques, 29730, Treffiagat, France
- **Telephone:** +33 298 582 388
- **Telefax:** +33 298 582 381
- **Website:** <http://www.simrad.fr>
- **E-mail address:** [simrad.france@simrad.com](mailto:simrad.france@simrad.com)

### Spain

- **Company name:** Simrad Spain
- **Address:** Poligono Partida Torres 38, 03570 Villajoyosa, Spain
- **Telephone:** +34 966 810 149
- **Telefax:** +34 966 852 304
- **Website:** <http://www.simrad.es>
- **E-mail address:** [simrad.spain@simrad.com](mailto:simrad.spain@simrad.com)

### USA

- **Company name:** Kongsberg Underwater Technology Inc / Simrad Fisheries
- **Address:** 19210 33rd Ave W, Lynnwood, WA 98036, USA
- **Telephone:** +1 425 712 1136
- **Telefax:** +1 425 712 1193
- **Website:** <http://www.simrad.com>
- **E-mail address:** [fish.usa.support@simrad.com](mailto:fish.usa.support@simrad.com)

### Malaysia

- **Company name:** Kongsberg Maritime Malaysia Sdn. Bhd
- **Address:** Unit 27-5 Signature Offices, The Boulevard, Mid Valley City, Lingkaran Syed Putra, 59200 Kuala Lumpur, Malaysia
- **Telephone:** +65 6411 7488
- **Telefax:** +60 3 2201 3359
- **Website:** <http://www.simrad.com>
- **E-mail address:** [simrad.asia@simrad.com](mailto:simrad.asia@simrad.com)

### Related topics

[Important, page 12](#)

# Preparations

## Topics

[Installation summary, page 36](#)

[About installation drawings, page 37](#)

[Necessary tools and equipment for EK80 installation, page 38](#)

[Requirements for shipyard worker skills, page 38](#)

[Where to install the transducer, page 39](#)

[Acoustic noise, page 42](#)

## Installation summary

Installation of the EK80 is a demanding task that requires careful preparations, a number of specific procedures, wiring and required system settings.

### Context

An overall installation procedure is provided below. The procedure does not describe any detailed tasks, but refers to the relevant procedures in this manual.

### Note

---

*In order to obtain maximum safety and performance, it is very important that the installation procedures in this manual are complied to, and that the tasks are carried out in the succession they are described. The vessel owner must make sure that the installation shipyard holds the applicable competence to perform the installation, and that the applicable maritime authorities are available to verify and certify the installation.*

---

### Procedure

- 1 Based on the vessel drawings and best practice, determine where the transducer (or transducers) shall be located.

Necessary considerations must be taken to avoid acoustic and electric disturbances.

### Note

---

*This information in this document must be regarded as general guidelines and recommendations only.*

*The installation shipyard must design and manufacture installation hardware to fit the transducer to each individual vessel.*

*Whenever required, the installation shipyard must also have the installation approved by the applicable maritime authorities.*

---

- 2 Install each transducer.

The installation shipyard must provide all necessary drawings in order to do this installation, and if required, these drawings must be approved by the applicable maritime authorities. Each transducer will penetrate the hull, and this is therefore a crucial part of the EK80 installation.

Relevant installation drawings are included with each transducer. Drawings can also be downloaded from our website:

- <http://www.simrad.com>

- 3 Install the EK80 system units.

Note that some EK80 system units may be commercial. Unless ordered specifically these are not included in the delivery, and must be purchased locally.

- 4 Install the cables between the EK80 system units.

Observe the relevant cable plan, procedures, as well as the general requirements for cabling.

- 5 Power up the EK80 for the first time, and set it to work.

**Note** \_\_\_\_\_

*In order to set up the EK80 in a safe and correct manner, these procedures must be complied to!*

---

- 6 Connect the peripheral units.

- 7 Run a complete system test.

The tests are described in *Setting to work* chapter in this manual, as well as in the *Harbour Acceptance Test* and the *Sea Acceptance Test* documents.

### **Further requirements**

Fill in and sign the *Installation Remarks* form, and send it to Simrad's support department as specified on the form.

## About installation drawings

All installation drawings must be supplied by the shipyard performing the installation.

**Note** \_\_\_\_\_

*If required, all drawings provided by the shipyard for the physical installation of the EK80 must be approved by the vessel's national registry and corresponding maritime authority and/or classification society. Such approval must be obtained before the installation can begin. The shipowner and shipyard doing the installation are responsible for obtaining and paying for such approval.*

---

Simrad offers free advice for installation planning. Proposed arrangements may be sent for commentary or suggestions. The following drawings should be submitted should assistance be requested:

- General arrangement
- Body plan and drawings of the relevant compartment
- Lines plan

Relevant outline dimensions and production drawings can be download from our website. Most documents are available in PDF or AutoCad (DWG) formats.

- <http://www.simrad.com/ek80>

## Necessary tools and equipment for EK80 installation

The installation of the EK80 must take place in dry dock, and the work must be done by a qualified shipyard.

In order to do the EK80 installation, all necessary tools and equipment for mechanical hull work, cabinet installation and electrical wiring must be available. It is not practical to provide a detailed list of all necessary tools and equipment. However, you must make sure that the following specialized tools are available.

- All necessary tools and items required for welding
- All necessary tools and consumables required for physical installation of units, cabinets and racks
- All necessary tools and items required for electrical installations

### Note

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*Whenever specific consumables or special tools or test instruments are required, these are identified in the relevant procedure(s).*

---

## Requirements for shipyard worker skills

The installation of the EK80 is a demanding task. It is very important that the shipyard workers involved in the installation tasks are competent.

As a minimum, the following certified craftsmen must be available:

- naval architects
- welders
- electricians
- project manager

### Note

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*The quality of the welding is critical to the safety of the vessel. Welding must only be done by a certified welder.*

*The final installation work must be approved by the vessel's national registry, the corresponding maritime authority and/or classification society. The shipowner and shipyard doing the installation are responsible for obtaining and paying for such approval.*

---

# Where to install the transducer

## Topics

[Introduction, page 39](#)

[Mount the transducer deep, page 39](#)

[Avoid protruding objects, page 40](#)

[Stay far away from the propellers, page 40](#)

[Choose a position far away from the bow thruster\(s\), page 40](#)

[Summary and general recommendations, page 41](#)

## Introduction

A single answer to the question “where to install the transducer” cannot be given.

The physical location of the transducer depends on the vessel's design and construction, how the hull is shaped, and how the water runs along the hull. There are however a number of important guidelines, and some of these are even conflicting.

### Note

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*The information here must be considered as general advice. Each EK80 installation must be handled separately depending on the hull design.*

---

## Mount the transducer deep

In order to achieve the best possible EK80 performance, mount the transducer as deep as possible under the vessel's hull.

Consider the situations when the vessel is unloaded, and when it is pitching in heavy seas.

There are several reasons for this.

- 1 The upper water layers of the sea contain a myriad of small air bubbles created by the breaking waves.

In heavy seas the upper 5 to 10 metres may be filled with air, and the highest concentrations will be near the surface. Air bubbles absorb and reflect the sound energy, and they may in worst cases block the sound transmission altogether.

- 2 Another reason to go deep is cavitation.

Cavitation is the formation of small bubbles in the water close to the transducer face due to the resulting local pressure becoming negative during parts of the acoustic pressure cycles. The cavitation threshold increases with the hydrostatic pressure.

- 3 The transducer must never be lifted free of the water surface.  
Transmitting into open air may damage the it beyond repair. Mounting the transducer at a deep position on the hull will in most cases prevent this.
- 4 If the transducer is lifted up from the water during heavy seas, it may be damaged when the hull strikes back at the sea surface.  
This is especially important for low frequency transducers with large faces.

## Avoid protruding objects

Objects protruding from the hull will generate turbulence and flow noise. This will reduce the EK80 performance.

Such objects may be zinc anodes, sonar transducers or even the vessel's keel. Holes and pipe outlets are also important noise sources, as well as rough surfaces caused by bad welding. All these protruding objects may act as resonant cavities amplifying the flow noise at certain frequencies.

Do not place a transducer in the vicinity of such objects, and especially not close behind them. For the same reason, it is very important that the hull area around the transducer face is as smooth and level as possible.

Even traces of sealing compound, sharp edges, protruding bolts or bolt holes without filling compound will create noise.

## Stay far away from the propellers

The propulsion propellers is the dominant noise source on most vessels. The noise is transmitted through the sea water, and may often reduce the performance of your EK80 system.

For this reason, the transducer must be placed far away from the propellers, which means on the fore part of the hull. Positions outside the direct line of sight from the propellers are favourable.

On small vessels with short distances it is advised to mount the transducer on that side of the keel where the propeller blades move upwards, because the propeller cavitation is strongest on the other side. The cavitation starts most easily when the water flows in the same direction as the propeller blade, and that is to some degree the case at that side of the keel where the propeller blades move downwards.

## Choose a position far away from the bow thruster(s)

Bow thruster propellers are extremely noisy.

When in operation, the noise and cavitation bubbles created by the thruster may make your EK80 system useless, almost no matter where the transducer is installed.



And when not in operation, the tunnel creates turbulence. If your vessel is pitching, the tunnel may be filled with air or aerated water in the upper position and release this in the lower position.

In general, all transducers must therefore be placed well away from the bow thruster. In most cases, a location forward of the bow thruster is advantageous.

However, this is not an invariable rule. Certain thruster designs combined with its physical location on the hull may still offer suitable locations near the thruster. If you are in doubt, consult a naval architect.

## Summary and general recommendations

Some of the installation guidelines provided for transducers may be conflicting. For this reason, each vessel must be treated individually in order to find the best compromise.

In general, the most important factor is to avoid air bubbles in front of the transducer face. For this reason, the recommended transducer location is normally in the fore part of the hull, well ahead of the noise created by the bow wave. The maximum distance from the bow is normally equal to one third of the total water line length of the hull.

If the vessel hull has a bulbous bow, this may well be a good transducer location, but also in this case the flow pattern of the aerated water must be taken into consideration. Often the foremost part of the bulb is preferable.

This applies to the vessel in normal trim and speed.

### Important

---

Under no circumstances should the transducer be tilted backwards when the vessel is moving at an appreciable speed. Mounting screws must never be extruding from the transducer, and the space around the screws must be filled with a compound or a locking ring.

---

## Acoustic noise

As with any other hydroacoustic systems, the quality of the EK80 presentations are subject to unwanted acoustic noise. The echoes from any large and small target must be detected inside the noise.

It is important that we keep this noise level as low as possible in order to obtain long range and dependable interpretations of the echoes. Even with the advanced noise filtering offered by the EK80, we must address the noise challenge during both planning and preparations for the EK80 installation.

### Topics

[Contributing factors, page 42](#)

[Self noise, page 44](#)

[Ambient noise, page 46](#)

[Fishing gear noise, page 46](#)

[Electrical noise, page 47](#)

[Some means to reduce acoustic noise, page 47](#)

## Contributing factors

Several factors are contributing to the performance of the hydroacoustic equipment used on board a vessel.

Such factors include:

- The quality and properties of the transmitted signal
- The quality of the receiving system
- The operational settings made during operation
- The properties of the target(s)
- The signal-to-noise ratio

The majority of these factors can neither be controlled nor improved by means of installation methods or transducer locations. The quality and properties of the transmitting and receiving systems are key factors during our product development, while our end user documentation aims to help the user to make the right filter settings during operation. As for the target properties, there is nothing any of us can do with those.

The *signal-to-noise ratio*, however, can be improved by making the correct choices during installation.

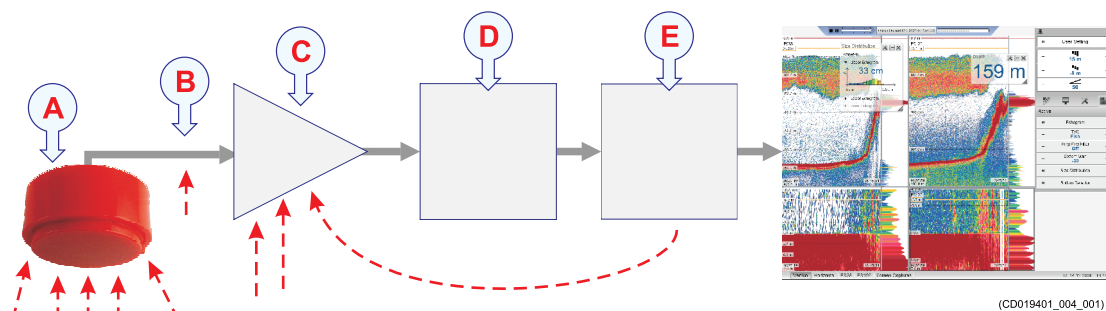
Signal-to-noise ratio (often abbreviated SNR or S/N) is a measure used in science and engineering that compares the level of a desired signal to the level of background noise. It is defined as the ratio of signal power to the noise power, often expressed in decibels. A ratio higher than 1:1 (greater than 0 dB) indicates more

signal than noise. While SNR is commonly quoted for electrical signals, it can be applied to any form of signal [...].

[http://en.wikipedia.org/wiki/Signal\\_to\\_noise\\_ratio](http://en.wikipedia.org/wiki/Signal_to_noise_ratio) (September 2013)

For active sonar and echo sounder systems, the signal is the echo that we want to know something about, while the noise is any unwanted signals or disturbances. The echo must be detected in the noise and therefore it is necessary to keep the noise level as low as possible in order to obtain long range and dependable interpretation. The noise that contributes to the signal to noise ratio on hydroacoustic instruments may be divided into the following types of noise:

- Self noise
- Ambient noise
- Fishing gear noise
- Electrical noise
- Reverberation



- A** The transducer can pick up noise from
- Biological disturbances
  - Interference
  - Cavitation
  - Propeller noise
  - Flow noise
  - Acoustic noise from other hydroacoustic systems
- B** The transducer cable is long, and may pick up electric noise from generators, pumps, cooling systems etc.
- C** The preamplifiers are very sensitive, and they can easily pick up electrical noise from internal and external power supplies. They are also vulnerable for analogue noise created by their own circuitry. Digital noise created by the converter and processing circuitry can also create problems.
- D** A/D converters transform the analogue echoes to digital format.
- E** Signal processing circuitry can create digital noise.

## Self noise

Any vessel equipped with a hydroacoustic system will produce more or less self noise.

There are many sources of such self noise.

- **Machinery noise:** Main engine, auxiliary engines, gears, pumps, blowers, refrigerator systems, etc.
- **Electric noise:** Electric motors, ground loops, etc
- **Propeller noise:** Propeller blade properties, cavitation, shaft vibrations, static discharges
- **Cavitation**
- **Flow noise:** Laminar flow, turbulent flow, bubbles, etc
- **Rattle noise:** Loose parts
- **Interferences:** Other hydroacoustic systems on your own vessel

We will here go into some details in order to analyse the different sources of self noise on a vessel and how they may influence upon the noise level of the hydroacoustic instruments.

### Machinery noise

The main contributor is usually the main engine on board the vessel. The contribution from auxiliary machinery may, however, be considerable, especially if some of it is in poor shape. The machinery noise can be transmitted to the transducer as a:

- Structure-borne noise through the ship structure and the transducer mountings
- Water-borne noise through the hull into the water to the transducer

### Electric noise

Modern vessels are normally equipped with a lot of electric instruments such as hydroacoustic systems, radars, navigation systems, and communication equipment. Any electric instruments may in some cause electrical interference and noise.

International regulations and certifications are used to control and reduce this, but even these are limited if the electrical systems are poorly installed and maintained.

### Propeller noise

This source is often the main source of noise at higher vessel speeds. Variable pitch propellers or fast moving propellers usually make more noise than fixed propellers or slow moving propellers.

This noise is usually water-borne. In some cases, however, shaft vibrations or vibrations in the hull near the propeller may be structure-borne to the transducer. If a propeller blade is damaged, this may increase the noise considerably.

Propeller cavitation is a severe source of noise. "Singing" propellers might be a source of noise, which interferes at discrete frequencies. In some cases static discharge from the rotating propeller shaft may be quite disturbing.

## Cavitation

Cavitation usually occurs more willingly in air filled water and the occurrence is dependent on the hydrostatic pressure. Cavitation is a severe source of noise. The noise is made when the voids implode. Cavitation noise often occurs at the propeller and near extruding objects at higher speeds.



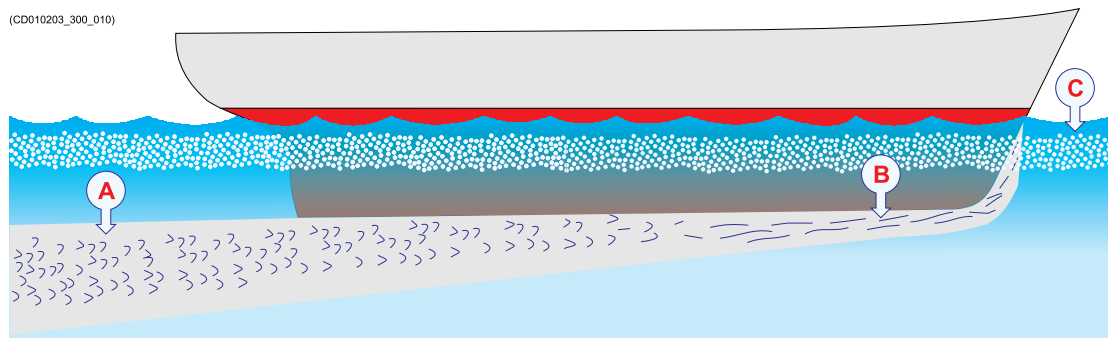
Contributions to the flow noise may also be caused by air bubbles hitting the transducer face, or by the splash caused by the waves set up by the vessel. In some cases a resonant phenomenon is set up in a hole near the hull. This sound will have a discrete frequency, while all other flow noise will have a wide frequency spectrum.

(Image from U. S. Navy in the public domain.)

## Flow noise

Every object that moves through water will disturb the medium, and it will cause friction in the water. The friction zone is called the *flow boundary layer*. The flow in this boundary layer may be *laminar* or *turbulent*.

- The laminar flow is a nicely ordered, parallel movement of the water.
- The turbulent flow is a disorderly flow pattern, full of eddies.



- A *Turbulent flow*
- B *Laminar flow*
- C *Air bubbles*

The boundary layer increases in thickness when it becomes turbulent. The boundary layer is thin in the forward part of the vessel hull, and increases as it moves aft. The thickness depends on ships speed and on the roughness of the hull. All objects sticking out from the hull, or dents in the hull, will disturb the flow and will increase the thickness of the boundary layer. When the flow speed is high, the turbulence can be violent enough

to destroy the integrity of the water. Small voids or cavities in the water will occur and this is called cavitation.

### **Rattle noises**

Rattle noise may be caused by loose objects in the vicinity of the transducer, like fixing bolts. The rattle may also come from loose objects inside the hull.

### **Interference**

Interference from other hydroacoustic equipment on board the same vessel may be an annoying source of disturbance. Unless the same frequency is used for more than one piece of equipment only the transmitted pulse will contribute to the interference.

## **Ambient noise**

Ambient noise is usually not a limiting factor to the performance of sonars and echo sounders.

The ambient noise may be split up as follows:

- **Sea noise:** Air bubbles, seismic disturbances, waves, boundary turbulence, etc.
- **Biological noise:** Fish, mammals, etc.
- **Man made noise:** Other vessels, interference
- **Precipitation noise**

In some areas, where many vessels are operating together the engine and propeller noise from other vessels might be disturbing.

Interference from hydroacoustic instruments located in other vessels may also be a limiting factor.

The sea noise is as can be expected dependent on the weather conditions. In bad weather the sea noise can be quite high.

## **Fishing gear noise**

Whenever your fishing gear is in use, it will create noise.

A bottom trawl, for instance, is a considerable noise maker.

Still, this noise will seldom be a limiting factor for hull mounted sonars or echo sounders.

However, for operation of a catch monitoring system or a trawl sonar, with the transducer(s) placed on the trawl, the gear noise is one of the main contributors to the noise level.

## Electrical noise

Electrical or electronic noise is picked up or generated in any other part of the equipment than the transducer.

Hum picked up by the transducer cables or picked up from the voltage supply is usually the most common source of electrical noise.

At higher frequencies – where rather wide bandwidths are necessary – the noise from components, transistors or other analogue electronic may be a limiting factor.

## Some means to reduce acoustic noise

Careful planning of the EK80 installation may reduce the acoustic noise.

Unfortunately, it is impossible to simply provide a number of specific procedures to reduce the noise.

An important factor is the physical location of the transducer. This depends on the vessel's design and construction, how the hull is shaped, and how the water runs along the hull.

Other factors deal with other equipment mounted on board, and this will also be vessel dependant.

At moderate ship speeds the machinery noise is usually dominant. At medium speeds the flow noise increases more rapidly and takes over, while at higher speed the propeller noise will be the main contributor.

### Note

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*The information here must be considered as general advice. Each EK80 installation must be handled separately depending on the hull design and the other electrical and mechanical systems installed on the vessel.*

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## Reducing flow noise

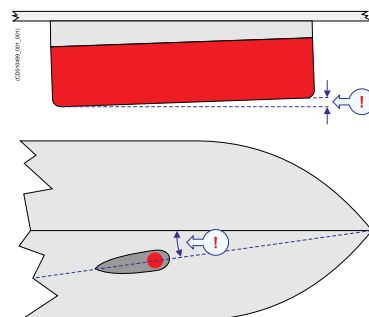
- The shape of the transducer (or dome around it) must be as streamlined as possible.
- The hull plating in front of the transducer must be as smooth as possible. Be especially aware of bilge keels and zinc alloy anodes. The keel should be rounded off without sharp edges.

### Important

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No extruding objects or any abrupt transitions should appear.

---



- Echo sounder transducer should be mounted with a small inclination angle (approximately 2 degrees).

### **Reducing machinery noise**

- The transducer(s) must be installed as far away from the engine room as possible.
- The main engine and relevant auxiliary engines and equipment should be fixed to rigid foundations to avoid vibrations. Use of shock absorbers or floating rafts may sometimes reduce this noise.
- Any hull structure that may vibrate should be damped or coated to reduce the vibrations.
- The structure-borne noise may be reduced by isolation, for example by providing vibration clamping between the transducer and the hull structure.

### **Reducing propeller noise**

- The transducer should be installed as far away from the propellers as possible.
- Sufficient clearance between the propellers and the hull, the rudder and the keel should be provided.
- Place the zinc alloy anodes in places where the water flow is the least disturbed.
- Ensure that the propellers blades are correctly designed and without damages.
- The use of a baffle between the propellers and the transducer may reduce noise appreciably.
- Static discharges caused by the rotating propeller shaft may be removed by proper grounding or by mounting a coal brush from the shaft to ground.

### **Reducing rattle noise**

Ensure that no parts near the transducer can rattle as a result of water flow or vibrations.

### **Reducing interference**

Interference from the transmission pulses from other hydroacoustic instruments on board the vessel is difficult to avoid.

The problem may be reduced by choosing the working frequencies carefully and to some extent by separating the different transducers.

On vessels with a large number of separate hydroacoustic systems installed and in simultaneous use, a separate synchronizing system (for example the **K-Sync**) should be considered.

### **Reducing electrical noise**

- Place the transducer cables in metal conduits from as close to the transducer as possible, and all the way to the rear side of the transceiver.



- Make sure that all units are properly grounded, as this is important to avoid electrical noise.
- You must use shielded cables with correct grounding.
- Separate EK80 cables from other cables with heavy currents or transients.
- Place all high voltage power cables in metal conduits.

# Installing the EK80 hardware units

## Topics

[Installing the Wide Band Transceiver \(WBT\) using the integrated brackets, page 51](#)

[Installing the Wide Band Transceiver \(WBT\) in a 19-inch rack, page 53](#)

[Installing the Wide Band Transceiver \(WBT\) power supply, page 55](#)

[Installing the display, page 57](#)

[Installing a commercial computer, page 58](#)

[Installing the Enix Processor Unit, page 60](#)

[Mounting the WBT Cabinet, page 62](#)

[Mounting the drawers in the WBT Cabinet, page 65](#)

[Installing the transducer\(s\), page 67](#)

## Installing the Wide Band Transceiver (WBT) using the integrated brackets

The Wide Band Transceiver (WBT) can be installed using the integrated mounting brackets.

### Prerequisites

A suitable location for the Wide Band Transceiver (WBT) must be defined prior to installation. The unit can in principle be mounted anywhere on board the ship, provided that the location is dry and ventilated. We recommend that it is mounted as close to the transducer(s) as possible.

You must be equipped with a standard set of tools. This tool set must comprise the normal tools for electronic and electromechanical tasks, such as screwdrivers, pliers, spanners, a cable stripper etc. Each tool must be provided in various sizes. We recommend that all tools are demagnetized to protect your equipment.

### Context

The Wide Band Transceiver (WBT) can be installed using integrated mounting brackets.

The unit can be mounted in any direction and on any surface provided that the environmental requirements are met.

**Note** \_\_\_\_\_

*If you mount the Wide Band Transceiver (WBT) on a bulkhead, position the unit so that all the sockets are facing down.*

---



### Procedure

- 1 Prepare the location and the necessary tools.
- 2 Observe the installation requirements.
  - a Depending on the local requirements and preferences, the Wide Band Transceiver (WBT) can be installed on the bulkhead, inside a console, in a cabinet or 19" rack, or on a desk.
  - b The position must be chosen to fit the available cable lengths between the transceiver and the other units it connects to. Short distance to the transducer(s) is always first priority.
  - c Observe the compass safe distance.
  - d Make sure that enough space is made available for maintenance purposes.
  - e Make sure that adequate ventilation is available to avoid overheating.

- f Ensure that the installation method allows for the physical vibration, movements and forces normally experienced on a vessel.

**Note** \_\_\_\_\_

*In order to allow for future maintenance, we strongly advice that you mount the unit with its cables and connectors available for immediate access.*

---

- 3 Verify that the chosen location meets the requirements.
- 4 Place the transceiver in the selected position.
- 5 Secure the unit using 6.5 mm bolts through the two mounting brackets.
- 6 Connect the cables.

**Note** \_\_\_\_\_

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

---

**Related topics**

[Wide Band Transceiver \(WBT\) outline dimensions, page 194](#)

[Equipment handling, page 215](#)

[Compass safe distances, page 212](#)

## Installing the Wide Band Transceiver (WBT) in a 19-inch rack

The Wide Band Transceiver (WBT) can be installed in a 19-inch rack by means of the optional WBT Drawer.

### Prerequisites

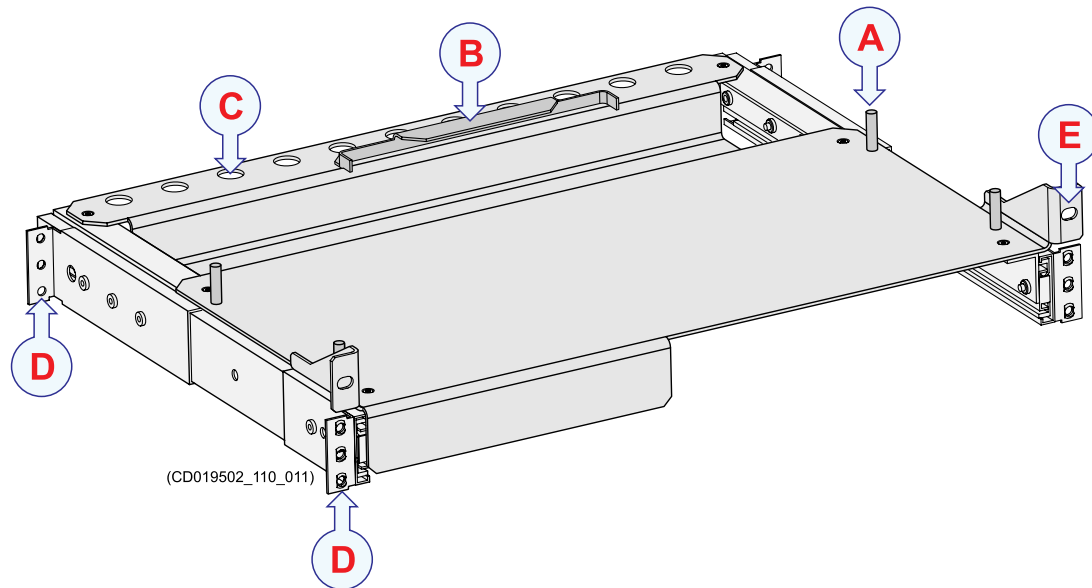
A suitable location for the Wide Band Transceiver (WBT) must be defined prior to installation. The unit can in principle be mounted anywhere on board the ship, provided that the location is dry and ventilated. We recommend that it is mounted as close to the transducer(s) as possible.

You must be equipped with a standard set of tools. This tool set must comprise the normal tools for electronic and electromechanical tasks, such as screwdrivers, pliers, spanners, a cable stripper etc. Each tool must be provided in various sizes. We recommend that all tools are demagnetized to protect your equipment.

### Context

The Wide Band Transceiver (WBT) can be installed in a standard 19-inch rack by means of the optional WBT Drawer.





- A** *Mounting bolts for the Wide Band Transceiver (WBT)*
- B** *Mounting bracket for the power supply*
- C** *Holes for fastening and securing the cables*
- D** *Mounting bolts for the drawer assembly*
- E** *Mounting bolts for the drawer*

If your EK80 system comprises more than one Wide Band Transceiver (WBT), you can use the optional WBT Cabinet. This 19" rack holds maximum seven transceivers with power supplies, as well as an Ethernet switch and a power distribution panel.

### Procedure

- 1 Prepare the location and the necessary tools.
- 2 Observe the installation requirements.
  - a Depending on the local requirements and preferences, the Wide Band Transceiver (WBT) can be installed on the bulkhead, inside a console, in a cabinet or 19" rack, or on a desk.
  - b The position must be chosen to fit the available cable lengths between the transceiver and the other units it connects to. Short distance to the transducer(s) is always first priority.
  - c Observe the compass safe distance.
  - d Make sure that enough space is made available for maintenance purposes.
  - e Make sure that adequate ventilation is available to avoid overheating.
  - f Ensure that the installation method allows for the physical vibration, movements and forces normally experienced on a vessel.

**Note**

---

*In order to allow for future maintenance, we strongly advice that you mount the unit with its cables and connectors available for immediate access.*

---

- 3 Verify that the chosen location meets the requirements.
- 4 Place the transceiver on the WBT Drawer.
- 5 Mount the transceiver and the power supply using the brackets, bolts and nuts provided.
- 6 Mount the WBT Drawer into the 19-inch rack.
- 7 Connect the cables.

**Note**

---

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

---

**Related topics**

[Wide Band Transceiver \(WBT\) outline dimensions, page 194](#)

[Equipment handling, page 215](#)

[Compass safe distances, page 212](#)

## Installing the Wide Band Transceiver (WBT) power supply

The power supply provided with the Wide Band Transceiver (WBT) is a commercial type custom made for the EK80. A specific installation procedure is provided.

**Prerequisites**

A suitable location for the power supply must be defined prior to installation.

**Note**

---

*If you place the unit on the bridge, observe the compass safe distance.*

---

You must be equipped with a standard set of tools. This tool set must comprise the normal tools for electronic and electromechanical tasks, such as screwdrivers, pliers, spanners, a cable stripper etc. Each tool must be provided in various sizes. We recommend that all tools are demagnetized to protect your equipment.

## Context

The power supply provided with the Wide Band Transceiver (WBT) can be installed in many ways. Some mounting kits are available.

- Desktop mounting using the brackets provided with the power supply
- Wall/bulkhead mounting using the wall bracket mounting kit (optional)
  - **Wall bracket mounting kit:** 393510

For special purposes, ad-hoc installation using any means available is also a possibility.



## Procedure

- 1 Prepare the location and the necessary tools.
- 2 Observe the installation requirements.
  - a The position must be chosen to fit the available cable lengths between the power supply, the transceiver and the AC power outlet.
  - b If you place the unit on the bridge, observe the compass safe distance.
  - c Make sure that enough space is made available for maintenance purposes.
  - d Make sure that adequate ventilation is available to avoid overheating.
  - e Ensure that the installation method allows for the physical vibration, movements and forces normally experienced on a vessel.

### Note

---

*In order to allow for future maintenance, we strongly advice that you mount the unit with its cables and connectors available for immediate access.*

---

- 3 Verify that the chosen location meets the requirements.
- 4 If you install the power supply using the wall/bulkhead kit:
  - a Mount the bracket in a suitable location using suitable bolts or screws.
  - b Place the power supply into the bracket so that the small lamp is visible.
- 5 If you install the power supply using the brackets:
  - a Place the power supply in a suitable location (vertical or horizontal).
  - b Secure the power supply using the brackets, as well as the bolts or screws included.
- 6 If you prefer an ad-hoc installation:
  - a Place the power supply in a suitable location (vertical or horizontal).
  - b Secure the power supply using any means available.



- 7 Connect the cables.

**Note**

---

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

---

**Related topics**

[Equipment handling, page 215](#)

[Compass safe distances, page 212](#)

## Installing the display

The display is normally not included with the EK80 delivery. A generic procedure is therefore provided.

We assume that you are equipped with a standard set of tools. This tool set must comprise the normal tools for electronic and electromechanical tasks, such as screwdrivers, pliers, spanners, a cable stripper etc. Each tool must be provided in various sizes. We recommend that all tools are demagnetized to protect your equipment.

A suitable location for the display must be defined prior to installation.

**Note**

---

*Observe the compass safe distance.*

---

**Procedure**

- 1 Prepare the location and the necessary tools.
- 2 Observe the installation requirements.
  - a The display must be located so that it is best protected from glare which reduces readability.
  - b The display may be mounted in a panel, on the desktop or bulkhead, or overhead.
  - c Make sure that adequate ventilation is available to avoid overheating.
  - d Make sure that the installation allows for the physical vibration, movements and forces normally experienced on a vessel.
  - e Make sure that enough space is provided for maintenance work.
- 3 Install the display as described in the applicable documentation provided by the manufacturer.

- 4 Connect the cables.

**Note**

---

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

---

**Related topics**

[Equipment handling, page 215](#)

[Compass safe distances, page 212](#)

## Installing a commercial computer

The Processor Unit (computer) may not be included with the EK80 delivery. A generic procedure is therefore provided.

**Prerequisites**

We assume that you are equipped with a standard set of tools. This tool set must comprise the normal tools for electronic and electromechanical tasks, such as screwdrivers, pliers, spanners, a cable stripper etc. Each tool must be provided in various sizes. We recommend that all tools are demagnetized to protect your equipment.

A suitable location for the computer must be defined prior to installation.

**Note**

---

*If you place the unit on the bridge, observe the compass safe distance.*

---

**Context**

For installation of a commercial computer, refer to the manual supplied by the manufacturer.

**Procedure**

- 1 Prepare the location and the necessary tools.

- 2 Observe the installation requirements.
  - a Depending on its physical properties, the computer can be installed inside a console, in a cabinet or 19" rack, or on a desk.
  - b The position must be chosen to fit the available cable lengths between the computer and the other units it connects to.
  - c Observe the compass safe distance.
  - d Make sure that enough space is made available for maintenance purposes.
  - e Make sure that adequate ventilation is available to avoid overheating.
  - f Ensure that the installation method allows for the physical vibration, movements and forces normally experienced on a vessel.

**Note** \_\_\_\_\_

*In order to allow for future maintenance, we strongly advice that you mount the unit with its cables and connectors available for immediate access.*

---

- 3 Verify that the chosen location meets the requirements.
- 4 Provide ample space around the computer.

You must be able to reach and use the front and rear mounted USB connectors, CD or DVD players, or to replaceable hard disks.

It is also important that you allow for easy access to all the cables, and enough space for inspection, maintenance and parts replacement.

If relevant, make sure that the space allows you to open the computer for unobstructed access to its internal parts.

**Important** \_\_\_\_\_

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

---

- 5 Install the computer as described in the applicable documentation provided with the unit.

**Note** \_\_\_\_\_

*Standard office computers may not be well fitted for maritime use. The motions and vibrations experienced on a vessel may reduce the computer lifetime considerably. During installation of a commercial computer, use your common sense to improve the installation method suggested by the manufacturer.*

---

- 6 Connect the cables.

**Note**

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

---

**Related topics**

[Equipment handling, page 215](#)

[Compass safe distances, page 212](#)

## Installing the Enix Processor Unit

A specific installation procedure is provided for the Processor Unit (computer).

**Prerequisites**

We assume that you are equipped with a standard set of tools. This tool set must comprise the normal tools for electronic and electromechanical tasks, such as screwdrivers, pliers, spanners, a cable stripper etc. Each tool must be provided in various sizes. We recommend that all tools are demagnetized to protect your equipment.

A suitable location for the computer must be defined prior to installation.

**Note**

*If you place the unit on the bridge, observe the compass safe distance.*

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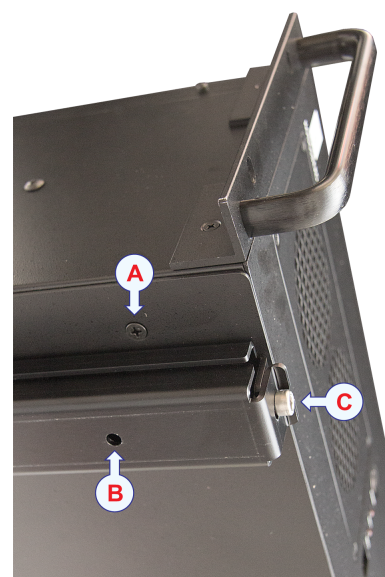
- A** The bottom plate is mounted with six bolts through the computer chassis.
- B** Each rail provides two holes for mounting to a flat surface.
- C** Remove this bolt to release the rail from the bottom plate.

**Context**

If you intend to mount the Enix Processor Unit in a 19" rack, you can disregard this procedure. However, you may then wish to remove the bottom plate and shock absorbers as described in this procedure, as these will not be required.

**Procedure**

- 1 Prepare the location and the necessary tools.



- 2 Observe the installation requirements.
  - a Depending on its physical properties, the computer can be installed inside a console, in a cabinet or 19" rack, or on a desk.
  - b The position must be chosen to fit the available cable lengths between the computer and the other units it connects to.
  - c Observe the compass safe distance.
  - d Make sure that enough space is made available for maintenance purposes.
  - e Make sure that adequate ventilation is available to avoid overheating.
  - f Ensure that the installation method allows for the physical vibration, movements and forces normally experienced on a vessel.

**Note**

---

*In order to allow for future maintenance, we strongly advice that you mount the unit with its cables and connectors available for immediate access.*

---

- 3 Verify that the chosen location meets the requirements.
- 4 Provide ample space around the Processor Unit.

You must be able to reach and use the front and rear mounted USB connectors, CD or DVD players, or to replaceable hard disks.

It is also important that you allow for easy access to all the cables, and enough space for inspection, maintenance and parts replacement.

If relevant, make sure that the space allows you to open the computer for unobstructed access to its internal parts.

**Important**

---

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

---

- 5 Turn the computer upside down, and remove the bottom plate (A) with the shock absorbers.

Observe the four holes in the shock absorbers and the bottom plate (B).
- 6 Using the bottom plate as a template, mark the position of the mounting bolts on the foundation.
- 7 Mount the bottom plate back on the computer.
- 8 Disassemble the two base rails from the computer by removing the two front Allen bolts (C).
- 9 Remove the bolts, lift the computer up and forward.
- 10 Mount the base rails on the foundation.
- 11 Mount the computer back onto the base rails.

- a Hook the unit onto the rails at the rear end.
  - b Press it down.
  - c Secure the computer with the two front Allen bolts (C).
- 12 Connect the cables.

**Note**

---

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

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**Related topics**

[Processor Unit outline dimensions, page 196](#)

[Equipment handling, page 215](#)

[Compass safe distances, page 212](#)

## Mounting the WBT Cabinet

The WBT Cabinet is a customized 19"-inch instrument rack fitted with powerful shock absorbers. The cabinet can contain maximum seven custom drawers, and each of these will hold one Wide Band Transceiver (WBT) and its power supply. An Ethernet switch and a power distributor panel are included the bottom of the cabinet. The cabinet is normally installed in a "sonar room" with short distance to the transducers.

## Prerequisites

We assume that you are equipped with a standard set of tools. This tool set must comprise the normal tools for electromechanical tasks, such as different screwdriver types, pliers, spanners and wrenches. Each tool must be provided in various sizes. We recommend that all tools are demagnetized to protect your equipment. Depending on the chosen installation method, additional tools may be required.

- Power drill
- Welding equipment

We recommend that you install the WBT Cabinet before you install the WBT Drawers and the transceivers.

## Context

The cabinet is mounted on the shock absorbers. It is mounted on the deck, and secured against a bulkhead. Alternatively, you can place it next to other similar cabinets, and use these for support.

If required for easier cable access, the cabinet can be lifted up from the deck by placing "U" shaped steel profiles under the shock absorbers. Additional distance from the bulkhead can be obtained by designing and installing suitable mounting brackets.

The installation of the cabinet must be planned and prepared by the installation shipyard in close cooperation with the end user. Relevant installation drawings with mounting details must be provided by the shipyard.

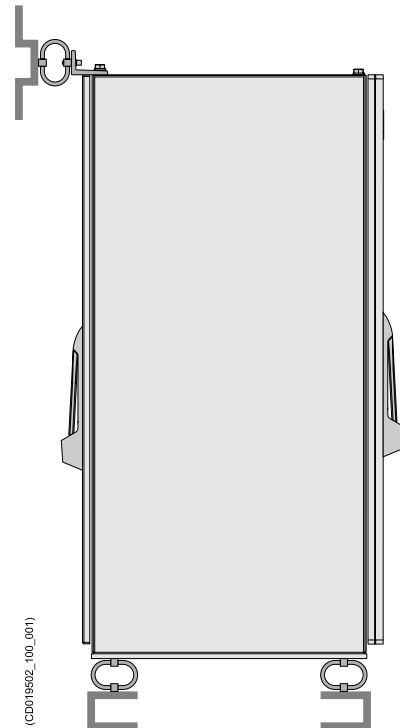
Observe the sonar room requirements.

## Caution

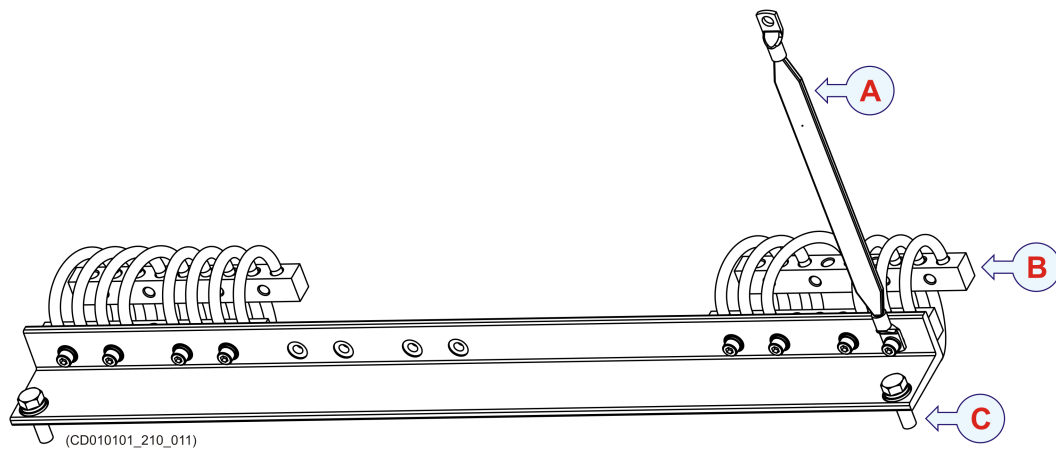
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*Before welding commences, make sure that the room is properly ventilated. Always wear the personal protective equipment. Use the safest welding method and materials for the job, and keep your face away from the welding plume. Observe and obey the relevant safety instructions.*

---



*Use bulkhead support bracket(s) to make installation easier, and/or "U" shaped profiles to make more space for cables under the cabinet.*



**A** *Earth strap*

**B** *Bolt this shock absorber to the bulkhead.*

**C** *Secure the shock absorber assembly to the top of the cabinet using these two bolts.*

All cables will enter through the bottom and/or the top of the cabinet.

## Procedure

1 Prepare the installation of the cabinet.

a Observe the outline dimensions drawing.

The drawing is located in the *Drawing file* chapter in this manual. It can also be downloaded from our website.

- <http://www.simrad.com/ek80>

### Note

*The outline dimensions drawing shows the initial size of an empty cabinet. When the cabinet is completed for normal operation, the weight will compress the bottom shock absorbers slightly. You must take this into consideration when you plan the mounting.*

b Determine the location of the cabinet.

c Verify that the location meets the sonar room requirements.

d Verify that the location meets the environmental requirements defined for the EK80.

e Verify that the location is within range of the transducer cables.

f Verify that the location offers ample space around the cabinet to allow for cables, maintenance and parts replacement.

g Determine the installation method.

h Make all necessary installation drawings.



- i If relevant, design and manufacture bulkhead support bracket(s) and/or "U" shaped steel profiles.

**Note**

---

*The use of U" shaped profiles and bulkhead support bracket(s) is optional.*

---

- 2 Mount the "U" shaped profiles.
  - a Design and manufacture the "U" shaped profiles, and make sure that they will support the weight of the complete cabinet.
  - b Make the required mounting holes to accept the bottom frame (with shock absorbers).
  - c Position the profiles on the deck, and mount them using bolts or welds.
- 3 Mount the bottom frame.

The bottom frame is fitted with four shock absorbers. If you have used "U" shaped profiles, place the frame on top of these.
- 4 Mount the bulkhead support bracket(s).
  - a Design and manufacture the bulkhead bracket(s).
  - b Make the required mounting holes to accept the top shock absorbers.
  - c Position the brackets on the bulkhead, and mount them using bolts or welds.
- 5 Mount the top shock absorber assembly.
  - a Remove the four lifting lugs.
  - b Mount the top shock absorber assembly using two of the same holes.
  - c Use spare bolts to close the remaining lifting lug holes.
- 6 Place cabinet in its correct position on the bottom frame.
  - a Use four bolts through the bottom frame to secure the cabinet.
  - b Mount the top shock absorbers to the bulkhead support bracket(s).
- 7 Fasten the earth strap.

**Related topics**

[WBT Cabinet outline dimensions, page 200](#)

[Equipment handling, page 215](#)

[Compass safe distances, page 212](#)

## Mounting the drawers in the WBT Cabinet

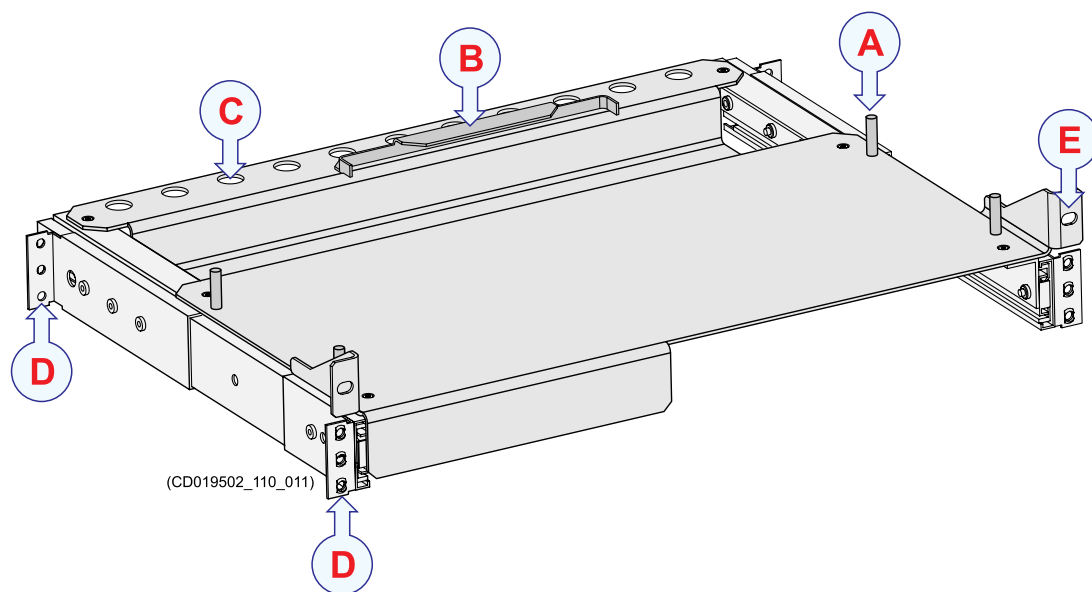
The WBT Cabinet can contain maximum seven custom drawers. Each drawer will hold one Wide Band Transceiver (WBT) and its power supply. The drawer is mounted in the same way as any other equipment designed for 19" racks using standard tools.

### Prerequisites

You must be equipped with a standard set of tools. This tool set must comprise the normal tools for electronic and electromechanical tasks, such as screwdrivers, pliers, spanners, a cable stripper etc. Each tool must be provided in various sizes. We recommend that all tools are demagnetized to protect your equipment.

### Context

We recommend that you mount all the empty drawers into the WBT Cabinet before you mount the Wide Band Transceiver (WBT) unit on each drawer.



- A** *Mounting bolts for the Wide Band Transceiver (WBT)*
- B** *Mounting bracket for the power supply*
- C** *Holes for fastening and securing the cables*
- D** *Mounting bolts for the drawer assembly*
- E** *Mounting bolts for the drawer*

### Procedure

- 1 Decide where in the cabinet you wish to mount the drawers.
- 2 Mount each drawer using six bolts on each side (D).
- 3 Pull out the drawer.
- 4 Remove the power supply bracket (B).
- 5 Place the power supply on the drawer, and mount the bracket (B) to secure it.
- 6 Mount the Wide Band Transceiver (WBT) using the bolts provided (A).

**Further requirements**

Observe the relevant procedures for cabling.

## Installing the transducer(s)

The installation of the transducer (or transducers) is a key task for successful installation of the EK80 system. Not only will you need to penetrate the vessel's hull, you must also to select a physical location for maximum performance and minimum acoustic and electric noise.

**Prerequisites**

To get a full overview of the installation, you will need all the relevant vessel drawings, as well as the drawings provided for each relevant transducer.

**Context**

Necessary information for the installation of each transducer can be found in the end user documentation provided with the transducer. The source drawings (in AutoCad format) can be downloaded from our website.

- <http://www.simrad.com>

**Procedure**

- 1 Based on the shape and properties of the hull, determine the physical location of the transducer.  
Make sure that all possible considerations are made to reduce the noise.
- 2 Based on the shape of the transducer housing, and the mounting devices available, determine the installation method.
- 3 Design, manufacture and mount the necessary fairing, installation blister, keel box and/or tank that is required to mount the transducer.
- 4 Design, manufacture and mount the steel conduit for the transducer cable.
- 5 Unpack the transducer from its transport crate.
- 6 Position the transducer under the mounting location.
- 7 Pull the transducer cable up through the steel conduit.
- 8 Tighten the packing nut on the cable gland properly to avoid leaks.
- 9 Mount the transducer.
- 10 Seal the top of the steel conduit to prevent water leaks.
- 11 Connect the transducer cable to the transceiver.

**Related topics**

[Equipment handling, page 215](#)

# Cable layout and interconnections

## Topics

[Read this first, page 69](#)

[Cable plans, page 70](#)

[List of EK80 cables, page 74](#)

[Cable procedures, page 76](#)

[Graphic adapter, page 89](#)

[Moxa CP114EL-I serial port adapter, page 92](#)

[Using a steel conduit to protect the transducer cable, page 93](#)

[Cable drawings and specifications, page 95](#)

[Basic cable requirements, page 131](#)

## Read this first

Detailed information about cable specifications, termination and connectors is provided. Unless otherwise specified, all cables are supplied by Kongsberg Maritime as a part of the EK80 delivery.

### Note

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*All electronic installations and corresponding wiring must be in accordance with the vessel's national registry and corresponding maritime authority and/or classification society. If no such guidelines exist, we recommend that Det Norske Veritas (DNV GL) Report No. 80-P008 "Guidelines for Installation and Proposal for Test of Equipment" is used as a guide.*

*Only trained and authorized personnel can install the EK80 cables.*

*Kongsberg Maritime will not accept any responsibility for errors, malfunctions or damage to system or personnel caused by improper wiring.*

---

A detailed drawing for each specific cable is provided. Each drawing provides additional information, and may, when applicable, include minimum specifications, connector terminations and the required number of cores.

Drawings are generally not provided for standard commercial cables.

Cables fall into two categories.

- 1 **System cables:** These cables are provided by Kongsberg Maritime as a part of the EK80 delivery.
- 2 **Shipyard cables:** These cables must be provided by the shipyard performing the installation, or the shipowner. It is very important that the cables used meet the minimum specifications provided in this manual.

Kongsberg Maritime accepts no responsibility for damage to the system or reduced operational performance caused by improper wiring.

### Note

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*It is very important that all cables are properly installed and correctly terminated. Observe the relevant regulations and work standards. Always leave enough cable slack close to system units and cabinets to allow for maintenance.*

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## Cable plans

### Topics

[About the cable plans, page 70](#)

[Topside computer cable plan, page 71](#)

[Wide Band Transceiver \(WBT\) cable plan, page 73](#)

### About the cable plans

Due to its modular design, the EK80 system can be set up in a variety of configurations to suit individual needs for operational frequencies, transducers and functionality.

It is not practical to define specific cable plans for all these configurations. To illustrate the variety of configurations, the following basic cable plans are provided:

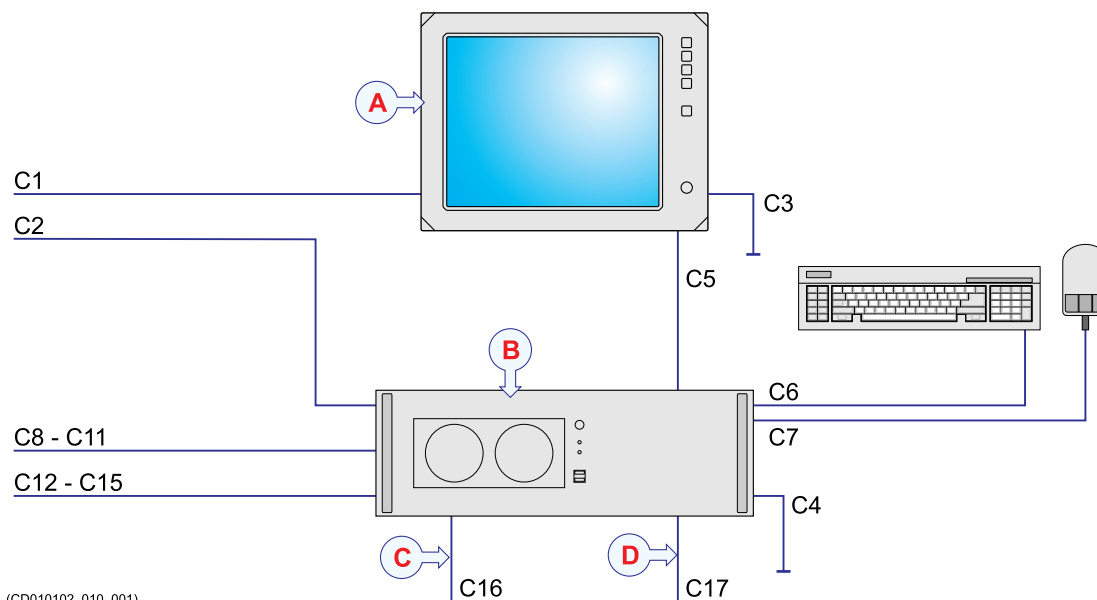
- Standard topside setup with a computer
- Standard transceiver setup with two Wide Band Transceiver (WBT) units.

The Wide Band Transceiver (WBT) used by the Simrad EK80 can be set up to work with maximum four -4- fixed operational frequencies. This means that you can use four single frequency/single beam transducers, two dual frequency transducers, or one split beam transducer.

In order to take advantage of the advanced functionality provided by the EK80 (size distribution, fish position and echo position), it is normally set up with split beam transducers. This means that one Wide Band Transceiver is required for each transducer.

# Topside computer cable plan

The topside cables include those used to connect the EK80 Processor Unit (computer) and the display to each other, to AC mains power, and to external devices. One Ethernet cable is used to connect the computer to the transceiver.



- A *Display*  
B *Processor Unit (computer)*  
C *Ethernet cable to the transceiver(s)*

### Note

*It is very important that high quality Ethernet cables are used. You must use CAT-5E STP (Shielded Twisted Pair) quality or better. Cables with lower bandwidth capacity will reduce the EK80 performance. Do not connect the Processor Unit to the transceiver(s) using the vessel's existing local area network.*

- D *Ethernet cable to the ship's network*

Cables identified with an asterisk (\*) are provided with the standard EK80 delivery.

### Tip

*Even though only one Ethernet cable is used, you should install two cables between the Processor Unit and the transceiver(s). This is recommended for redundancy purposes.*

### **Related topics**

[List of EK80 cables, page 74](#)

[Cable procedures, page 76](#)

[Cable drawings and specifications, page 95](#)

[Basic cable requirements, page 131](#)

[Graphic adapter, page 89](#)

[Moxa CP114EL-I serial port adapter, page 92](#)

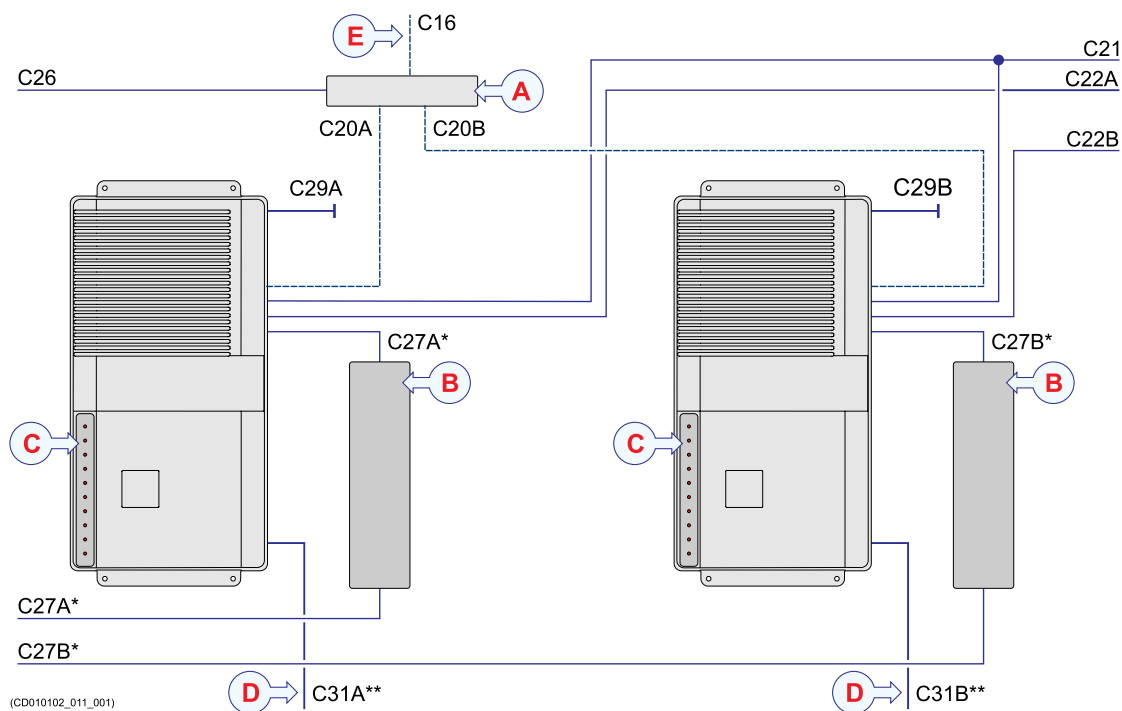
[Moxa CP114EL-I overview, page 92](#)

[Moxa CP114EL-I connectors, page 93](#)



## Wide Band Transceiver (WBT) cable plan

The transceiver cables include those used to connect the EK80 transceiver(s) to AC mains power, and to the transducer(s). One Ethernet cable is used to connect the transceiver(s) to the topside units.



- A Ethernet switch
- B Power supply
- C Transceiver Unit (Wide Band Transceiver (WBT))
- D Transducer cables
- E Ethernet cable to the Processor Unit

### Note

*It is very important that high quality Ethernet cables are used. You must use CAT-5E STP (Shielded Twisted Pair) quality or better. Cables with lower bandwidth capacity will reduce the EK80 performance. Do not connect the Processor Unit to the transceiver(s) using the vessel's existing local area network.*

Depending on the operational requirements, one or more Wide Band Transceiver (WBT) units may be used in the complete EK80 system. If only one transceiver is used, the Ethernet switch is not required.

Cables identified with an asterisk (\*) are provided with the standard EK80 delivery.

Transducer cables (marked with a dual asterisk (\*\*)) are provided with each transducer.

**Related topics**

[List of EK80 cables, page 74](#)

[Cable procedures, page 76](#)

[Cable drawings and specifications, page 95](#)

[Basic cable requirements, page 131](#)

## List of EK80 cables

A set of cables is required to connect the EK80 system units to each other, to the relevant power source(s), and to peripheral devices.

The following cables are used when the EK80 is set up with a Wide Band Transceiver (WBT).

| Cable   | Signal     | From / To                                 | Min. requirements                |
|---------|------------|-------------------------------------------|----------------------------------|
| C1      | AC Power   | Ship supply / Display                     | 2 x 1.5 mm <sup>2</sup> + Ground |
| C2      | AC Power   | Ship supply / Computer                    | 2 x 1.5 mm <sup>2</sup> + Ground |
| C3      | Ground     | Display / Ground                          | 1 x 6 mm <sup>2</sup>            |
| C4      | Ground     | Computer / Ground                         | 1 x 6 mm <sup>2</sup>            |
| C5      | Video      | Computer / Display                        | See comment 1                    |
| C6      | Keyboard   | Computer / Keyboard                       | See comment 2                    |
| C7      | Mouse      | Computer / Mouse                          | See comment 3                    |
| C8–C11  | Serial     | External device / Computer                | 2 x 4 x 0.5 mm <sup>2</sup>      |
| C12–15  | USB        | External device / Computer                | See comment 4                    |
| C16     | Ethernet   | Computer / Ethernet switch or transceiver | See comment 5                    |
| C17     | Ethernet   | Computer / Ship's local area network      | See comment 5                    |
| C18–C19 | Not used   |                                           |                                  |
| C20     | Ethernet   | Ethernet switch / Transceiver             | See comment 5                    |
| C21     | Not used   |                                           |                                  |
| C22     | Not used   |                                           |                                  |
| C23–C25 | Not used   |                                           |                                  |
| C26     | AC power   | Ship supply / Transceiver power supply    | 2 x 1.5 mm <sup>2</sup> + Ground |
| C27     | DC power   | Transceiver power supply / Transceiver    | See comment 6                    |
|         |            | Battery / Transceiver                     | 2 x 1.5 mm <sup>2</sup>          |
| C28     | Not used   |                                           |                                  |
| C29     | Ground     | Transceiver / Ground                      | 1 x 6 mm <sup>2</sup>            |
| C30     | Not used   |                                           |                                  |
| C31     | Transducer | Transceiver / Transducer                  | See comment 7                    |

### Comments

- 1 This is a commercial cable. It is normally provided with the display.
- 2 This is a commercial cable. It is normally provided with the keyboard.
- 3 This is a commercial cable. It is normally provided with the mouse.
- 4 USB cables are commercial.
- 5 Ethernet cables are commercial.

### Note

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*It is very important that high quality Ethernet cables are used. You must use CAT-5E STP (Shielded Twisted Pair) quality or better. Cables with lower bandwidth capacity will reduce the EK80 performance.*

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- 6 The DC power cable from the WBT power supply to the transceiver is provided with the power supply.
- 7 The transducer cable is provided with the transducer. If you need to splice the transducer cable to make it longer, observe the information in the end user documentation for the relevant transducer.

### Identifying EK80 cables on a project cable drawing

The EK80 is often a part of a project delivery. For such deliveries, project cable drawings are established to show all main cables, and how the various products interconnect. In such project cable drawings, the EK80 cables are identified as **EK80/Cx**.

### Related topics

[Topside computer cable plan, page 71](#)  
[Wide Band Transceiver \(WBT\) cable plan, page 73](#)  
[Cable procedures, page 76](#)  
[Cable drawings and specifications, page 95](#)  
[Basic cable requirements, page 131](#)

## Cable procedures

### Topics

- [Prerequisites for cable installation, page 76](#)
- [General requirements for cable installations, page 77](#)
- [Connecting AC mains and ground to the Processor Unit, page 77](#)
- [Connecting power and ground to the Wide Band Transceiver, page 78](#)
- [Connecting battery power to the Wide Band Transceiver, page 79](#)
- [Connecting AC mains and ground to the colour display, page 80](#)
- [Connecting the video cable from the Processor Unit to the display, page 81](#)
- [Connecting the Ethernet cable from the Wide Band Transceiver \(WBT\) to the Processor Unit, page 82](#)
- [Connecting external devices to the Processor Unit using serial interfaces, page 84](#)
- [Connecting a synchronization cable to the Processor Unit using an RS-232 serial interfaces, page 85](#)
- [Connecting external devices to the Processor Unit using Ethernet interfaces, page 86](#)
- [Connecting the transducer\(s\) to the Wide Band Transceiver, page 87](#)
- [Splicing the transducer cable, page 88](#)

### Prerequisites for cable installation

Certain prerequisites apply for all cable installations.

Electrical installations can only be done by certified electricians. All necessary tools and instruments required must be available. The installation shipyard must prepare detailed drawings of the electrical system, and identify each cable.

Observe the basic cable requirements.

You must be equipped with a standard set of tools. This tool set must comprise the normal tools for electronic and electromechanical tasks, such as screwdrivers, pliers, spanners, a cable stripper etc. Each tool must be provided in various sizes. We recommend that all tools are demagnetized to protect your equipment.

Consumables include:

- Solder
- Cable strips and cable identification labels
- 9-pin D-connectors and crimpable Ethernet connectors
- Ship cables and Ethernet cables

Whenever specific or special consumables, tools or test instruments are required, these are identified in the relevant procedure(s).

**Note**

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*It is very important that high quality Ethernet cables are used. You must use CAT-5E STP (Shielded Twisted Pair) quality or better. Cables with lower bandwidth capacity will reduce the EK80 performance.*

---

## General requirements for cable installations

Certain general requirements apply for all cable installations.

- 1 Refer to the cable plan and the list of cables for a complete overview.
- 2 Detailed information about cable specifications, termination and connectors are provided in the referenced cable drawings.
- 3 All cables are provided by Kongsberg Maritime unless otherwise specified.
- 4 In order to ease the access for maintenance purposes, and to allow for vibration, make sure that some slack is provided for each cable.
- 5 Before you do the EK80 cabling, ensure that the relevant circuit breakers are switched off.
- 6 Observe the basic cable requirements.

## Connecting AC mains and ground to the Processor Unit

The EK80 Processor Unit (computer) must be connected to AC mains, and it must be properly grounded.

### Context

The mains voltage for the EK80 Processor Unit is 115 or 230 Vac, and it will automatically sense the current supply voltage.

Two cables are used.

- 1 AC mains cable.

This cable is provided with the EK80 delivery.

- 2 Grounding cable.

This cable must be provided by the installation shipyard.



### Procedure

- 1 Locate the power input and the ground connector on the rear side of your computer.
- 2 Connect the AC mains cable from the computer to the bulkhead mains socket or the Uninterrupted Power Supply (UPS).

A standard mains socket (identified with the arrow) is provided on the rear side of the computer.

- 3 Connect the grounding cable from the nearest grounding point to the relevant contact point or socket on the rear side of the computer.

A dedicated grounding point (identified with the arrow) is provided on the rear side of the computer.

The grounding cable must be connected to the vessel's ground in the fuse box (or other common grounding point).

### Related topics

[AC mains power cable using IEC C13 inline socket, page 96](#)

## Connecting power and ground to the Wide Band Transceiver

The EK80 Wide Band Transceiver is powered by a dedicated power supply connected to the AC mains, or from a suitable battery for DC operation. The transceiver must be properly grounded.

### Context

The mains voltage for the Wide Band Transceiver is 230 Vac provided by a separate power supply. It is normally connected to an uninterruptible power supply, and will automatically detect the mains voltage (230 or 115 Vac) when connected.. The output from the power supply is connected to the +12 Vdc input socket on the transceiver. The cabinet is connected to vessel ground. Two cables are used.

- Power supply with AC mains cable  
The power supply and both power cables are provided with the EK80 delivery.
- Grounding cable  
This cable must be provided by the installation shipyard.



### Procedure

- 1 Locate the power input and the ground connector on the Wide Band Transceiver.
- 2 Connect the DC cable from the power supply to the +12 Vdc socket (identified with the arrow) on the Wide Band Transceiver.
- 3 Connect the AC mains plug on the power supply to the bulkhead power outlet (or an uninterrupted power supply).
- 4 Connect the grounding cable from the nearest grounding point to the dedicated terminal (identified with the arrow) on the Wide Band Transceiver.

The grounding cable must be connected to the vessel's ground in the fuse box (or other common grounding point).

If you wish to operate your transceiver from a DC supply, you can use any suitable battery providing +12 to +15 Vdc.

- 5 Connect the DC power cable from the battery to the +12 Vdc socket (identified with the arrow) on the Wide Band Transceiver.

### Related topics

[AC mains power cable using IEC C13 inline socket, page 96](#)

## Connecting battery power to the Wide Band Transceiver

The transceiver can operate from a large capacity battery.

### Prerequisites

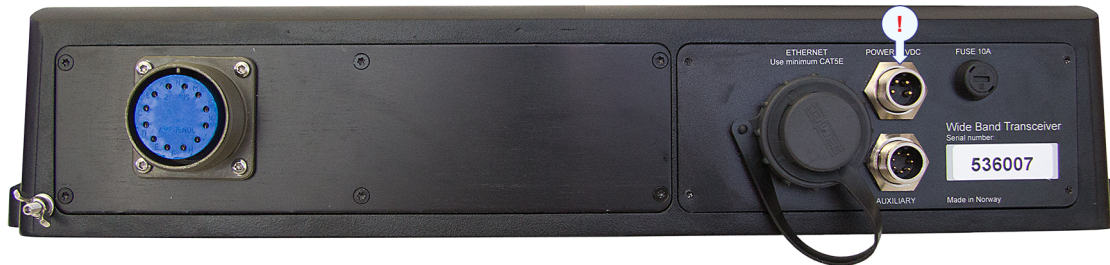
In order to power the Wide Band Transceiver from a battery, you will need:

- A large capacity +12 Vdc battery
- A power plug that fits the connector on the transceiver
- A suitable cable



## Context

The battery must be placed close to the transceiver to minimize power loss in the cable.



## Procedure

- 1 Locate the dedicated socket (identified with the arrow) on the Wide Band Transceiver.
- 2 Terminate the cable with the correct connectors.
- 3 Connect the battery power to the transceiver.

## Related topics

[Battery cable for Wide Band Transceiver, page 106](#)

## Connecting AC mains and ground to the colour display

The display must be connected to AC mains, and it must be – if specified by the manufacturer – properly grounded.

## Context

The mains voltage for the display is defined by the manufacturer. Refer to the relevant documentation or the identification plate on the display cabinet. The display is normally connected to the Uninterrupted Power Supply for AC mains. The cabinet is connected to vessel ground. Two cables are used.

- 1 AC mains cable  
This cable is provided with the display.
- 2 Grounding cable  
This cable must be provided by the installation shipyard.

## Procedure

- 1 Locate the power input and the ground connector on the rear side of your display.  
A ground connector is only provided if the display manufacturer has chosen to implement it.
- 2 Connect the AC mains cable from the display to the bulkhead mains socket or the Uninterrupted Power Supply (UPS).



- The grounding cable must be connected to the vessel's ground in the fuse box (or other common grounding point).

AC mains power cable using IEC C13 inline socket, page 96

The video interface cable is a standard commercial cable. Several video standards exist. The cable is normally provided with the display.

This cable is often physically attached to the display, and terminated in the “computer end” with a male connector.

*To learn more about the various video standards, explore these Wikipedia pages.*

### SVG description

### *DVI description*

### HDMI description

### DisplayPort description

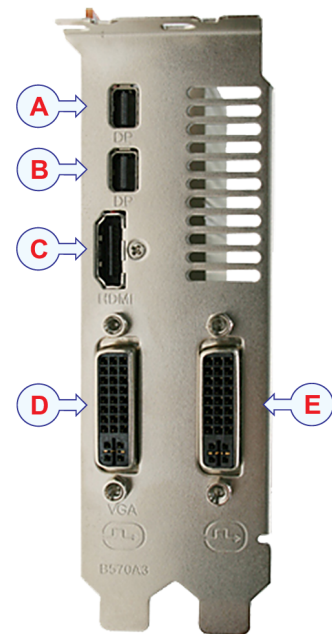
The outputs from the graphic adapters are positioned as follows:

- A** DisplayPort output
- B** DisplayPort output
- C** HDMI output
- D** DVI-I output
- E** DVI-D output

Note

*The two DVI outputs are not identical. If you wish to connect a standard VGA display using a DVI-to-VGA adapter, you must use the left output (D).*

(Photo downloaded from [www.tulembedded.com](http://www.tulembedded.com), 2015)



### Procedure

- 1 Locate the video outputs on the rear side of the Processor Unit.
- 2 Connect the display cable from the appropriate slot on the rear side of the Processor Unit to the display.

If you have purchased the EK80 Processor Unit, use the left socket if you only have one colour display.

Important

Keep the display cable as short as possible. If the cable is too long, it may pick up electric noise, and this will reduce the image quality.

### Related topics

[Graphic adapter, page 89](#)

[Moxa CP114EL-I Serial line adapter, page 103](#)

## Connecting the Ethernet cable from the Wide Band Transceiver (WBT) to the Processor Unit

The Processor Unit is connected to the Wide Band Transceiver (WBT) using high speed Ethernet communication.

### Context

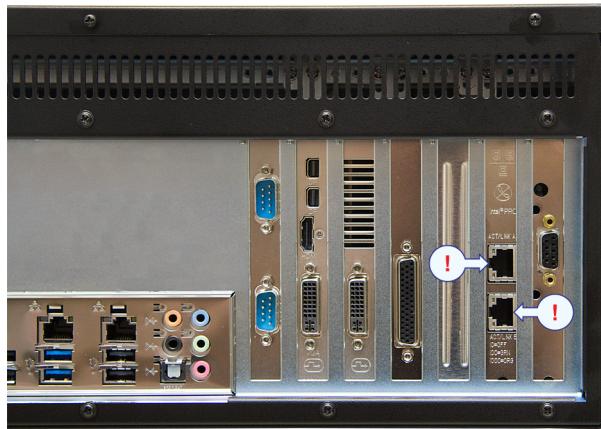
A 5 meter long Ethernet cable is provided with the Processor Unit. If a longer cable is required, this must be provided by the installation shipyard.

For redundancy, we strongly recommend that at least one additional Ethernet cable is installed. This extra cable can then be used as a spare cable.

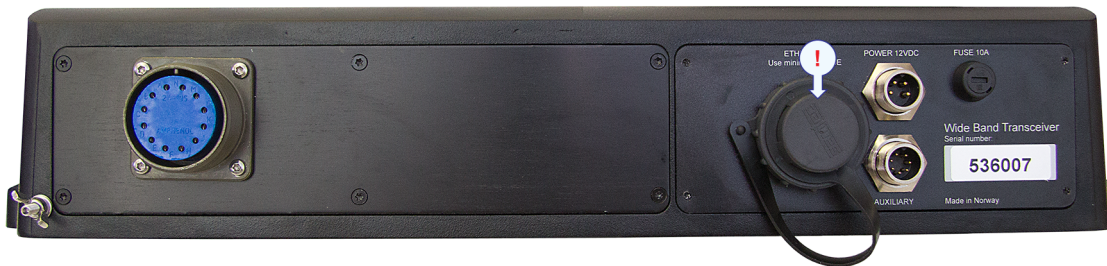
#### Note

*It is very important that high quality Ethernet cables are used. You must use CAT-5E STP (Shielded Twisted Pair) quality or better. Cables with lower bandwidth capacity will reduce the EK80 performance. Do not connect the Processor Unit to the transceiver(s) using the vessel's existing local area network.*

---



Suitable cables can be ordered from Kongsberg Maritime.



### Procedure

1. Locate the Ethernet connectors on the rear side of the Processor Unit.  
Use one of the sockets identified with the arrows.  
Do not use any of the Ethernet sockets on the Processor Unit's default connector panel.
2. Locate the Ethernet connector (identified with the arrow) on the Wide Band Transceiver.
3. Connect the Ethernet cable from the Processor Unit to the Ethernet socket on the transceiver.

#### Note

*If your EK80 system uses more than one transceiver, connect the cable to a high capacity Ethernet switch. From this switch, connect separate high quality Ethernet cables to each transceiver.*

---

### Further requirements

Verify that the length of the Ethernet cable does not exceed the maximum operational length.

### Related topics

[RJ45 High speed Ethernet cable \(1000Base-t\), page 105](#)

## Connecting external devices to the Processor Unit using serial interfaces

External devices such as sensors and positioning systems are often connected to the Processor Unit using RS-232 and/or RS-422 serial lines and NMEA communication formats.

### Prerequisites

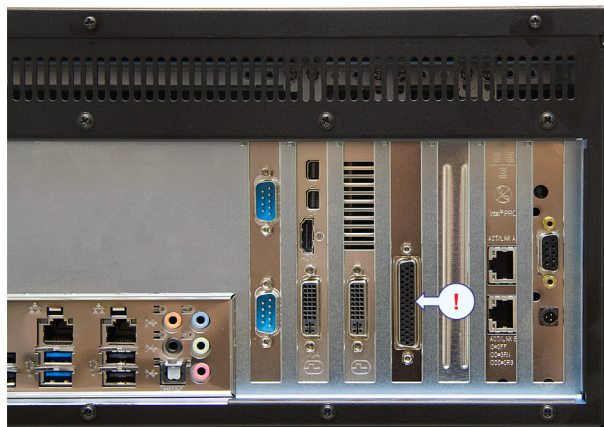
You must be equipped with a standard set of tools. This tool set must comprise the normal tools for electronic and electromechanical tasks, such as screwdrivers, pliers, spanners, a cable stripper etc. Each tool must be provided in various sizes. We recommend that all tools are demagnetized to protect your equipment.

### Context

Unless otherwise specified, the serial line cable must be provided by the installation shipyard.

#### Important

If you are using RS-232 serial communication, observe that long runs of unshielded cable will pick up noise easily. This is because the RS-232 signals are not balanced.



### Procedure

- 1 Locate the serial connector on the rear side of the Processor Unit (computer).  
On the EK80 Processor Unit, a large socket (indicated with arrow) is available. A dedicated adapter is provided to allow four cables to be connected to this single socket.
- 2 Connect the serial cable from the computer to the peripheral device.
- 3 On the peripheral device, wire as described in the relevant documentation.

### Further requirements

All serial interfaces must be defined in the EK80 software prior to use.

### Related topics

[Generic RS-232 connection using three wires, page 98](#)

[Generic RS-232 connection using five wires, page 99](#)

[Generic RS-422 serial line using five wires, page 100](#)

[Generic RS-485 connection using two or four wires, page 102](#)

## Connecting a synchronization cable to the Processor Unit using an RS-232 serial interfaces

An RS-232 serial line connection using the Request To Send (RTS) and Clear To Send (CTS) signals is common way to connect the EK80 to external devices for synchronisation purposes. The cable is connected to the serial line adapter on Processor Unit.

### Prerequisites

You must be equipped with a standard set of tools. This tool set must comprise the normal tools for electronic and electromechanical tasks, such as screwdrivers, pliers, spanners, a cable stripper etc. Each tool must be provided in various sizes. We recommend that all tools are demagnetized to protect your equipment.

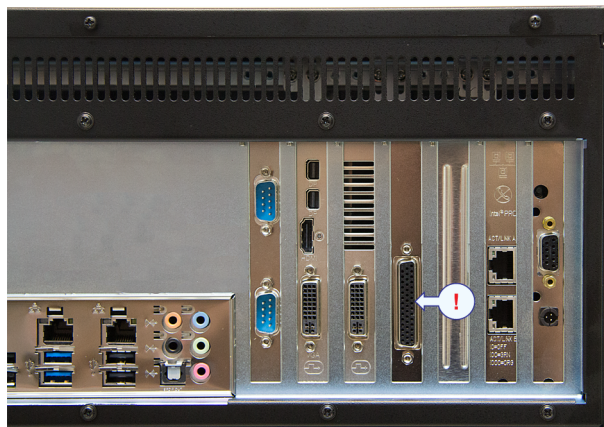
### Context

Note that this cable does not support all the signals in the standard RS-232 specification.

Unless otherwise specified, the serial line cable must be provided by the installation shipyard.

### Important

When you are using RS-232 serial communication, observe that long runs of unshielded cable will pick up noise easily. This is because the RS-232 signals are not balanced.





## Procedure

- 1 Locate the serial connector on the rear side of the Processor Unit.

On the EK80 Processor Unit, a large socket (indicated with arrow) is available. A dedicated adapter is provided to allow four cables to be connected to this single socket.

### Note

*You must use an RS-232 interface for this purpose.*

- 2 Connect the synchronisation cable from the computer to the peripheral device.
- 3 On the peripheral device, wire as described in the relevant documentation.

## Further requirements

The synchronisation setup must be defined in the EK80 software prior to use.

## Related topics

[RS-232 used as synchronization trigger \(input or output\), page 101](#)

## Connecting external devices to the Processor Unit using Ethernet interfaces

External devices such as positioning systems are often connected to the Processor Unit using Ethernet.

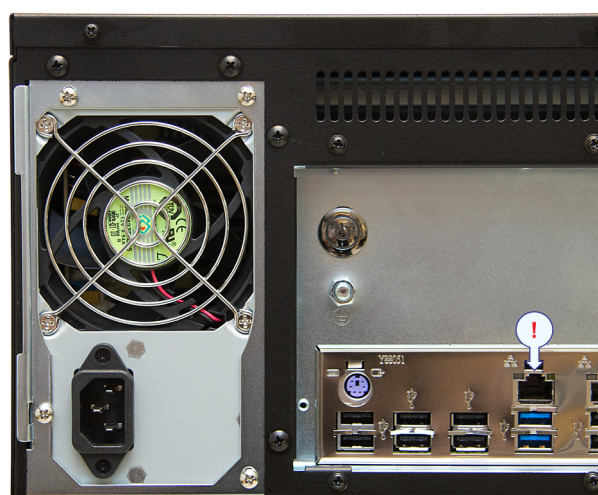
## Context

You can connect your Processor Unit to the ship's local area network (LAN) to fetch sensor information that is shared on the network. The same connection can be used to save EK80 data on a network disk, or to transfer the data to a second computer for post-processing.

## Procedure

- 1 Locate the Ethernet connector on the rear side of the computer.

On the EK80 Processor Unit, an RJ45 socket (indicated with the arrow) is available.



**Note**

*Do not use this Ethernet socket — or any other sockets on the computer's motherboard — for communication with the transceiver.*

---

- 2 Connect an Ethernet cable from the computer to the peripheral device or the ship's network.

**Further requirements**

All Ethernet interfaces to and from navigation sensors must be defined in the EK80 software prior to use.

**Related topics**

[RJ45 High speed Ethernet cable \(1000Base-t\), page 105](#)

## Connecting the transducer(s) to the Wide Band Transceiver

One or more transducers may be connected to the Wide Band Transceiver.

**Context**

The Wide Band Transceiver (WBT) used by the Simrad EK80 can be set up to work with maximum four -4- fixed operational frequencies. This means that you can use four single frequency/single beam transducers, two dual frequency transducers, or one split beam transducer.

In order to take advantage of the advanced functionality provided by the EK80 (size distribution, fish position and echo position), it is normally set up with split beam transducers. This means that one Wide Band Transceiver is required for each transducer.

The Wide Band Transceiver used by the Simrad EK80 can be set up to work with ???

The Wide Band Transceiver used by the EK80 can be set up to work with ???

The transducer connector is mounted on the side panel of the Wide Band Transceiver.

The transducer connector is a circular socket with 12 pins identified as A through N.



## Note

---

*It is strongly recommended to lay a steel conduit from the transducer's cable gland to the EK80 transceiver, and to pull the transducer cable through this conduit.*

---

## Procedure

- 1 Obtain the wiring information for the transducer(s) you wish to use, as well as the relevant transducer connection diagrams.
- 2 Prepare a steel conduit for the transducer cable(s).
- 3 Pull the transducer cable(s) through the steel conduits.
- 4 Connect the conductors in the transducer cable(s) to the correct pins in the plug.

## Related topics

[Single beam low power transducer connection to a GPT Transducer socket, page 107](#)

[Single beam high power transducer connection to a GPT Transducer socket, page 108](#)

[Dual single beam transducer connection to a GPT Transducer socket, page 109](#)

[Split beam transducer; connections and specifications, page 111](#)

[Split beam transducer to single beam output on GPT Transducer socket, page 113](#)

[Split beam transducer connection to a GPT Transducer socket wired for single beam high output, page 114](#)

[Transducer 12-16/60 connection to a GPT Transducer socket, page 116](#)

[Transducer 38/200 Combi C connection to a GPT Transducer socket, page 120](#)

[Transducer 50/200 Combi C connection to a GPT Transducer socket, page 123](#)

[Transducer ES38-7 connection to a GPT transducer socket, page 118](#)

[Transducer ES38-10 connection to a GPT Transducer socket, page 119](#)

[Transducer ES70-18CD connection to a GPT Transducer socket, page 125](#)

[Using a steel conduit to protect the transducer cable, page 93](#)

## Splicing the transducer cable

If you need to cut or lengthen the transducer cable, you must splice it correctly.

## Prerequisites

Electrical installations can only be done by certified electricians. All necessary tools and instruments required must be available. The installation shipyard must prepare detailed drawings of the electrical system, and identify each cable.

Observe the basic cable requirements.

The cable between the junction box and the transceiver must be supplied by Kongsberg Maritime, and this must be the same type as used on the transducer(s).

You will also need a metal junction box with cable glands designed for electromagnetic compatibility (EMC), and a terminal block. The terminal block must provide solid fastening of the cable ends as well as sufficient insulation between the wires.



## Context

Do not solder the wires together with only electrical tape for insulation. This will result in electrical noise and reduced operational performance.

Do not connect the cable screen to the vessel's ground.

## Procedure

- 1 Mount the junction box in a suitable location.
- 2 Terminate the steel conduits containing the transducer cables as close to the junction box as possible.
- 3 Verify that the junction box chassis is not connected to the vessel ground.  
If required, use necessary insulation.
- 4 Remove the insulation on each transducer cable, and connect the individual conductors to the terminal block.
- 5 Remove the insulation on each extension cable, and connect the individual conductors to the terminal block.
- 6 Verify that you have connected the wires 1:1, and that the colours match.
- 7 Connect the cable screens the to cable glands in the junction box.

## Related topics

[Single beam low power transducer connection to a GPT Transducer socket, page 107](#)

[Single beam high power transducer connection to a GPT Transducer socket, page 108](#)

[Dual single beam transducer connection to a GPT Transducer socket, page 109](#)

[Split beam transducer; connections and specifications, page 111](#)

[Split beam transducer to single beam output on GPT Transducer socket, page 113](#)

[Split beam transducer connection to a GPT Transducer socket wired for single beam high output, page 114](#)

[Transducer 12-16/60 connection to a GPT Transducer socket, page 116](#)

[Transducer 38/200 Combi C connection to a GPT Transducer socket, page 120](#)

[Transducer 50/200 Combi C connection to a GPT Transducer socket, page 123](#)

[Transducer ES38-7 connection to a GPT transducer socket, page 118](#)

[Transducer ES38-10 connection to a GPT Transducer socket, page 119](#)

[Transducer ES70-18CD connection to a GPT Transducer socket, page 125](#)

## Graphic adapter

The graphic adapter used by the Enix Processor Unit is the **ER93F** manufactured by TUL.

(Photo downloaded from [www.tulembedded.com](http://www.tulembedded.com), 2015)

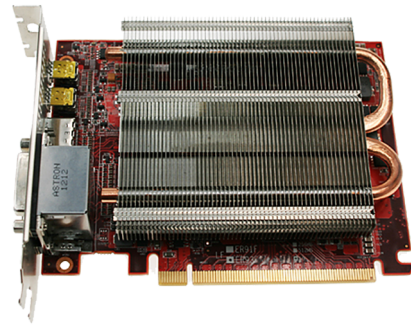
### Description

The manufacturer's website offers the following description of the ER39F graphic adapter.

The ER93F Graphic Card is provided with two DVI, two Mini DP and one HDMI port, allowing system customers to implement multi-display output without additional video converters or splitters. The graphic card's complete range of output ports is perfect for developing new system products or upgrading an existing product. The ER93F is particularly suitable for upgrading existing digital signage equipment or arcade machine. Apart from the variety of output ports, the two sets of Mini DP and DVI outputs allow old systems to be upgraded directly to multi-display solutions.

The ER93F Graphic Card uses the embedded E6760 graphics chip from AMD and incorporates 128-bit 1GB GDDR5 memory in MCM BGA packaging. Industrial-grade passive electronic components are used throughout the entire card and it has been tested between -20 ~ 55°C to ensure ideal system compatibility and reliability. For industrial and automation industry customers, this resolves any doubt about compatibility and stability on production selection and system configuration.

[www.tulembedded.com](http://www.tulembedded.com), March 2015



### Outputs and resolutions

The following video outputs are provided.

- **Display Port**, maximum resolution 2560 x 1600 px
- **HDMI**, maximum resolution 1920 x 1200 px
- **DVI-I/D**, maximum resolution 2560 x 1600 px
- **VGA** (using adapter), maximum resolution 2048 x 1536 px

The outputs from the graphic adapters are positioned as follows:

- A**    *DisplayPort output*
- B**    *DisplayPort output*
- C**    *HDMI output*
- D**    *DVI-I output*
- E**    *DVI-D output*

Note

*The two DVI outputs are not identical. If you wish to connect a standard VGA display using a DVI-to-VGA adapter, you must use the left output (D).*

*(Photo downloaded from [www.tulembedded.com](http://www.tulembedded.com), 2015)*

Tip

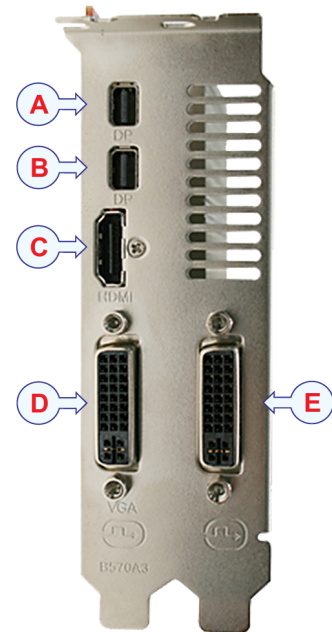
*To learn more about the various video standards, explore these Wikipedia pages.*

[\*SVGA description\*](#)

[\*DVI description\*](#)

[\*HDMI description\*](#)

[\*DisplayPort description\*](#)



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## Related topics

[Topside computer cable plan, page 71](#)

## Moxa CP114EL-I serial port adapter

The **Moxa CP114EL-I** serial port adapter is used in the EK80 Processor Unit to provide serial communication.

### Topics

[Moxa CP114EL-I overview, page 92](#)

[Moxa CP114EL-I connectors, page 93](#)

[Moxa CP114EL-I overview, page 92](#)

[Moxa CP114EL-I connectors, page 93](#)

### Moxa CP114EL-I overview

The Processor Unit is equipped with a **Moxa CP114EL-I** serial adapter board. The board provides four serial lines.

The Moxa CP114EL-I serial line adapter board supports RS-232, RS-422 and RS-485 (both 2 and 4-wire).

The connections to the board are made using a converter cable with four 9-pin male D-connectors. The converter cable is supplied with the Processor Unit.

The board is manufactured by Moxa at <http://www.moxa.com/>



### Serial line support

The **Moxa CP114EL-I** serial adapter board supports the following interface formats:

- **Port 1:** RS-232 / RS-422 / RS-485
- **Port 2:** RS-232 / RS-422 / RS-485
- **Port 3:** RS-232 / RS-422 / RS-485
- **Port 4:** RS-232 / RS-422 / RS-485

A dedicated software utility in the device driver is used to set up the ports to match your requirements. For this reason, there are neither jumpers nor DIP switches on the circuit board.

### Related topics

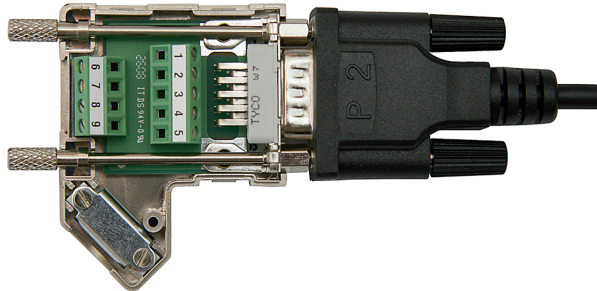
[Topside computer cable plan, page 71](#)

## Moxa CP114EL-I connectors

The Moxa CP114EL-I serial line adapter board provides a front mounted D-connector for its serial lines.

A dedicated adapter cable is provided with the EK80 delivery. It splits the large front mounted connector to four 9-pin D-connectors.

To make the individual connections easier, four 9-pin D-sub connectors with screw terminals, and a number of adapter nuts for connection to the adapter cable, are also included in the delivery.



### Pin assignments

| Moxa CP114EL-I 9-pin D-connector converter |        |         |                |                |
|--------------------------------------------|--------|---------|----------------|----------------|
| Pin                                        | RS-232 | RS-422  | RS485 (4-wire) | RS485 (2-wire) |
| 1                                          | DCD    | TXD-(A) | TXD-(A)        |                |
| 2                                          | RxD    | TXD+(B) | TXD+(B)        |                |
| 3                                          | TxD    | RXD+(B) | RXD+(B)        | Data-(B)       |
| 4                                          | DTR    | RXD-(A) | RXD-(A)        | Data-(A)       |
| 5                                          | GND    | GND     | GND            | GND            |
| 6                                          | DSR    |         |                |                |
| 7                                          | RTS    |         |                |                |
| 8                                          | CTS    |         |                |                |
| 9                                          |        |         |                |                |

### Related topics

[Topside computer cable plan, page 71](#)

## Using a steel conduit to protect the transducer cable

A steel conduit is used to protect the transducer cable.

### Why use steel conduits?

It is strongly recommended to lay a steel conduit from the transducer's cable gland to the EK80 transceiver, and to pull the transducer cable through this conduit.

There are several reasons for this.

- It will make it easier at a later stage to replace the transducer.
- Noise and interference from other electrical equipment is greatly reduced.
- The risk of flooding is greatly reduced if the steel conduit is terminated above the water line.

With a steel conduit the installation will satisfy the European Union regulations for electromagnetic compatibility (EMC) interference. Without a steel conduit, there is a risk of reduced EK80 performance.

### **Steel conduits qualities and shielding**

The steel conduit must be unbroken and watertight from the transducer to above the water line. From there, the cable can be pulled further, or a junction box can be installed to facilitate further connections.

#### **Note**

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*The steel conduit must act as a continuous electrical screen all the way.*

---

The minimum dimensions of the steel conduit must be specified by the relevant maritime authority and/or classification society.

### **More than one transducer cable?**

If two or more transducers are installed close to each other it is possible to pull their cables in the same steel conduit, provided the conduit diameter is increased accordingly. However, for easy replacement it is recommended that each transducer has its own steel conduit.

## Cable drawings and specifications

Relevant cables and connections required for the EK80 are described in detail.

### Topics

[AC mains power cable using IEC C13 inline socket, page 96](#)

[Generic RS-232 connection using three wires, page 98](#)

[Generic RS-232 connection using five wires, page 99](#)

[Generic RS-422 serial line using five wires, page 100](#)

[RS-232 used as synchronization trigger \(input or output\), page 101](#)

[Generic RS-485 connection using two or four wires, page 102](#)

[Moxa CP114EL-I Serial line adapter, page 103](#)

[RJ45 High speed Ethernet cable \(1000Base-t\), page 105](#)

[Battery cable for Wide Band Transceiver, page 106](#)

[Single beam low power transducer connection to a GPT Transducer socket, page 107](#)

[Single beam high power transducer connection to a GPT Transducer socket, page 108](#)

[Dual single beam transducer connection to a GPT Transducer socket, page 109](#)

[Split beam transducer; connections and specifications, page 111](#)

[Split beam transducer to single beam output on GPT Transducer socket, page 113](#)

[Split beam transducer connection to a GPT Transducer socket wired for single beam high output, page 114](#)

[Transducer 12-16/60 connection to a GPT Transducer socket, page 116](#)

[Transducer ES18 connection to a GPT transducer socket, page 117](#)

[Transducer ES38-7 connection to a GPT transducer socket, page 118](#)

[Transducer ES38-10 connection to a GPT Transducer socket, page 119](#)

[Transducer 38/200 Combi C connection to a GPT Transducer socket, page 120](#)

[Transducer ES38-18/200-18C connection to a GPT transducer socket, page 122](#)

[Transducer 50/200 Combi C connection to a GPT Transducer socket, page 123](#)

[Transducer ES70-18CD connection to a GPT Transducer socket, page 125](#)

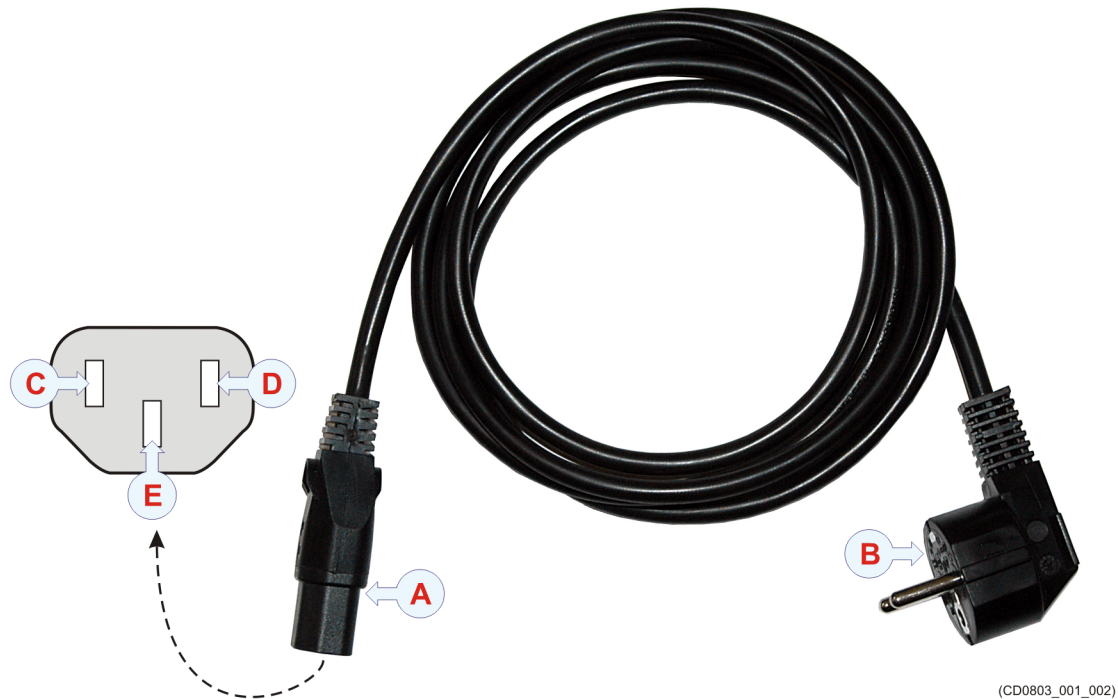
[Burton underwater connectors on split beam transducers for deep water, page 126](#)

[About serial lines, page 128](#)

## AC mains power cable using IEC C13 inline socket

This is a commercial power cable normally used for 230 Vac mains power. The inline socket and plug comply to the IEC60320 standard.

A standard commercial AC mains cable is used.



- A IEC13 line socket – may be fitted with a locking device
- B CEE 7/7 male power plug
- C Live (normally identified with Blue insulation)
- D Neutral (normally identified with Brown insulation)
- E Ground (normally identified with Yellow or Yellow/Green insulation)

The power cable is normally terminated with an female IEC C13 inline socket. The AC mains end is terminated in an AC connector suitable for the local standard and/or the output sockets on a Uninterruptible Power Supply (UPS) unit. If this is not the case, you must replace the AC connector.

The typical cable length is between 1,5 and 2 meters. If this is too short you must use an extension cable (not recommended), mount a new power outlet within range, or make your own power cable with sufficient length. If you use an Uninterruptible Power Supply (UPS), you can also move the UPS unit to a different location within range.

### Note

*There are substantial differences between American and British nomenclature related to power plugs and sockets. Observe local standards and regulations.*

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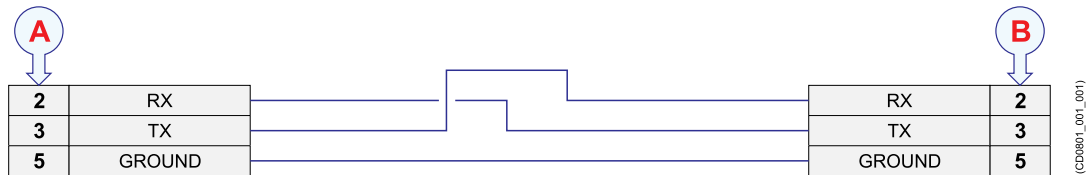


### **Minimum cable requirements**

- **Conductors:** 2 x 1.5 mm<sup>2</sup> + GND
- **Screen:** None
- **Voltage:** 750 V
- **Maximum outer diameter:** Defined by the plugs

## Generic RS-232 connection using three wires

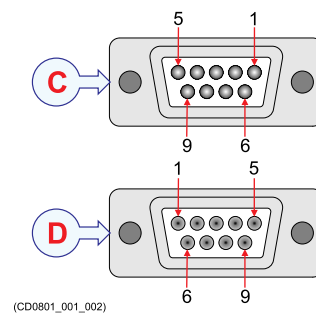
An RS-232 serial line connection using three (3) wires and NMEA telegrams is a common way to connect the EK80 to external devices.



- A *Local connection*
- B *Connection on peripheral device*
- C *Female 9-pin D-connector*
- D *Male 9-pin D-connector*

Unless otherwise specified, the serial line cable must be provided by the installation shipyard.

Note that this cable does not support all the signals in the standard RS-232 specification.



### Minimum cable requirements

- **Conductors:** 2 x 4 x 0.5 mm<sup>2</sup>
- **Screen:** Overall braided
- **Voltage:** 60 V
- **Maximum outer diameter:** Defined by the plugs

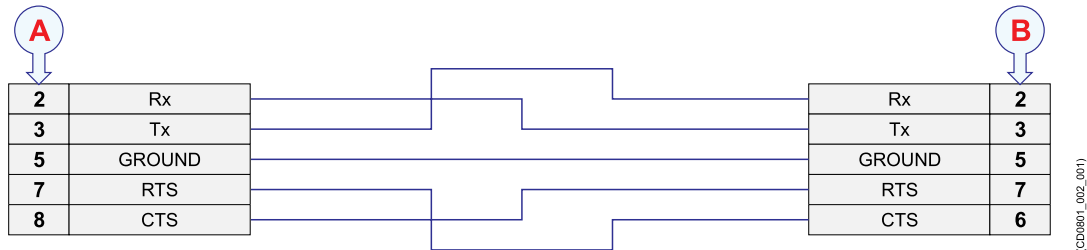
If you need to install a very long serial line cable, increase the cross section.

### Related topics

[About serial lines, page 128](#)

## Generic RS-232 connection using five wires

An RS-232 serial line connection using five (5) wires and NMEA telegrams is a common way to connect the EK80 to external devices.



A *Local connection*

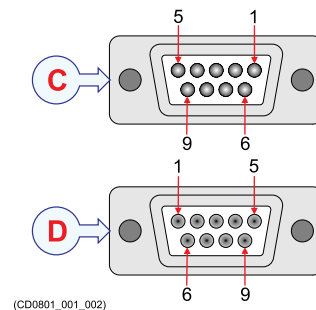
B *Connection on peripheral device*

C *Female 9-pin D-connector*

D *Male 9-pin D-connector*

Unless otherwise specified, the serial line cable must be provided by the installation shipyard.

Note that this cable does not support all the signals in the standard RS-232 specification.



### Minimum cable requirements

- **Conductors:** 2 x 4 x 0.5 mm<sup>2</sup>
- **Screen:** Overall braided
- **Voltage:** 60 V
- **Maximum outer diameter:** Defined by the plugs

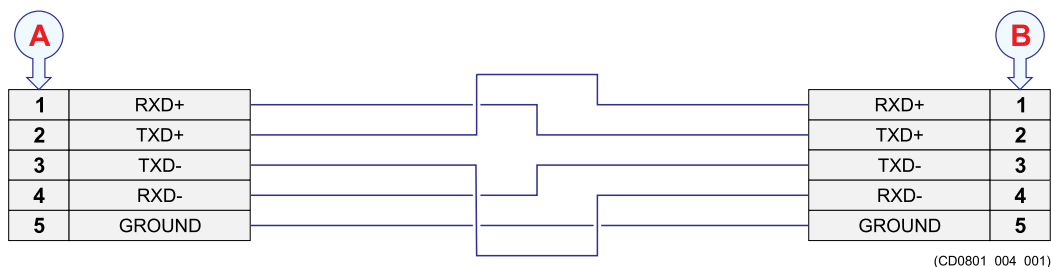
If you need to install a very long serial line cable, increase the cross section.

### Related topics

[About serial lines, page 128](#)

## Generic RS-422 serial line using five wires

An RS-422 serial line connection can transmit data at rates as high as 10 million bits per second, and may be sent on cables as long as 1500 meters.



A *Local connection*

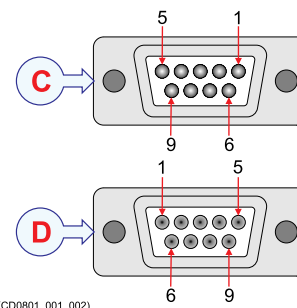
B *Connection on peripheral device (typical example)*

*Note that the pin numbers on your peripheral device may be different from those shown here!*

C *Female 9-pin D-connector*

D *Male 9-pin D-connector*

Unless otherwise specified, the serial line cable must be provided by the installation shipyard.



### Minimum cable requirements

- **Conductors:** 2 x 4 x 0.5 mm<sup>2</sup>
- **Screen:** Overall braided
- **Voltage:** 60 V
- **Maximum outer diameter:** Defined by the plugs

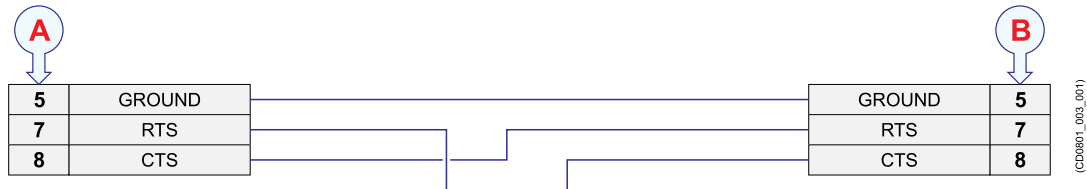
If you need to install a very long serial line cable, increase the cross section.

### Related topics

[About serial lines, page 128](#)

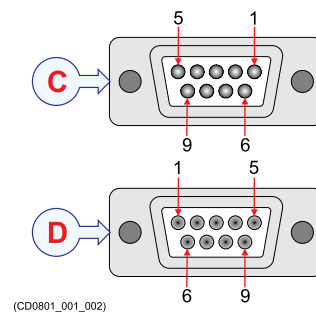
## RS-232 used as synchronization trigger (input or output)

An RS-232 serial line connection using the Request To Send (RTS) and Clear To Send (CTS) signals is common way to connect the EK80 to external devices for synchronization purposes.



- A *Local connection*
- B *Connection on peripheral device*
- C *Female 9-pin D-connector*
- D *Male 9-pin D-connector*

This cable comprises an RS-232 serial line applied as an external trigger. It provides interface with any peripheral unit that requires or controls transmit/receive synchronization.



Note that this cable does not support all the signals in the standard RS-232 specification.

Unless otherwise specified, the serial line cable must be provided by the installation shipyard.

### Minimum cable requirements

- **Conductors:** 2 x 4 x 0.5 mm<sup>2</sup>
- **Screen:** Overall braided
- **Voltage:** 60 V
- **Maximum outer diameter:** Defined by the plugs

If you need to install a very long serial line cable, increase the cross section.

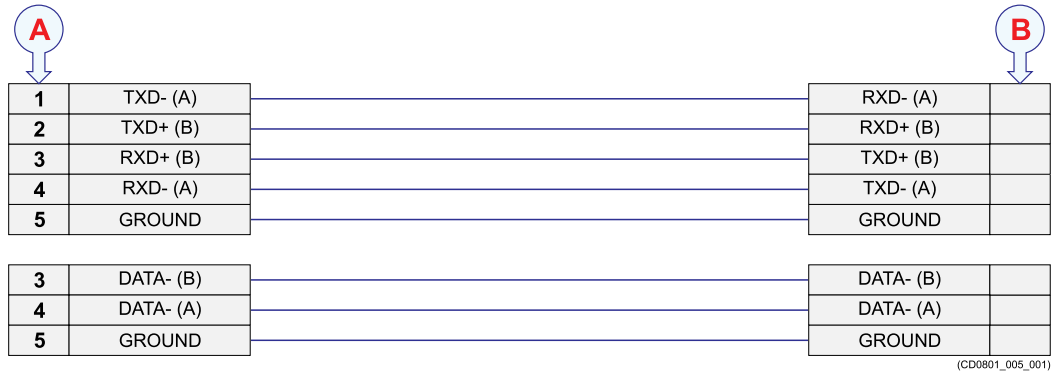
### Related topics

[About serial lines, page 128](#)

[Connecting a synchronization cable to the Processor Unit using an RS-232 serial interfaces, page 85](#)

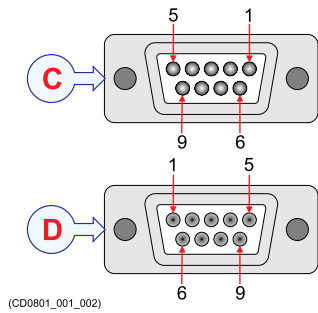
# Generic RS-485 connection using two or four wires

An RS-485 serial line connection using two or four wires is common way to connect the EK80 to external devices. This format is recommended if the serial cable needs to be very long.



- A *Local connection with pin configuration for Moxa CP114EL-I serial adapter*
- B *Connection on peripheral device – refer to manufacturer’s documentation for pin configuration*
- C *Female 9-pin D-connector*
- D *Male 9-pin D-connector*

Unless otherwise specified, the serial line cable must be provided by the installation shipyard.



## Minimum cable requirements

- **Conductors:** 2 x 5 x 0.5 mm<sup>2</sup>
- **Screen:** Overall braided
- **Voltage:** 60 V
- **Maximum outer diameter:** Defined by the plugs

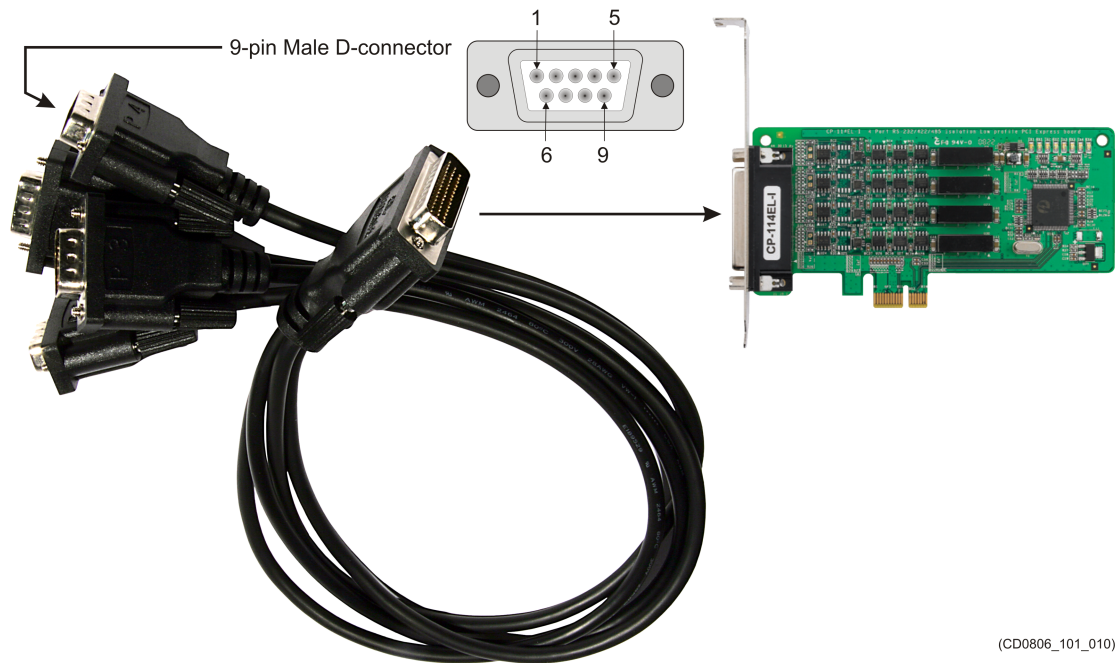
If you need to install a very long serial line cable, increase the cross section.

## Related topics

[About serial lines, page 128](#)

## Moxa CP114EL-I Serial line adapter

The Processor Unit is equipped with a **Moxa CP114EL-I** serial adapter board. The board provides four serial lines.



The Moxa CP114EL-I serial line adapter board supports RS-232, RS-422 and RS-485 (both 2 and 4-wire).

The connections to the board are made using a converter cable with four 9-pin male D-connectors. The converter cable is supplied with the Processor Unit.

The board is manufactured by Moxa at <http://www.moxa.com/>

Unless otherwise specified, the serial line cable must be provided by the installation shipyard.

### Important

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When you are using RS-232 serial communication, observe that long runs of unshielded cable will pick up noise easily. This is because the RS-232 signals are not balanced.

---

Maximum length for an RS-232 serial cable is typically 60 meters with 2400 bps data rate, however this depends on the cable quality. Always check the cable manufacturers specifications for the actual "shunt capacitance". A common figure is 47.5 pF/m, which gives a maximum cable length of about 50 meters.

**Note** 

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*Even though a standard exist for RS-232 pin configuration, certain manufacturer may still choose their own connector pins for the various signals used. In order to make the RS-232 connection to your peripheral device work properly, you must always consult the relevant instructions provided by the device manufacturer.*

---

**Pin assignments**

| Moxa CP114EL-I 9-pin D-connector converter |        |         |                |                |
|--------------------------------------------|--------|---------|----------------|----------------|
| Pin                                        | RS-232 | RS-422  | RS485 (4-wire) | RS485 (2-wire) |
| 1                                          | DCD    | TXD-(A) | TXD-(A)        |                |
| 2                                          | RxD    | TXD+(B) | TXD+(B)        |                |
| 3                                          | TxD    | RXD+(B) | RXD+(B)        | Data-(B)       |
| 4                                          | DTR    | RXD-(A) | RXD-(A)        | Data-(A)       |
| 5                                          | GND    | GND     | GND            | GND            |
| 6                                          | DSR    |         |                |                |
| 7                                          | RTS    |         |                |                |
| 8                                          | CTS    |         |                |                |
| 9                                          |        |         |                |                |

**Minimum cable requirements**

- **Conductors:** 2 x 5 x 0.5 mm<sup>2</sup>
- **Screen:** Overall braided
- **Voltage:** 60 V
- **Maximum outer diameter:** Defined by the plugs

If you need to install a very long serial line cable, increase the cross section.

**Related topics**

[About serial lines, page 128](#)



## RJ45 High speed Ethernet cable (1000Base-t)

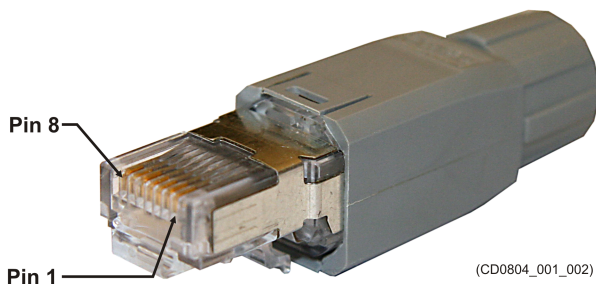
Most high speed data connections between the EK80 system units are made using Ethernet cables. These cables may also be used between the EK80 and peripheral equipment.



A Local Ethernet connection

B Connection on external network device

Ethernet cables are available commercially in different lengths, colours and categories. Normally, CAT-5E and CAT-6 cables are used in local area networks with bandwidths exceeding 100 Mbit.



### Note

*It is very important that high quality Ethernet cables are used. You must use CAT-5E STP (Shielded Twisted Pair) quality or better. Cables with lower bandwidth capacity will reduce the EK80 performance.*

### Cable specifications

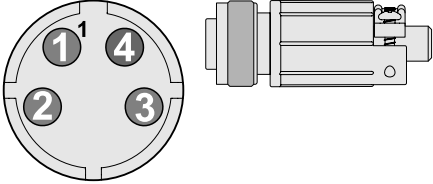
Not applicable. This is a commercial cable.

## Battery cable for Wide Band Transceiver

A suitable cable must be provided if you wish to run the transceiver from a battery.

The power socket is mounted on the rear panel of the Wide Band Transceiver.

The socket is made to fit a Conxall 4-pin **Mini-Con-X®** shielded plug. One spare plug is included with the transceiver, you can use this if you wish to power the transceiver from a battery.



The plug can also be ordered from the manufacturer (<http://www.conxall.com>), or purchased from Simrad using order number **390616**.

| Pin | 1       | 2     | 3     | 4       |
|-----|---------|-------|-------|---------|
| Use | +12 Vdc | 0 Vdc | 0 Vdc | +12 Vdc |

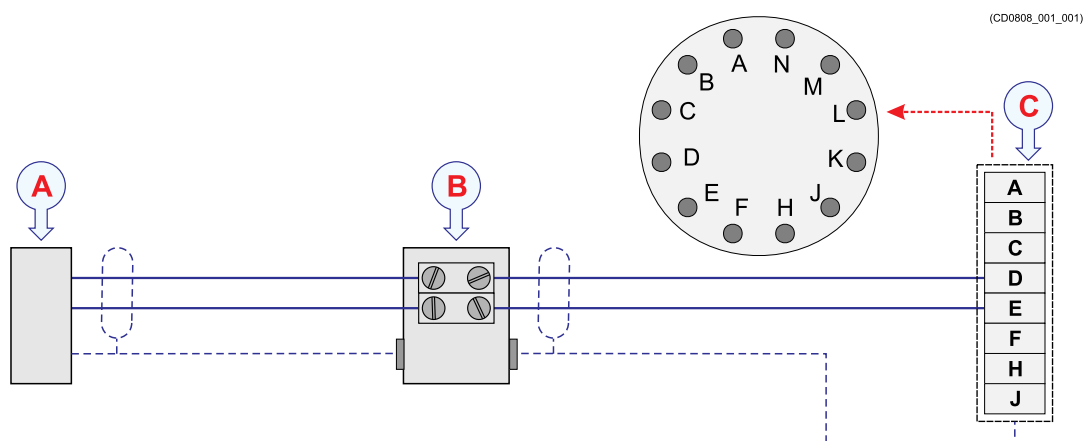
### Minimum cable requirements

- **Conductors:** 2 x 1.5 mm<sup>2</sup>
- **Screen:** None
- **Voltage:** 60 V
- **Maximum outer diameter:** N/A

## Single beam low power transducer connection to a GPT Transducer socket

A single beam low power transducer can be connected to sockets **D** and **E** on a GPT type transducer socket.

The other end of the cable is permanently fixed to the transducer.



A *Transducer*

B *Optional junction box*

C *GPT transducer connector*

The cable screen must be connected to the housing on the transducer plug. If a junction box is used to extend the cable, the screen must be connected to the cable glands on the box. The screen must not be connected to vessel ground.

If you need to splice the transducer cable, it is very important to use the correct cable. You must also avoid ground loops. We strongly recommend the use of a junction box. The junction box must be made of metal, it must be provided with proper cable glands, and its chassis must not be connected to vessel ground.

We strongly recommend that you install the transducer cable in a steel conduit.

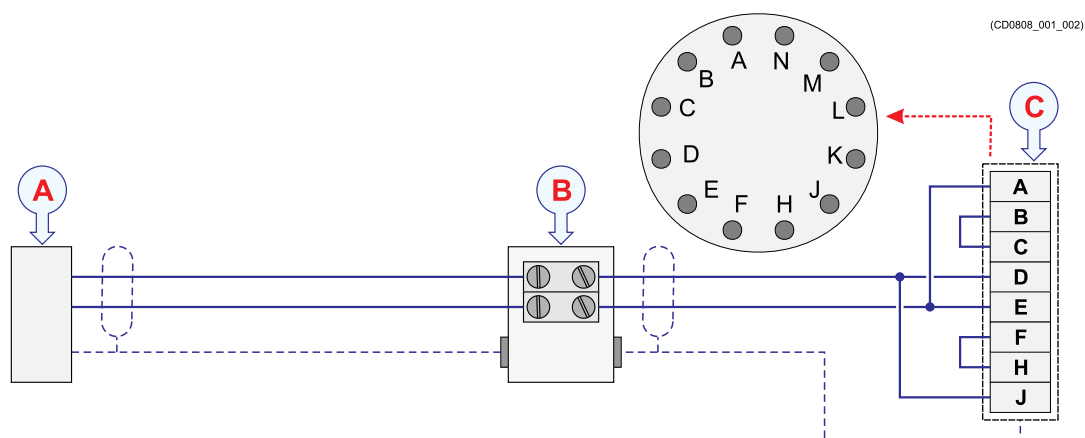
### Cable specifications

Not applicable. If you need an extension cable, contact your dealer – or Simrad – for advice.

## Single beam high power transducer connection to a GPT Transducer socket

A single beam high power transducer can be connected to sockets **A** through **J** on a GPT type transducer socket.

The other end of the cable is permanently fixed to the transducer.



**A** Transducer

**B** Optional junction box

**C** GPT transducer connector

The cable screen must be connected to the housing on the transducer plug. If a junction box is used to extend the cable, the screen must be connected to the cable glands on the box. The screen must not be connected to vessel ground.

If you need to splice the transducer cable, it is very important to use the correct cable. You must also avoid ground loops. We strongly recommend the use of a junction box. The junction box must be made of metal, it must be provided with proper cable glands, and its chassis must not be connected to vessel ground.

We strongly recommend that you install the transducer cable in a steel conduit.

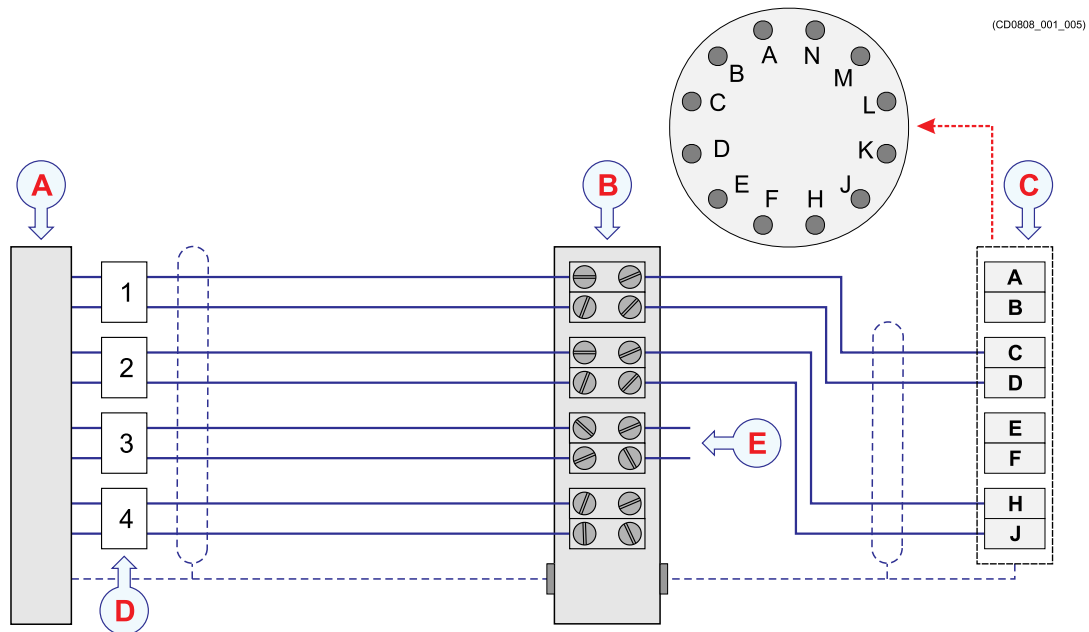
### Cable specifications

Not applicable. If you need an extension cable, contact your dealer – or Simrad – for advice.

## Dual single beam transducer connection to a GPT Transducer socket

A dual single beam transducer can be connected to sockets **C** and **D** plus **H** and **J** on a GPT type transducer socket.

The other end of the cable is permanently fixed to the transducer.



- A Transducer
- B Optional junction box
- C GPT transducer connector
- D Cable pairs – each pair has a black and a white wire
- E Thermistor output

The cable screen must be connected to the housing on the transducer plug. If a junction box is used to extend the cable, the screen must be connected to the cable glands on the box. The screen must not be connected to vessel ground.

Cable pair 4 is not used. Cable pair 3 is connected to the thermistor that has been built into the transducer body on some transducer types.

The thermistor output wires must be connected to the relevant analogue input on your EK80 system.

The Wide Band Transceiver (WBT) does not support input from an analogue thermistor.

The EK80 software does not support input from a temperature sensor.

If you need to splice the transducer cable, it is very important to use the correct cable. You must also avoid ground loops. We strongly recommend the use of a junction box. The junction box must be made of metal, it must be provided with proper cable glands, and its chassis must not be connected to vessel ground.

We strongly recommend that you install the transducer cable in a steel conduit.

**Cable specifications**

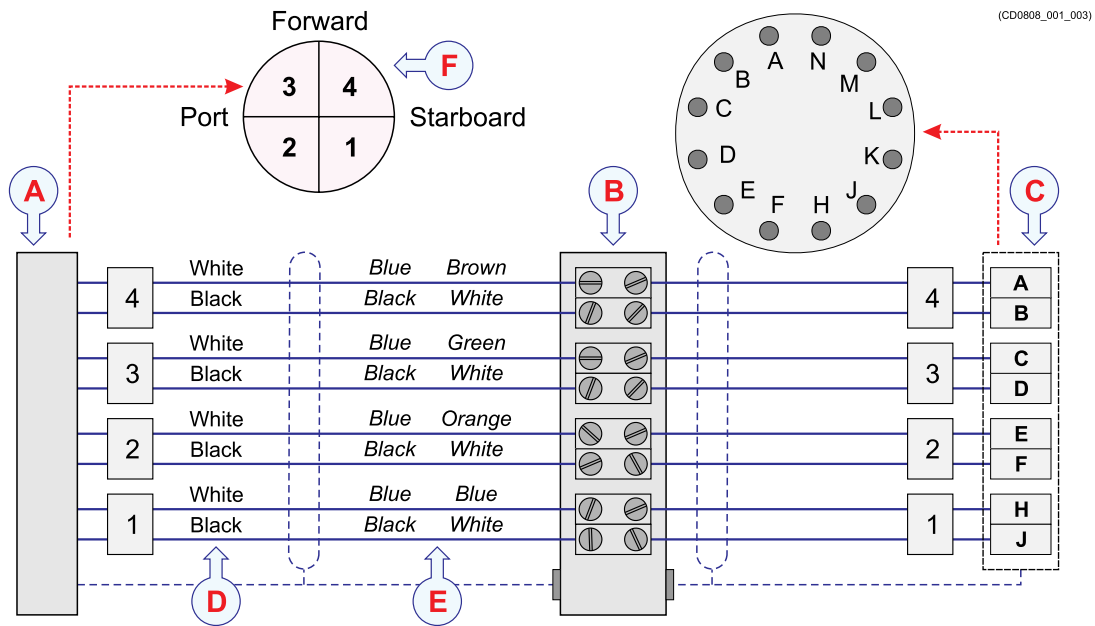
Not applicable. If you need an extension cable, contact your dealer – or Simrad – for advice.

## Split beam transducer; connections and specifications

A split beam transducer can be connected to sockets A through J on a GPT type transducer socket.

This is the termination of the transducer cable from a split beam transducer to a GPT type transducer socket.

The other end of the cable is permanently fixed to the transducer.



A Transducer

B Optional junction box

C GPT transducer connector

D Colour codes on cables

E Alternative colour codes on cables (mainly on old transducers)

F Transducers segments (seen from top)

The cable screen must be connected to the housing on the transducer plug. If a junction box is used to extend the cable, the screen must be connected to the cable glands on the box. The screen must not be connected to vessel ground.

If you need to splice the transducer cable, it is very important to use the correct cable. You must also avoid ground loops. We strongly recommend the use of a junction box. The junction box must be made of metal, it must be provided with proper cable glands, and its chassis must not be connected to vessel ground.

We strongly recommend that you install the transducer cable in a steel conduit.

### **Cable specifications**

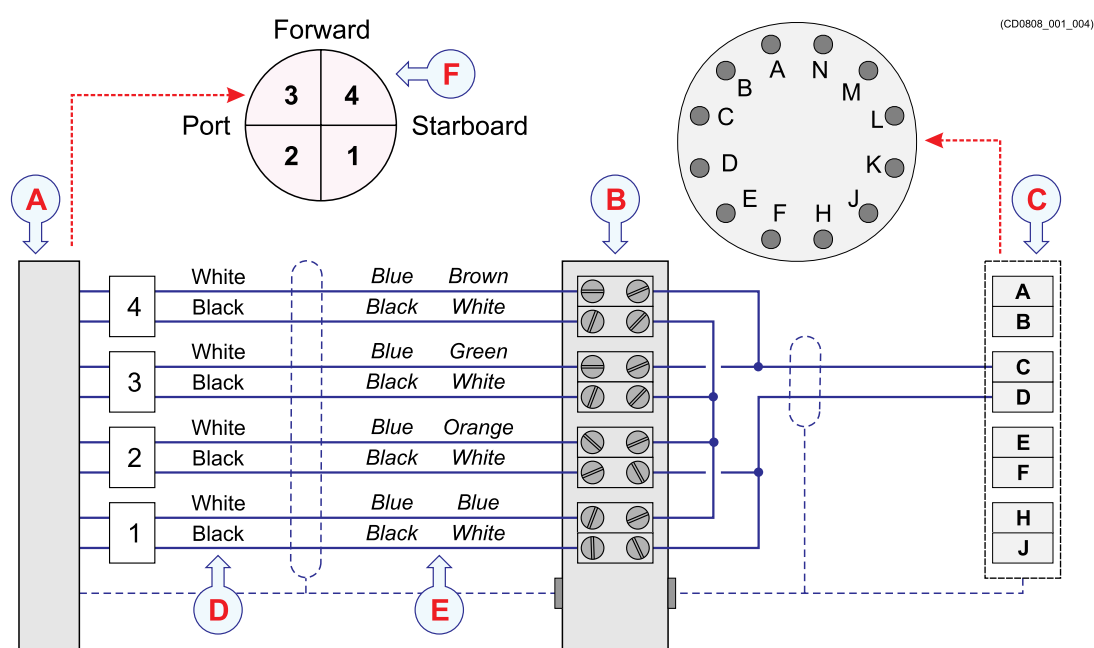
Not applicable. If you need an extension cable, contact your dealer – or Simrad – for advice.



## Split beam transducer to single beam output on GPT Transducer socket

A split beam transducer can be connected to sockets C and D on a GPT type transducer socket. This allows you to use the transducer as a single beam unit.

The other end of the cable is permanently fixed to the transducer.



- A Transducer
- B Optional junction box
- C GPT transducer connector
- D Colour codes on cables
- E Alternative colour codes on cables (mainly on old transducers)
- F Transducers segments (seen from top)

The cable screen must be connected to the housing on the transducer plug. If a junction box is used to extend the cable, the screen must be connected to the cable glands on the box. The screen must not be connected to vessel ground.

If you need to splice the transducer cable, it is very important to use the correct cable. You must also avoid ground loops. We strongly recommend the use of a junction box. The junction box must be made of metal, it must be provided with proper cable glands, and its chassis must not be connected to vessel ground.

We strongly recommend that you install the transducer cable in a steel conduit.

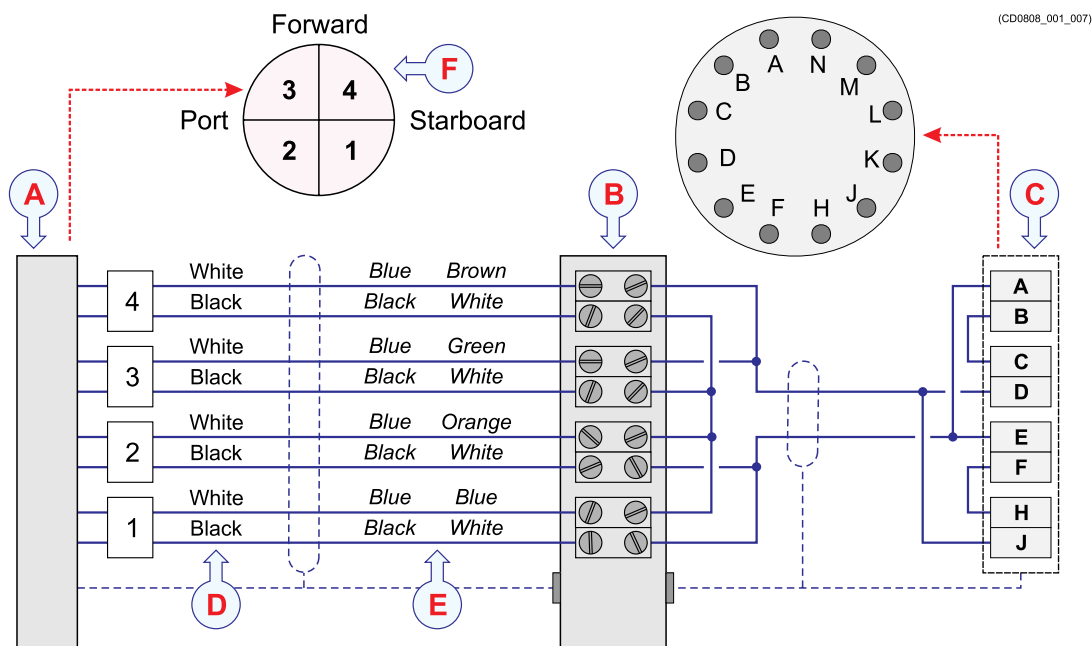
### Cable specifications

Not applicable. If you need an extension cable, contact your dealer – or Simrad – for advice.

## Split beam transducer connection to a GPT Transducer socket wired for single beam high output

A split beam transducer can be connected as a single beam unit to sockets **A** through **J** on a GPT type transducer socket. This allows you to use the transducer as a single beam high power unit.

The other end of the cable is permanently fixed to the transducer.



- A Transducer
- B Optional junction box
- C GPT transducer connector
- D Colour codes on cables
- E Alternative colour codes on cables (mainly on old transducers)
- F Transducers segments (seen from top)

The cable screen must be connected to the housing on the transducer plug. If a junction box is used to extend the cable, the screen must be connected to the cable glands on the box. The screen must not be connected to vessel ground.

If you need to splice the transducer cable, it is very important to use the correct cable. You must also avoid ground loops. We strongly recommend the use of a junction box. The junction box must be made of metal, it must be provided with proper cable glands, and its chassis must not be connected to vessel ground.

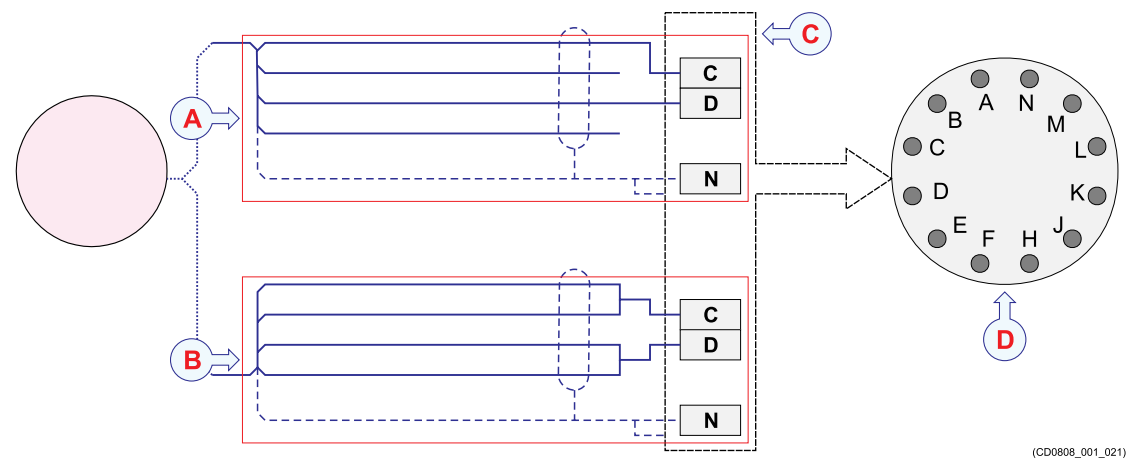
We strongly recommend that you install the transducer cable in a steel conduit.

### **Cable specifications**

Not applicable. If you need an extension cable, contact your dealer – or Simrad – for advice.

Transducer 12-16/60 connection to a GPT Transducer socket

The Simrad12–16/60 dual beam transducer can be connected to sockets C, D and N on a GPT type transducer socket. This socket is used on the General Purpose Transceiver (GPT), and on some versions of the Wide Band Transceiver (WBT).



- A** Use this wiring for wide beam
- B** Use this wiring for narrow beam
- C** Connectors on the GPT transducer socket (note that only C, D and N are used)
- D** GPT transducer socket seen from outside

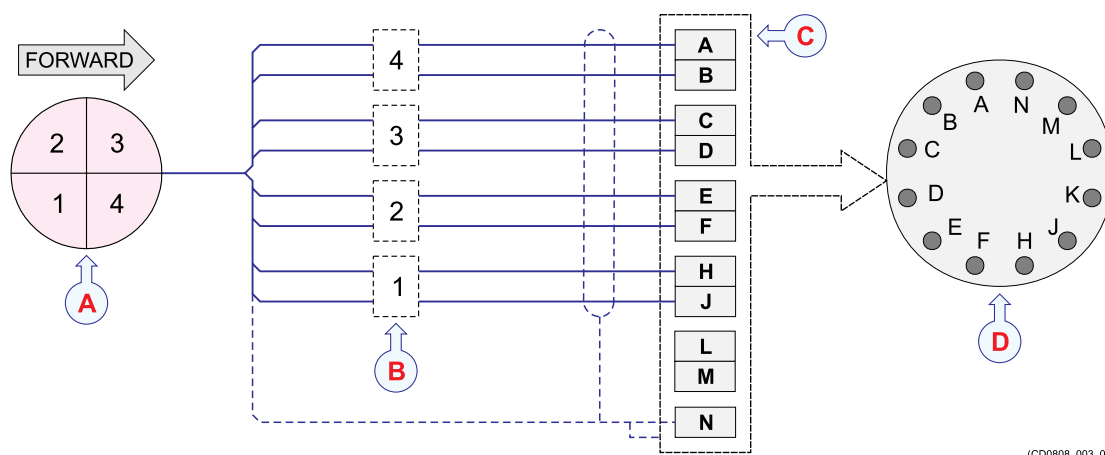
| Beam         | Cable colours | Terminal on GPT socket |
|--------------|---------------|------------------------|
| Wide         | Brown         | C                      |
|              | Blue          | —                      |
|              | Yellow        | D                      |
|              | Black         | —                      |
| Narrow       | Brown         | C                      |
|              | Blue          |                        |
|              | Yellow        | D                      |
|              | Black         |                        |
| Cable screen | Screen        | N                      |

The cable screen must be connected to the housing on the transducer plug and to terminal N. You must always install the transducer cable in a steel conduit.

If you need to splice the transducer cable, we strongly recommend the use of a metal junction box with proper cable glands. The cable screen must be connected to the cable glands. The cable screen and the junction box chassis must not be connected to vessel ground. Avoid ground loops. You must use the same type of cable as the original transducer cable, contact Kongsberg Maritime for advice.

## Transducer ES18 connection to a GPT transducer socket

The ES18 transducer shall be connected to terminals A through J (plus N) on a GPT type transducer socket. This socket is used on the General Purpose Transceiver (GPT), and on some versions of the Wide Band Transceiver (WBT).



(CD0808\_003\_008)

- A Transducer seen from top - observe the sector locations relative to the forward direction!
- B Sectors
- C Connectors on the GPT transducer socket
- D GPT transducer socket seen from outside

| Sector       | Cable colours | Terminal on GPT socket |
|--------------|---------------|------------------------|
| 1            | White         | H                      |
|              | Black         | J                      |
| 2            | Green         | E                      |
|              | Black         | F                      |
| 3            | Yellow        | C                      |
|              | Black         | D                      |
| 4            | Blue          | A                      |
|              | Black         | B                      |
| Cable screen | Screen        | N                      |

The cable screen must be connected to the housing on the transducer plug and to terminal N. You must always install the transducer cable in a steel conduit.

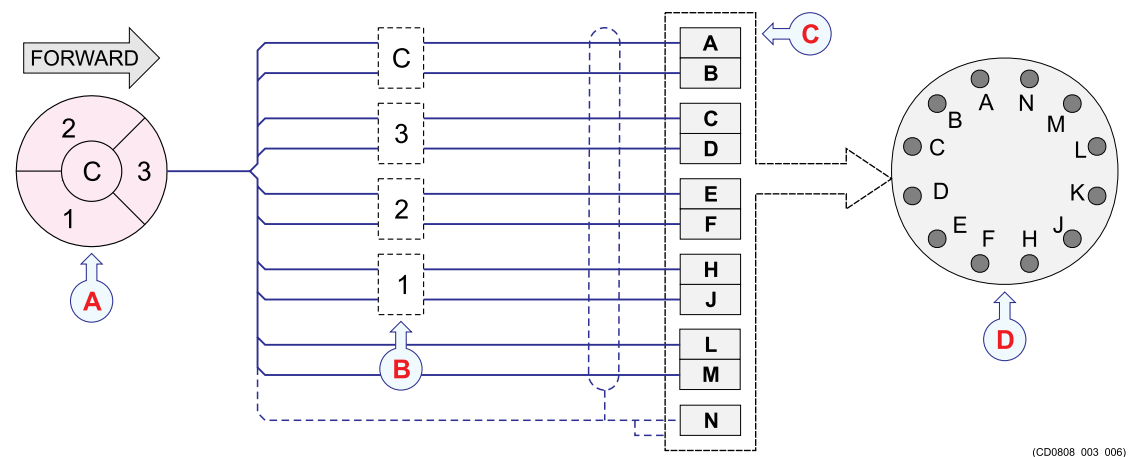
### Note

*The black wires in the transducer cable are not for grounding. You must never connect these together, and you must not connect any of them to vessel ground.*

If you need to splice the transducer cable, we strongly recommend the use of a metal junction box with proper cable glands. The cable screen must be connected to the cable glands. The cable screen and the junction box chassis must not be connected to vessel ground. Avoid ground loops. You must use the same type of cable as the original transducer cable, contact Kongsberg Maritime for advice.

Transducer ES38-7 connection to a GPT transducer socket

The ES38-7 transducer shall be connected to terminals A through N on a GPT type transducer socket. This socket is used on the General Purpose Transceiver (GPT), and on some versions of the Wide Band Transceiver (WBT).



- A Transducer seen from top - observe the sector locations relative to the forward direction!
- B Sectors
- C Connectors on the GPT transducer socket
- D GPT transducer socket seen from outside

| Sector         | Cable colours | Terminal on GPT socket |
|----------------|---------------|------------------------|
| 1              | White         | H                      |
|                | Black         | J                      |
| 2              | Green         | E                      |
|                | Black         | F                      |
| 3              | Yellow        | C                      |
|                | Black         | D                      |
| Centre         | Blue          | A                      |
|                | Black         | B                      |
| Digital output | Red           | L                      |
| Digital ground | Black         | M                      |
| Cable screen   | Screen        | N                      |

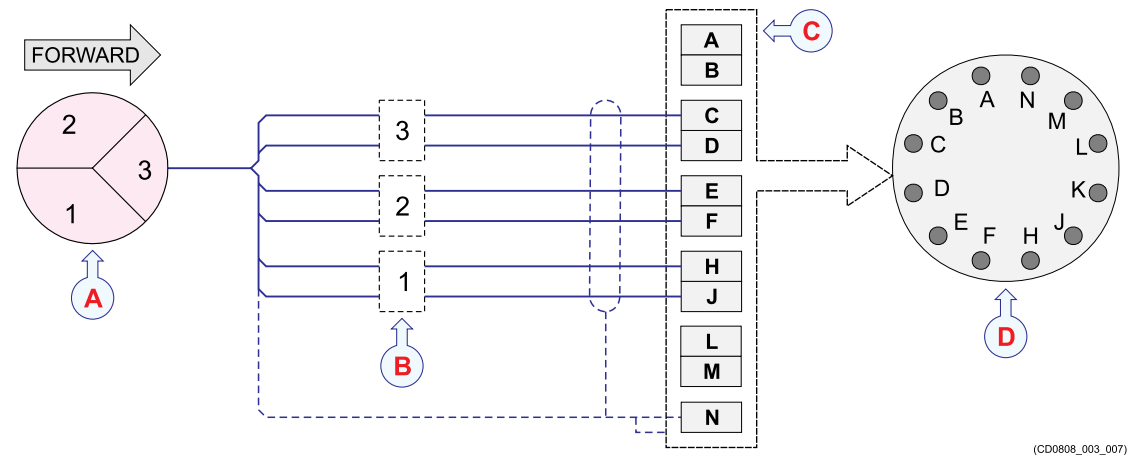
The cable screen must be connected to the housing on the transducer plug and to terminal N. You must always install the transducer cable in a steel conduit.

**Note** *The black wires in the transducer cable are not for grounding. You must never connect these together, and you must not connect any of them to vessel ground.*

If you need to splice the transducer cable, we strongly recommend the use of a metal junction box with proper cable glands. The cable screen must be connected to the cable glands. The cable screen and the junction box chassis must not be connected to vessel ground. Avoid ground loops. You must use the same type of cable as the original transducer cable, contact Kongsberg Maritime for advice.

# Transducer ES38-10 connection to a GPT Transducer socket

The Simrad ES38-10 split beam transducer shall be connected to sockets C through J (and N) on a GPT type transducer socket. This socket is used on the General Purpose Transceiver (GPT), and on some versions of the Wide Band Transceiver (WBT).



(CD0808\_003\_007)

- A Transducer seen from top - observe the sector locations relative to the forward direction!
- B Sectors
- C Connectors on the GPT transducer socket
- D GPT transducer socket seen from outside

| Sector       | Cable colours | Terminal on GPT socket |
|--------------|---------------|------------------------|
| 1            | White         | H                      |
|              | Black         | J                      |
| 2            | White         | E                      |
|              | Black         | F                      |
| 3            | White         | C                      |
|              | Black         | D                      |
| Cable screen | Screen        | N                      |

The cable screen must be connected to the housing on the transducer plug and to terminal N. You must always install the transducer cable in a steel conduit.

## Note

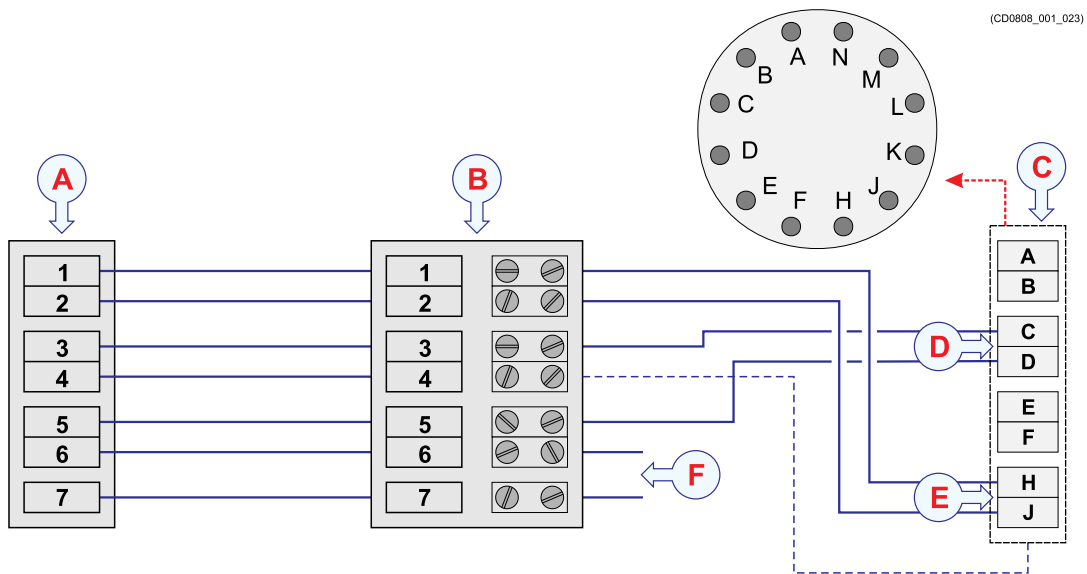
*The black wires in the transducer cable are not for grounding. You must never connect these together, and you must not connect any of them to vessel ground.*

If you need to splice the transducer cable, we strongly recommend the use of a metal junction box with proper cable glands. The cable screen must be connected to the cable glands. The cable screen and the junction box chassis must not be connected to vessel ground. Avoid ground loops. You must use the same type of cable as the original transducer cable, contact Kongsberg Maritime for advice.

## Transducer 38/200 Combi C connection to a GPT Transducer socket

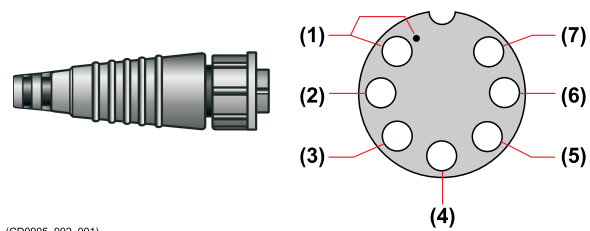
The Simrad 38/200 Combi C transducer can be connected to sockets **C**, **D**, **H** and **J** on a GPT type transducer socket.

The other end of the cable is permanently fixed to the transducer.



- A Transducer – the cable is fitted with a 7-pin Mini-Con-X female plug
- B Optional junction box with a male 7-pin socket
- C GPT transducer connector
- D Low frequency element (38 kHz) is connected to sockets **C** and **D**
- E High frequency element (200 kHz) is connected to sockets **H** and **J**
- F Thermistor output

The cable screen must be connected to the housing on the transducer plug. If a junction box is used to extend the cable, the screen must be connected to the cable glands on the box. The screen must not be connected to vessel ground.



Note \_\_\_\_\_

*The transducer cable must not be exposed to oil or other petroleum fluids!*

Pins 6 and 7 on the transducer are connected to the thermistor that has been built into the transducer body.



The thermistor output wires must be connected to the relevant analogue input on your EK80 system.

The Wide Band Transceiver (WBT) does not support input from an analogue thermistor.

The EK80 software does not support input from a temperature sensor.

| Pin on transducer plug | Signal     | Wire colour | Pin on GPT plug |
|------------------------|------------|-------------|-----------------|
| 1                      | 200 kHz    | Red         | H               |
| 2                      | 200 kHz    | Black       | J               |
| 3                      | 38 kHz     | Blue        | C               |
| 4                      | Screen     |             | Housing         |
| 5                      | 38 kHz     | White       | D               |
| 6                      | Thermistor | Green       | N/A             |
| 7                      | Thermistor | Yellow      | N/A             |

If you need to splice the transducer cable, it is very important to use the correct cable. You must also avoid ground loops. We strongly recommend the use of a junction box. The junction box must be made of metal, it must be provided with proper cable glands, and its chassis must not be connected to vessel ground.

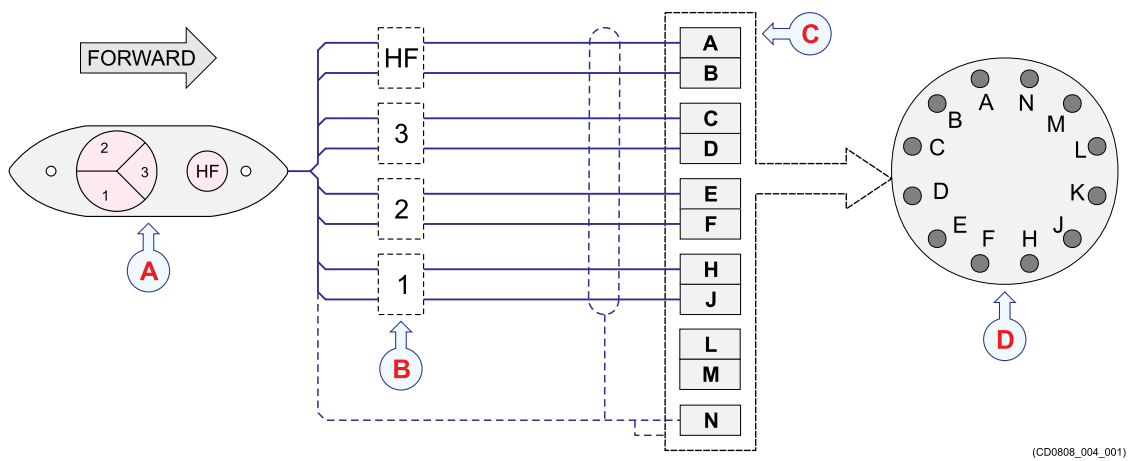
We strongly recommend that you install the transducer cable in a steel conduit.

### Cable specifications

Not applicable. If you need an extension cable, contact your dealer – or Simrad – for advice.

Transducer ES38-18/200-18C connection to a GPT transducer socket

The ES38-18/200-18C transducer shall be connected to terminals A through N on a GPT type transducer socket. This socket is used on both the General Purpose Transceiver (GPT) and the Wide Band Transceiver (WBT) units.



- A Transducer seen from top - observe the sector locations relative to the forward direction!
- B Sectors
- C Connectors on the GPT transducer socket
- D GPT transducer socket seen from outside

| Sector         | Cable colours | Terminal on GPT socket |
|----------------|---------------|------------------------|
| 1              | White         | H                      |
|                | Black         | J                      |
| 2              | Green         | E                      |
|                | Black         | F                      |
| 3              | Yellow        | C                      |
|                | Black         | D                      |
| HF             | Blue          | A                      |
|                | Black         | B                      |
| Digital output | Red           | L                      |
| Digital ground | Black         | M                      |
| Cable screen   | Screen        | N                      |

The cable screen must be connected to the housing on the transducer plug and to terminal N. You must always install the transducer cable in a steel conduit.

Note \_\_\_\_\_

*The black wires in the transducer cable are not for grounding. You must never connect these together, and you must not connect any of them to vessel ground.*

If you need to splice the transducer cable, we strongly recommend the use of a metal junction box with proper cable glands. The cable screen must be connected to the cable glands. The cable screen and the junction box chassis must not be connected to vessel ground. Avoid ground loops. You must use the same type of cable as the original transducer cable, contact Kongsberg Maritime for advice.



The Wide Band Transceiver (WBT) does not support input from an analogue thermistor.  
The EK80 software does not support input from a temperature sensor.

| Pin on transducer plug | Signal     | Wire colour | Pin on GPT plug |
|------------------------|------------|-------------|-----------------|
| 1                      | 50 kHz     | Red         | C               |
| 2                      | 50 kHz     | Black       | D               |
| 3                      | 200 kHz    | Blue        | H               |
| 4                      | Screen     |             | Housing         |
| 5                      | 200 kHz    | White       | J               |
| 6                      | Thermistor | Green       | N/A             |
| 7                      | Thermistor | Yellow      | N/A             |

If you need to splice the transducer cable, it is very important to use the correct cable. You must also avoid ground loops. We strongly recommend the use of a junction box. The junction box must be made of metal, it must be provided with proper cable glands, and it its chassis must not be connected to vessel ground.

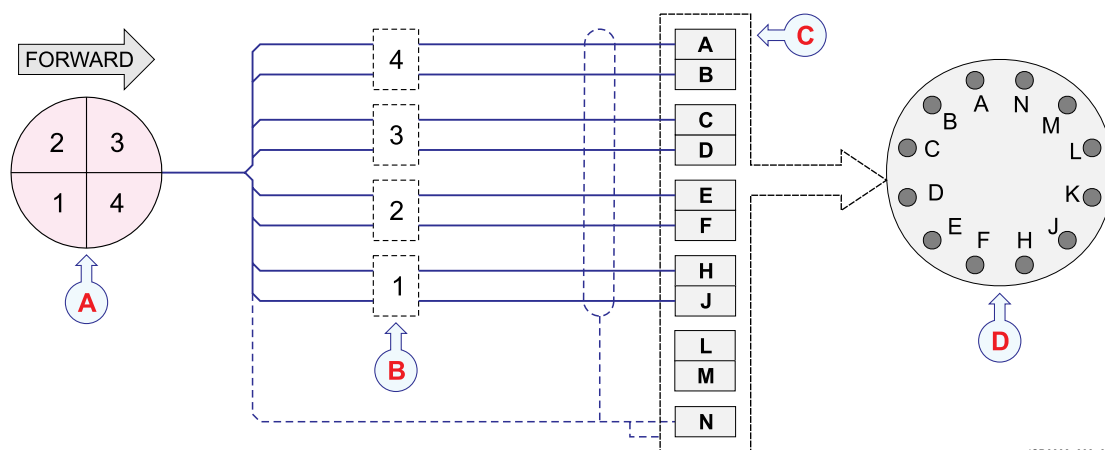
We strongly recommend that you install the transducer cable in a steel conduit.

### **Cable specifications**

Not applicable. If you need an extension cable, contact your dealer – or Simrad – for advice.

## Transducer ES70-18CD connection to a GPT Transducer socket

The ES70-18CD transducer is provided with an underwater plug. However, it may instead be connected to terminals A through N (plus N) on a GPT type transducer socket. This socket is used on both the General Purpose Transceiver (GPT) and the Wide Band Transceiver (WBT) units. To do this, you must cut the transducer cable to remove the plug, and use a junction box and an extension cable.



(CD0808\_003\_008)

- A *Transducer seen from top - observe the sector locations relative to the forward direction!*
- B *Sectors*
- C *Connectors on the GPT transducer socket*
- D *GPT transducer socket seen from outside*

| Sector       | Cable colours | Terminal on GPT socket |
|--------------|---------------|------------------------|
| 1            | White         | H                      |
|              | Black         | J                      |
| 2            | Green         | E                      |
|              | Black         | F                      |
| 3            | Yellow        | C                      |
|              | Black         | D                      |
| 4            | Blue          | A                      |
|              | Black         | B                      |
| Cable screen | Screen        | N                      |

The cable screen must be connected to the housing on the transducer plug and to terminal N. You must always install the transducer cable in a steel conduit.

### Note

*The black wires in the transducer cable are not for grounding. You must never connect these together, and you must not connect any of them to vessel ground.*

If you need to splice the transducer cable, we strongly recommend the use of a metal junction box with proper cable glands. The cable screen must be connected to the cable glands. The cable screen and the junction box chassis must not be connected to vessel ground. Avoid ground loops. You must use the same type of cable as the original transducer cable, contact Kongsberg Maritime for advice.

## Burton underwater connectors on split beam transducers for deep water

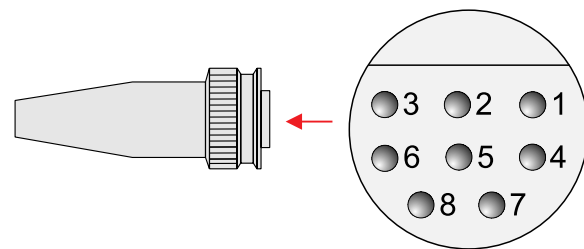
A selection of the Simrad transducers have been designed to operate in deep water. These are intended for installation in subsea constructions, with autonomous transceivers, or inside a towed body.

Deep water transducers are fitted with only a short cable, and this is terminated in a female underwater connector. When the transducer is installed, the design of the subsea device must include a watertight junction box with the matched male panel socket. The transducer cable must then be fed from the junction box to the vessel or land station, or to a transceiver built into the subsea unit. Without a local transceiver, adequate protection must be provided to support the transducer cable.

### Burton connector

The Burton connector used on the cable is an 8-pin Series 55.

The 5500 Series is an extremely rugged and reliable underwater electrical connector. It is the standard Burton connector series with pins in the receptacles and sockets in the plugs. The pin and socket relationship is due to the fact that in most applications, power runs from the plug into the receptacle. For safety reasons, it is desirable never to have power available on the pin side.



*Burton subsea connectors, #CI-Subsea 102010, 2014*

For more information about the Burton connectors, refer to the manufacturer's website.

- <http://www.cooperinterconnect.com>

### Subsea female connector used on the cable

- Burton subsea female 8-pin connector (Series 55): **370-076837**
- True manufacturer's part number: **5501-2008-0005**

### Suggested panel male connector

- Burton male panel 8-pin connector (with flange mount): **370-084169**
- True manufacturer's part number: **5506-2008-0004**

**Pin configuration**

| Pin on<br>Burton connector | Sector       | Pin on<br>GPT connector | Sector<br>position |
|----------------------------|--------------|-------------------------|--------------------|
| 1                          | Sector 1 (+) | H                       | Aft starboard      |
| 4                          | Sector 1 (-) | J                       |                    |
| 2                          | Sector 2 (+) | E                       | Aft port           |
| 5                          | Sector 2 (-) | F                       |                    |
| 3                          | Sector 3 (+) | C                       | Fore port          |
| 6                          | Sector 3 (-) | D                       |                    |
| 7                          | Sector 4 (+) | A                       | Fore starboard     |
| 8                          | Sector 4 (-) | B                       |                    |

## About serial lines

A preferred method to establish communication between the EK80 and peripheral devices, is by means of serial lines. Several serial line standards are available, each with different qualities.

Unless otherwise specified, the serial line cable must be provided by the installation shipyard.

### RS-232 serial communication standard

An RS-232 serial port was once a standard feature of a personal computer, used for connections to modems, printers, mice, data storage, uninterruptible power supplies, and other peripheral devices. However, RS-232 is hampered by low transmission speed, large voltage swing, and large standard connectors. [...] Nevertheless, RS-232 devices are still used, especially in industrial machines, networking equipment and scientific instruments.

*<https://en.wikipedia.org/wiki/RS-232> (September 2015)*

Most RS-232 cables do not support all the signals in the standard RS-232 specification.

#### Important

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When you are using RS-232 serial communication, observe that long runs of unshielded cable will pick up noise easily. This is because the RS-232 signals are not balanced.

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Maximum length for an RS-232 serial cable is typically 60 meters with 2400 bps data rate, however this depends on the cable quality. Always check the cable manufacturers specifications for the actual "shunt capacitance". A common figure is 47.5 pF/m, which gives a maximum cable length of about 50 meters.

#### Note

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*Even though a standard exist for RS-232 pin configuration, certain manufacturer may still choose their own connector pins for the various signals used. In order to make the RS-232 connection to your peripheral device work properly, you must always consult the relevant instructions provided by the device manufacturer.*

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For more information about the RS-232 serial communication standard, see (for example):

- <https://en.wikipedia.org/wiki/RS-232>

### RS-422 serial communication standard

While RS-232 is the most common serial interface for communicating with external devices using the NMEA standard, it only allows for one transmitter and one receiver on each line.

RS-422 provides a mechanism for transmitting data up to 10 Mbits/s. This interface format uses a balanced signal on two wires. This increases both the maximum baud



rate and the physical length of the cable, and it reduces the noise. With a high quality cable, you can use RS-422 on distances up to 1500 meters even in noisy environments. RS-422 is also specified for multi-drop applications. This means that one transmitter can send data to up to 10 receivers.

**Note** 

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*There are no common standard for RS-422 pin configuration. Any manufacturer may choose their own connector pins for the various signals used. In order to make the RS-422 connection to your peripheral device work properly, you must always consult the relevant instructions provided by the device manufacturer.*

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For more information about the RS-422 serial communication standard, see (for example):

- <https://en.wikipedia.org/wiki/RS-422>

**RS-485 serial communication standard**

RS-485 (also known as TIA-485–A) is a standard defining the electrical characteristics of drivers and receivers for use in balanced digital multipoint systems. The standard is published by the Telecommunications Industry Association/Electronic Industries Alliance (TIA/EIA). Digital communications networks implementing the RS-485 standard can be used effectively over long distances and in electrically noisy environments. Multiple receivers may be connected to such a network in a linear, multi-drop configuration.

RS-485 offers data transmission speeds of 35 Mbit/s up to 10 m and 100 kbit/s at 1200 m. Since it uses a differential balanced line over twisted pair (like RS-422), it can span relatively large distances (typically up maximum 1200 m). In contrast to RS-422, which has a single driver circuit which cannot be switched off, RS-485 drivers need to be put in transmit mode explicitly by asserting a signal to the driver. This allows RS-485 to implement linear bus topologies using only two wires. The equipment located along a set of RS-485 wires are interchangeably called nodes, stations or devices.

RS-485, like RS-422, can be made full-duplex by using four wires. Since RS-485 is a multi-point specification, however, this is not necessary in many cases.

**Note** 

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*There are no common standard for RS-485 pin configuration. Any manufacturer may choose their own connector pins for the various signals used. In order to make the RS-485 connection to your peripheral device work properly, you must always consult the relevant instructions provided by the device manufacturer.*

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For more information about the RS-485 serial communication standard, see (for example):

- <https://en.wikipedia.org/wiki/RS-485>

**Related topics**

[Generic RS-232 connection using three wires, page 98](#)

[Generic RS-232 connection using five wires, page 99](#)

[Generic RS-422 serial line using five wires, page 100](#)

[RS-232 used as synchronization trigger \(input or output\), page 101](#)

[Generic RS-485 connection using two or four wires, page 102](#)

[Moxa CP114EL-I Serial line adapter, page 103](#)

## Basic cable requirements

It is very important that all systems cables are installed correctly. All cables must be properly supported and protected, and all relevant precautions must be made to prevent unwanted noise

### Topics

[Cable trays, page 131](#)

[Radio frequency interference, page 132](#)

[Physical protection of cables, page 132](#)

[Grounding of system cables, page 132](#)

[Cable connections and terminations, page 133](#)

[Cable identification, page 133](#)

[Cable glands and termination procedures, page 134](#)

### 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.

- 1 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.
- 2 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.
- 3 Where a service requires duplicate supply lines, the cables must follow separate paths through the vessel whenever possible.
- 4 Signal cables must not be installed in the same cable tray or conduit as high-power cables.
- 5 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.

- 6 Cables with protective coverings which may damage other cables should not be grouped with other cables.
- 7 Cables having a copper sheath or braiding must be installed in such a way that galvanic corrosion by contact with other metals is prevented.
- 8 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

Suitable screening can be established using 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 which must be bonded to the screening of the radio room at its points of entry and exit.

## Physical protection of cables

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 (for example 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 of system cables

All metallic cable coverings (armour, metallic sheathing and other protection) 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 and terminations

All cable connections are shown on the applicable cable plan and/or 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.

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.

The 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.

## Cable glands and termination procedures

Cable glands are used to attach and secure the end of a cable to the equipment. Cable glands may also be used for sealing cables passing through bulkheads or gland plates.

### About cable glands

Cable glands are used whenever a cable passes through a watertight bulkhead or into a cabinet, to seal the opening through which the cable passes and to protect the cable from abrasion on the edges of the hole.

There are many different types of cable gland on the market. The cable glands are not supplied with the system.

#### Note

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*Even though the cabinets from Kongsberg Maritime may be prepared for specific types of cable glands, the installation shipyard will be responsible for selecting cable gland types and installing them.*

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A cable gland (in the U.S. more often known as a cable connector or fitting) is a device designed to attach and secure the end of a cable to the equipment. A cable gland provides strain-relief and connects by a means suitable for the type and description of cable for which it is designed—including provision for making electrical connection to the armour or braid and lead or aluminium sheath of the cable, if any. Cable glands may also be used for sealing cables passing through bulkheads or gland plates.

Cable glands are mechanical cable entry devices and can be constructed from metallic or non-metallic materials. They are used throughout a number of industries in conjunction with cable and wiring used in electrical instrumentation and automation systems.

Cable glands may be used on all types of electrical power, control, instrumentation, data and telecommunications cables. They are used as a sealing and termination device to ensure that the characteristics of the enclosure which the cable enters can be maintained adequately.

*[http://en.wikipedia.org/wiki/Cable\\_gland](http://en.wikipedia.org/wiki/Cable_gland) (February 2014)*

### Preparing cables for termination

Whenever a cable shall penetrate a cabinet or a bulkhead using a cable gland, the termination of the cable must be prepared.

### Prerequisites

Electrical installations can only be done by certified electricians. All necessary tools and instruments required must be available. The installation shipyard must prepare detailed drawings of the electrical system, and identify each cable.

## Context

Cable glands are used whenever a cable passes through a watertight bulkhead or into a cabinet, to seal the opening through which the cable passes and to protect the cable from abrasion on the edges of the hole. Follow the guidelines provided here when installing cables through cable glands.

## Important

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There are many different types of cable gland on the market. This procedure describes the types used (now and previously) as standard in the units manufactured by Kongsberg Maritime. The cable glands are not supplied with the system.

Even though the cabinets from Kongsberg Maritime may be prepared for specific types, the installation shipyard will be responsible for selecting cable gland types and installing them.

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## Procedure

- 1 Ensure all the cables to be connected are completely isolated from any power sources.

For safety reasons, switch off and remove the power supply fuses from any units or systems into which the cables are already connected.

- 2 Select the cable to be connected into the cabinet, and select the cable gland through which the cable is to pass.

### Note

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*A minimum of 5 cm (recommended 5 - 10 cm) of slack cable must be allowed, both inside and outside the cabinet, when installing cables. This is to allow for vibration damping, maintenance and measurement errors. Always double-check your measurements before taking any irreversible actions.*

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- 3 Depending on whether the cable has previously been installed in conduits:
  - a If the cable has already been installed in conduits, measure the maximum length of cable required to reach from the final cable clip outside the cabinet to the terminal blocks inside the cabinet, add 20 cm, then remove the excess cable.
  - b If the cable has not been installed in conduits, measure the maximum length of wire required to reach from the cable gland to the terminal blocks inside the cabinet, add 20 cm, and mark the cable.

### Note

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*The cable's outer insulation will extend into the cable gland to a point approximately 5 mm outside the outer surface of the cabinet wall into which the cable gland is secured.*

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- 4 Carefully remove the outer insulation from the required cable length.  
Be careful to avoid damage to the screening!
- 5 Leaving an appropriate length of the screen exposed from the insulation, cut off the remainder.

### **Securing and terminating cables**

Once a cable has been prepared for termination, it must be connected to a unit or cabinet.

#### **Prerequisites**

Electrical installations can only be done by certified electricians. All necessary tools and instruments required must be available. The installation shipyard must prepare detailed drawings of the electrical system, and identify each cable.

#### **Context**

Observe the relevant cable plan and/or interconnection drawing(s) for the product.

#### **Procedure**

- 1 Referring to the wiring diagram and ensuring that there is 5 to 10 cm slack cable inside the cabinet, prepare and connect the cable cores to the appropriate terminals and/or plugs within or onto the cabinet.
- 2 Secure the cable using cable clips.
- 3 Check the terminal connections against the wiring diagram to ensure they are correct. Follow the same procedure for all the cables and cable glands.
- 4 Check the cabinet to ensure all tools and rubbish are removed, then close the cabinet door.
- 5 Take the appropriate safety measures, then replace the fuses and apply power to the system.
- 6 Perform a relevant system test to ensure the installation has been made successfully.

### **Using multi-diameter cable sealing**

Cable sealing systems are available from several manufacturers, and multi-diameter types are becoming increasingly popular due to their ease of use.



### Prerequisites

Electrical installations can only be done by certified electricians. All necessary tools and instruments required must be available. The installation shipyard must prepare detailed drawings of the electrical system, and identify each cable.

### Context

Only a brief description of the sealing system will be presented here. Further information with relevant technical specifications and installation descriptions must be obtained from the manufacturer.



*Roxtec modules (Image from Roxtec website)*

The illustrations and examples here are provided by the following manufacturer:

Roxtec International AB  
Box 540  
S-371 23 Karlskrona, SWEDEN

- <http://www.roxtec.com>



*Sealing system example; the finished assembly*

The Roxtec system is available with a large number of various modules and compression units. It will also comply with screening and EMC requirements.

## Procedure

- 1 Cut an opening in the structure (bulkhead, cabinet etc) you wish to penetrate.

The hole must be sized to fit one of the standard rectangular or circular frames provided by the sealing system manufacturer.

### Note

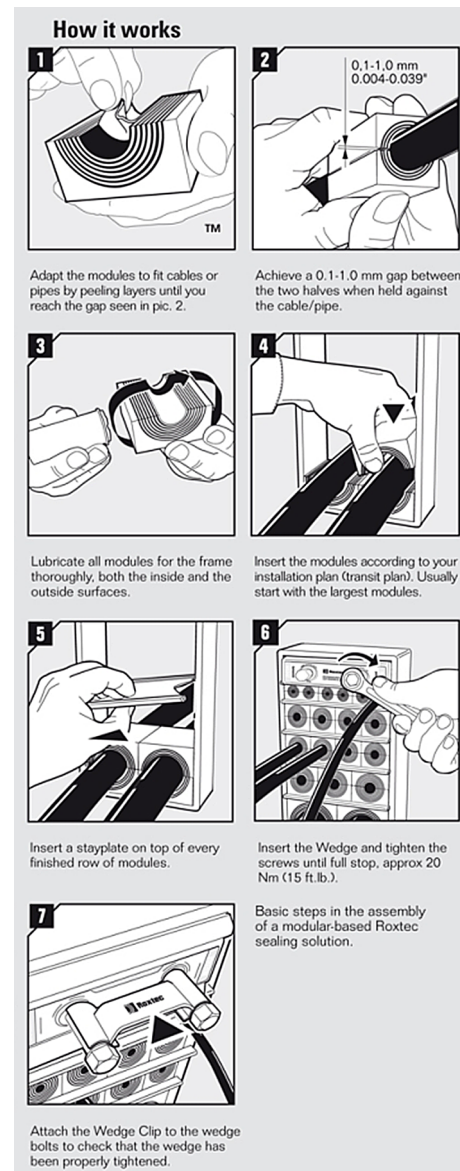
*The chosen solution must comply with the fire and/or pressure demands for the vessel.*

*If the sealing is to be used under water, both pressure and material requirements must be taken into consideration.*

- 2 Mount the frame.
- 3 Pull the cable(s) through the frame.  
In most cases the opening will be large enough to accept the plugs on the cables.
- 4 Secure each cable with a square sealing module.
- 5 Adjust the module to fit the cable's outer diameter.
- 6 When the required number of modules are installed, tighten the assembly with a compression unit.

## Further requirements

For more information, and other installation procedures, refer to the documentation provided by Roxtec (or your manufacturer of choice).



*Roxtec steps (Image from Roxtec website)*

# Setting to work

## Topics

[Setting to work summary, page 140](#)

[Verifying that the EK80 is ready for operational use, page 141](#)

[Powering up the EK80 for the first time, page 148](#)

[Configuring the EK80 for operational use, page 160](#)

[Interfacing peripheral equipment, page 162](#)

[Test procedures, page 180](#)

[Powering down the EK80, page 189](#)

[Installation remarks, page 191](#)

## Setting to work summary

Once all the hardware units have been installed, and all the cables have been connected, the EK80 can be powered up for the first time, and set to work.

### Prerequisites

- All EK80 hardware units have been installed according to the relevant instructions.
- All system cables have been installed.
- All connections have been made.
- All operating power is available.
- All peripheral devices that shall communicate with the EK80 are available and operational.
- All relevant personnel and tools are available.

### Procedure

- 1 Verify that the EK80 is ready for operational use.
  - a Verify that all hardware have been installed correctly.
  - b Verify that all cables have been connected correctly.
- 2 Power up the EK80 for the first time.
  - a Install the EK80 software and the relevant software licenses.
  - b Define the IP address on the Ethernet adapter.
  - c Install transducer(s) and frequency channel(s).
- 3 Set up the interfaces to peripheral devices.

To provide correct information, the EK80 needs to communicate with external devices. All these interfaces must be set up in the EK80 software.
- 4 Test the EK80 operational functionality.

To verify that the EK80 fulfills all operational and functional requirements, specific tests are required.
- 5 Create a backup with the EK80 configuration and software installation.

Once all EK80 configuration and testing have been finalized, it is good practice to back up the configuration data and software installation.
- 6 Fill in and sign the installation approval document, and return it to Simrad.

# Verifying that the EK80 is ready for operational use

## Topics

[Verifying that operational power is correct, page 141](#)

[Verifying that all cables are properly connected, page 142](#)

[Visual inspection of the display, page 142](#)

[Visual inspection of the Processor Unit, page 145](#)

[Visual inspection of the Wide Band Transceiver \(WBT\), page 146](#)

## Verifying that operational power is correct

The EK80 operates on AC power from the vessel's mains supply. Before you can apply AC power up any EK80 unit, you must verify the power is correct.

## Prerequisites

- All EK80 hardware units have been installed according to the relevant instructions.
- All system cables have been installed.
- All connections have been made.
- All operating power is available.
- All relevant personnel (ships electrician) and tools (for example a voltmeter) are available.

## Procedure

- 1 For each EK80 unit that operates on AC mains:
  - a Verify that the unit is connected to AC mains.
  - b Measure the voltage and the frequency in the power outlet, and make sure that the relevant EK80 unit can operate on this power.
  - c Verify that the circuit breaker on the power circuit can handle the load when the EK80 is powered up.
- 2 If irregularities are found, write these down in the in the *Installation remarks* table.

## Verifying that all cables are properly connected

The EK80 relies on communication between each system unit, and between the EK80 and external devices. It is very important that all cables are correctly installed, that the proper cable types have been used, and that all cables are connected correctly.

### Prerequisites

- All EK80 hardware units have been installed according to the relevant instructions.
- All system cables have been installed.
- All connections have been made.
- All operating power is available.
- All relevant personnel (ships electrician) and tools (for example multimeter and cable tester) are available.

For this procedure you will also need a qualification tester with the ability to test the quality and bandwidth of Ethernet cables.

### Context

All cabling is described in the *Cable layout and interconnections* chapter. Refer to the cable plan, the cable list and the basic cable requirements.

### Procedure

- 1 For each cable that is in used on the EK80:
  - a Verify that the cable has been installed.
  - b Verify that the connections made at each end of the cable are correct.
  - c Verify that the cable has been installed as instructed in the basic cable requirements.

Pay special attention to signal cables. These must not be installed too close to power cables.
  - d Use a multimeter or a dedicated cable tester to check the continuity in each cable.
- 2 Use a qualification tester to verify that each Ethernet cable is correctly wired, and meets the specifications related to quality and bandwidth.
- 3 If irregularities are found, write these down in the in the *Installation remarks* table.

## Visual inspection of the display

A visual inspection of the EK80 display is required to verify that the unit has not been physically damaged during the installation.

## Prerequisites

This procedure assumes that the EK80 system has been installed as specified in the EK80 *Installation manual*.

No specific tools or instruments are required for this test.

## Context

The display shall be new, clean and free from scratches, dents or other physical damage. It shall be clearly identified with a product label.

Observe the installation shipyard's procedures for workmanship, installation of physical units, and installation and termination of cables.

## Note

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*This test procedure is only used when the display is provided by Simrad as a part of the EK80 delivery.*

---

## Procedure

- 1 Check that the display is installed in the correct location, and that it is suitably orientated with respect to ambient light conditions and reflections.
- 2 Check that the structure to which the display is fastened is substantial enough to hold the unit securely under all operating conditions.  
  
If the display is secured to a table or shelf, check that it is bolted or welded securely to the deck and/or bulkhead.
- 3 Check that the unit is securely connected to the ship's ground with an earthing strap.  
  
The strap must be in addition to any incidental electrical contact made by the mounting lugs on the unit.
- 4 Use a standard multimeter to check that the resistance between the unit and the ship's ground is approximately 0 (zero)  $\Omega$ .
- 5 Check the physical installation of the unit.
  - a Check that the bolts, screws or studs holding the unit are of the correct size.
  - b Check that the correct flat and shake-proof washers have been used.
  - c Check that all nuts have been tightened properly.
- 6 Check that all welds and brackets have been painted with the correct preservation medium to prevent corrosion.
- 7 Check that all cables leading to the unit have been properly mounted and secured.
- 8 Verify that enough slack has been provided on the cables to allow maintenance and replacement.
- 9 Check that the unit is not physically damaged, and that the paint-work is clean.

The physical handling of the unit during the installation may have caused some scratches to the paint-work. This can be accepted. However, if rough handling has caused serious damage to the unit, this must be recorded with a written statement and necessary photos, so that corrective actions can be made.

- 10 If irregularities are found, write these down in the in the *Installation remarks* table.



## Visual inspection of the Processor Unit

A visual inspection of the EK80 Processor Unit is required to verify that the unit has not been physically damaged during the installation.

### Prerequisites

This procedure assumes that the EK80 system has been installed as specified in the EK80 *Installation manual*.

No specific tools or instruments are required for this test.

### Context

The Processor Unit shall be new, clean and free from scratches, dents or other physical damage. It shall be clearly identified with a product label.

Observe the installation shipyard's procedures for workmanship, installation of physical units, and installation and termination of cables.

### Note

---

*This test procedure is only used when the Processor Unit is provided by Simrad as a part of the EK80 delivery.*

---

### Procedure

- 1 Check that the Processor Unit is installed in the correct location, and that it is suitably oriented for replacement and cabling.
- 2 Check that you have free access to rear and front side connectors on the Processor Unit for maintenance purposes.
- 3 Check that ample space is provided to open/close DVD and/or CD lids, and to insert and remove USB memory devices.
- 4 If the unit is installed inside a rack or a closed compartment, check that ample ventilation is provided to avoid overheating.
- 5 Check that the unit is securely connected to the ship's ground with an earthing strap.  
The strap must be in addition to any incidental electrical contact made by the mounting lugs on the unit.
- 6 Use a standard multimeter to check that the resistance between the unit and the ship's ground is approximately 0 (zero)  $\Omega$ .
- 7 Check the physical installation of the unit.
  - a Check that the bolts, screws or studs holding the unit are of the correct size.
  - b Check that the correct flat and shake-proof washers have been used.
  - c Check that all nuts have been tightened properly.
- 8 Check that all welds and brackets have been painted with the correct preservation medium to prevent corrosion.

- 9 Check that all cables leading to the unit have been properly mounted and secured.
- 10 Verify that enough slack has been provided on the cables to allow maintenance and replacement.
- 11 Check that the unit is not physically damaged, and that the paint-work is clean.  
The physical handling of the unit during the installation may have caused some scratches to the paint-work. This can be accepted. However, if rough handling has caused serious damage to the unit, this must be recorded with a written statement and necessary photos, so that corrective actions can be made.
- 12 Verify that the unit's serial number has been recorded in the list of hardware items.

## Visual inspection of the Wide Band Transceiver (WBT)

A visual inspection of each EK80 Wide Band Transceiver (WBT) is required to verify that the units have not been physically damaged during the installation.

### Prerequisites

This procedure assumes that the EK80 system has been set up with its hardware units connected as specified in the EK80 *Installation manual*.

No specific tools or instruments are required for this test.

### Context

The transceiver shall be new, clean and free from scratches, dents or other physical damage. It shall be clearly identified with a product label.

Observe the installation shipyard's procedures for workmanship, installation of physical units, and installation and termination of cables.

### Note

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*The steps in this procedure must be repeated for each Wide Band Transceiver (WBT) that have been installed.*

---

### Procedure

- 1 Check that the Wide Band Transceiver (WBT) is installed in the correct location, and that it is suitably oriented for easy maintenance and replacement of parts.
- 2 Check that you have free access to all the connectors on the transceiver for maintenance purposes.
- 3 If a WBT Cabinet has been installed:
  - a Ensure that the cabinet front door can be fully opened, and that access to the drawers is not impaired.
  - b Check that the bulkhead structure to which the WBT Cabinet is fastened is substantial enough to hold the unit securely under all operating conditions.

- 4 Check that the unit is securely connected to the ship's ground with an earthing strap.  
The strap must be in addition to any incidental electrical contact made by the mounting lugs on the unit.
- 5 Use a standard multimeter to check that the resistance between the unit and the ship's ground is approximately 0 (zero)  $\Omega$ .
- 6 Check the physical installation of the unit.
  - a Check that the bolts, screws or studs holding the unit are of the correct size.
  - b Check that the correct flat and shake-proof washers have been used.
  - c Check that all nuts have been tightened properly.
- 7 Check that all welds and brackets have been painted with the correct preservation medium to prevent corrosion.
- 8 Check that all cables leading to the unit have been properly mounted and secured.
- 9 Verify that enough slack has been provided on the cables to allow maintenance and replacement.
- 10 Check that the unit is not physically damaged, and that the paint-work is clean.  
The physical handling of the unit during the installation may have caused some scratches to the paint-work. This can be accepted. However, if rough handling has caused serious damage to the unit, this must be recorded with a written statement and necessary photos, so that corrective actions can be made.
- 11 If irregularities are found, write these down in the in the *Installation remarks* table.

# Powering up the EK80 for the first time

## Topics

[Setting up summary, page 148](#)

[Installing the EK80 operational software, page 150](#)

[Powering up the EK80 to \*Passive\* mode, page 151](#)

[Obtaining and installing the software license, page 152](#)

[Defining the IP address on the Processor Unit network adapter for communication with the Wide Band Transceiver \(WBT\), page 154](#)

[Installing one or more transducers, page 155](#)

[Installing transceiver channels, page 156](#)

[Adjusting the screen resolution, page 158](#)

## Setting up summary

Before a new EK80 Scientific wide band echo sounder can be put to use, it must be set up for operation. You must install the software, and configure transducer(s) and transceiver(s).

## Prerequisites

- The EK80 Scientific wide band echo sounder system units have all been installed according to the instructions provided.
- All power and interface cables and connections have been connected and verified.
- All system units have been inspected.
- The EK80 operational software is available.
- The EK80 software license is available.

## Caution

---

*You must never power up the EK80 when the ship is in dry dock. The transducer will be damaged if it transmits in open air.*

---

## Procedure

- 1 Do the following preparations:
  - a Power up the Processor Unit.
  - b Verify that you have administrative rights.
  - c Switch off any firewall applications.

- d Open the operating systems's *Network and Sharing Center*, and set the IP address for the network adapter used to communicate with the transceiver.

IP Address: **157.237.15.16** (*Example, any IP address can be used*)

Subnet mask: **255.255.255.0**

- 2 Install the EK80 operational software.
- 3 Power up the transceiver(s).
- 4 Verify that the Processor Unit is connected to the transceiver(s) using the Ethernet cable specified in the EK80 *Installation manual*.

If you use more than one transceiver, a high performance Ethernet switch must be used.

**Note**

---

*It is very important that high quality Ethernet cables are used. You must use CAT-5E STP (Shielded Twisted Pair) quality or better. Cables with lower bandwidth capacity will reduce the EK80 performance. Do not connect the Processor Unit to the transceiver(s) using the vessel's existing local area network.*

---

- 5 Start the EK80.
- 6 Click **Setup**→**Installation**→**Software License** to insert the license string(s).
- 7 Click **Setup**→**Installation**→**Transducer** to add the correct transducer(s) from the list.

For each transducer, type the serial number (found on the transducer body).

- 8 Click **Setup**→**Installation**→**Transceiver** to connect the Processor Unit to the transceiver(s).

The available transceiver(s) should be listed. Check transceiver serial number according to correct frequency. For each transceiver, choose the correct transducer.

If no transceivers are listed, click **Browse** button, and select correct network adapter IP address under **Local IP address**.

- 9 Set up the interfaces to peripheral navigation sensors.
- 10 Click **Setup**→**Environment** to select correct water temperature and salinity.

If possible, average values for the water column must be used.
- 11 Start normal operation.

- a Set **Operation** to *Normal*.
- b Click **Operation**→**Normal Operation** to set the transmit parameters.
- c Set **Ping Mode** to *Interval*, and choose a suitable ping rate.
- d Set up the raw data recording parameters.
- e Start and stop raw data recording by means of the **Record RAW** button.

**Note**

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*To obtain quantitative data, the EK80 must be calibrated.*

*Observe the description in the EK80 Reference manual and on-line help.*

---

## Installing the EK80 operational software

If your EK80 Scientific wide band echo sounder is provided with a Processor Unit, the EK80 software has already been installed. However, if you intend to use your own computer, you must install the software yourself.

### Prerequisites

In order to install the EK80 operational software, you need the relevant file set on a suitable media. This can be a CD, a DVD or a USB flash drive.

If the EK80 software is provided on a CD or a DVD, and your computer is not fitted with a suitable drive, copy the files to a USB flash drive.

**Note**

---

*You need administrative rights on the Processor Unit to install the EK80 software.*

---

If you are using the EK80 system with your own computer, verify that this computer meets the technical requirements before you install the software.

### Context

If you are using one or more Wide Band Transceiver (WBT) unit, you will need valid software licences to operate the EK80. You must install one license for each transceiver after the software installation.

### Procedure

- 1 Power up the Processor Unit (computer), and allow the operating system to start.
- 2 Verify that you have administrative rights on the Processor Unit.  
You will need this to install the EK80 software.
- 3 Insert the EK80 software media.
- 4 Use a file manager application on the computer to access the software files.
- 5 Double-click on the `Setup.exe` file to start the installation.
- 6 Allow the installation wizard to run. Follow the instructions provided.

We recommend that you install the EK80 in the default folder suggested by the wizard.

In the last dialog box you are permitted to remove old settings. Since this is your first installation of the software, you can disregard this option.

- 7 Once the installation has been completed, double-click the EK80 icon on the desktop to start the program.
- 8 Depending on your operating system parameters, certain dialog boxes may open.
  - a Observe that Windows 7 Firewall may open a dialog box requesting information about the network. Select **Public**, and click **Allow access**.
  - b The operating system may also open other dialog boxes to verify that the EK80 software can run on the computer. You must of course permit this.

### Further requirements

Observe the dedicated procedures for obtaining and installing the software licences.

## Powering up the EK80 to *Passive* mode

In order to use the EK80, you must first power it up. In this situation we do not want the EK80 to transmit, so we will leave it in *Passive* mode.

### Prerequisites

This procedure assumes that the entire EK80 installation has been inspected. All power sources have been measured and verified, and all system cables and connectors have been checked and tested.

It is also assumed that the EK80 software has been installed.

### Context

The EK80 software is not automatically started when the Processor Unit is powered up. Once the operating system has started, you must click the icon on the desktop.

When the EK80 is powered up and set to *Normal* mode, it will use the transducers to transmit acoustic pulses into the water.

### Caution

---

*You must never power up the EK80 when the ship is in dry dock. The transducer will be damaged if it transmits in open air.*

---

### Procedure

- 1 Verify that the EK80 transceiver(s) are switched on.

The Wide Band Transceiver (WBT) power supply is fitted with an on/off switch.
- 2 Power up the display(s).

If required, refer to the instructions provided by the display manufacturer.

3 Power up the Processor Unit.

If required, refer to the instructions provided by the computer manufacturer.

Wait for the operating system to start up.

4 Double-click the EK80 icon on the Processor Unit desktop to start the program.

Wait while the EK80 program starts.

5 Choose user settings.

During the program load, a dialog box appears to let you choose from the current user settings available on the EK80. The dialog box is only visible a few seconds. You do not need to make a choice here. You can select your predefined user setting at any time by means of the **User Settings** dialog box on the **Main** menu.

6 Once the EK80 program has started, observe that the presentation fills the entire screen.

## Obtaining and installing the software license

If your EK80 shall operate with a Wide Band Transceiver (WBT), you will need a valid license. Before you can use the EK80 you must obtain a "license string" and install it on your Processor Unit. Without a license you will not be able to communicate with the Wide Band Transceiver (WBT).

### Prerequisites

This procedure assumes that the EK80 software has been installed on the Processor Unit.

### Context

#### Note

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*This procedure is only valid if your EK80 shall operate with a Wide Band Transceiver (WBT).*

---

In order to obtain a software license for your EK80, you must contact a Simrad dealers or distributor. You can also use the request form on <http://www.simrad.com/support>, or contact our support department directly.

The software license is 32 character hexadecimal string built from the transceiver's serial number. It defines several key parameters that controls the functionality and behaviour of the transceiver(s) you use. The software license is not linked to the physical Processor Unit. You can therefore easily move the EK80 software from one computer to another, just remember to take a copy of the license string.



**Note**

*If you have purchased a complete EK80 system from Kongsberg Maritime with transducer(s) and a Processor Unit, the software license has already been installed.*

*Once you receive your software license string(s), do not lose them.*

---

**Procedure**

- 1 Obtain the software license.
  - a Check your transceiver(s), and write down the serial number(s).
  - b For each transceiver, write down how many transducers you have connected.
  - c For each transducer, write down:
    - The center frequency
    - The Q-value
    - The maximum nominal power rating for the transducer

- 2 Send the necessary information to one of Simrad's dealers or distributors.

You can also use the request form on <http://www.simrad.com/support>, or contact our support department directly.

You can use the following e-mail address:

- [purchase.order@simrad.com](mailto:purchase.order@simrad.com)

Once the software license string(s) have been returned to you (most likely by e-mail), you can install the licenses into the EK80 software.

- 3 Observe the **Main** menu.

Its default location is on the right side of the EK80 presentation.

- 4 Click the **Setup** icon.

This icon is located under the **Main** menu. It is used to open the **Setup** menu.

- 5 On the **Setup** menu, click **Installation**.



Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

- 6 On the left side of the **Installation** dialog box, click **Software License**.

Observe that the **Software License** page opens.

- 7 Click **Type License String**, and type the license string into the dialog box.

If you do not have a computer keyboard connected to your EK80 system, click the **Keyboard** button to open an on-screen keyboard.

Tip

---

*If you have received the license string on an electronic format (e-mail or text file), you can copy the string from the source document and paste it into the **Type License String** dialog box.*

---

- 8 Click **OK** to save the license string and close the **Type License String** dialog box.
- 9 Verify that the license string is placed in the **Currently active licenses** list.  
If necessary, click the arrow button [>] to move it from the list of inactive license string.
- 10 Click **Apply** and then **Close** to save all the parameters and close the **Installation** dialog box.

## Defining the IP address on the Processor Unit network adapter for communication with the Wide Band Transceiver (WBT)

The communication between the Processor Unit and the transceiver(s) is made using a high speed Ethernet cable. If more than one transceiver is used, an Ethernet switch is added. In order to communicate, you recommend that define which IP Address and Subnet mask the Ethernet adapter in the Processor Unit shall use for this communication.

### Prerequisites

This procedure is made for the Microsoft® Windows® 7 operating system. It is assumed that you are familiar with this operating system.

### Context

As long as you do not change the Processor Unit to an other computer, or replace the network adapter in your Processor Unit, you will only need to do this once.

### Procedure

- 1 On the Processor Unit, stop the EK80 program.
- 2 Locate the operating system dialog box.
  - a Click **Start**→**Control Panel**→**Network and Sharing Center**.
  - b On the left hand menu, select **Change adapter settings**.
  - c Click once on the network adapter to select it, then left-click and select **Properties** on the short-cut menu.
  - d On the list of connections, click **Internet Protocol 4 (TCP/IPv4)**, and then **Properties**.

- 3 Select **Use the following IP address**, and type the IP address and network mask.

IP Address: **157.237.15.16** (*Example, any IP address can be used*)

Subnet mask: **255.255.255.0**

You can leave **Subnet mask** blank and click **OK**. When you see an error message saying that the message subnet mask is missing, click **OK** again. A subnet mask will then automatically be generated.

- 4 Click **OK** to save the settings, then close all the dialog boxes.

## Installing one or more transducers

The transducers you wish to use with your EK80 Scientific wide band echo sounder must be "installed" as a part of the software configuration. Which transducers to use depends on the number of transceivers in your system, and the licenses you have for these.

### Prerequisites

It is assumed that the EK80 software has been installed, and that all relevant license strings have been applied.

### Context

Transducers are installed using the **Transducer** page in the **Installation** dialog box.

The list of transducers is generated from a system file on your Processor Unit. It contains all transducers compatible with the Wide Band Transceiver (WBT) as well as key technical information about each transducer.

### Procedure

- 1 Click the **Setup** icon.

This icon is located under the **Main** menu. It is used to open the **Setup** menu.

- 2 On the **Setup** menu, click **Installation**.



Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

- 3 On the left side of the **Installation** dialog box, click **Transducer** to open the page.
- 4 On the **Transducer** page, open the list, select which transducer you wish to install, and then click **Add**.

Observe that the **Add Transducer** dialog box opens.

- 5 Insert the transducer's serial number.

This serial number is very important, because you will need it as a reference identification when the EK80 Scientific wide band echo sounder is calibrated.

Tip

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*If you do not have a computer keyboard connected to your EK80 system, click the **Keyboard** button to open an on-screen keyboard.*

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- 6 Type the name that you wish to use.

This is only for easy recognition.

The name you select will only be used to identify the transducer in other dialog boxes. It will not be reflected in raw or processed data that you export.

- 7 Click **OK** to close the **Add Transducer** dialog box.
- 8 Repeat these steps for every transducer you wish to install.

### Result

Once a transducer has been defined, it will be listed in the collapsed menu on the left side of the **Installation** dialog box. To see the relevant transducer information, click on the menu entry. The parameters collected by the **Add Transducer** dialog box are then shown.

This page contains a Remove button that allows you to remove the transducer from the EK80 configuration.

## Installing transceiver channels

In order to use the EK80 the Processor Unit must be connected to one or more transceivers, and each of these must in turn be connected to one or more transducers. This transceiver/transducer-combination is referred to as a "channel". Each channel must be installed before it can be put to use.

### Prerequisites

This procedure assumes that:

- The EK80 installation is complete with all cables connected.
- The transceiver has been powered up.
- The software license for each transceiver has been installed and activated.
- The Ethernet adapter in the Processor Unit has been set up with a unique IP address.
- All relevant transducers have been installed on the **Transducer** page in the **Installation** dialog box.

### Context

The **Transceiver Installation** parameters control the installation and disconnection of transceivers. Every time the page is opened, the EK80 software automatically performs a search on the Ethernet network for transceivers.

The phrase frequency channel is used to identify the combination of a transceiver, transducers and the frequencies offered.

The frequency channel list on the top of the **Transceiver Installation** page provides you with an overview of the frequency channels currently available.

If you have many transceivers connected you can change the size of the dialog box, or you can use the two arrows on the right hand side of the list to scroll up and down.

- **Busy:** The frequency channel is already in use, probably by another echo sounder on the same network. You can not connect to this channel.
- **Installed:** This frequency channel is connected to your EK80 system.
- **Lost:** This frequency channel can not be used.
- **Available:** This frequency channel is vacant and ready for use.

### Procedure

- 1 Observe the **Main** menu.

Its default location is on the right side of the EK80 presentation.

- 2 Click the **Setup** icon.

This icon is located under the **Main** menu. It is used to open the **Setup** menu.

- 3 On the **Setup** menu, click **Installation**.



Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

- 4 Install the frequency channels(s).

- a Observe that the transceiver(s) you have connected to the Processor Unit are shown at the top of the page.

Each transceiver is identified with type and serial number. The available channels on each transceiver are listed separately.

If no transceivers are listed, click **Browse** in the **Transceiver Browsing** field, and open the **Local IP Address** field to select the correct address for the Ethernet adapter you are using. This will make the EK80 search the network for available transceivers. If you still have no transceivers listed, check that each transceiver has been powered up, and that the Ethernet communication between the units is operational. Also, if you are using an Ethernet switch, verify that it works.

- b For each channel, use the drop-down list to choose transducer.

The list of transducers available for installation is defined by those you installed on the **Transducer** page.

**Note**

*This is a critical task. You must ensure that the correct transducer is selected.*

- c Observe that the status for the relevant frequency channels changes to *Installed*.
- 5 Click **OK** to save the chosen parameters and close the dialog box.

## Result

When all transceiver channels have been installed, you can go to the **Operation** menu and set **Operation** to *Normal*.

**Caution**

*You must never set the EK80 into normal operation when the ship is in dry dock. The transducer will be damaged if it transmits in open air.*

## Adjusting the screen resolution

If you purchase the Simrad EK80 Scientific wide band echo sounder with a "Enix" Processor Unit, you will see that the default screen resolution on the computer has been set to 1280 x 1024 pixels. We recommend that you use a higher resolution than this.

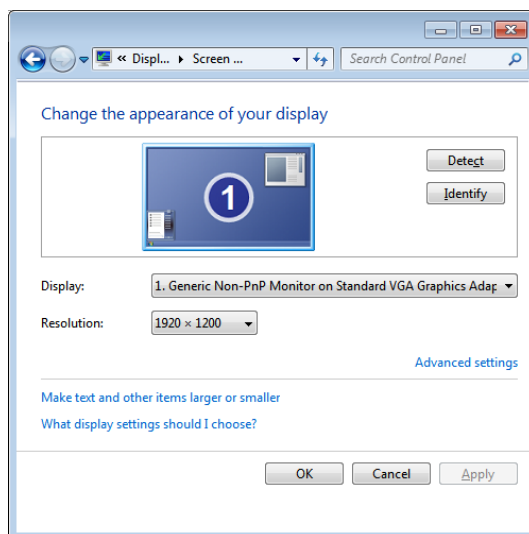
### Prerequisites

This procedure is made for the Microsoft® Windows® 7 operating system. It is assumed that you are familiar with this operating system.

### Context

As a general recommendation, you should set the screen resolution as high as possible. This will allow you more "space" in the EK80 presentation to offer more detailed information. The physical length of your top bar will also be extended, and free space for icons and navigational information.

As long as you do not change the Processor Unit to an other computer, replace the graphic adapter in your Processor Unit or the physical display, you will only need to do this once.



**Procedure**

- 1 On the Processor Unit, stop the EK80 program.
- 2 In the bottom left corner of your computer desktop, click the **Start** button.
- 3 On the right side of the **Start** menu, click **Control Panel**.
- 4 Observe that the **Control Panel** opens.
- 5 In the **Control Panel** dialog box, under **Appearance and Personalization**, click **Adjust screen resolution**.
- 6 Change the display settings:
  - a Verify that the correct display is shown.
  - b Change the resolution to maximum permitted resolution for your display.
  - c Click **OK**.
  - d Observe that the screen resolution changes.
  - e Click **Keep changes** in the acknowledge dialog box that appears.
- 7 Click the [X] in the top right corner to close the **Control Panel**.

# Configuring the EK80 for operational use

## Topics

[Selecting measurement units, page 160](#)

[Defining the file and folder settings for raw data recording, page 161](#)

## Selecting measurement units

The EK80 is prepared to work with several standards for units of measurements.

### Context

Use the **Units** options to set up the various units of measurements you wish to work with. The EK80 will use these in all presentations. Normally, you will only need to define these once.

### Procedure

- 1 Click the **Setup** icon.

This icon is located under the **Main** menu. It is used to open the **Setup** menu.

- 2 On the **Setup** menu, click **Installation**.



Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

- 3 On the left side of the **Installation** dialog box, click **Units**.

Observe that the relevant options are shown on the **Units** page. You can adjust the measurement units for:

- Depth
- Distance
- Length
- Speed
- Temperature

- 4 Make the necessary adjustments.
- 5 Click **OK** to save the chosen parameters and close the dialog box.



## Defining the file and folder settings for raw data recording

The EK80 allows you to record both raw and processed echo data. The data are saved on the Processor Unit's hard disk - or on an external data storage device - according to the preferences you have defined.

### Context

The **File Setup** parameters control how and where the recorded files are saved on the Processor Unit hard disk, or on an external disk. By adding a file name prefix, you can also identify files recorded from any specific mission or survey. Additional limitations may also be specified.

Set up the file and folder parameters before you start the recording.

### Note

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*Data files will normally become very large. If you wish to record large amounts of EK80 data, make sure that you have enough space on your hard disk. Unless your computer is equipped with a very large disk capacity, we recommend that you save the data files to an external storage device.*

---

If the current file size gets too big during recording, use the **Split File** function on the **Record RAW** button. This will close the current file, and then automatically continue recording to a new file.

### Procedure

- 1 Click the **Operation** icon.

This icon is located under the **Main** menu. It is used to open the **Operation** menu.

- 2 On the **Operation** menu, click **Output**.



Observe that the **Output** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

- 3 On the left side, click **File Setup** to open the page.
- 4 On the **File Setup** page, define the relevant file and folder properties.
- 5 Click **OK** to save the chosen parameters and close the dialog box.

# Interfacing peripheral equipment

## Topics

[Setting up input from a navigation system, page 162](#)

[Setting up input from a motion sensor, page 166](#)

[Setting up the input from a sound speed sensor, page 167](#)

[Setting up a serial line for annotation input, page 169](#)

[Setting up depth output to an external system, page 172](#)

[Exporting sensor data to a peripheral system, page 174](#)

[Setting up a synchronization interface, page 177](#)

## Setting up input from a navigation system

In order to read navigational data (position, speed, distance and heading) from an external sensor, you must choose which interface port to use, and then which datagram(s) to read.

### Prerequisites

This procedure assumes that:

- You have a vacant interface port on your Processor Unit.
- You are familiar with NMEA and other relevant datagram formats.
- You know how to set up the parameters for serial and local area network (LAN) communication.

### Context

Most Global Positioning System (GPS) receivers provide NMEA 0183 telegrams containing speed, sailed distance as well as geographical latitude and longitude information. Some GPS systems will also provide the current heading, but this information is normally taken from the gyro.

### Procedure

- 1 Connect the navigation system to an available communication port on your Processor Unit.

This is described in the *Cable layout and interconnections* chapter.

- 2 Click the **Setup** icon.

This icon is located under the **Main** menu. It is used to open the **Setup** menu.

- 3 On the **Setup** menu, click **Installation**.



Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

- 4 On the left side of the **Installation** dialog box, click **I/O Setup**.

Observe that the **I/O Setup** page is shown.

- 5 Select the interface port you wish to use.

- a Observe that a list of the Processor Unit's serial and network interface ports is shown.

- b Click once on the port you wish to use (serial or LAN).

- c Click the **Input** button below the list to open the **Select Inputs** dialog box.

- 6 On the **Available Inputs** list, click the system/data type(s) you wish to import, then click [►].

To import navigation data, choose **GPS**, **DistanceLog**, **SpeedLog** and/or **Gyro**.

- 7 Verify that the chosen data type(s) are shown in the **Inputs** list.

- 8 Click **OK** to save the chosen parameters and close the **Select Inputs** dialog box.

- 9 On the **I/O Setup** page, click once on the chosen communication port to select it.

- 10 If you are using a serial port, define the relevant communication parameters.

- a Click **Setup** to open the **Serial Port Setup** dialog box.

- b In the **Serial Port Setup** dialog box, define the relevant parameters for the communication.

The communication parameters defined for **NMEA 0183** are:

- **Baudrate:** 4800 bits per second
- **Data bits:** 8
- **Parity:** None
- **Stop bits:** One

Some instruments may offer other parameters and/or choices. You must always check the relevant documentation provided by the manufacturer.

- c Click **OK** to save the chosen parameters and close the **Serial Port Setup** dialog box.

- 11 If you are using an Ethernet communication port (LAN), define the relevant communication parameters.

- a Click **Setup** to open the **LAN Port Setup** dialog box.

- b In the **LAN Port Setup** dialog box, define the relevant parameters for the communication.

The parameters must be set up to match your network environment.

- **Local IP Address:** This is the Internet Protocol (IP) address of the local Ethernet interface adapter (circuit board) in your Processor Unit. If you have only one Ethernet adapter, you must use the default value provided. If you have more than one Ethernet adapter on your computer, or if you use an adapter with multiple IP addresses, you must specify the IP address of the adapter you wish to use.
  - **Local Port:** This port must match the port number on the remote computer. To find the port number on the remote computer, consult the documentation for the software utility to be used. If the data communication is set up to only transmit information, this parameter is not required.
  - **Remote IP Address:** This is the Internet Protocol (IP) address for the remote computer. Since you are about to receive data, this address is unessential.
  - **Remote Port:** Since you are about to receive data, this port is unessential. Keep its default value.
- c Click **OK** to save the chosen parameters and close the **LAN Port Setup** dialog box.
- 12 Restart the EK80.
- a Close the **Installation** dialog box.
  - b Click the [X] in the top right corner to close down the program.
  - c Start the program.
  - d Open the **Installation** dialog box.
- 13 Set up the position data you wish to receive.
- a On the left side of the **Installation** dialog box, select **Navigation**→**Position**.
  - b Select which NMEA sentence you wish to receive.  
  
If you choose *Auto*, the EK80 will automatically choose among the incoming telegrams according to a predefined priority list.
  - c If applicable, define the **Talker ID**.  
  
If your EK80 is not equipped with a keyboard, click the "keyboard" button to open an on-screen keyboard.
- 14 Set up the speed data you wish to receive.
- a On the left side of the **Installation** dialog box, select **Navigation**→**Speed**.
  - b Select which NMEA sentence you wish to receive.  
  
If you choose *Auto*, the EK80 will automatically choose among the incoming telegrams according to a predefined priority list.
  - c If applicable, define the **Talker ID**.  
  
If your EK80 is not equipped with a keyboard, click the "keyboard" button to open an on-screen keyboard.

- d If you wish to define a manual speed, select **Manual Speed** and use **Speed [kts]** to choose the value.
- 15 Set up the distance data you wish to receive.
  - a On the left side of the **Installation** dialog box, select **Navigation**→**Distance**.
  - b Choose from which source you wish to receive the distance information.
  - c If applicable, define the **Talker ID**.

If your EK80 is not equipped with a keyboard, click the "keyboard" button to open an on-screen keyboard.
  - d If you wish to define a manual distance, use **Distance [nmi]** to choose the value.

Note that this option is not available if **Source** has been set to *Sensor Input*.
- 16 Set up the heading data you wish to receive.
  - a On the left panel in the **Installation** dialog box, select **Navigation**→**Heading**.
  - b Select which NMEA sentence you wish to receive.

If you choose *Auto*, the EK80 will automatically choose among the incoming telegrams according to a predefined priority list.
  - c If applicable, define the **Talker ID**.

If your EK80 is not equipped with a keyboard, click the "keyboard" button to open an on-screen keyboard.
- 17 On the left side of the **Installation** dialog box, click **I/O Setup**.

Observe that the **I/O Setup** page is shown.
- 18 Verify that each communication port is functional.
  - a Click **Monitor** to open the **Port Monitor** dialog box.
  - b Check the data flow on the input communication line (**Rx Data** text field).

In order to monitor this data flow, the peripheral system must be active and transmitting information to the EK80.
  - c If the data flow is operational, click **OK** to close the **Port Monitor** dialog box.

If the data flow is not present, we suggest the following actions:

    - Check that the peripheral system has been switched on.
    - Check that the peripheral system is in fact transmitting information.
    - Check the cables.
    - Check that you have made the physical connection to the communication port that you are monitoring.
- 19 Click **OK** to save the chosen parameters and close the dialog box.

## Setting up input from a motion sensor

The information from a motion sensor (normally heave, roll and pitch) can be imported into the EK80 to increase the accuracy of the echo sounder data.

### Prerequisites

This procedure assumes that:

- You have a vacant interface port on your Processor Unit.
- You are familiar with NMEA and other relevant datagram formats.
- You know how to set up the parameters for serial and local area network (LAN) communication.

### Procedure

- 1 Connect the motion sensor system to an available communication port on your Processor Unit.

This is described in the *Cable layout and interconnections* chapter.

- 2 Click the **Setup** icon.

This icon is located under the **Main** menu. It is used to open the **Setup** menu.

- 3 On the **Setup** menu, click **Installation**.



Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

- 4 On the left side of the **Installation** dialog box, click **I/O Setup**.

Observe that the **I/O Setup** page is shown.

- 5 Select the serial interface port you wish to use.

- a Observe that a list of the Processor Unit's serial interface ports is shown.
- b Click once on the serial port you wish to use.
- c Click the **Input** button below the list to open the **Select Inputs** dialog box.

- 6 On the **Available Inputs** list, click the system/data type(s) you wish to import, then click [►].

To import motion information, choose **MotionASCII** or **MotionBinary**.

- 7 Verify that the chosen data type(s) are shown in the **Inputs** list.
- 8 Click OK to save the chosen parameters and close the **Select Inputs** dialog box.
- 9 On the **I/O Setup** page, click once on the chosen communication port to select it.
- 10 Define the relevant communication parameters.
  - a Click **Setup** to open the **Serial Port Setup** dialog box.

- b In the **Serial Port Setup** dialog box, define the relevant parameters for the communication.

The communication parameters defined for **NMEA 0183** are:

- **Baudrate:** 4800 bits per second
- **Data bits:** 8
- **Parity:** None
- **Stop bits:** One

Some instruments may offer other parameters and/or choices. You must always check the relevant documentation provided by the manufacturer.

- c Click **OK** to save the chosen parameters and close the **Serial Port Setup** dialog box.

- 11 Verify that the communication port is functional.

- a Click **Monitor** to open the **Port Monitor** dialog box.

- b Check the data flow on the input communication line (**Rx Data** text field).

In order to monitor this data flow, the peripheral system must be active and transmitting information to the EK80.

- c If the data flow is operational, click **OK** to close the **Port Monitor** dialog box.

If the data flow is not present, we suggest the following actions:

- Check that the peripheral system has been switched on.
- Check that the peripheral system is in fact transmitting information.
- Check the cables.
- Check that you have made the physical connection to the communication port that you are monitoring.

- 12 Click **OK** to save the chosen parameters and close the dialog box.

## Setting up the input from a sound speed sensor

If you have a sound speed sensor located close to the transducer face, you can import the information from this sensor. This will result in more accurate EK80 data.

### Prerequisites

This procedure assumes that:

- You have a vacant interface port on your Processor Unit.
- You are familiar with NMEA and other relevant datagram formats.
- You know how to set up the parameters for serial and local area network (LAN) communication.

## Context

The data communication from the sound speed sensor is based on a proprietary data format.

## Procedure

- 1 Connect the sound speed sensor to an available serial communication port on your Processor Unit.

This is described in the *Cable layout and interconnections* chapter.

- 2 Click the **Setup** icon.

This icon is located under the **Main** menu. It is used to open the **Setup** menu.

- 3 On the **Setup** menu, click **Installation**.



Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

- 4 On the left side of the **Installation** dialog box, click **I/O Setup**.

Observe that the **I/O Setup** page is shown.

- 5 Select the serial interface port you wish to use.

- a Observe that a list of the Processor Unit's serial interface ports is shown.
- b Click once on the serial port you wish to use.
- c Click the **Input** button below the list to open the **Select Inputs** dialog box.

- 6 On the **Available Inputs** list, click the system/data type(s) you wish to import, then click [►].

To import information from a sound speed sensor, choose **AML**.

- 7 Verify that the chosen data type(s) are shown in the **Inputs** list.
- 8 Click OK to save the chosen parameters and close the **Select Inputs** dialog box.
- 9 On the **I/O Setup** page, click once on the chosen communication port to select it.
- 10 Define the relevant communication parameters.
  - a Click **Setup** to open the **Serial Port Setup** dialog box.



- b In the **Serial Port Setup** dialog box, define the relevant parameters for the communication.

The communication parameters defined for **NMEA 0183** are:

- **Baudrate:** 4800 bits per second
- **Data bits:** 8
- **Parity:** None
- **Stop bits:** One

Some instruments may offer other parameters and/or choices. You must always check the relevant documentation provided by the manufacturer.

- c Click **OK** to save the chosen parameters and close the **Serial Port Setup** dialog box.

- 11 Verify that the communication port is functional.

- a Click **Monitor** to open the **Port Monitor** dialog box.

- b Check the data flow on the input communication line (**Rx Data** text field).

In order to monitor this data flow, the peripheral system must be active and transmitting information to the EK80.

- c If the data flow is operational, click **OK** to close the **Port Monitor** dialog box.

If the data flow is not present, we suggest the following actions:

- Check that the peripheral system has been switched on.
- Check that the peripheral system is in fact transmitting information.
- Check the cables.
- Check that you have made the physical connection to the communication port that you are monitoring.

- 12 Click **OK** to save the chosen parameters and close the dialog box.

## Setting up a serial line for annotation input

Several different annotation types may be added to the echogram. You can add these manually, or import information as datagrams using a communication port.

### Prerequisites

This procedure assumes that:

- You have a vacant interface port on your Processor Unit.
- You are familiar with NMEA and other relevant datagram formats.
- You know how to set up the parameters for serial and local area network (LAN) communication.

## Context

The data communication from an external annotation source is based on a proprietary data format.

The EK80 supports the following datagram format for annotations.

- **ATS**

This is a proprietary format developed by Kongsberg Maritime for use with annotations

## Procedure

- 1 Connect the peripheral system providing the annotations to an available communication port on your Processor Unit.

This is described in the *Cable layout and interconnections* chapter.

- 2 Click the **Setup** icon.

This icon is located under the **Main** menu. It is used to open the **Setup** menu.

- 3 On the **Setup** menu, click **Installation**.



Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

- 4 On the left side of the **Installation** dialog box, click **I/O Setup**.

Observe that the **I/O Setup** page is shown.

- 5 Select the interface port you wish to use.

- a Observe that a list of the Processor Unit's serial and network interface ports is shown.

- b Click once on the port you wish to use (serial or LAN).

- c Click the **Input** button below the list to open the **Select Inputs** dialog box.

- 6 On the **Available Inputs** list, click the system/data type(s) you wish to import, then click [▶].

To import annotations from a peripheral system, choose **Annotations**.

- 7 Verify that the chosen data type(s) are shown in the **Inputs** list.

- 8 Click OK to save the chosen parameters and close the **Select Inputs** dialog box.

- 9 On the **I/O Setup** page, click once on the chosen communication port to select it.

- 10 If you are using a serial port, define the relevant communication parameters.

- a Click **Setup** to open the **Serial Port Setup** dialog box.

- b In the **Serial Port Setup** dialog box, define the relevant parameters for the communication.

The communication parameters defined for **NMEA 0183** are:

- **Baudrate:** 4800 bits per second
- **Data bits:** 8
- **Parity:** None
- **Stop bits:** One

Some instruments may offer other parameters and/or choices. You must always check the relevant documentation provided by the manufacturer.

- c Click **OK** to save the chosen parameters and close the **Serial Port Setup** dialog box.

- 11 If you are using an Ethernet communication port (LAN), define the relevant communication parameters.

- a Click **Setup** to open the **LAN Port Setup** dialog box.

- b In the **LAN Port Setup** dialog box, define the relevant parameters for the communication.

The parameters must be set up to match your network environment.

- **Local IP Address:** This is the Internet Protocol (IP) address of the local Ethernet interface adapter (circuit board) in your Processor Unit. If you have only one Ethernet adapter, you must use the default value provided. If you have more than one Ethernet adapter on your computer, or if you use an adapter with multiple IP addresses, you must specify the IP address of the adapter you wish to use.
- **Local Port:** This port must match the port number on the remote computer. To find the port number on the remote computer, consult the documentation for the software utility to be used. If the data communication is set up to only transmit information, this parameter is not required.
- **Remote IP Address:** This is the Internet Protocol (IP) address for the remote computer. Since you are about to receive data, this address is unessential.
- **Remote Port:** Since you are about to receive data, this port is unessential. Keep its default value.

- c Click **OK** to save the chosen parameters and close the **LAN Port Setup** dialog box.

- 12 Verify that the communication port is functional.

- a Click **Monitor** to open the **Port Monitor** dialog box.

- b Check the data flow on the input communication line (**Rx Data** text field).

In order to monitor this data flow, the peripheral system must be active and transmitting information to the EK80.

- c If the data flow is operational, click **OK** to close the **Port Monitor** dialog box.

If the data flow is not present, we suggest the following actions:

- Check that the peripheral system has been switched on.
- Check that the peripheral system is in fact transmitting information.
- Check the cables.
- Check that you have made the physical connection to the communication port that you are monitoring.

13 Click **OK** to save the chosen parameters and close the dialog box.

## Setting up depth output to an external system

The depth output from the EK80 can be exported to a peripheral system.

### Prerequisites

This procedure assumes that:

- You have a vacant interface port on your Processor Unit.
- You are familiar with NMEA and other relevant datagram formats.
- You know how to set up the parameters for serial and local area network (LAN) communication.

### Context

The current depth from a defined transceiver channel can be sent out on a serial line to an external system.

The data is exported on standard NMEA datagram formats and/or on proprietary formats.

### Procedure

- 1 Connect the peripheral system to an available communication port on your Processor Unit.

This is described in the *Cable layout and interconnections* chapter.

- 2 Click the **Operation** icon.

This icon is located under the **Main** menu. It is used to open the **Operation** menu.

- 3 On the **Operation** menu, click **Output**.



Observe that the **Output** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

- 4 On the left side of the **Outputs** dialog box, select **Depth Output**.

Observe that the **Depth Output** page opens.

- 5 Set up the depth output port.

a On the **Depth Output** page, select which output type (datagram) to export.

b Click **Add**.

Observe that **Depth Output Configuration** dialog box opens to collect the communication parameters.

c Select the communication port you wish to use.

d Click **Inspect Port** to verify that the port parameters are correct.

If you need to adjust the port settings, you must select **I/O Setup** to correct this after you have defined the output parameters.

e Select which channel (transceiver and frequency) you wish to export the depth information from.

Tip \_\_\_\_\_

*In most cases, the lowest frequency is used.*

---

f If applicable, define the **Talker ID**.

g Click **OK** to save the chosen parameters and close the **Depth Output Configuration** dialog box.

6 On the left side of the **Outputs** dialog box, select **I/O Setup**.

Observe that the **I/O Setup** page is shown.

7 On the **I/O Setup** page, click once on the chosen communication port to select it.

8 If you are using a serial port, define the relevant communication parameters.

a Click **Setup** to open the **Serial Port Setup** dialog box.

b In the **Serial Port Setup** dialog box, define the relevant parameters for the communication.

The communication parameters defined for **NMEA 0183** are:

- **Baudrate:** 4800 bits per second
- **Data bits:** 8
- **Parity:** None
- **Stop bits:** One

Some instruments may offer other parameters and/or choices. You must always check the relevant documentation provided by the manufacturer.

c Click **OK** to save the chosen parameters and close the **Serial Port Setup** dialog box.

9 If you are using an Ethernet communication port (LAN), define the relevant communication parameters.

a Click **Setup** to open the **LAN Port Setup** dialog box.

- b In the **LAN Port Setup** dialog box, define the relevant parameters for the communication.

The parameters must be set up to match your network environment.

- **Local IP Address:** This is the Internet Protocol (IP) address of the local Ethernet interface adapter (circuit board) in your Processor Unit. If you have only one Ethernet adapter, you must use the default value provided. If you have more than one Ethernet adapter on your computer, or if you use an adapter with multiple IP addresses, you must specify the IP address of the adapter you wish to use.
- **Local Port:** This port must match the port number on the remote computer. To find the port number on the remote computer, consult the documentation for the software utility to be used. If the data communication is set up to only transmit information, this parameter is not required.
- **Remote IP Address:** This is the Internet Protocol (IP) address for the remote computer. Since you are about to receive data, this address is unessential.
- **Remote Port:** Since you are about to receive data, this port is unessential. Keep its default value.

- c Click **OK** to save the chosen parameters and close the **LAN Port Setup** dialog box.

- 10 Verify that the communication port is functional.

- a Click **Monitor** to open the **Port Monitor** dialog box.

- b Check the data flow on the output communication line (**Tx Data** text field).

In order to monitor this data flow, your EK80 must be active and transmitting information to the peripheral system.

- c If the data flow is operational, click **OK** to close the **Port Monitor** dialog box.

If the data flow is not present, we suggest the following actions:

- Check that the appropriate output data in your EK80 has been set up to the correct port, and enabled.

- 11 Click **OK** to save the chosen parameters and close the dialog box.

## Exporting sensor data to a peripheral system

The information provided to the EK80 system from various sensors can also be useful for other systems on board. The EK80 allows you to export this sensor information on a chosen communication port.

## Prerequisites

This procedure assumes that:

- You have a vacant interface port on your Processor Unit.
- You are familiar with NMEA and other relevant datagram formats.
- You know how to set up the parameters for serial and local area network (LAN) communication.

## Context

The information provided to the EK80 system from various sensors can also be useful for other systems on board your vessel. The EK80 allows you to export this sensor information on a chosen communication port.

The following sensor data can be exported:

- Navigation
- Motion sensor

## Procedure

- 1 Connect the peripheral system to an available communication port on your Processor Unit.

This is described in the *Cable layout and interconnections* chapter.

- 2 Click the **Operation** icon.

This icon is located under the **Main** menu. It is used to open the **Operation** menu.

- 3 On the **Operation** menu, click **Output**.



Observe that the **Output** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

- 4 On the left side on the **Outputs** dialog box, click **Relay Output**.
- 5 Set up the data export parameters.

- a Select which data format to export.
- b Click **Add**.

Observe that a dedicated dialog box opens to collect the communication parameters.

- c Select which communication port to use.
- d Click **Inspect Port** to verify that the port parameters are correct.

If you need to adjust the port settings, click **I/O Setup** on the left menu in the **Outputs** dialog box, and make the necessary changes to the communication port. You can do this after you have defined the output parameters.

- e Click **OK** to save the chosen parameters and close the dialog box.

- 6 On the left side of the **Outputs** dialog box, select **I/O Setup**.  
Observe that the **I/O Setup** page is shown.
- 7 On the **I/O Setup** page, click once on the chosen communication port to select it.
- 8 If you are using a serial port, define the relevant communication parameters.
  - a Click **Setup** to open the **Serial Port Setup** dialog box.
  - b In the **Serial Port Setup** dialog box, define the relevant parameters for the communication.  
The communication parameters defined for **NMEA 0183** are:
    - **Baudrate:** 4800 bits per second
    - **Data bits:** 8
    - **Parity:** None
    - **Stop bits:** One
 Some instruments may offer other parameters and/or choices. You must always check the relevant documentation provided by the manufacturer.
  - c Click **OK** to save the chosen parameters and close the **Serial Port Setup** dialog box.
- 9 If you are using an Ethernet communication port (LAN), define the relevant communication parameters.
  - a Click **Setup** to open the **LAN Port Setup** dialog box.
  - b In the **LAN Port Setup** dialog box, define the relevant parameters for the communication.  
The parameters must be set up to match your network environment.
    - **Local IP Address:** This is the Internet Protocol (IP) address of the local Ethernet interface adapter (circuit board) in your Processor Unit. If you have only one Ethernet adapter, you must use the default value provided. If you have more than one Ethernet adapter on your computer, or if you use an adapter with multiple IP addresses, you must specify the IP address of the adapter you wish to use.
    - **Local Port:** This port must match the port number on the remote computer. To find the port number on the remote computer, consult the documentation for the software utility to be used. If the data communication is set up to only transmit information, this parameter is not required.
    - **Remote IP Address:** This is the Internet Protocol (IP) address for the remote computer. Since you are about to receive data, this address is unessential.
    - **Remote Port:** Since you are about to receive data, this port is unessential. Keep its default value.
  - c Click **OK** to save the chosen parameters and close the **LAN Port Setup** dialog box.
- 10 Verify that the communication port is functional.



- a Click **Monitor** to open the **Port Monitor** dialog box.
- b Check the data flow on the output communication line (**Tx Data** text field).  
In order to monitor this data flow, your EK80 must be active and transmitting information to the peripheral system.
- c If the data flow is operational, click **OK** to close the **Port Monitor** dialog box.  
If the data flow is not present, we suggest the following actions:
  - Check that the appropriate output data in your EK80 has been set up to the correct port, and enabled.

11 Click **OK** to save the chosen parameters and close the dialog box.

## Setting up a synchronization interface

The purpose of the **Synchronization** parameters are to set up the EK80 to operate alone, or as a master or slave in a synchronized system. Synchronization is required in order to avoid interference if the EK80 is used simultaneously with other hydroacoustic instruments within the same frequency range.

### Prerequisites

For "slave" operation, a remote system (for example *K-Sync*) must be available to provide trigger pulses. For "master" operation, a remote system must be connected. This remote system must be set up in "slave" mode.

### Context

Whenever more than one hydroacoustic system is installed on a vessel, interference may occur. To avoid this, the systems may either be connected to a common synchronization system, or one of the acoustic systems may be defined as a "master", and control the transmission on the other system(s).

The EK80 includes interface for remote transmit synchronisation. It can be set up to operate in either *Master* or *Slave* mode in relation to an external synchronization or an other hydroacoustic system.

### Procedure

- 1 Connect the synchronisation cable from the remote system to an available communication port on your Processor Unit.

This is described in the *Cable layout and interconnections* chapter.

- 2 Power up the Processor Unit, and start the EK80 program.
- 3 Click the **Setup** icon.

This icon is located under the **Main** menu. It is used to open the **Setup** menu.

- 4 On the **Setup** menu, click **Installation**.



Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

- 5 On the left side of the **Installation** dialog box, select **Synchronization**.
- 6 From the list of ports available, select **Synchronization Port**.

This must be a serial port. Since the synchronization function only use the Request To Send (RTS) and Clear To Send (CTS) signals, you can use a serial port that is already used for other purposes. For the same reason, you do need to define any baud rate.

- 7 Select **Synchronization Delay**.

This delay parameter is used differently depending on the chosen synchronization mode.

- **Standalone**

The **Synchronization Delay** parameter is not applicable when synchronization is switched off.

- **Master**

The EK80 will wait for the delay time after the external trigger signal has been sent to the slaves before transmitting the ping. This is often referred to as *Pre-trigger*.

Note that this delay will only work when the synchronization is set up using a serial port.

- **Slave**

The EK80 will wait for the delay time after the external trigger signal has arrived before transmitting the ping. This is often referred to as *Post-trigger*.

- 8 Select **Synchronization Mode**.

- **Standalone**

This synchronization mode is used if the EK80 is working by itself, and with no synchronization required. This is the default setting. The EK80 will operate using its internal ping interval parameters, independent of any signals arriving at the synchronization port.

- **Master**

This mode is used if the EK80 shall act as a "Master" unit in a synchronized system. The peripheral hydroacoustic system(s) will then only be permitted to transmit when enabled by the EK80. When this mode is chosen, the EK80 will run using its internal ping interval parameters, and transmit external trigger signals to the peripheral system(s) on the synchronization port.

- **Slave**

This mode is used if the EK80 shall transmit only when permitted by a peripheral system. When this mode is chosen, the EK80 will wait for an external trigger to appear on the chosen synchronization port before each ping.

**Note** \_\_\_\_\_

*The synchronization mode is not fixed. It can be changed at any time during EK80 operation.*

---

- 9 Click **OK** to save the chosen parameters and close the dialog box.

## Test procedures

### Topics

[Starting the EK80 Scientific wide band echo sounder, page 181](#)

[Measuring noise in \*Passive\* mode, page 182](#)

[Testing the synchronization interface, page 183](#)

[Testing the interfaces to external devices, page 184](#)

[Reading the transceiver hardware and software versions, page 185](#)

[Calibrating the EK80 Scientific wide band echo sounder, page 187](#)

[Making a noise/speed curve to determine vessel noise, page 188](#)

## Starting the EK80 Scientific wide band echo sounder

A basic functional test includes power-up, frequency channel installations and initial bottom detection.

### Prerequisites

This procedure assumes that the EK80 system has been installed as specified in the EK80 *Installation manual*.

No specific tools or instruments are required for this test.

### Context

This procedure shall verify that the transceiver(s) provided with the EK80 system are operational.

### Procedure

- 1 Verify that the EK80 units have been set up to operate with the voltage you have available (115 Vac or 230 Vac or +12 Vdc).
- 2 Verify that the transducer cables are not installed close to power cables.
- 3 Apply power to all units.
- 4 Verify that the power LED on the Wide Band Transceiver is lit.
- 5 Start the EK80 program.
- 6 On the **Setup** menu, click **About** to verify that the correct software version is installed.
- 7 Install the correct transducers for all frequencies.
- 8 Start the EK80 in normal operational mode.
- 9 Verify that you can see the bottom in all echograms.

## Measuring noise in *Passive* mode

Low noise is a key factor for high quality and reliable measurements.

### Prerequisites

This procedure assumes that the EK80 system has been installed as specified in the *EK80 Installation manual*.

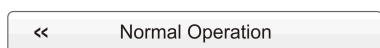
No specific tools or instruments are required for this test.

### Context

This procedure shall verify that the noise level in *Passive* mode is acceptable.

### Procedure

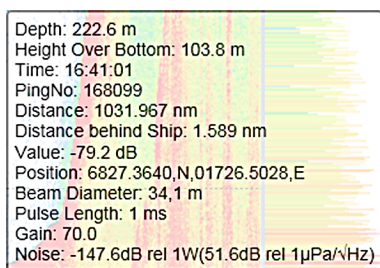
- 1 Operate all relevant frequencies in *Passive* mode with 1,024 ms pulse duration.
- 2 Prepare the EK80 to read the noise values.
  - a On the **Operation** menu, click **Normal Operation** to open the dialog box.



- b In the **Normal Operation** dialog box, set **Mode** to *Passive*.
  - c On the **Display** menu, click **Display Options** to open the dialog box.



- d In the **Display Options** dialog box, enable the **Noise** tooltip.
- 3 Place the cursor over the echogram, and observe the tooltip information.



- 4 Read the noise values for each channel.  
Write down the measured noise value.

### Result

| Frequency | Noise estimate | Frequency | Noise estimate |
|-----------|----------------|-----------|----------------|
| 18 kHz    |                | 120 kHz   |                |
| 33 kHz    |                | 200 kHz   |                |
| 70 kHz    |                | 333 kHz   |                |

## Testing the synchronization interface

In larger hydroacoustic systems, the individual products are frequently connected to provide transmit synchronisation.

### Prerequisites

This procedure assumes that the EK80 system has been installed as specified in the EK80 *Installation manual*.

It is also assumed that the EK80 is connected to an external hydroacoustic system for triggering purposes.

No specific tools or instruments are required for this test.

### Context

This procedure shall verify that the external trigger interface is operational.

#### Note

---

*If the EK80 is set up to operate as a 'stand-alone' system independent of other hydroacoustic systems, this test can be omitted.*

---

### Procedure

- 1 On the **Setup** menu, click **Synchronization** to open the dialog box.
- 2 Select the relevant synchronization mode.
- 3 Start both the EK80 and the external system, and set them both to normal operation.
- 4 Verify that the EK80 transmissions are synchronized with the external system.

## Testing the interfaces to external devices

In order to provide the relevant navigational data, the EK80 must be connected to external sensors.

### Prerequisites

This procedure assumes that the EK80 system has been installed as specified in the EK80 *Installation manual*.

It is also assumed that the EK80 is connected to one or more external sensors to provide navigational information, and that these sensors are operational.

No specific tools or instruments are required for this test.

### Context

This procedure shall verify that the interfaces to external sensors are operational.

All relevant procedures for setting up the interfaces to external devices can be found in the EK80 *Installation manual* and in the EK80 *Reference manual*. The procedures are also available in the on-line help.

### Procedure

- 1 Set the EK80 to operate in normal operation.
- 2 Verify that the relevant external devices are operational, and that they transmit data.
- 3 Verify that the EK80 receives the data.
  - a Open the **Setup** menu.
  - b Click **Installation**→**I/O Setup**.
  - c Use the **Port Monitor** dialog box to verify that sensor data is received as expected.



## Reading the transceiver hardware and software versions

The **Transceiver Installation** page shows you all relevant information related to the hardware and software versions of the Wide Band Transceiver (WBT).

### Prerequisites

The EK80 must be operational with all relevant channels (transceiver/transducer combination) installed.

### Context

The hardware and software versions of the Wide Band Transceiver (WBT) are required for a unique identification of the EK80 system at the time of the test.

### Procedure

- 1 Click the **Setup** icon.

This icon is located under the **Main** menu. It is used to open the **Setup** menu.

- 2 Click the **Installation** button.



- a Observe that the **Installation** dialog box opens.
  - b On the left side, click **Transceiver**.
  - c Observe that the **Transceiver** page opens.
- 3 Check that all applicable transceivers and transducers are connected and operational.  
For each transceiver, this is indicated by the green label with text “Installed”.
  - 4 Repeat this cycle for each transceiver in use.
    - a Click on the transceiver to select it.
    - b In the transceiver list, read the name of the transducer in use.
    - c In the *Transceiver Information* field, read the following information:
      - Identity
      - FPGA TX Firmware version
      - FPGA RX Firmware version
      - SW Version
    - d Write down this information in the result table
  - 5 Close the **Installation** dialog box.

**Result**

| WBT | Identity | Transducer | TX Firmware<br>version | RX Firmware<br>version | SW Version |
|-----|----------|------------|------------------------|------------------------|------------|
| 1   |          |            |                        |                        |            |
| 2   |          |            |                        |                        |            |
| 3   |          |            |                        |                        |            |
| 4   |          |            |                        |                        |            |
| 5   |          |            |                        |                        |            |
| 6   |          |            |                        |                        |            |

## Calibrating the EK80 Scientific wide band echo sounder

A complete test of the EK80 Scientific wide band echo sounder is done by means of a system calibration.

### Prerequisites

In order to calibrate the EK80, the following equipment is required:

- Reference targets (metal spheres) to fit the operational frequencies
- Winch arrangement with relevant lines to lower the sphere into the sound beam

The vessel must be anchored in a suitable position with sufficient depth, and with calm and sheltered water.

### Context

In order to calibrate the EK80, a reference target (calibration sphere) with known target strength (TS) is lowered into the sound beam. The measured target strength is then compared with the known target strength. During the calibration, the calibration sphere is physically moved inside the sound beam.

Kongsberg Maritime can supply a variety of copper and tungsten calibration spheres dedicated for different operational frequencies. Each sphere diameter is selected for minimum temperature dependence.

### Procedure

- 1 Prepare the vessel for calibration according to the relevant procedures.
- 2 Calibrate all channels on the EK80 Scientific wide band echo sounder according to the relevant procedures.

## Making a noise/speed curve to determine vessel noise

The performance of the EK80 Scientific wide band echo sounder will always be limited by different noise sources. During the sea acceptance test, accurate noise measurements must be performed for different vessel speeds. The weather and sea conditions for the noise measurements will be those at the time of the sea acceptance test.

### Prerequisites

The EK80 Scientific wide band echo sounder has been installed according to the instructions in the EK80 *Installation manual*. All transceivers have been set up, and are operational with their respective transducers.

The EK80 *Harbour Acceptance Test* has been conducted successfully.

For this test you will need a desktop or laptop computer with a spreadsheet program.

### Context

In order to measure the noise, you must record the noise value using the tooltip in the echogram. Since the noise will vary with each individual ping, you must five measurements for each speed, and calculate the average noise.

You must measure the noise for each single channel, but you can do all these measurements simultaneously.

#### Tip

---

*If you record all the raw data you retrieve during the test, you can go back later and repeat the test using the replay file. You may then for example record more than five noise samples for each speed to make a more accurate curve.*

---

### Procedure

- 1 Prepare the EK80 to read the noise values.
  - a On the **Display** menu, click **Display Options** to open the dialog box.


  - b In the **Display Options** dialog box, enable the **Noise** tooltip.
  - c Click **OK** to close the **Display Options** dialog box.
- 2 Establish a separate communication line with the bridge to verify the vessel speed during the test.
- 3 Start raw data recording.
- 4 Repeat the following cycle for each vessel speed:
  - a Ask the bridge to set the speed.
  - b Once the bridge reports that the speed has been obtain, click the **Event** marker on the toolbar.

- c If you can read the vessel speed on the toolbar, verify the speed.
  - d For each channel, place the cursor five different places on the echogram on the right side of the event marker, and record the noise values.
  - e Calculate the average noise in each channel, and record it in the table.
  - f Ask the bridge to set the next speed.
- 5 Stop raw data recording.
  - 6 When all the measurements have been made, type the data (speed and noise) into a spreadsheet to create the curve.

### Result

Use the following table to record the noise values, or write them straight into a spreadsheet. Make the necessary copies to that you have one table for each channel.

| Speed    | M1 | M2 | M3 | M4 | M5 | Average |
|----------|----|----|----|----|----|---------|
| 1        |    |    |    |    |    |         |
| 2        |    |    |    |    |    |         |
| 3        |    |    |    |    |    |         |
| 4        |    |    |    |    |    |         |
| 5        |    |    |    |    |    |         |
| 6        |    |    |    |    |    |         |
| 7        |    |    |    |    |    |         |
| 8        |    |    |    |    |    |         |
| 9        |    |    |    |    |    |         |
| 10       |    |    |    |    |    |         |
| Channel: |    |    |    |    |    |         |

## Powering down the EK80

You must NEVER switch off the EK80 by means of the on/off switch on the Processor Unit. You must ALWAYS exit the EK80 program by clicking the **Exit** button on the top bar.

### Context

When you do not use the EK80, switch off the display and the Processor Unit.

If you know that you will not use the EK80 for a long time, we recommend that you also switch off the transceiver(s). Use the on/off switch on the power supply, or disconnect the power cable.

### Procedure

- 1 Click the **Exit** button on the top bar.

Observe that the EK80 program closes down.

- 2 If the Processor Unit does not switch itself off automatically, use the functionality provided by the operating system to switch it off manually.



- 3 Switch off the display(s).

If required, refer to the instructions provided by the display manufacturer.

- 4 Switch off the transceiver(s).

The transceiver is not provided with an on/off switch.

Unless a dedicated solution has been provided during the installation to facilitate power on/off, you can leave the transceiver(s) on. However, if you know that the EK80 is not to be used for a longer period of time, disconnect the power to the transceiver(s).

## Installation remarks

Use this space to document comments and remarks related to the installation. When the installation has been fully completed, and all functional tests have been performed to full satisfaction, representatives from all parties concerned must sign.

|                         |  |
|-------------------------|--|
| <b>Vessel/Customer:</b> |  |
| <b>Place and date:</b>  |  |
| <b>Comments:</b>        |  |

## Signatures

| Installation performed by | Company/Position | Date | Signature |
|---------------------------|------------------|------|-----------|
|                           |                  |      |           |
| Installation accepted by  | Company/Position | Date | Signature |
|                           |                  |      |           |

# Drawing file

## Topics

[About the drawings in the drawing file, page 193](#)

[Wide Band Transceiver \(WBT\) outline dimensions, page 194](#)

[Processor Unit outline dimensions, page 196](#)

[WBT Cabinet outline dimensions, page 200](#)

[GPT Transducer connector wiring, page 204](#)



## About the drawings in the drawing file

Drawings relevant for EK80 installation are provided.

### Note

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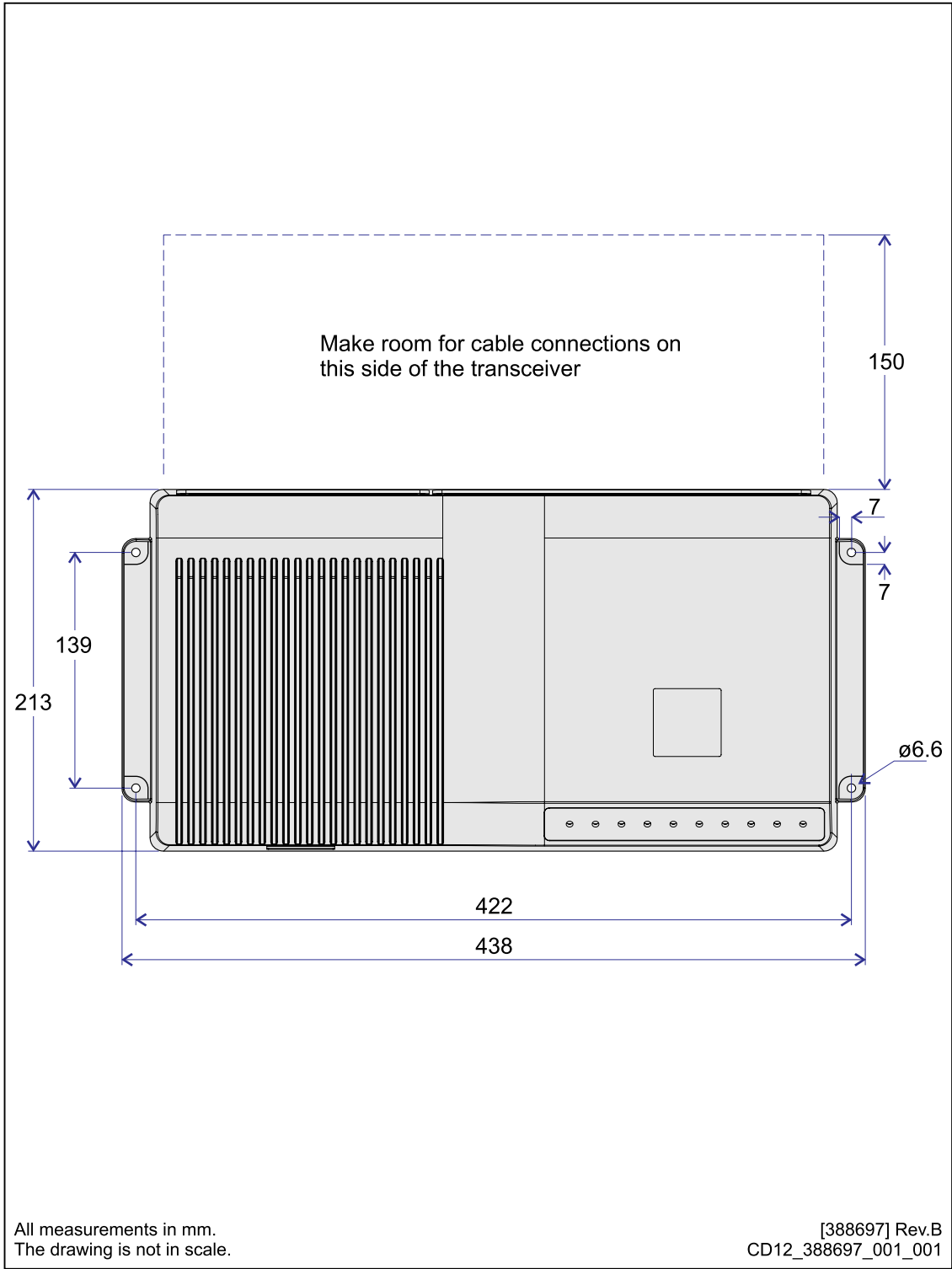
*These drawings are for information and planning purposes only. They are not in scale. All dimensions are in mm unless otherwise is noted. The original installation drawings are available on PDF and/or AutoCad's DWG format.*

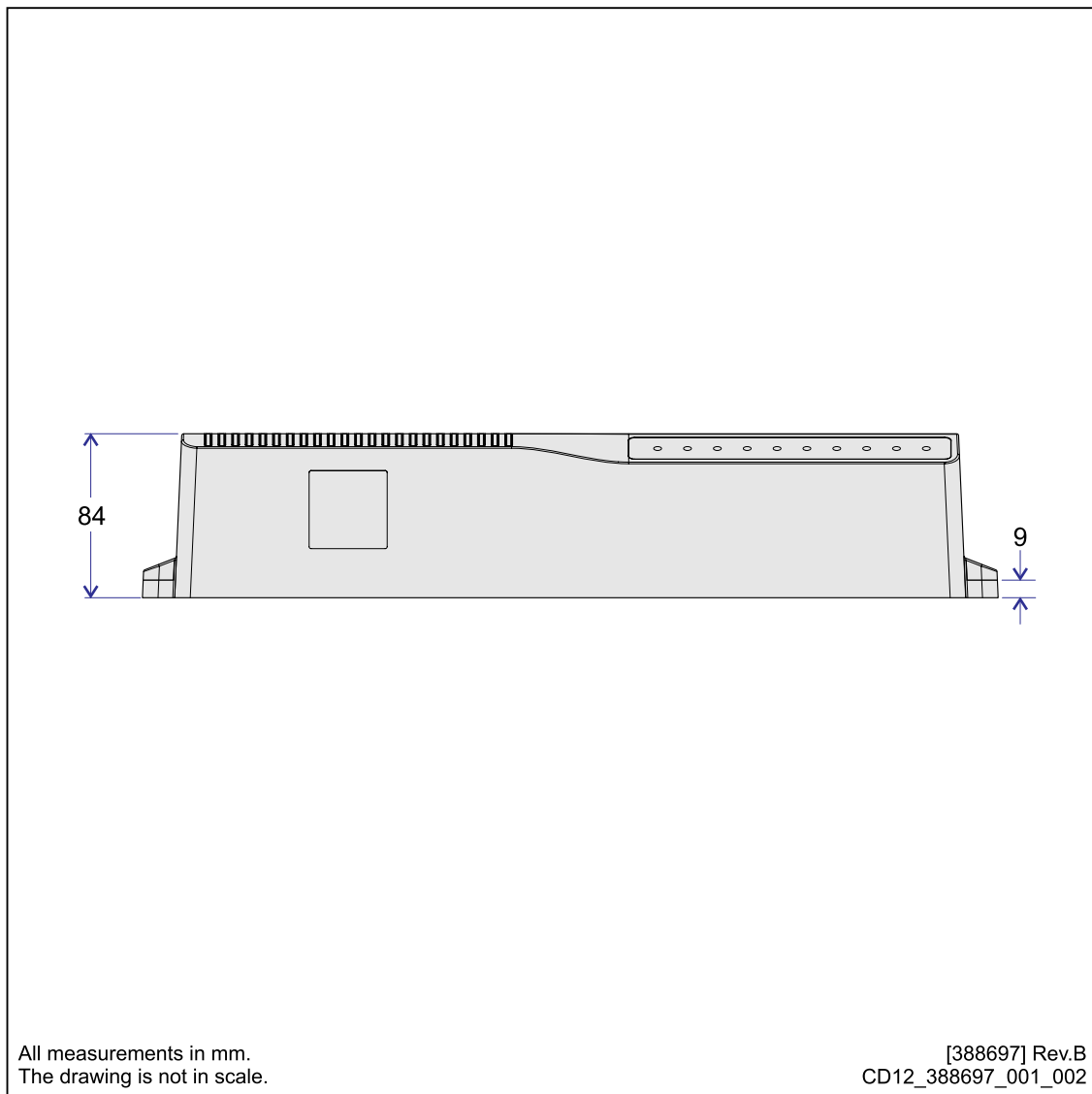
*The original drawings can be downloaded from our website.*

- <http://www.simrad.com/ek80>
-

# Wide Band Transceiver (WBT) outline dimensions

Drawing 388697 (2 pages)





### Related topics

[Wide Band Transceiver \(WBT\) description, page 19](#)

[Basic items provided with a standard delivery, page 25](#)

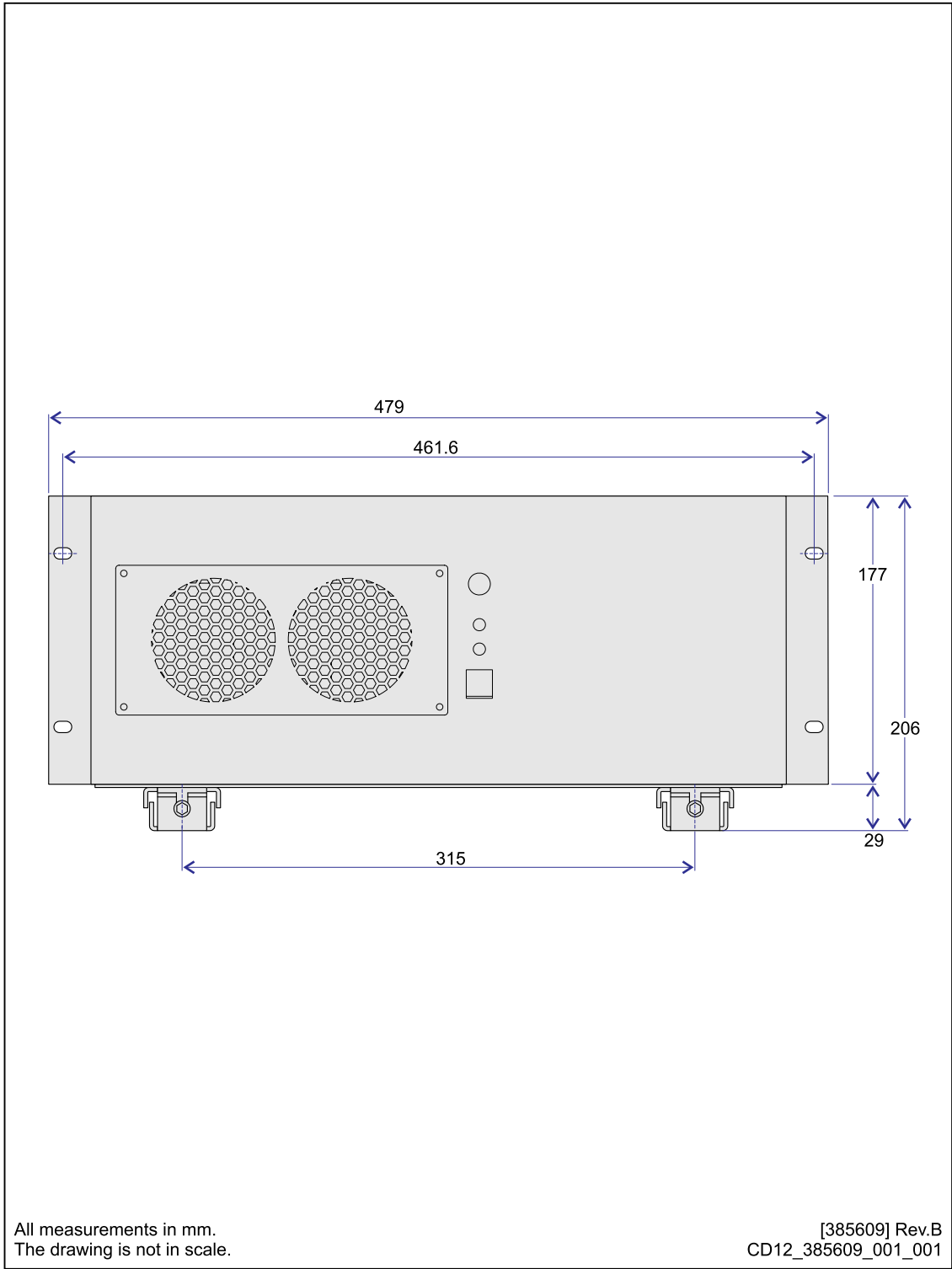
[Installing the Wide Band Transceiver \(WBT\) using the integrated brackets, page 51](#)

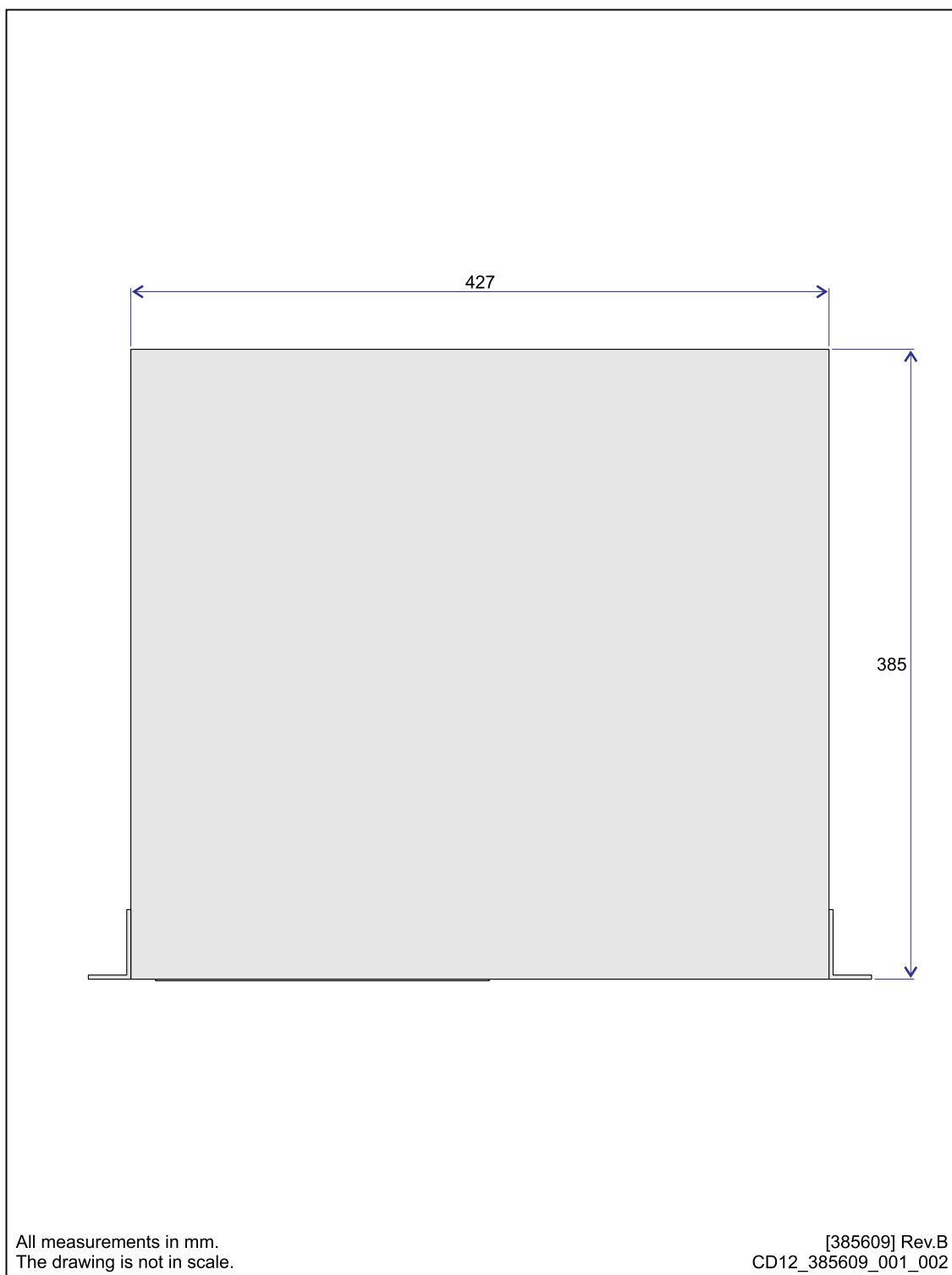
[Installing the Wide Band Transceiver \(WBT\) in a 19-inch rack, page 53](#)

[Weights and outline dimensions, page 208](#)

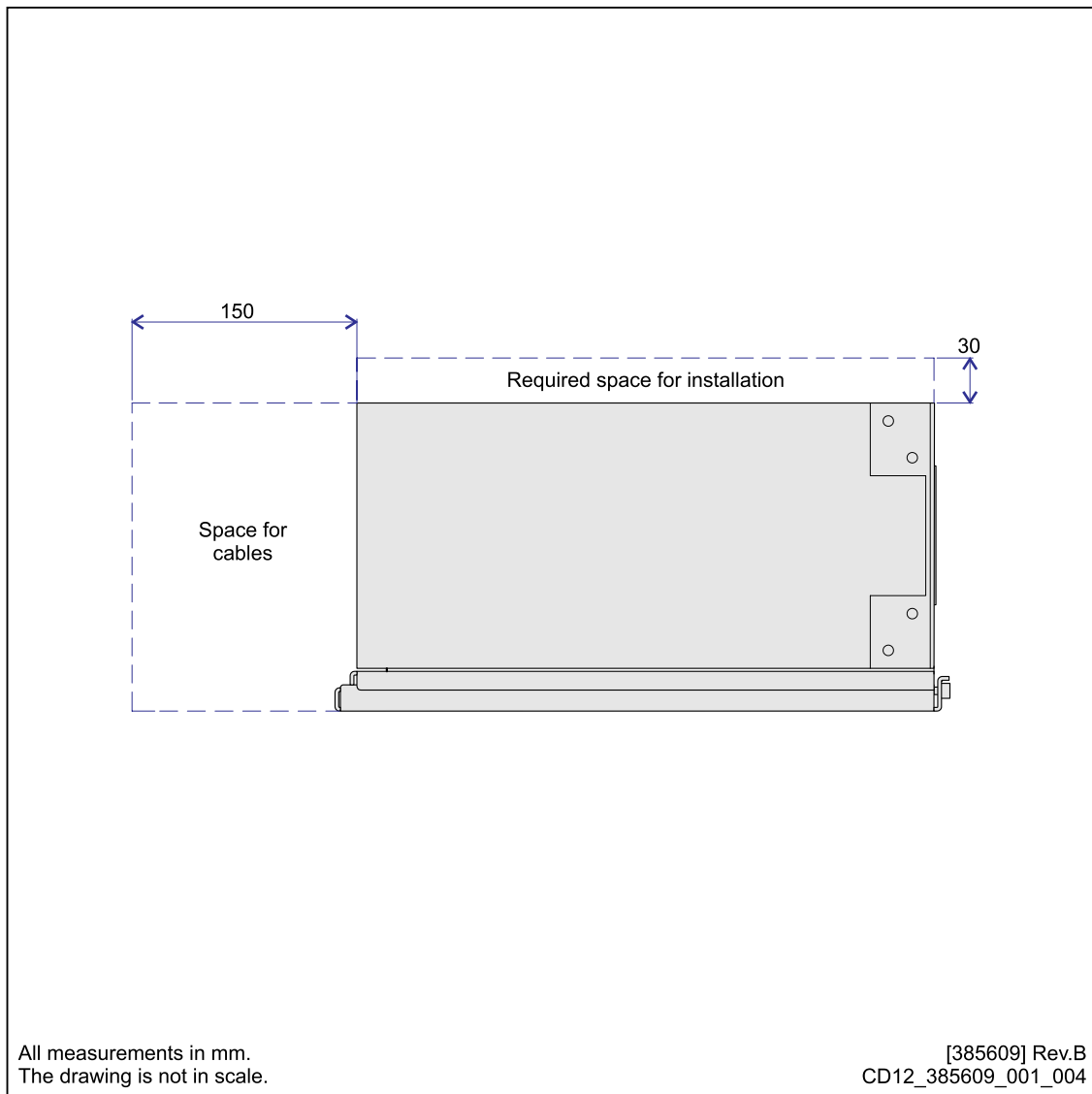
# Processor Unit outline dimensions

Drawing 385609 (4 pages)









### Related topics

[Processor Unit description, page 18](#)

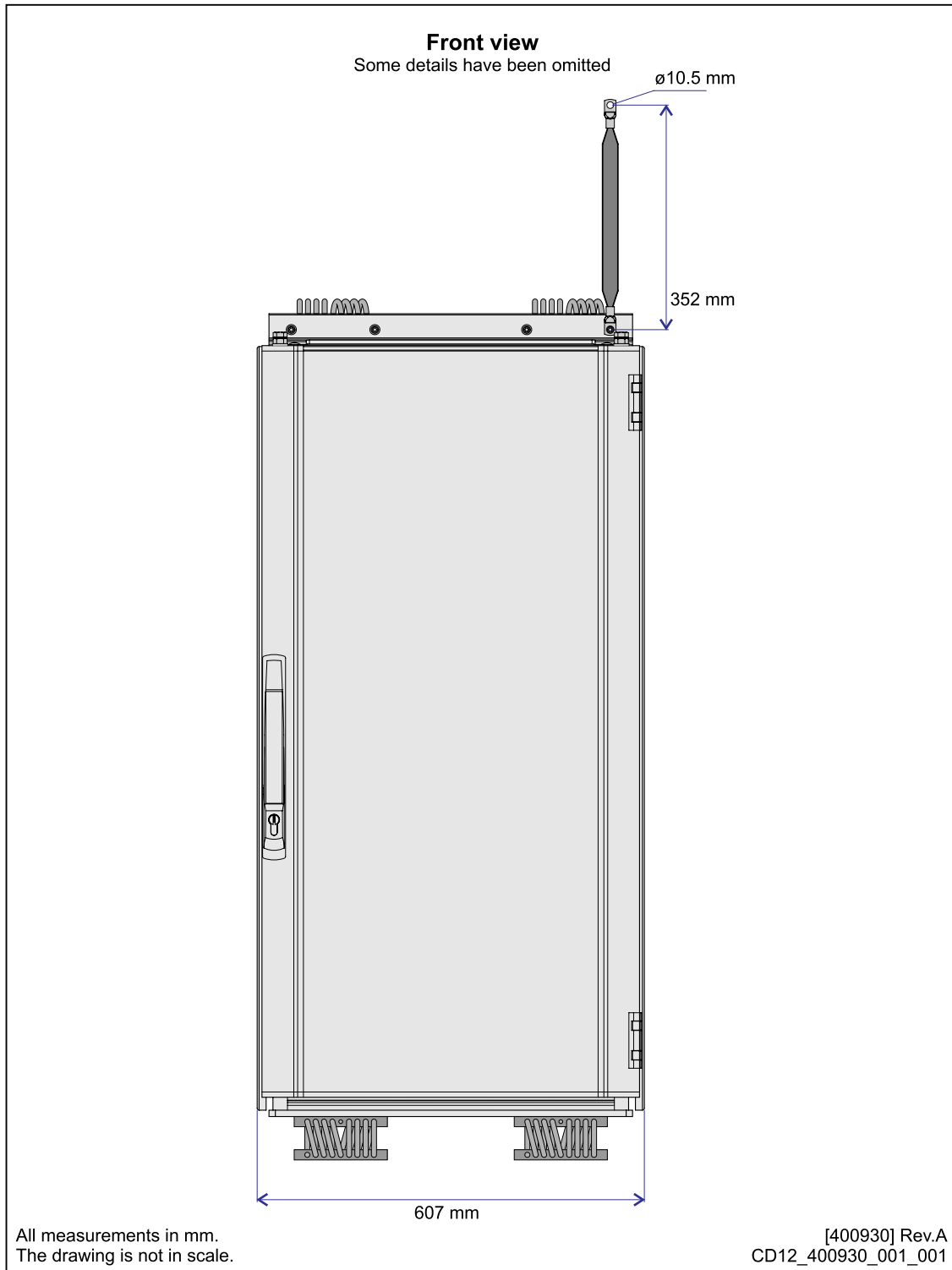
[Additional required items, page 26](#)

[Installing the Enix Processor Unit, page 60](#)

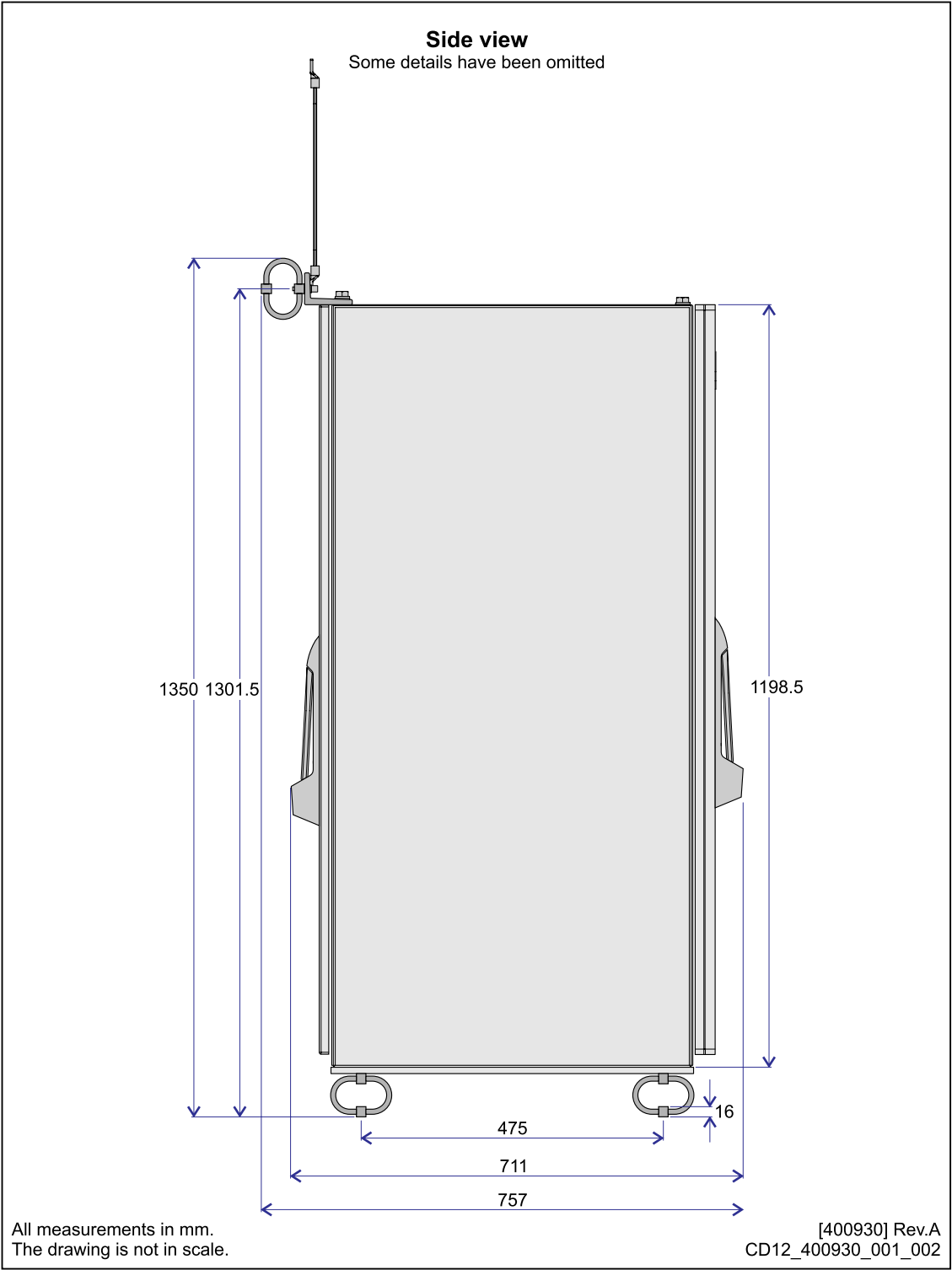
[Weights and outline dimensions, page 208](#)

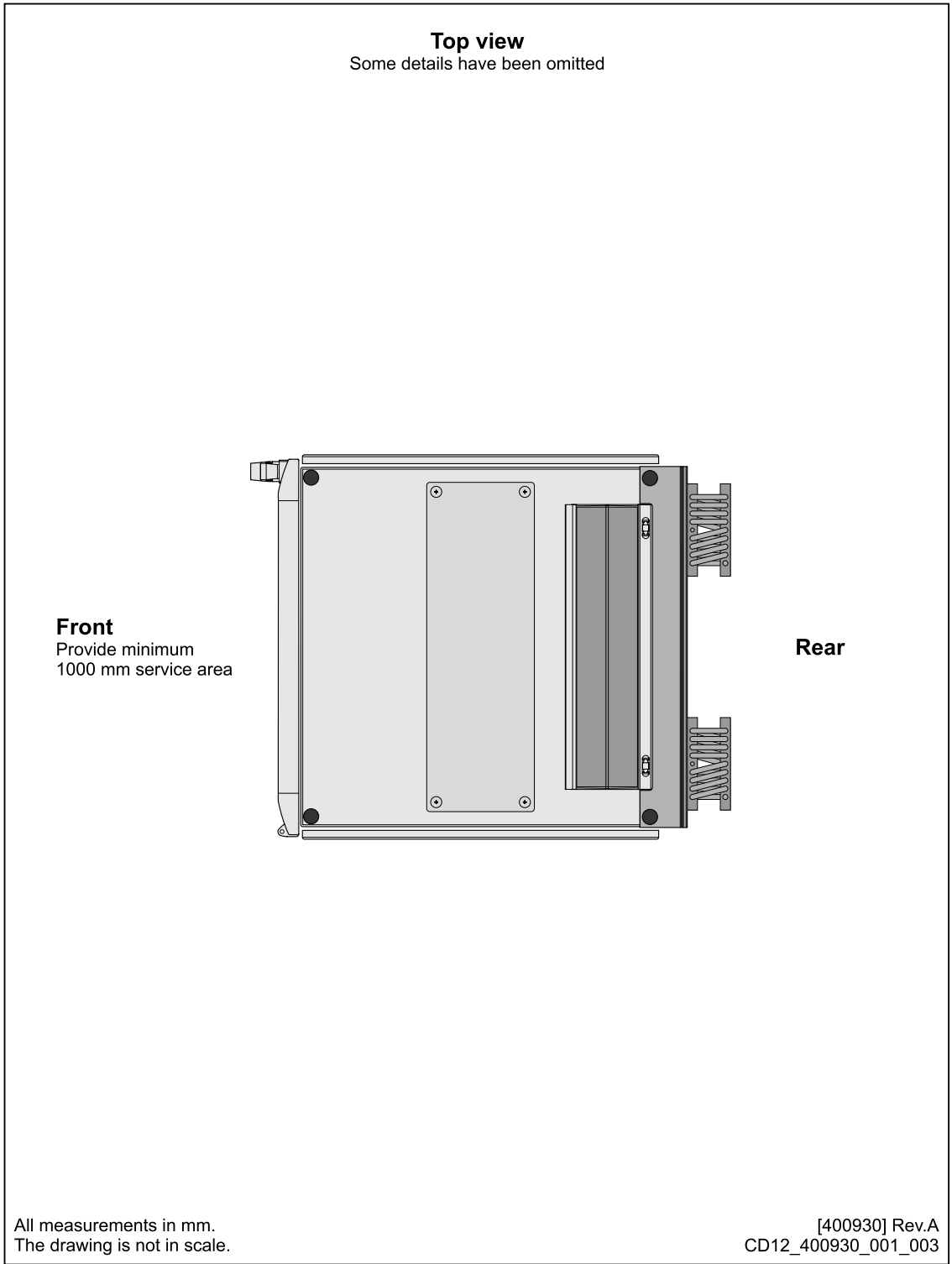
## WBT Cabinet outline dimensions

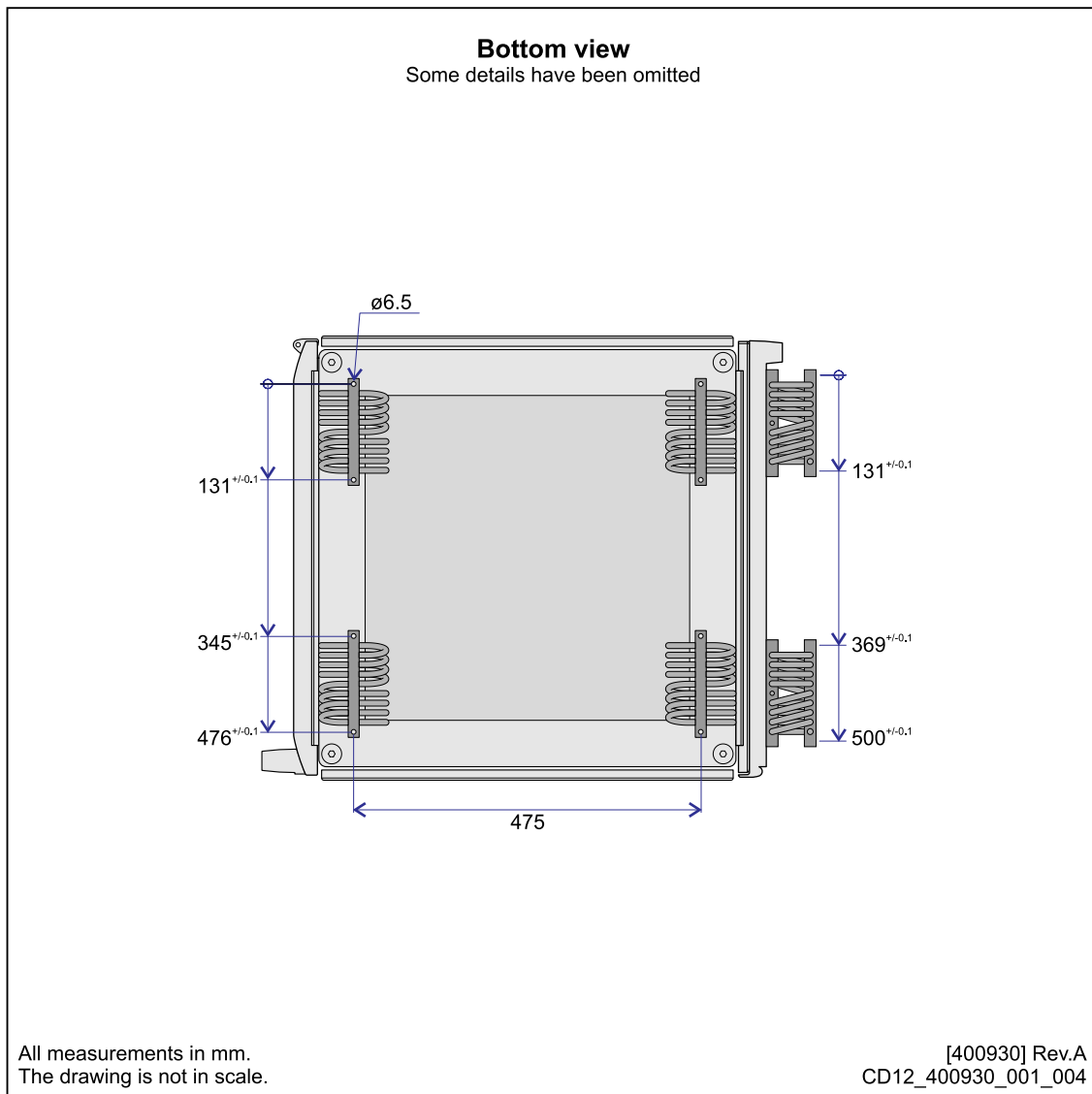
Drawing 400930 (4 pages)











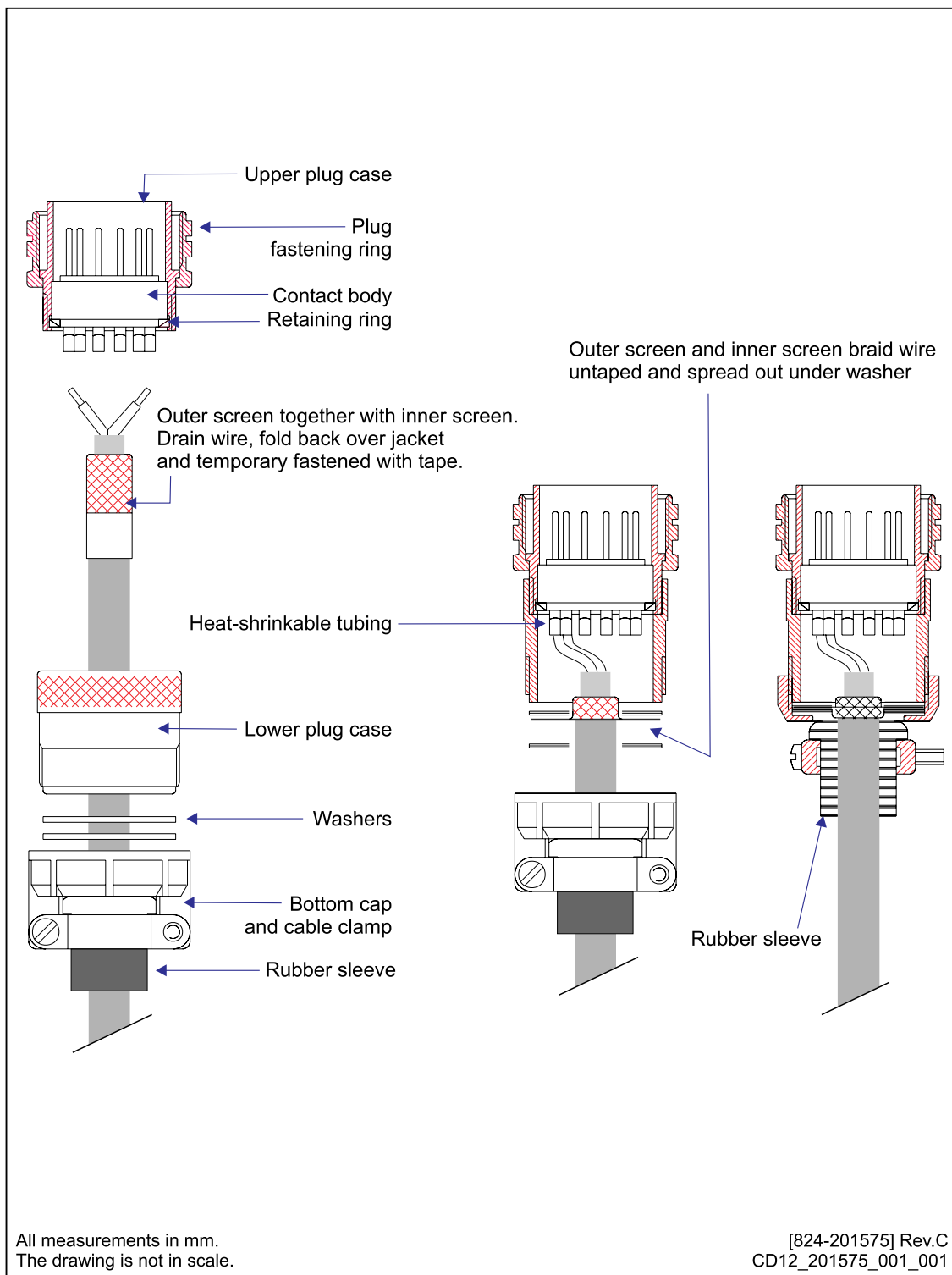
### Related topics

[Additional optional items, page 27](#)

[Mounting the WBT Cabinet, page 62](#)

## GPT Transducer connector wiring

Drawing 201575.



# Technical specifications

## Topics

[Introduction, page 206](#)

[Interface specifications, page 206](#)

[Weights and outline dimensions, page 208](#)

[Power requirements, page 210](#)

[Environmental requirements, page 211](#)

[Compass safe distances, page 212](#)

[Minimum computer requirements, page 212](#)

[Minimum technical requirements for display, page 214](#)

## Introduction

The technical specifications summarize the main functional and operational characteristics of the Simrad EK80 Scientific wide band echo sounder, as well as information related to power requirements, physical properties and environmental conditions.

### Note

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*In Kongsberg Maritime AS, we are continuously working to improve the quality and performance of our products. Technical specifications may therefore be changed without prior notice.*

---

## Interface specifications

The EK80 will interface with peripheral systems and sensors using standard and/or proprietary datagram formats.

### Supported datagram formats for position information

The EK80 supports the following datagram formats for position information.

- **Auto**

The EK80 will read all relevant datagrams. If the specified information is provided to the system on more than one datagram format, a built-in priority list will be used.

- **GGA**

This NMEA datagram format contains time, position and fix related data from a global positioning system (GPS).

- **GLL**

This NMEA datagram format is used to transfer latitude and longitude of vessel position, time of position fix, and status from a global positioning system (GPS).

- **RMC**

This NMEA datagram format contains time, date, position, course and speed data provided by a global navigation satellite system (GNSS) receiver.

### Supported datagram formats for speed information

The EK80 supports the following datagram format for speed information.

- **Auto**

The EK80 will read all relevant datagrams. If the specified information is provided to the system on more than one datagram format, a built-in priority list will be used.

- **RMC**

This NMEA datagram format contains time, date, position, course and speed data provided by a global navigation satellite system (GNSS) receiver.

### **Supported datagram formats for distance information**

The EK80 supports the following datagram format for vessel distance information.

- **VLW**

This NMEA datagram format contains the distance travelled relative to the water and over the ground.

### **Supported datagram formats for heading information**

The EK80 supports the following datagram format for vessel heading information.

- **RMC**

This NMEA datagram format contains time, date, position, course and speed data provided by a global navigation satellite system (GNSS) receiver.

### **Supported datagram formats for motion sensor information**

The EK80 supports the following datagram formats from a motion sensor.

- **MotionBinary**

This is a proprietary format created by Kongsberg Maritime to interface motion sensors.

- **MotionASCII**

This is a proprietary format created by Kongsberg Maritime to interface motion sensors.

### **Supported datagram formats for sound speed sensors**

The EK80 supports the following datagram format from a sound speed sensor.

- **AML**

This is a third party proprietary datagram format. It was created by AML Oceanographic (<http://www.amloceanographic.com>) for use with their sound speed sensors.

### **Supported datagram format for annotations**

The EK80 supports the following datagram format for annotations.

- **ATS**

This is a proprietary format developed by Kongsberg Maritime for use with annotations

### **Supported datagram formats for depth output**

The EK80 supports the following datagram formats for depth output.

- **DBS**

This NMEA datagram format provides the current depth from the surface. The datagram is no longer recommended for use in new designs.

- **DBT**

This NMEA datagram format provides the water depth referenced to the transducer.

- **DPT**

This NMEA datagram format contains water depth relative to the transducer and offset of the measuring transducer.

- **Simrad**

This is the proprietary "EK500 Depth" datagram format created by Kongsberg Maritime to contain depth data.

- **Atlas**

This is a third party proprietary datagram format for depth information. It was created by Atlas Elektronik (<https://www.atlas-elektronik.com>) for use with their echo sounders.

### Processed data formats

The following processed data output formats are available:

- **None**

- **XYZ**

This is processed and interpolated xyz data in ASCII format. Note that navigation input must be available.

- **EK500**

This is the proprietary **EK500** datagram format. The datagrams consists of user defined excerpts of the processed sample data (pixel data), ie the backscatter value of the targets. The echograms are stored as time tagged datagrams in separate files.

## Weights and outline dimensions

The weights and outline dimension characteristics summarize the physical properties of the Simrad EK80 Scientific wide band echo sounder.

### Note

---

*For more detailed information about the physical dimensions, see the Drawing file.*

---



### Processor Unit

- **Make and model:** Simrad Enix
- **Outline dimensions:**
  - **Depth:** 385 mm
  - **Width:** 479,6 mm (fits in a 19" rack)
  - **Height:** 177 mm
- **Weight:** approximately 16 kg

The technical specifications are those valid for the computer that may be ordered from Kongsberg Maritime as a part of the EK80 delivery. For specifications related to a locally purchased computer, refer to the documentation provided with the unit.

### Transceiver Unit

- **Type:** Wide Band Transceiver (WBT)
- **Outline dimensions**
  - **Depth:** 213 mm
  - **Width:** 438 mm
  - **Height:** 84 mm
- **Weight:** Approximately 5 kg

### Ethernet switch

- **Manufacturer:** Black Box
- **Manufacturer's website:** <http://www.blackbox.co.uk>
- **Type:** LBS209AE-R2
- **Physical dimensions:**
  - **Height:** 44 mm
  - **Width:** 22.8 mm
  - **Depth:** 123 mm
- **Weight:** 1.2 kg

These specifications were taken from the manufacturer's website in June 2013. The specifications may be altered without prior notice.

The technical specifications are those valid for the Ethernet switch that may be ordered from Kongsberg Maritime as a part of the EK80 delivery. For specifications related to a locally purchased Ethernet switch, refer to the documentation provided with the unit.

### Display

The display is not a part of the EK80 scope of supply, and it is not manufactured by Kongsberg Maritime. Refer to the documentation provided by the manufacturer.

### Related topics

[Processor Unit outline dimensions, page 196](#)

[Wide Band Transceiver \(WBT\) outline dimensions, page 194](#)

## Power requirements

The power specifications summarize the supply power requirements for the Simrad EK80 Scientific wide band echo sounder.

### Processor Unit

- **Make and model:** Simrad Enix
- **Voltage requirement:** 115/230 Vac / 47 to 63 Hz / single phase
- **Maximum voltage deviation:** 15%
- **Maximum transient:** 20% of nominal voltage, recovery time 3 s
- **Power consumption:** Approximately 500 W @ 230 Vac

The technical specifications are those valid for the computer that may be ordered from Kongsberg Maritime as a part of the EK80 delivery. For specifications related to a locally purchased computer, refer to the documentation provided with the unit.

### Transceiver Unit

- **Type:** Wide Band Transceiver (WBT)
- **Voltage requirement:** 12 to 15 Vdc, 5A

A suitable power supply for 230/115 Vac operation is provided with the EK80 delivery.

### Ethernet switch

- **Manufacturer:** Black Box
- **Manufacturer's website:** <http://www.blackbox.co.uk>
- **Type:** LBS209AE-R2
- **Voltage requirement:** 100 to 240 Vac

These specifications were taken from the manufacturer's website in June 2013. The specifications may be altered without prior notice.

The technical specifications are those valid for the Ethernet switch that may be ordered from Kongsberg Maritime as a part of the EK80 delivery. For specifications related to a locally purchased Ethernet switch, refer to the documentation provided with the unit.

### Display

The display is not a part of the EK80 scope of supply, and it is not manufactured by Kongsberg Maritime. Refer to the documentation provided by the manufacturer.

## Environmental requirements

The environmental specifications summarize the temperature and humidity requirements for the Simrad EK80 system.

### Processor Unit

- **Make and model:** Simrad Enix
- **Operational temperature:** –15 to +55°C
- **Storage temperature:** –20 to +70°C
- **Relative humidity:** 10 to 95% relative non-condensing
- **Certificates:**
  - IEC 60945
  - IACS E10

The technical specifications are those valid for the computer that may be ordered from Kongsberg Maritime as a part of the EK80 delivery. For specifications related to a locally purchased computer, refer to the documentation provided with the unit.

### Transceiver Unit

- **Type:** Wide Band Transceiver (WBT)
- **Operational temperature:** 0 to +50°C
- **Storage temperature:** –40 to +70°C
- **Relative humidity:** 5 to 95% relative non-condensing

### Ethernet switch

- **Manufacturer:** Black Box
- **Manufacturer's website:** <http://www.blackbox.co.uk>
- **Type:** LBS209AE-R2
- **Operational temperature:** 0 to +50°C
- **Relative humidity:** 10 to 90% relative non-condensing

These specifications were taken from the manufacturer's website in June 2013. The specifications may be altered without prior notice.

The technical specifications are those valid for the Ethernet switch that may be ordered from Kongsberg Maritime as a part of the EK80 delivery. For specifications related to a locally purchased Ethernet switch, refer to the documentation provided with the unit.

### Display

The display is not a part of the EK80 scope of supply, and it is not manufactured by Kongsberg Maritime. Refer to the documentation provided by the manufacturer.

## Compass safe distances

If you place any of the EK80 units on the bridge, you must observe the distance to the compass.

### Processor Unit

- **Make and model:** Simrad Enix
- **Standard compass:** 200 cm
- **Other compass:** 140 cm

The technical specifications are those valid for the computer that may be ordered from Kongsberg Maritime as a part of the EK80 delivery. For specifications related to a locally purchased computer, refer to the documentation provided with the unit.

### Transceiver Unit

- **Type:** Wide Band Transceiver (WBT)
- **Compass safe distance:** 30 cm

### WBT Power Supply

- **Type:** WBT Power Supply
- **Compass safe distance:** 30 cm

### Display

The display is not a part of the EK80 scope of supply, and it is not manufactured by Kongsberg Maritime. Refer to the documentation provided by the manufacturer.

### Related topics

[Installing the Wide Band Transceiver \(WBT\) using the integrated brackets, page 51](#)

[Installing the Wide Band Transceiver \(WBT\) in a 19-inch rack, page 53](#)

[Installing the Wide Band Transceiver \(WBT\) power supply, page 55](#)

[Installing the display, page 57](#)

[Installing a commercial computer, page 58](#)

[Mounting the WBT Cabinet, page 62](#)

[Installing the Enix Processor Unit, page 60](#)

## Minimum computer requirements

Although a computer can be ordered from Kongsberg Maritime as a part of the EK80 delivery, it is also possible to purchase one locally.

If you purchase a computer locally, make sure that the chosen model meets the functional and technical requirements.

It is important to make sure that the chosen computer model is relatively new with sufficient processing power, a high performance graphic adapter, and a high speed network adapter.

The computer must be able to facilitate the various interface requirements made by the EK80, and you may need to add extra Ethernet and serial adapters.

**Note**

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*The computer design and construction must allow for maritime use, easy access to connectors, parts and cables, and a safe installation.*

---

A laptop computer may be used as long as it meets the functional and technical requirements.

The minimum technical requirements are:

- **Memory capacity:** Minimum 4 Gb
- **Hard disk capacity:** If you wish to record raw data, you must either install a large hard disk, use peripheral storage devices, or connect the Processor Unit to the ship's network.
- **Graphic adapter:**
  - Minimum resolution is 1280 x 1024 pixels.
  - Recommended resolution is 1920 x 1200 pixels or better.

- **Ethernet adapter(s)**

The Processor Unit must offer minimum one 1 Gb/s Ethernet adapter. Two are required if the Processor Unit shall also be connected to a local area network (LAN).

A high quality Ethernet adapter is required.

The Ethernet adapter communicating with the Wide Band Transceiver (WBT) must offer a **Receive Buffers** function. This parameter must be set to its maximum value if more than one Wide Band Transceiver (WBT) is used.

- **Ethernet interfaces:** The Processor Unit must offer minimum one 1 Gb/s Ethernet adapter. Two are required if the Processor Unit shall also be connected to a local area network (LAN).
- **Serial interfaces:** One or more serial line interfaces are also required. The number of serial lines depend on the interface requirements.
- **Operating system:** The EK80 software has been designed for 64-bit Windows® 7. It will also work on 32-bit systems. Older operating systems are not supported.

A large number of commercial graphic adapters are available, and we have not tested all of them. Even adapters that meet the minimum specifications may fail with the EK80 software. We welcome any feedback with comments or experiences with graphic adapters.

#### Tip

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*If you have connected a USB-to-serial adapter to the Processor Unit, do not remove it while the EK80 is running. Also, do not move the adapter to a different USB socket on the Processor Unit.*

---

#### Related topics

[Processor Unit description, page 18](#)

[Additional required items, page 26](#)

## Minimum technical requirements for display

Unless specifically ordered, the EK80 is not provided with a display. This item must then be purchased locally.

You can use one or two displays on your EK80 Processor Unit depending on personal and operational preferences.

#### Note

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*It is important that the chosen display meets the technical system requirements. The display design and construction must allow for maritime use, easy access to cables, and a safe installation.*

---

The minimum technical requirements are:

- **Resolution:**
  - **Minimum:** 1280 x 1024 pixels.
  - **Recommended:** 1920 x 1200 pixels or better
- **Video interface:** These must match the video output formats provided by the Processor Unit.

The Processor Unit offers video output on several formats. Investigate your options before purchasing a display.
- **Physical size:** This depends on personal and operational preferences.

The EK80 software supports 9:16 displays.

#### Related topics

[Display description, page 17](#)

[Additional required items, page 26](#)

# Equipment handling

Observe these 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. The phrase *box* is used to describe all kinds of cases, wooden or cardboard boxes etc used to hold the *unit*.

## Topics

[Transporting Kongsberg Maritime equipment, page 216](#)

[Lifting units and transportation boxes, page 217](#)

[Inspection of units and transportation boxes after arrival, page 218](#)

[Specifications for storage prior to installation or use, page 219](#)

[Unpacking instructions, page 220](#)

[Specifications for storage after unpacking, page 225](#)

[Packing instructions for storage or shipping, page 226](#)

[Storage after use, page 227](#)

[Handling instructions for printed circuit boards and electronic modules, page 229](#)

[Disposal of old products, page 234](#)

## Transporting Kongsberg Maritime equipment

Unless otherwise stated in the accompanying documentation, electronic, electromechanical and mechanical units supplied by Kongsberg Maritime can be only transported using methods approved for delicate and fragile equipment.

### Prerequisites

Transportation methods approved for delicate equipment includes transportation by road, rail, air or sea.

### Context

The units are to be transported in accordance with general or specific instructions for the appropriate unit(s), using pallets, transport cases, wooden boxes, or carton boxes as appropriate.

Observe the packing instructions.

### 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.*

---

### Procedure

- 1 Ensure that all local transportation is done according to the same specifications as for the initial delivery.
- 2 Make sure that the box containing the unit is kept dry at all times, and sheltered from the weather.

It must not be subjected to shocks, excessive vibration or other rough handling. The box will normally be marked with text or symbols indicating which way it is to be placed. Follow the instructions provided, and make sure that the box is always placed with its “top” facing upwards.

- 3 Make sure that the box is not used for any purpose for which it was not intended (step, table, etc.).

In the absence of other information, no other boxes must be stacked on top of it.

- 4 Handle all boxes and units with care.

### Note

---

*Due to the nature of Kongsberg Maritime’s products, and the extensive use of delicate electronic parts, all units and boxes must be regarded and handled as fragile equipment.*

---



**Related topics**

[Packing instructions for storage or shipping, page 226](#)

[Circuit board unpacking and handling, page 230](#)

[Lifting units and transportation boxes, page 217](#)

## Lifting units and transportation boxes

Some of the boxes used to hold equipment units may be heavy. Use caution when lifting.

**Prerequisites**

Units and boxes may be heavy. Make sure that you have the necessary equipment required for lifting heavy items. Persons using the lifting equipment must be skilled and have the relevant certificate(s).

**Context**

A heavy box will normally be marked with its weight. The weights of other boxes in the shipment will normally be entered on the packing list(s).

Heavy units may be equipped with dedicated lifting lugs for transportation by crane within the workshop or installation area.

**Note**

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*Observe the local rules and regulations related to the use of lifting equipment.*

---

**Procedure**

- 1 Check the weight of the box or unit before you attempt to lift it.
- 2 Make sure that you have the relevant lifting apparatus required, and that this equipment is approved and certified for the load.
- 3 If you need to use a crane:
  - a Check the applicable weight certificate for the crane.
  - b Check the security of the lifting lugs.
  - c If the unit to be lifted is provided with dedicated lifting lugs, make sure that all available lugs are used.
  - d Make sure that the unit remains under full control during the lifting operation.  
This is important to avoid damage to the unit, equipment or personnel.
- 4 If you need to use a forklift truck:
  - a Check the applicable weight certificate for the truck.
  - b Check the limitations for lifting height and angles.
  - c Pay special attention to the position of the unit's centre of gravity.

- d Make sure that the unit is properly secured to the truck during the lifting and transportation operations.
- 5 Handle all units and boxes with care.

**Note**

---

*Due to the nature of Kongsberg Maritime's products, and the extensive use of delicate electronic parts, all units and boxes must be regarded and handled as fragile equipment.*

---

**Related topics**

[Transporting Kongsberg Maritime equipment, page 216](#)

[Packing instructions for storage or shipping, page 226](#)

## Inspection of units and transportation boxes after arrival

A visual inspection must be done immediately after the box(es) have arrived at their destination.

**Prerequisites**

If you suspect that the equipment has been damaged during the transport, request that a representative of the carrier is present during the inspection.

**Procedure**

- 1 Check all boxes (wooden or cardboard boxes, plastic bags and/or pallets) for physical damage.  
Look for signs of dropping, immersion in water or other mishandling.
- 2 If external damage is detected, open the box to check its contents.  
Request that a representative of the carrier to be present while the box is opened, so any transportation damage can be identified and documented.
- 3 If a unit has been damaged, prepare an inspection report stating the condition of the unit and actions taken.  
Describe the damage, and collect photographic evidence if possible. Return the inspection report to Kongsberg Maritime as soon as possible.
- 4 If 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.

## Specifications for 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.

### General specifications

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 box.
- 2 Ensure that the units are clearly separated in the shelves and that each unit is easily identifiable.
- 3 The box must not be used for any purpose for which it was not intended (work platform, steps, table etc.).
- 4 Boxes must not be placed on top of each other, unless specific markings permit this.
- 5 Boxes must not be placed directly on a dirt floor.
- 6 Do not open a box for inspection unless special circumstances permit so.  
“Special circumstances” may be suspected damage to the box and its content, or inspections by civil authorities.
  - a If a unit is damaged, prepare an inspection report stating the condition of the unit and the actions taken. Describe the damage and collect photographic evidence if possible. Re-preserve the equipment.
  - b If the unit is not damaged, check the humidity absorbing material. If required, dry or replace the bags, then re-pack the unit according to the packing instructions.
- 7 If a box 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 room/area’s mean temperature must not be lower than -10° C, and not warmer than +50° C. If other limitations apply, the crates will be marked accordingly.
- 10 Boxes must not be exposed to moisture from fluid leakages.
- 11 Boxes must not be exposed to direct sunlight or excessive warmth from heaters.
- 12 Boxes must not be subjected to excessive shock and vibration.
- 13 If the unit contained in a box holds 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 or battery handling procedures for further details.*

---

### Temperature protection

Any units that requires protection against extreme temperatures are identified as such in the applicable documentation. The box used to transport and store such units are clearly marked, for example:

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

Other temperature limits may be used if applicable.

If a unit needs temperature protection, the box to be used for storage and transportation must be lined on all walls, base and lid, using minimum 5 cm thick polyurethane or polystyrene foam.

Most system units can normally be stored in temperatures between -30° C and +70° C. Refer to the relevant technical specifications for details.

### Note

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*Unless otherwise specified, transducers and hydrophones must not be stored in temperatures below -10° C and above +50° C.*

---

## Unpacking instructions

Prior to installation or use, electronic, electromechanical and mechanical units must be unpacked from their transport boxes. It is important that this unpacking is done according to the relevant instructions, and without inflicting damage to the equipment.

### Topics

[Unpacking standard parts and units, page 221](#)

[Unpacking mechanical units, page 222](#)

[Unpacking electronic and electromechanical units, page 223](#)

[Unpacking transducers, page 224](#)

## Unpacking standard parts and units

Prior to installation or use, parts and units must be inspected, and then unpacked from their transport boxes. It is important that this unpacking is done without inflicting damage to the equipment.

### Context

This procedure provides the basic tasks of unpacking units (main unit, spare parts etc) from boxes shipped from Kongsberg Maritime.

### Note

---

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

*Do not use a knife to open cardboard boxes - the contents may be located close to the surface, and can then be damaged by the blade.*

---

### Procedure

- 1 Check the carton before opening it to ensure it shows no signs of dropping, immersion in water or other mishandling.
  - 1 If external damage is detected, open the box to check its contents.
  - 2 Request that a representative of the carrier to be present while the box is opened, so any transportation damage can be identified and documented.
  - 3 If a unit has been damaged, prepare an inspection report stating the condition of the unit and actions taken.

Describe the damage, and collect photographic evidence if possible. Return the inspection report to Kongsberg Maritime as soon as possible.
- 2 Place the box on a stable work bench or on the floor with the top of the box facing upwards.
- 3 In the absence of other instructions, always open the top of the carton first.

The contents of the box will normally have been lowered into the carton from above, so this will usually be the easiest route to follow. Be careful when you open the box, and make sure that the contents are not damaged. Do not use a knife to open cardboard boxes.
- 4 If the box 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 box has been closed using screws, always remove them using a screwdriver.

Do not attempt to force the lid open with a crowbar or similar tool.

- 6 Once the carton is open, carefully remove all loose packing and insulation material.
- 7 Check for user manuals and other documents that may have been added to the carton during packing.
- 8 Check also for special tools, door keys etc.

### Related topics

[Unpacking mechanical units, page 222](#)

[Unpacking electronic and electromechanical units, page 223](#)

[Unpacking transducers, page 224](#)

## Unpacking mechanical units

Prior to installation or use, mechanical units must be unpacked from their transport boxes. It is important that this unpacking is done without inflicting damage to the equipment.

### Prerequisites

Observe the procedure for unpacking of standard parts and units.

### Context

Mechanical and electromechanical units may be heavy.

A transducer must always be handled as a delicate item. Wrongful actions may damage the transducer beyond repair.

Observe these rules:

- **Do not** activate the transducer when it is out of the water.
- **Do not** lift the transducer by the cable.
- **Do not** step on the transducer cable.
- **Do not** handle the transducer roughly, avoid impacts.
- **Do not** expose the transducer to direct sunlight or excessive heat.
- **Do not** use high pressure water, sand blasting, metal tools or strong solvents to clean the transducer face.

### Procedure

- 1 Obtain the necessary lifting equipment, and make sure that the equipment is certified for the weight.
- 2 Lift the unit out of the transportation box.
- 3 Place it in a stable position on the floor/work bench.
- 4 Inspect the unit for visual damage.
- 5 Remove any packing material that may be inside the unit.
- 6 Collect and keep the relevant user manuals and/or documents provided with the unit.

**Related topics**

[Unpacking standard parts and units, page 221](#)

## Unpacking electronic and electromechanical units

Prior to installation or use, electronic and electromechanical units must be unpacked from their transport boxes. It is important that this unpacking is done without inflicting damage to the equipment.

**Prerequisites**

Observe the procedure for unpacking of standard parts and units.

**Context**

Electronic and electromechanical units will normally be wrapped in a clear antistatic plastic bag.

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.

**Note**

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*When you handle electronic circuit boards and modules, 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.*

---

**Procedure**

- 1 Lift the unit, in its bag, out of the box.

**Note**

---

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

---

- 2 Place it in a stable position on the floor or a work bench.
- 3 Inspect the unit for visual damage before opening the antistatic plastic bag.
- 4 Assuming all is well, open the bag and remove the unit.
- 5 If applicable, open the unit and check inside.
- 6 Remove any packing and desiccant material that may be inside the unit.
- 7 Collect and keep the relevant user manuals and/or documents provided with the unit.

**Related topics**

[Unpacking standard parts and units, page 221](#)

## Unpacking transducers

Prior to installation or use, sonar heads and hydrophones must be unpacked from their transport boxes. It is important that this unpacking is done without inflicting damage to the equipment.

### Prerequisites

Observe the procedure for unpacking of standard parts and units.

### Context

Transducers may be supplied mounted to a hull unit (if any), or packed separately. Sonar heads and hydrophones are normally packed and shipped in separate boxes. Boxes are identified by the order number and the serial number of the unit inside.

### Note

---

*Once a transducer, sonar head or hydrophone is unpacked, make sure that the body and the cabling are not exposed to any mechanical stress. Protect the transducer face with a padded cover plate to prevent damage.*

---

Transducers may be heavy.

A transducer must always be handled as a delicate item. Wrongful actions may damage the transducer beyond repair.

Observe these rules:

- **Do not** activate the transducer when it is out of the water.
- **Do not** lift the transducer by the cable.
- **Do not** step on the transducer cable.
- **Do not** handle the transducer roughly, avoid impacts.
- **Do not** expose the transducer to direct sunlight or excessive heat.
- **Do not** use high pressure water, sand blasting, metal tools or strong solvents to clean the transducer face.

### Procedure

- 1 Obtain the necessary lifting equipment, and make sure that the equipment is certified for the weight.
- 2 Lift the transducer, sonar head or hydrophone out of the transportation box.
- 3 Place it in a stable position on the floor/work bench.
- 4 Inspect the unit for visual damage.
- 5 Make sure that the relevant protection is kept in place until the final stages of the installation.
- 6 Collect and keep the relevant user manuals and/or documents provided with the unit.



- 7 Observe the handling rules for transducers.

### Related topics

[Unpacking standard parts and units, page 221](#)

## Specifications for storage after unpacking

The unit must whenever possible be stored in its original transportation crate until ready for installation.

### General specifications

During storage, each box must not be used for any purpose for which it was not intended (work platform, table, steps etc.).

Once unpacked, all 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 Kongsberg Maritime with the seal broken, we will assumed that the unit has been used, and the you will be billed accordingly.*

---

Each 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.

#### 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 or battery handling procedures for further details.*

---

### Temperature protection

Any units that requires protection against extreme temperatures are identified as such in the applicable documentation. The box used to transport and store such units are clearly marked, for example:

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

Other temperature limits may be used if applicable.

If a unit needs temperature protection, the box to be used for storage and transportation must be lined on all walls, base and lid, using minimum 5 cm thick polyurethane or polystyrene foam.

Most system units can normally be stored in temperatures between -30° C and +70° C. Refer to the relevant technical specifications for details.

**Note**

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*Unless otherwise specified, transducers and hydrophones must not be stored in temperatures below -10° C and above +50° C.*

---

## Packing instructions for storage or shipping

If a unit needs to be packed for storage or shipment, you must whenever possible use its original packing material and/or crate.

### Context

In the event that the original packing material is unavailable, observe this basic procedure. It applies to all cabinets, large or small units, and mechanical items.

Note that a dedicated procedure applies for circuit board handling and packaging.

Any units that requires protection against extreme temperatures are identified as such in the applicable documentation. The box used to transport and store such units are clearly marked, for example:

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

Other temperature limits may be used if applicable.

If a unit needs temperature protection, the box to be used for storage and transportation must be lined on all walls, base and lid, using minimum 5 cm thick polyurethane or polystyrene foam.

Most system units can normally be stored in temperatures between -30° C and +70° C. Refer to the relevant technical specifications for details.

**Note**

---

*Unless otherwise specified, transducers and hydrophones must not be stored in temperatures below -10° C and above +50° C.*

---

### Procedure

- 1 Clean and protect the unit as described in the relevant procedures.
- 2 Place the unit in a suitable cardboard box or wooden crate.

- 3 Make sure that the unit is well be protected against physical damage by means of shock-absorbing insulation mats.
- 4 Take the necessary precautions if the unit must be protected against high or low temperatures, and mark the box accordingly.
- 5 Mark the box clearly to identify its contents.
- 6 Stored the box in a dry and dust-free area.

**Related topics**

[Transporting Kongsberg Maritime equipment, page 216](#)

[Lifting units and transportation boxes, page 217](#)

[Circuit board unpacking and handling, page 230](#)

[Returning a printed circuit board or an electronic module to Kongsberg Maritime, page 231](#)

[About Electrostatic Discharge \(ESD\), page 232](#)

## 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.

**Topics**

[Cleaning an electronic cabinet or unit, page 227](#)

[Cleaning a mechanical or electromechanical unit, page 228](#)

## Cleaning an electronic cabinet or unit

If an electronic cabinet has been exposed to salt atmosphere, it must be thoroughly cleaned both internally and externally to prevent corrosion.

**Prerequisites**

In order to clean an electronic cabinet or unit, you will need relevant tools and detergents. You will also need some amount of desiccant material.

**Procedure**

- 1 Wipe off the external surfaces of the unit using a damp lint free cloth and a mild detergent.

**Note**

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*Do not use excessive amounts of water. The unit may not be water tight.*

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- 2 On completion, dry the unit thoroughly.
- 3 Inspect all surfaces for signs of corrosion, flaking, bubbling paint, stains etc.
- 4 Clean damaged or suspect areas, prepare and preserve these areas using the correct preservation mediums.
- 5 Open the unit.
- 6 Use a dedicated vacuum cleaner with an anti static nozzle to remove all dust from inside the unit.

**Note**

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*Use extreme care with delicate circuit boards and units. Make sure that these are not damaged in the process.*

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- 7 Wipe clean all exposed cables, and check for damage.  
If a cable shows signs of wear or ageing, contact Kongsberg Maritime for advice.
- 8 Check if the unit contains 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 or battery handling procedures for further details.*

---

- 9 Place a suitably sized bag of desiccant material (silica gel or similar) into the unit to keep the electronic components as dry as possible.
- 10 Close the cabinet firmly before storage and/or shipment.
- 11 Secure and protect loose parts (shock absorbers, plug and sockets, protruding objects etc).
- 12 If the electronic cabinet shall be sent to storage or shipped, spray it externally using a corrosion inhibitor (for example a light oil) prior to packing.

## Cleaning a mechanical or electromechanical unit

If an mechanical unit has been exposed to a salt atmosphere, it must be thoroughly cleaned to prevent corrosion.

### Prerequisites

In order to clean a mechanical or electromechanical unit, you will need relevant tools and detergents.

### Procedure

- 1 Wipe off the external surfaces of the mechanical unit using a damp lint free cloth and a mild detergent.

#### Note

---

*Do not use excessive amounts of water. The unit may include parts that are not water tight.*

---

- 2 On completion, dry the unit thoroughly.
- 3 Inspect all surfaces for signs of corrosion, flaking, bubbling paint, stains etc.
- 4 Clean damaged or suspect areas, prepare and preserve these areas using the correct preservation mediums.
- 5 Wipe clean all exposed cables, and check for damage.  
If a cable shows signs of wear or ageing, contact Kongsberg Maritime for advice.
- 6 Secure and protect loose parts (shock absorbers, plug and sockets, protruding objects etc).
- 7 If the mechanical unit shall be sent to storage or shipped, spray it externally using a corrosion inhibitor (for example a light oil) prior to packing.
- 8 If relevant, place a suitably sized bag of desiccant material (silica gel or similar) into the to storage/transport box to keep the components as dry as possible.

## Handling instructions for printed circuit boards and electronic modules

Printed circuit boards and electronic modules 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.

### Topics

[Circuit board unpacking and handling, page 230](#)

[Returning a printed circuit board or an electronic module to Kongsberg Maritime, page 231](#)

[About Electrostatic Discharge \(ESD\), page 232](#)

## Circuit board unpacking and handling

It is very important that printed circuit boards and other electronic modules are handled correctly.

### Prerequisites

For correct and safe handling of printed circuit boards and electronic modules, you will need a suitable workbench with an approved conductive service mat. This service mat 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.

Sensitive printed circuit boards and electronic modules must always be transported and stored in protective antistatic packing bags. The circuit boards and modules must not be transported or stored close to strong electrostatic, electromagnetic or radioactive fields.

### Context

Beware of electrostatic discharge (ESD)!

#### Note

---

*When you handle electronic circuit boards and modules, 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.*

---

### Procedure

- 1 Prepare a suitable workbench with a conductive service mat.
- 2 Make sure that you wear a grounded wristband with direct contact with the skin

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.

#### Note

---

*Keep far away from the bridge or any other rooms with wall-to-wall carpets!*

---

If possible, bring a wristband and ground yourself.

- 3 Lift the circuit board, in its protective antistatic packing bag, out of the transport box.
- 4 Place it in a stable position on the workbench.
- 5 Inspect the unit for damage before you open the plastic bag.

- 6 Do not break the seal to open a printed circuit board or electronics module package before the item shall to be used.

**Important** \_\_\_\_\_

If the package is returned with the seal broken, we will assume that the content has been used. You will then be billed accordingly.

---

- 7 Assuming all is well, open the bag and remove the unit.
- 8 Take out and keep the documentation.  
You will need the documentation if the circuit board or module shall be returned to us.
- 9 Remove any packing and desiccant material that may be inside.
- 10 Keep the protective antistatic packing bag for future use.

**Related topics**

[Transporting Kongsberg Maritime equipment, page 216](#)

[Packing instructions for storage or shipping, page 226](#)

[Returning a printed circuit board or an electronic module to Kongsberg Maritime, page 231](#)

[About Electrostatic Discharge \(ESD\), page 232](#)

## Returning a printed circuit board or an electronic module to Kongsberg Maritime

If you wish to return a printed circuit board or an electronic module to us – either operational or defective – certain rules apply.

### Prerequisites

For correct and safe handling of printed circuit boards and electronic modules, you will need a suitable workbench with an approved conductive service mat. This service mat 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.

Sensitive printed circuit boards and electronic modules must always be transported and stored in protective antistatic packing bags. The circuit boards and modules must not be transported or stored close to strong electrostatic, electromagnetic or radioactive fields.

### Context

Beware of electrostatic discharge (ESD)!

When you handle electronic circuit boards and modules, 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.

**Note**

---

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

---

**Procedure**

- 1 Place the circuit board to be returned in the same protective antistatic packing bag as you originally received it in - or in a protective bag of similar electrostatic discharge (ESD) protection quality.

**Note**

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*DO NOT* use standard plastic bags, such as commercial bubble wrap.

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- 2 Fill in all the necessary information on the applicable documentation and place it inside the bag.
- 3 Seal the bag.
- 4 Place the circuit board in a suitable carton, and secure it for shipping.

**Related topics**

[Packing instructions for storage or shipping, page 226](#)

[Circuit board unpacking and handling, page 230](#)

[About Electrostatic Discharge \(ESD\), page 232](#)

## About Electrostatic Discharge (ESD)

Electrostatic discharge (ESD) is the sudden flow of electricity between two electrically charged objects. Such flow can be caused by contact, an electrical short, or dielectric breakdown. ESD can cause serious damage to printed circuit boards and electronic modules.

### Beware of Electrostatic Discharge (ESD)!

**Note**

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*When you handle electronic circuit boards and modules, 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.*

---

For correct and safe handling of printed circuit boards and electronic modules, you will need a suitable workbench with an approved conductive service mat. This service mat 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.

### **What is Electrostatic Discharge (ESD)?**

Electrostatic 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 local overheating, and it can also “puncture” insulating layers within the structure of the device. This may deposit a conductive residue of the vaporized metal on the device, and thus create a short circuit.

This may result in a failures or degraded performance of the device.

ESD can create spectacular electric sparks (thunder and lightning is a large-scale ESD event), but also less dramatic forms which may be neither seen nor heard, yet still be large enough to cause damage to sensitive electronic devices. Electric sparks require a field strength above approximately 4 kV/cm in air, as notably occurs in lightning strikes. Other forms of ESD include corona discharge from sharp electrodes and brush discharge from blunt electrodes.

ESD can cause a range of harmful effects of importance in industry, including gas, fuel vapour and coal dust explosions, as well as failure of solid state electronics components such as integrated circuits. These can suffer permanent damage when subjected to high voltages. Electronics manufacturers therefore establish electrostatic protective areas free of static, using measures to prevent charging, such as avoiding highly charging materials and measures to remove static such as grounding human workers, providing antistatic devices, and controlling humidity.

*[http://en.wikipedia.org/wiki/Electrostatic\\_discharge](http://en.wikipedia.org/wiki/Electrostatic_discharge) (January 2014)*

### **Precautions to prevent Electrostatic Discharge (ESD)**

Sensitive printed circuit boards and electronic modules must always be transported and stored in protective antistatic packing bags. The circuit boards and modules must not be transported or stored close to strong electrostatic, electromagnetic or radioactive fields.

If it is necessary to open and touch the printed circuit board or module inside the protective bag, 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 $\Omega$  and 2 M $\Omega$ , and is connected directly to a reliable earth point via its earthing cord.
- 2 You - and all other service personnel involved - must wear a wristband in direct contact with the skin. The wristband must be electrically connected to the service mat.
- 3 Printed circuit boards and electronic modules must be placed on the conductive service mat during installation and maintenance operations.

- 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 (for example a static shielding bag) before transportation.
- 5 During installation and servicing, all electrical equipment (for example soldering irons and test equipment) must be earthed.

### **Related topics**

[Packing instructions for storage or shipping, page 226](#)

[Circuit board unpacking and handling, page 230](#)

[Returning a printed circuit board or an electronic module to Kongsberg Maritime, page 231](#)

## **Disposal of old products**

At the end of the product lifetime, all Kongsberg Maritime products must be disposed of in an environmentally-friendly way.

All electrical and electronic components must be disposed of separately from the municipal waste stream via designated collection facilities appointed by the government or local authorities. The correct disposal and separate collection of your old appliance will help prevent potential negative consequences for the environment and human health. This is a precondition for reuse and recycling of used electrical and electronic equipment. For more detailed information about disposal of your old appliance, please contact your local authorities or waste disposal service.

All disposal of mechanical, electromechanical, electronic and chemical waste - including all types of batteries - must take place according to national and international rules and regulations. Observe the relevant Waste Electrical and Electronic Equipment (WEEE) regulations.

### **Product recycling service**

Kongsberg Maritime offers a product recycling service. The service is described on our website.

- <http://www.km.kongsberg.com>

Observe the following path: **Products**→**Services**→**Product recycling**.

We accept all Kongsberg Maritime products for recycling free of charge. The cost of having products removed, packed and delivered to a Kongsberg Maritime registered company location is, however, not covered by us. Prior to returning any material please contact us for information about a relevant return address and procedure for your product.

Kongsberg Maritime has implemented and maintains an environmental management system in accordance with NS-EN ISO 14001:2004.

### **Topics**



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## **Simrad EK80 Scientific wide band echo sounder Installation manual**

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