Installation Manual

KONGSBERG

XPR 100

Long-Range Relative Positioning System

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XPR-D-Inst/6.0

Document information

- Product: XPR 100
- Document: Installation Manual
- Document part number: XPR-D-Inst

Copyright

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. You must be familiar with the contents of the appropriate manuals before attempting to operate or work on the equipment.

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

Disclaimer

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

Support information

If you require maintenance or repair, contact Kongsberg Maritime's support organisation. You can contact us using the following address: km.support.seatex@km.kongsberg.com. If you need information about our other products, visit http: //www.kongsberg.com.

Table of contents

About this manual

Purpose of manual

The purpose of this manual is to provide the descriptions and procedures required to install and configure the XPR system.

Target audience

The manual is intended for technical personnel; such as skilled shipyard workers, electricians, qualified engineers and naval architects.

License information

The XPR 100 system is not a licensed product. The product is a radio transmitting device. A national license for the use of radio frequencies is required for operation.

Maintenance purposes

This manual is also intended as reference material for the maintenance personnel. Keep this manual for later use.

XPR 100

Topics

System description

XPR 100 is a microwave-based solution developed for Dynamic Positioning (DP) applications in need of long-range relative positioning. It operates in the 9.2 to 9.3 GHz band. Each light weight Sensor Unit has an opening angle of 100 degrees.

XPR 100 can be deployed as an omni directional system using several sensor units. This will give the system an extended operational area of up to 280°. It will also avoid blind angles.

The system can be interfaced to remote systems such as Dynamic Positioning. Either through Ethernet or serial lines. Configuration and operation of the system is done through the application software.

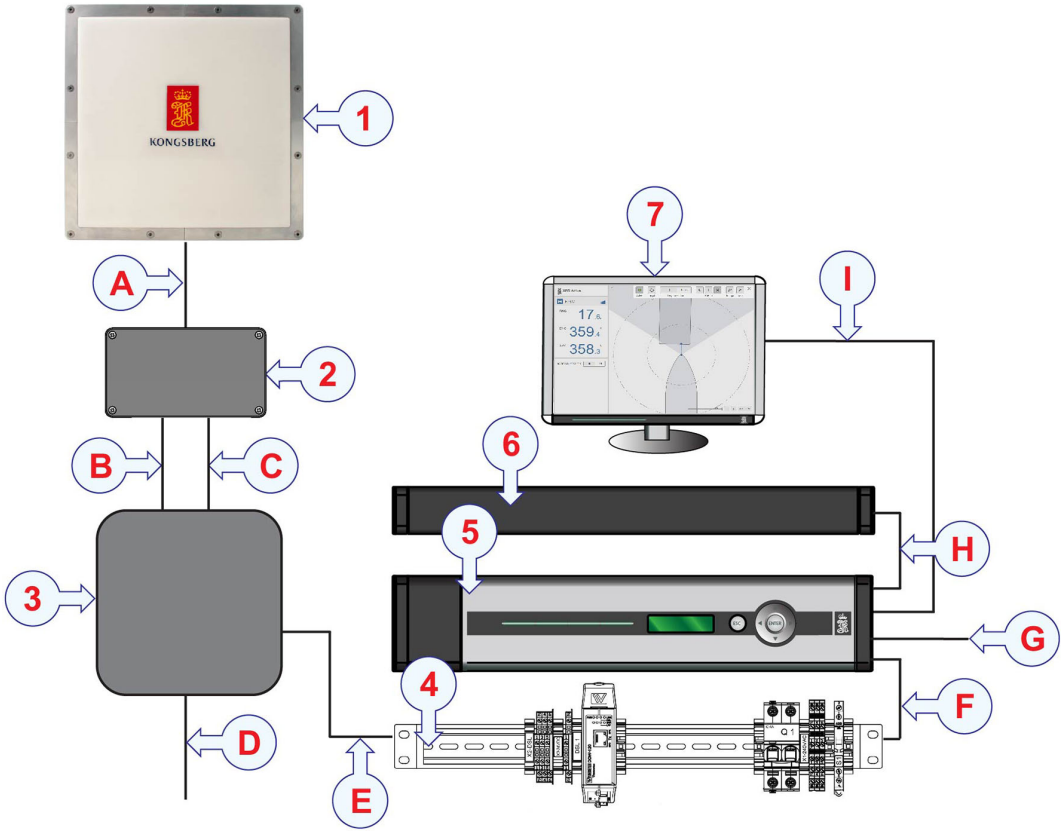
The system has automatic target selection, built-in system test and verification.

The system can be set up to operate as an interrogator or a transponder.

XPR 100 meets the requirements specified by IMO for DP Class 2 vessels.

System diagram

The system diagram identifies the main components of a basic XPR 100 system. The illustration shows a system installation with a single Sensor Unit. Some mains cables are not shown in the diagram.



Main system units

1 *XPR Sensor Unit*

(Set up as Interrogator or Transponder)

2 *Junction box*

3 *Remote interface cabinet (RIFC)*

4 *Local interface rail (LIFR)*

5 *Processing Unit*

6 *Keyboard and mouse*

7 *Display*

Cables

A *Power and data cable, Pigtail fixed to Sensor Unit*

B *Power cable (Junction box to RIFC)*

C *Ethernet cable (Junction box to RIFC)*

D *Power cable to RIFC (input)*

E *Data cable (RIFC to LIFR)*

F *Ethernet cable (LIFR to Processing Unit*

G *RS-422 to DP*

H *Keyboard/mouse cable*

I *VGA cable*

You can also have an XPR system with two or three Sensor Units for extended operation area. Then you need a Junction box for each of the Sensor Units. Or you can use a triple Junction box.

Main system units

Topics

Sensor Unit description

The Sensor Unit is a sealed unit which consists of a transmitter, a receiver and a signal processing module. The power is supplied from an external power supply. The rear panel of the Sensor Unit has one connector for data and power.

The Sensor Unit can operate as both a transponder and an interrogator. It operates in the 9.2 to 9.3 GHz band. The opening angle of the Sensor Unit is 100 degrees.

The interface to the Processing Unit is via Ethernet.

Junction Box description

The Junction box connects the Sensor Units with the Remote Interface Cabinet. The Sensor Unit pigtail cable is split into power and Ethernet. Power and data signals are distributed to the Remote Interface Cabinet.

If you have an XPR system with two or three Sensor Units, you need one Junction Box for each Sensor Unit. Or you can use a triple Junction box.

Remote Interface Cabinet description

The Remote Interface Cabinet contains modem and power supply. The Ethernet cable from the Junction Box is connected to the modem in the Remote Interface Cabinet. The modem data signal is distributed to the Local Interface Rail.

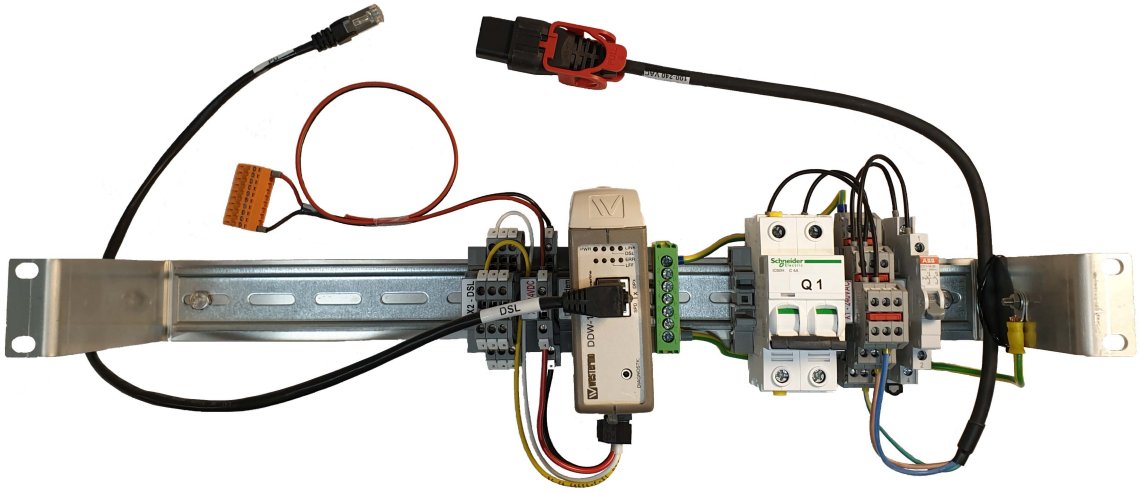
The Remote Interface Cabinet also distributes 24 V power to the Sensor Unit via the Junction Box.

The AC ON/OFF power switch (S1) is located to the left of the power supply unit in the cabinet.

The cabinet can be delivered as a single cabinet or a dual/triple cabinet.

Local Interface Rail description

The Local Interface Rail is connected to the Remote Interface Cabinet with a DSL signal cable. It provides power to the Processing Unit with a 230 V AC power cable.



Processing Unit description

The Processing Unit runs the processing software and the operator software. The unit communicates with the Interrogator Sensor Units and calculates range and bearing to a Transponder Sensor Unit. It transmits dynamic positioning (DP) telegrams and writes log data to disk.

The unit is a 2U unit designed to fit standard 19-inch racks. It is typically installed on the bridge or in the instrument room. The unit comprises the following main parts.

- Compact flash card.

- Hard disk.
- Serial I/O board, Ethernet and computer main board.
- Power supply.

The power on/off switch, local area network (LAN) port and USB connection are located behind the lid to the left on the front panel. Push lid on left side to open. LAN 1 is type RJ-45, 10/100 Mbits/s and reserved for support. The rear panel of the unit contains communication interface ports for interfacing to external equipment. These ports are individually galvanically isolated.

Note

The USB ports are not compatible with USB 3 devices.

Related topics

Processing Unit interface descriptions, page 97

Scope of supply

Basic items

Observe the basic items provided with a standard XPR 100 delivery.

- Sensor Unit, with mounting bracket and pigtail (3 m)
- Processing Unit (2U)
- Junction Box with mounting bracket
- Local interface rail (LIFR)
- Single Remote Interface Cabinet (RIFC)
- Mains cable for Processing Unit (230 V)
- Mains cable for Local Interface Rail (230 V)
- End-user documentation

Additional required items

Observe these additional items which are required for installation and/or operation. They can be ordered from Kongsberg Seatex AS or purchased locally.

- 19" rack for mounting of the rack components (Minimum 4U space is required if rack-mountable keyboard/mouse is used)
- Keyboard and mouse (rollerball)
- Display (Minimum resolution 1024 x 768) + Power cable+ VGA cable
- Power cable (from Junction Box to RIFC)

- Ethernet cable (from Junction Box to RIFC)
- Data cable (ship cable) (from RIFC to LIFR)

Additional optional items

Observe these additional optional items which can be used together with the XPR 100. Additional optional items can be purchased from Kongsberg Seatex AS.

- Sensor Unit
- Junction Box
- Dual/triple Remote Interface Cabinet
- Additional cables
- Multi Sensor Stand

Product restrictions

Topics

Restrictions in guarantee, page 14

Restrictions in use, page 15

Restrictions in guarantee

Changes or modifications to the product not explicitly approved by Kongsberg Seatex AS will void the guarantee.

The liability of Kongsberg Seatex AS is limited to repair of this product only under the given terms and conditions stated in the sales documents. Consequential damages such as customer's loss of profit or damage to other systems traceable back to this product's malfunctions, are excluded.

The warranty does not cover malfunctions of the product resulting from the following conditions.

- Incorrect power connection.
- The Sensor Unit housing has been opened by the customer in an attempt to carry out repair work.
- The Processing Unit housing has been opened by the customer.

Restrictions in use

The operation sector of the Sensor Units is 100 degrees. If the vessel goes beyond the operating sector, the system will output range and bearing with decreased precision until the signal is completely lost.

XPR radio frequencies

XPR systems with operating frequencies in the range 9.2 – 9.3 MHz are compliant to relevant parts in the standard ETSI EN 302 248 v2.1.1.

Use of these radio frequencies in territorial waters may be subject to the national regulations of the administration concerned.

Related topics
Radio frequency license, page 15

Radio frequency license

This product contains a radio transmitting device. A frequency license for the use of radio frequencies is required for operation. Use in national waters will require a frequency license issued by the relevant national authorities. The owner and user of the equipment are responsible for obtaining such a license prior to switching the product ON.

It may be required to switch the product OFF when the product is brought close to shore (closer than 12 NM).

Related topics
XPR radio frequencies, page 15

Possible radio frequency interference

This equipment generates, uses and can radiate radio frequency energy. If the equipment is not installed and used in accordance with the instructions, it may cause harmful interference to radio communication or other electronic equipment. However, there is no guarantee that interference will not occur in a particular installation.

You can determine if this equipment causes harmful interference by turning the equipment off and on.

If this equipment causes harmful interference to radio or television reception, try to correct the interference by one or more of these measures.

- If possible, reposition or relocate the electronic equipment.

- Increase the separation between this equipment and the receiver.
- Connect this equipment to an outlet on an electronic circuit different from the one to which the disturbed equipment is connected.
- Consult the manufacturer or dealer for help.

Network security

If the XPR 100 product is connected to a local area network, data security is important.

Equipment manufactured by Kongsberg Seatex is frequently connected to a local area network (LAN). When you connect a computer to a local area network you will always expose the data on that computer. All other computers connected to the same network may be able to access your data. Several threats may immediately occur:

- Remote computers can read the data.
- Remote computers can change the data.
- Remote computers can change the behavior 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 computer will do any of the above.

2 The damage done if a remote computer succeeds doing this.

Kongsberg Seatex has no information regarding the complete system installation. Systems provided by Kongsberg Seatex are regarded as stand-alone offline systems. They are stand-alone even though they may be connected to a network for sensor interfaces and/or data distribution.

Note

No network safety applications are installed on Kongsberg Seatex computers. The computers are therefore not protected against viruses, malware or unintentional access by external users.

Securing the XPR 100 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 XPR 100 will always be in charge of defining and implementing a security policy, and providing the relevant network security applications.

Note

Kongsberg Seatex will not accept any responsibility for errors and/or damages caused by unauthorized use of or access to the XPR 100.

Support information

If you need technical support for your product you must contact Kongsberg Seatex AS or a Kongsberg Maritime office. A list of our offices is provided on our website.

- **Company name**: Kongsberg Seatex AS
- **Address**: Havnegata 9, 7010 Trondheim, Norway
- **Telephone**: +47 73 54 55 00
- **Telephone, 24h support**: +47 33 03 24 07
- **E-mail address**: km.support.seatex@km.kongsberg.com
- **Website**: http://www.kongsberg.com/maritime

KM-Support App

KM Support is also available in the KM-App. The KM-Support App is available for free in the App Store and Google Play.

Preparing the installation

Topics

Personnel qualifications

Electrical installations with AC mains power can only be done by certified electricians.

Mechanical drawings

Outline dimension drawings are included in this manual.

Unless otherwise specified, all measurements are in millimetres. The drawings are not to scale.

Related topics

Drawings, page 85

Necessary tools and equipment

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. This includes different screwdriver types, pliers, spanners, a cable stripper, a soldering iron, etc.Each tool must be provided in various sizes. We recommend that all tools are demagnetized to protect your equipment.

Unless otherwise stated, all mounting hardware (such as bolts, nuts, washers, screws etc.) referred to in this document is to be supplied by the customer or the shipyard.

Cable recommendations

Recommendations for the cables used in the XPR system.

Signal cable

Each DSL line needs 1 pair in a signal cable. Cable from Local Interface Rail to Remote Interface Cabinet. Cable type Shipline.

Power cable

The power cable from the Remote Interface Cabinet to the Junction Box should be 1.5 mm^2 or larger. If the cable is 30 - 50 metres, it is recommended to use a 2.5 mm^2 cable.

Data cable

The data cable from the Remote Interface Cabinet to the Junction Box should be CAT5e or better.

Related topics

About cable layout and interconnections, page 38
Cable specifications, page 83
Cabling between the rack units, page 48

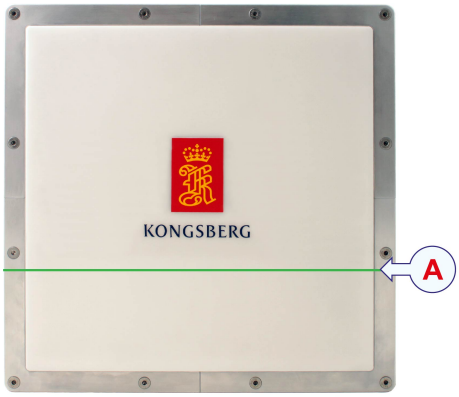
Location of hardware units

Topics

Sensor Unit location

Consider these factors when installing the unit. Correct location of the unit is important for the system performance.

- Consider the sector which the unit is supposed to cover. The unit has an operating sector of 100 degrees horizontally and 25 degrees vertically.
- The axis must be horizontally orientated for the XPR system to be able to track the Sensor Unit.



A This axis must be horizontal.

- Place the unit as high as possible above sea level.
- Do not mount the unit close to the ship side or other large metal surfaces. This is to avoid multipath effects.
- Do not mount the unit in the vicinity of radio equipment or in the beam of the S/X band radar.

- The Interrogator Sensor Unit needs free line of sight to the Transponder Sensor Unit, or other compatible sensor units.
- Mount the unit to a rigid structure. This is to avoid mechanical resonances caused by vibration. Excessive vibrations (>1 g rms) could affect the quality of the measurements.

Related topics

Installing the Sensor Unit on a rail or wall, page 33
Installing the Sensor Unit with the Multi Sensor Stand, page 35
Sensor Unit operating sectors, page 21
Sensor Unit dimensions, page 86
Multi Sensor Stand dimensions, page 88

Sensor Unit operating sectors

The Sensor Unit transmits and receives microwave power. It will be affected by obstructions in close proximity to the Sensor Unit.

In order to avoid interference and error measurements, no solid objects or obstructions should be located closer than 10 metres from the Sensor Unit.

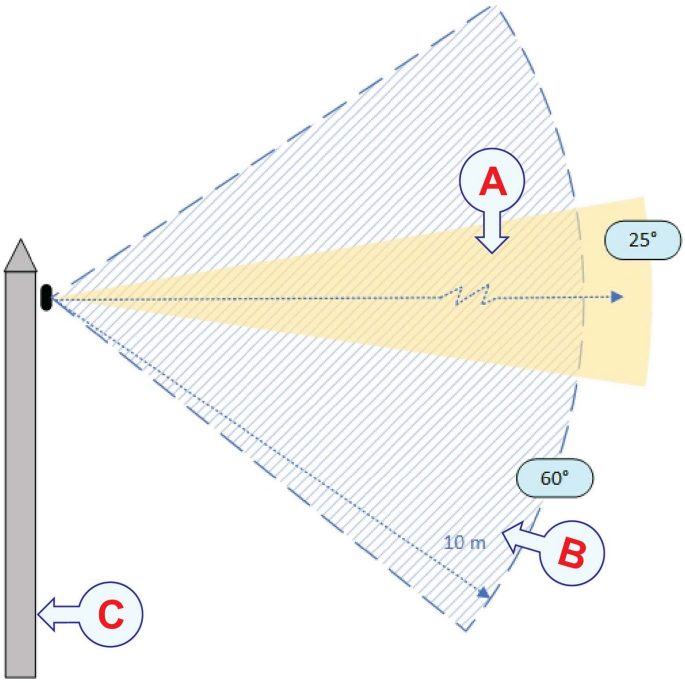
Note

The area with no solid objects, or obstructions, is dependent on the number of Sensor Units.

Vertical operating sector

The yellow sector indicates the Sensor Unit's vertical operating sector.

No solid objects located closer than 10 metres from the Sensor Unit (shaded area).



A *Operating sector (yellow area)*

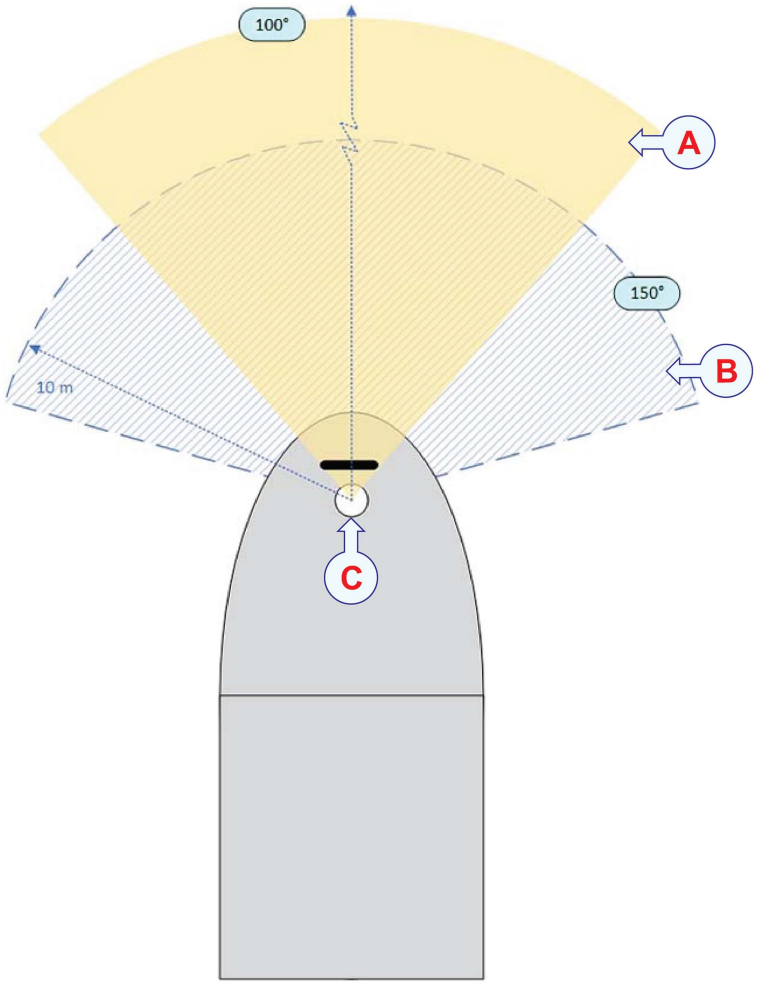
B *No solid objects located closer than 10 metres from the Sensor Unit (shaded area)*

C *Mast*

Horizontal operating sector - single Sensor Unit

The yellow sector indicates the Sensor Unit's horizontal operating sector for one single Sensor Unit.

No solid objects located closer than 10 metres from the Sensor Unit (shaded area).



A *Operating sector (yellow area)*

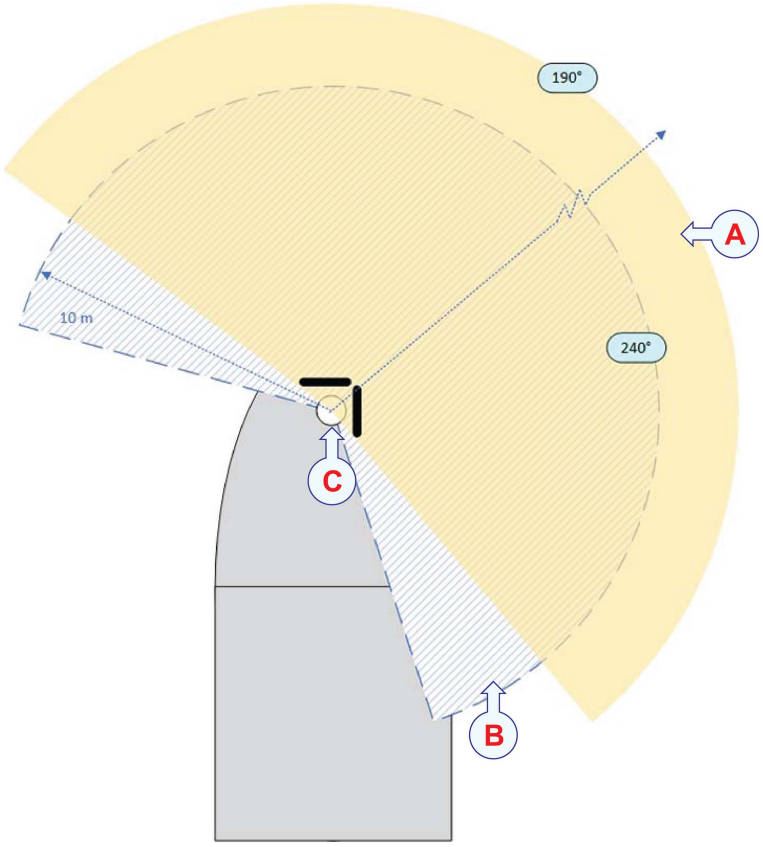
B *No solid objects located closer than 10 metres from the Sensor Unit (shaded area)*

C *Mast*

Horizontal operating sector - dual Sensor Units

The yellow sector indicates the Sensor Unit's horizontal operating sector for two Sensor Units.

No solid objects located closer than 10 metres from the Sensor Unit (shaded area).



A *Operating sector (yellow area)*

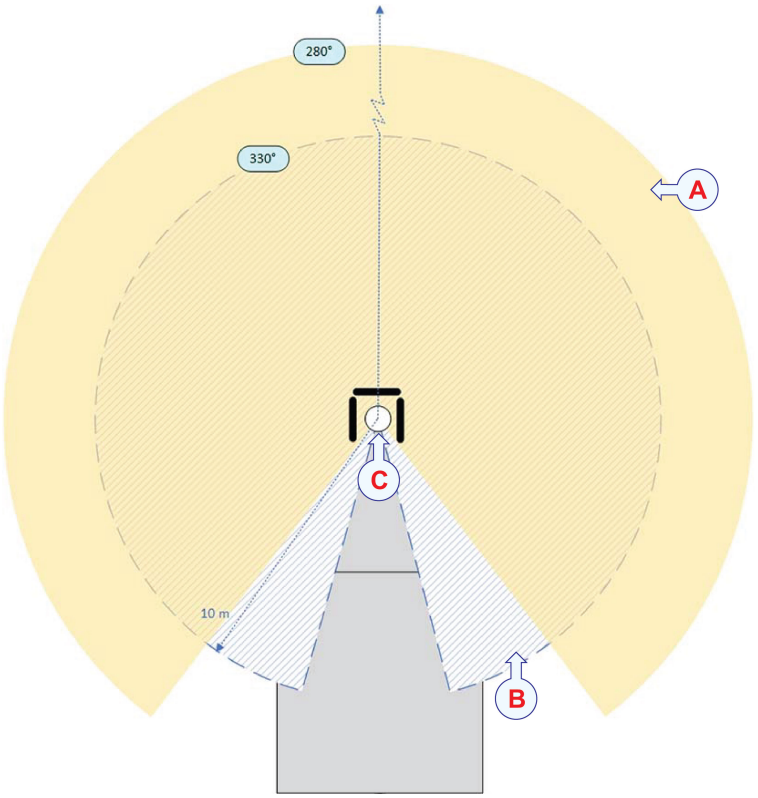
B *No solid objects located closer than 10 metres from the Sensor Unit (shaded area)*

C *Mast*

Horizontal operating sector - triple Sensor Units

The yellow sector indicates the Sensor Unit's horizontal operating sector for three Sensor Units.

No solid objects located closer than 10 metres from the Sensor Unit (shaded area).



A *Operating sector (yellow area)*

B *No solid objects located closer than 10 metres from the Sensor Unit (shaded area)*

C *Mast*

Related topics

Installing the Sensor Unit on a rail or wall, page 33
Installing the Sensor Unit with the Multi Sensor Stand, page 35
Sensor Unit location, page 20

Junction Box location

Consider these factors when installing the Junction Box.

- Place the Junction Box close to the Sensor Unit.

  Within the distance of the Sensor Unit cable. The Sensor Unit cable is 3 metres long.
- Place the Junction Box in a location where it is easily accessible.

  A preferred location is on the same railing as the Sensor Unit.

Related topics
Installing the Junction Box, page 36
Single Junction Box dimensions, page 90

Remote Interface Cabinet location

Consider the following when installing the cabinet.

- The cabinet is designed for installation in a technical room or a sheltered environment.
- Avoid installing the cabinet in locations with heavy vibrations.
- Make sure that the location offers ample space around the cabinet to allow for cables, maintenance and parts replacement.

Related topics
Installing the Remote Interface Cabinet, page 30
Single Remote Interface Cabinet dimensions, page 92
Dual/triple Remote Interface Cabinet dimensions, page 93

Local Interface Rail location

Consider these factors when installing the rail.

- The rail is designed for mounting in a 19-inch rack.
- Mount the rail close to the Processing Unit.
- Avoid mounting the rail directly behind the Processing Unit.
- Mount the rail as high as possible at the rear of the rack. Make space for cable entry from above.

Related topics
Installing the system units in a rack, page 29

Processing Unit location

Consider these factors when installing the unit.

- The unit is designed for indoor installation. The best location is typically in the instrument room or on the bridge.
- The unit fits on rails in a 19-inch rack or console.
- The unit has an internal fan and requires free airflow from the rear and out to the sides. It is recommended that ventilation or air conditioning is provided in order to keep the ambient operating temperature at around 20 °C.
- Avoid placing the unit in locations with heavy vibrations, strong electronic fields (close to transformers), excessive heat.

- Keep the area around the unit free from dust and static electricity.
- All connections to the unit are at the rear of the unit and available space for cable connections and servicing must be provided.

Related topics
Installing the system units in a rack, page 29
Processing Unit dimensions, page 94

Display location

Consider these factors when installing the display.

- The best location is typically on a table in the instrument room or on the bridge.
- Place the display close to the Processing Unit in order to reduce the length of the VGA cable.
- It is recommended that the area around the display is kept free from dust and static electricity.
- For best readability, the display must be protected from glare and have the correct height and angle.
- It is recommended to use a standard VGA display or VGA compatible display.

The display is not a standard part of the delivery. This is a commercial item that can be purchased locally.

Related topics
Installing a standard display, page 31
Installing a touch display, page 32

Rack requirements

This product can be delivered with or without a rack. If the product is delivered with a rack, the rack components are pre-installed in the rack. If the product is delivered without a rack with pre-installed components, the rack units must be installed in a rack which is already in place on site. This applies to the Processing Unit and the Local Interface Rail.

Consider the following to determine whether your rack is suitable for the installation.

- The rack must be securely mounted to the floor.
- The rack must be a standard 19-inch rack.
- The minimum depth of the rack must be 600 mm.
- The rack should have air inlet on top and bottom or ventilation splits on the sides. The rack unit has ventilation of the sides. Forced ventilation may be required if the rack contains several electronic modules.

- The rack must be mounted in such a way that the minimum cable bends (on the rear side) are not exceeded.
- The rack must be connected to a grounded outlet.

Related topics

Installing the system units in a rack, page 29

Indoor installation

Topics

Installing the system units in a rack

The Processing Unit and the Local Interface Rail shall be mounted in a 19-inch rack or cabinet with cabling and interfaces. If your product is delivered with these units pre-installed, you only have to do the cabling.

Context

A cable strain relief bracket is delivered. The cable strain relief bracket allows for flexibility in the cables without putting stress on the vulnerable points on the cable.

Important

The strain relief bracket must be grounded to the grounding point on the Local Interface Rail.

Important

If you have a rack-mountable keyboard in your system, make sure that you have enough space in the rack for the keyboard.

A rack-mountable keyboard and mouse will require 1U space in the rack.

Note

The Processing Unit has a plastic film on top, and it may have one underneath, to protect the unit from transportation scratches. Remove this film before operation as the plastic film will reduce the heat transfer from the unit and thus cause an increase in the temperature inside the unit.

Procedure

1 Find a suitable location for the system units.

Typically on the bridge or in the instrument room.

2 Remove any plastic film from the Processing Unit.

3 Place the unit on rails or shelves in a 19-inch rack.

This is to ensure that the unit is supported at the rear.

4 Fasten the unit with four screws in the front.

Minimum 10 cm free space is needed behind the unit for connection of cables.

5 Place the Local Interface Rail at the rear of the rack. Preferably as high as possible and not directly behind the Processing Unit.

6 Connect the Processing Unit and the Local Interface Rail to vessel ground.

7 Place the cable strain relief bracket at the rear of the rack, flush with the bottom of the Processing Unit.

Related topics

Local Interface Rail location, page 26
Processing Unit location, page 26
Rack requirements, page 27
Processing Unit dimensions, page 94
Cable layout and interconnections, page 38
Setting modem DIP switches, page 50

Installing the Remote Interface Cabinet

A Remote Interface Cabinet is used to facilitate transfer of data signals over a long distance.

Prerequisites

The mounting surface must be sufficiently smooth. Make sure that there is adequate carrying capacity for wall mounting.

Context

The cabinet can be mounted on a wall or you can make your own mounting arrangement. The cabinet is usually mounted in a technical room.

The distance between the Remote Interface Cabinet and the Junction Box can be maximum 100 metres.

The distance between the Remote Interface Cabinet and the Processing Unit can be up to 500 metres.

Procedure

1 Find a suitable location for the cabinet.

2 Make holes for the screws with which the cabinet is fastened.

3 Open the cabinet lid to gain access to the screw holes. Fasten the cabinet with four screws.

4 Close the cabinet lid.

Related topics

Remote Interface Cabinet location, page 26
Single Remote Interface Cabinet dimensions, page 92
Dual/triple Remote Interface Cabinet dimensions, page 93
Cable layout and interconnections, page 38
Setting modem DIP switches, page 50

Installing a standard display

A display is required to set up and operate the XPR system.

Context

The display is not a standard part of the XPR 100 delivery. This is a commercial item that can be purchased locally.

There are two ways of supplying power to the display, depending on the location of the display.

If the display is located close to the rack with the Local Interface Rail, you can use the Q1 switch on the LIFR to power the display. If the display is located further away from the rack, you must supply power to the display via an ordinary power socket.

Power sockets are not supplied by Kongsberg Seatex AS.

Procedure

1 Find the best mounting location for the display. The screen must be easy to see for the vessel operator.

2 Connect the display to the VGA connector at the rear of the Processing Unit.

3 Provide power to the display via an ordinary power socket or a cable from the Q1 switch on the Local Interface Rail (LIFR).

Related topics
Display location, page 27
Cabling between the rack units, page 48

Installing a touch display

A display is required to set up and operate the XPR system.

Context

The display is not a standard part of the XPR 100 delivery. This is a commercial item that can be purchased locally.

The XPR system supports single-click touch screen user interaction when a supported touch display is connected to the Processing Unit.

Procedure

1 Find the best mounting location for the display. The screen must be easy to see for the vessel operator.

2 Connect the display to the VGA connector at the rear of the Processing Unit.

3 Connect the display power cable to the AC power terminal blocks on the Local Interface Rail (LIFR).

Further requirements

You have now connected the display to the Processing Unit and afterwards you must connect the USB cable or serial cable which communicates the touch commands to the Processing Unit and enable allocation of serial port.

Related topics
Display location, page 27
Cabling between the rack units, page 48

Outdoor installation

Topics

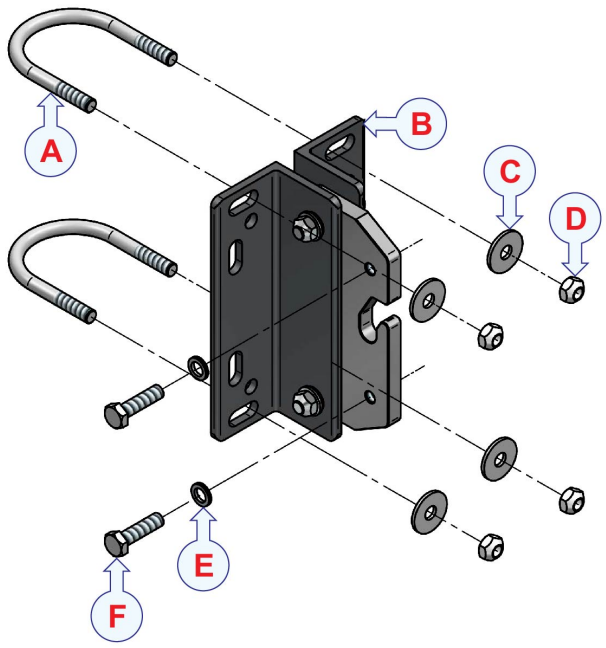
Installing the Sensor Unit on a rail or wall

The Sensor Unit is designed for rail or mast mounting. The mounting bracket can also be mounted on a wall or flat surface.

Context

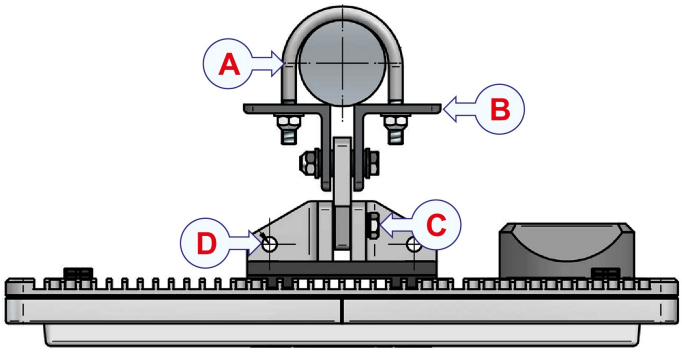
The mounting bracket is designed for 2-inch or 3-inch pipe mounting. It can be mounted horizontally or vertically. Vertical mounting is recommended as it is more stable. The mounting bracket can also be mounted on a wall or flat surface.

The mounting bracket kit is enclosed with the delivery. The kit contains these items.



A *2 x 2" and 2 x 3" U-bolts*
B *Mounting bracket*
C *4 x washer for M8*
D *4 x Lock nut M8*
E *2 x NordLock washer NL8ss*
F *2 x screw M8 x 30*

A safety wire is also included in the mounting kit.



A *U-bolt M8*
B *Mounting bracket*
C *2 x screw M8x30 DIN 933 A42 x NL8ss NordLock washer*
D *Hole for safety wire carabine hook*

Procedure

1 Identify the best mounting location for the unit.

2 Place the U-bolts on the pipe. Insert the U-bolts in the mounting bracket slots.

The mounting bracket slots can accommodate both sizes in both vertical and horizontal directions.

3 Fasten the U-bolts with screws and washers.

4 Attach the safety wire to the Sensor Unit.

The wire will prevent the Sensor Unit from falling down and cause potential damage or injury.

5 Lift the Sensor Unit and hook the unit onto the mounting bracket.

6 Fasten the unit with two M8 screws with NordLock washers.

Related topics

Sensor Unit location, page 20
Sensor Unit operating sectors, page 21
Sensor Unit dimensions, page 86
Cable layout and interconnections, page 38

Installing the Sensor Unit with the Multi Sensor Stand

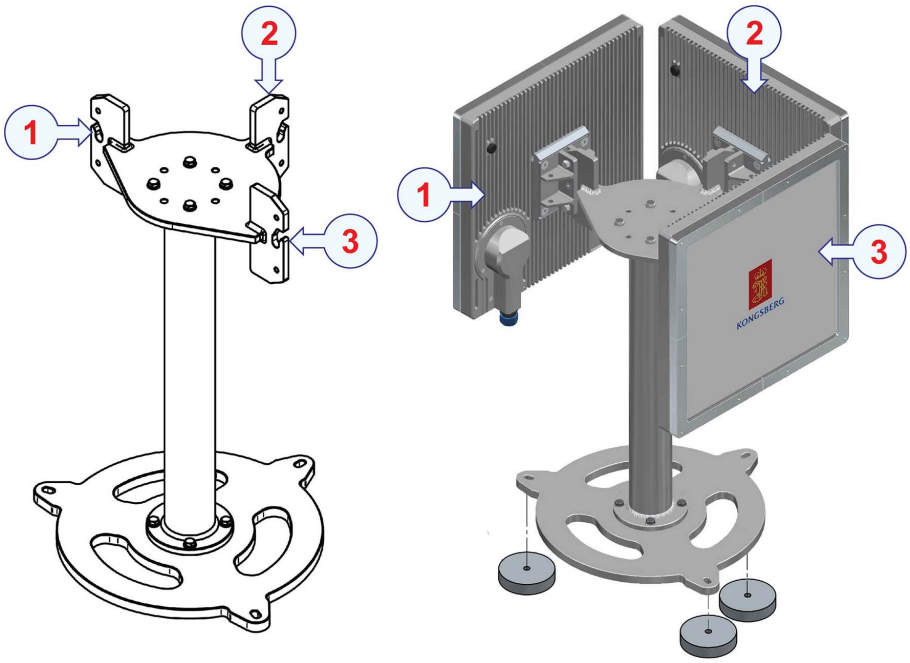
The Multi Sensor Stand is designed to replace an existing Artemis system with an XPR system.

Context

If it is possible, reuse the existing Artemis cables. And/or run and connect new cables to the Remote Interface Cabinet and Junction Box(es).

Important

The Multi Sensor Stand and the Sensor Units are marked with a number from 1 to 3. Place the Sensor Unit marked 1 at the Multi Sensor Stand location marked 1, and so on. This is important for the system to work properly.



Procedure

1 Disconnect the cables from the existing Artemis unit.

2 Remove the Artemis unit.

3 Mount the Multi Sensor Stand. Fasten with 3 bolts.

Place insulation washers between the Multi Sensor Stand and the mounting surface if the surface is of another material than aluminium.

4 Attach the safety wire to the Sensor Unit.

This will prevent it from falling down and cause potential damage or injury.

5 Hook the Sensor Unit(s) onto the stand.

6 Fasten the Sensor Unit with two M8 screws with NordLock washers.

7 Connect the power and signal cables.

Related topics

Sensor Unit location, page 20
Sensor Unit operating sectors, page 21
Multi Sensor Stand dimensions, page 88
Cable layout and interconnections, page 38

Installing the Junction Box

The Junction Box connects the Sensor Unit with the Remote Interface Cabinet.

Context

The mounting bracket is designed for 2-inch or 3-inch pipe mounting. It can be mounted horizontally or vertically. Due to the design of the Junction Box it is recommended to be two persons when mounting the box.

If you have an XPR system with two or three Sensor Units, you need one Junction Box for each Sensor Unit.

Note

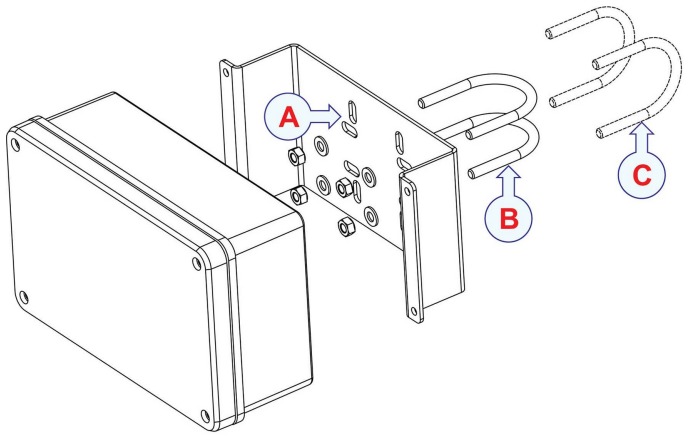
Installation in protected areas is generally recommended. When it is required to install junction boxes where they may be exposed to a salt mist atmosphere, and thereby risk corrosion, it is strongly recommended to protect the fastening screws with a suitable grease lubricant or copper paste. The screws must be fully covered but avoid any grease or paste on the gasket.

Procedure

1 Mount the junction box in a suitable location. The maximum distance from the Sensor Unit is 3 metres.

2 Place the U-bolts on the pipe. Insert the U-bolts in the mounting bracket slots.

The mounting bracket slots can accommodate both sizes in both vertical and horizontal directions.



A *Mounting bracket slots*

B *Mounting on vertical pipe (mast)*

C *Mounting on horizontal pipe (rail)*

3 Insert the washer. Fasten firmly with self-locking nuts.

Related topics

Junction Box location, page 25
Single Junction Box dimensions, page 90
Cable layout and interconnections, page 38

Cable layout and interconnections

Topics

About cable layout and interconnections

The Remote Interface Cabinet (RIFC) can be delivered with single, dual or triple data lines. The data cable should be connected according to standard TIA/EIA-568B. A single cabinet is 300 mm x 400 mm. A dual or triple cabinet is 500 mm x 500 mm.

A standard XPR system is delivered with one Sensor Unit and one Junction Box. For an increased operating sector you can have up to three Sensor Units in one XPR system.

If you have more then one Sensor Unit, you either need one Junction Box for each of the Sensor Units or you can have one Triple Junction Box which facilitates up to three Sensor Units.

The data cable from the Junction Box is terminated in the patch panel in the Remote Interface Cabinet (RIFC). Instructions for termination of the Ethernet cable in the RIFC are enclosed with the RIFC.

The bend radius of the cables should start at least 25 mm from the end of the cable gland. The cable ends must be provided with ferrules.

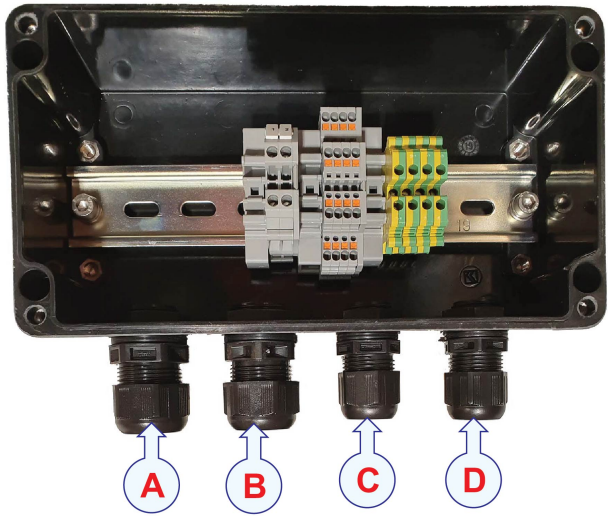
The XPR system relies on communication between each system unit and between the XPR system and external devices. It is very important that all cables are correctly installed, that the proper cable types have been used, and that all cables are connected correctly.

Related topics

Cable recommendations, page 19
Cable specifications, page 83

Junction Box connections

The illustration shows the connectors in the Junction Box. All connectors are straight-through.



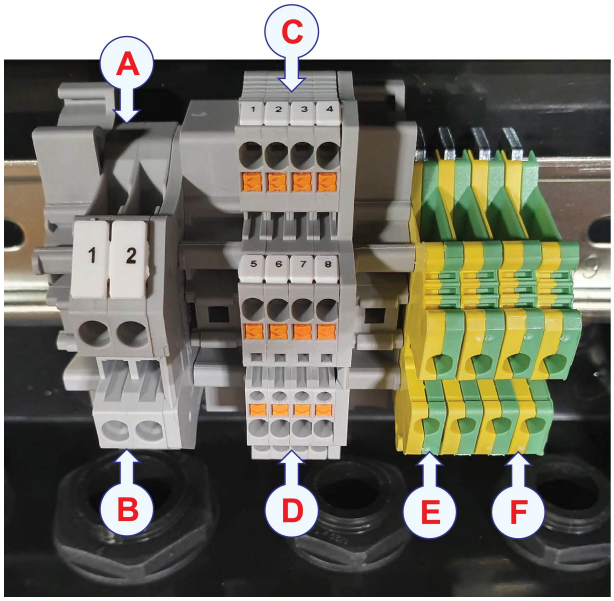
A *Power from Remote Interface Cabinet*

B *Sensor Unit pigtail cable, power and data*

C *Data from Remote Interface Cabinet*

D *Ground*

The illustration shows the terminals in the Junction Box.



A *Power in*

B *Power out*

C *Data in from Remote Interface Cabinet*

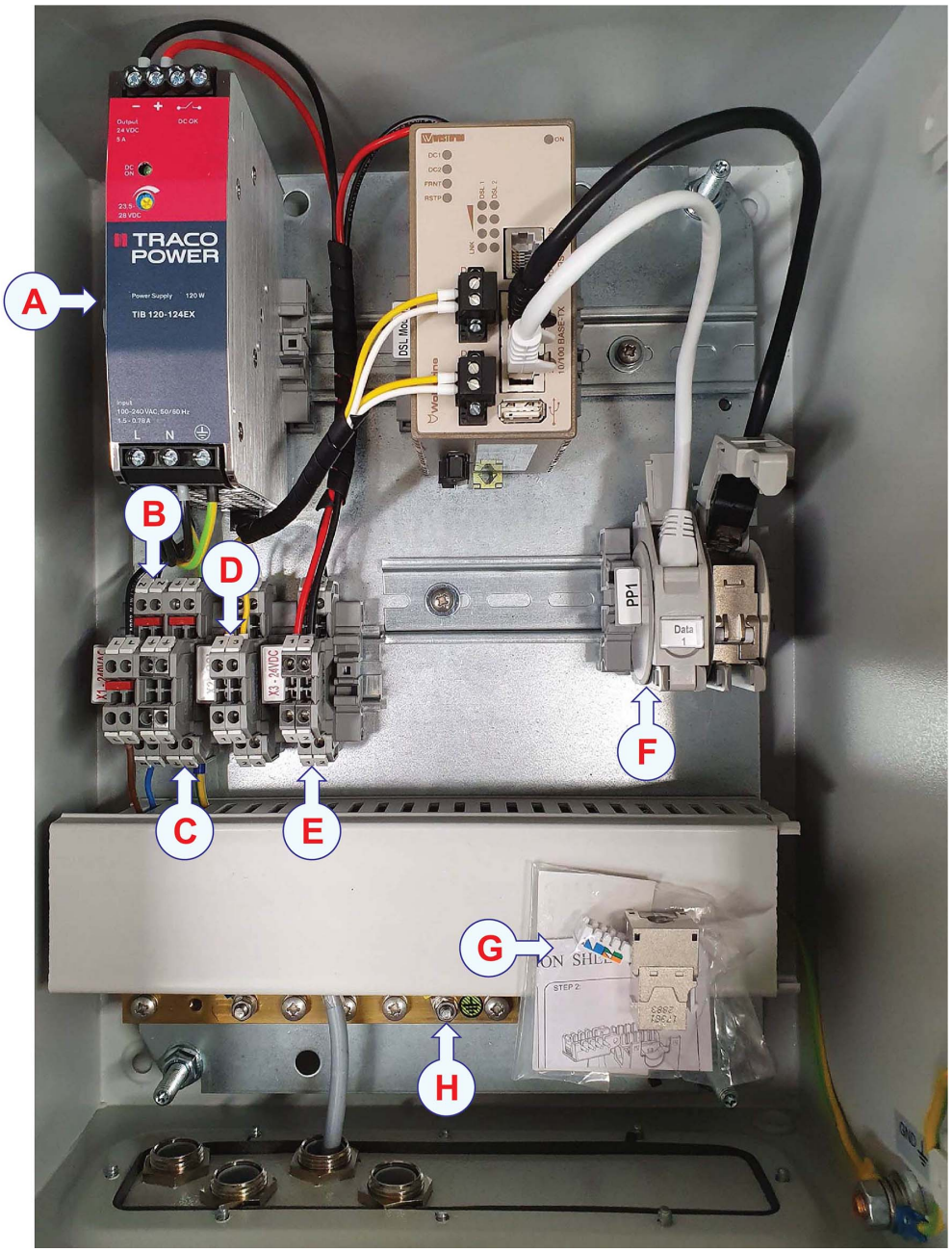
D *Data out to Sensor Unit*

E *Yellow/green cable shield*

F *Local ground cable*

Remote Interface Cabinet connections

The illustration shows the connections in a single Remote Interface Cabinet.



A *AC on/off power switch S1*

B *AC power in (shown as brown/blue)*

C *Safety ground*

D *Data in from Local Interface Rail (shown as yellow)*

E *DC power out to Junction Box (shown as red/black)*

F *Data out to Junction Box*

G *Instructions for termination of the Ethernet cable*

H *Cable to ground*

Cabling between RIFC, Junction Box 1 and Sensor Unit 1

The table shows the connection from the Remote Interface Cabinet (RIFC) to one single Junction Box and one single Sensor Unit.

The yellow/green wire in the pigtail cable from the Sensor Unit must be connected to a ground terminal (yellow/green) in the Junction Box. This wire is not listed in the table. The yellow/green terminal should be connected to local ground with a short wire.

The power cables are described as having red and black colour but they can have other colours depending on the cable type used.

All cable ends must be terminated, even if they are not used.

REMOTE INTERFACE CABINET		**SINGLE JUNCTION BOX IN MAST**	**SINGLE SENSOR UNIT IN MAST**	
PP1		**Junction Box 1**	**Sensor Unit 1**	
PP1 – Data 1	Data line to Sensor Unit 1	**Data**		
Orange/White		1	Orange/White	
Orange		2	Orange	
Green/White		3	Green/White	
Blue		4	Blue (Not used)	
Blue/White		5	Blue/White (Not used)	
Green		6	Green	
Brown/White		7	Brown/White (Not used)	
Brown		8	Brown (Not used)	
X3–24 VDC	Power to Sensor Unit 1	**Power**		
1		1	Power to Sensor Unit 1	Red +
2		2		Black —

Cabling between RIFC, Junction Box 1 and 2 and Sensor Units 1 and 2

The table shows the connection from the Remote Interface Cabinet (RIFC) to dual Junction Boxes and dual Sensor Units.

The yellow/green wire in the pigtail cable from the Sensor Unit must be connected to a ground terminal (yellow/green) in the Junction Box. This wire is not listed in the table. The yellow/green terminal should be connected to local ground with a short wire.

The power cables are described as having red and black colour but they can have other colours depending on the cable type used.

All cable ends must be terminated, even if they are not used.

REMOTE INTERFACE CABINET		**DUAL JUNCTION BOXES IN MAST**	**DUAL SENSOR UNITS IN MAST**	
PP1		**Junction Box 1/2**	**Sensor Unit 1/2**	
PP1 – Data 1/2	Data line to Sensor Unit 1/2	**Data 1**		
Orange/White		1	Orange/White	
Orange		2	Orange	
Green/White		3	Green/White	
Blue		4	Blue (Not used)	
Blue/White		5	Blue/White (Not used)	
Green		6	Green	
Brown/White		7	Brown/White (Not used)	
Brown		8	Brown (Not used)	
X3–24 VDC		**Power 1**		
1	Power to Sensor Unit 1	1	Power to Sensor Unit 1	Red +
2		2		Black —
3	Power to Sensor Unit 2	1	Power to Sensor Unit 2	Red +
4		2		Black —

Cabling between RIFC, Junction Box 1, 2 and 3 and Sensor Units 1, 2 and 3

The table shows the connection from the Remote Interface Cabinet (RIFC) to triple Junction Boxes and triple Sensor Units.

The yellow/green wire in the pigtail cable from the Sensor Unit must be connected to a ground terminal (yellow/green) in the Junction Box. This wire is not listed in the table. The yellow/green terminal should be connected to local ground with a short wire.

The power cables are described as having red and black colour but they can have other colours depending on the cable type used.

All cable ends must be terminated, even if they are not used.

REMOTE INTERFACE CABINET		**TRIPLE JUNCTION BOXES IN MAST**	**TRIPLE SENSOR UNITS IN MAST**	
PP1		**Junction Box 1/2/3**	**Sensor Unit 1/2/3**	
PP1 – Data 1/2/3	Data line to Sensor Unit 1/2	**Data 1**		
Orange/White		1	Orange/White	
Orange		2	Orange	
Green/White		3	Green/White	
Blue		4	Blue (Not used)	
Blue/White		5	Blue/White (Not used)	
Green		6	Green	
Brown/White		7	Brown/White (Not used)	
Brown		8	Brown (Not used)	
X3–24 VDC		**Power 1**		
1	Power to Sensor Unit 1	1	Power to Sensor Unit 1	Red +
2		2		Black —
3	Power to Sensor Unit 2	1	Power to Sensor Unit 2	Red +
4		2		Black —
5	Power to Sensor Unit 3	1	Power to Sensor Unit 3	Red +
6		2		Black —

Cabling between RIFC, triple Junction Box and multiple Sensor Units

The table shows the connection from the Remote Interface Cabinet (RIFC) to a triple Junction Box and multiple Sensor Units. Sensor Units 1, 2 and/or 3.

The yellow/green wire in the pigtail cable from the Sensor Unit must be connected to a ground terminal (yellow/green) in the Junction Box. This wire is not listed in the table. The yellow/green terminal should be connected to local ground with a short wire.

The power cables are described as having red and black colour but they can have other colours depending on the cable type used.

All cable ends must be terminated, even if they are not used.

REMOTE INTERFACE CABINET		TRIPLE JUNCTION BOX IN MAST	MULTIPLE SENSOR UNITS IN MAST	
PP1–Data 1		**Data**	**Sensor Unit 1**	
Orange/White	Data line to Sensor Unit 1	1	Orange/White	
Orange		2	Orange	
Green/White		3	Green/White	
Blue		4	Blue (Not used)	
Blue/White		5	Blue/White (Not used)	
Green		6	Green	
Brown/White		7	Brown/White (Not used)	
Brown		8	Brown (Not used)	
PP1–Data 2	Data line to Sensor Unit 2		**Sensor Unit 2**	
Orange/White		9	Orange/White	
Orange		10	Orange	
Green/White		11	Green/White	
Blue		12	Blue (Not used)	
Blue/White		13	Blue/White (Not used)	
Green		14	Green	
Brown/White		15	Brown/White (Not used)	
Brown		16	Brown (Not used)	
PP1–Data 3	Data line to Sensor Unit 3		**Sensor Unit 3**	
Orange/White		17	Orange/White	
Orange		18	Orange	
Green/White		19	Green/White	
Blue		20	Blue (Not used)	
Blue/White		21	Blue/White (Not used)	
Green		22	Green	
Brown/White		23	Brown/White (Not used)	
Brown		24	Brown (Not used)	
X3–24 VDC		**Power**		
1	Power to Sensor Unit 1	1	Power to Sensor Unit 1	Red +
2		2		Black —
3	Power to Sensor Unit 2	3	Power to Sensor Unit 2	Red +
4		4		Black —
5	Power to Sensor Unit 3	5	Power to Sensor Unit 3	Red +
6		6		Black —

Cabling between RIFC and Local Interface Rail

The table shows the connection of the DSL line and power between the Remote Interface Cabinet (RIFC) and the Local Interface Rail (LIFR).

REMOTE INTERFACE CABINET		LOCAL INTERFACE RAIL
x1–240 VAC		
1	Vessel power in, 100 – 240 VAC	
2		
3	Optional power forwarding	
4		
X2–DSL		**X2–DSL**
1	DSL line 1	1
2		2
3	DSL line 2 (optional)	3
4		4
5	DSL line 3 (optional)	5
6		6

Related topics

Cabling between the rack units, page 48

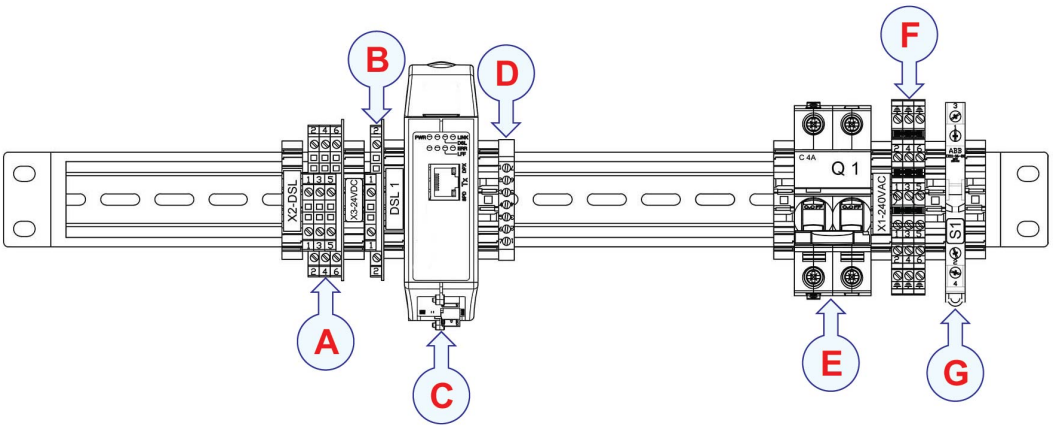
Cabling between the rack units

The XPR system relies on communication between each system unit and between the XPR system and external devices.

Context

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.

Local Interface Rail



A *X2–DSL: Connection of DSL line to Remote Interface Cabinet.*

B *X3–24 VDC: Power connection for DSL modem and switch.*

C *DSL modem: For DSL line to Remote Interface Cabinet.*

D *GND connector*

E *Q1: Fuse 4A. For power to system display.*

F *X1–240 VAC: Power distribution for the system.*

G *S1: Main power switch for the system.*

Procedure

1 Connect the Ethernet cable from LAN3 on the Processing Unit to the Ethernet port on the DSL modem on the Local Interface Rail.

2 Connect the cables for mouse and keyboard at the rear of the Processing Unit.

3 Connect the signal cable (DSL line, X2–DSL) which goes to the Remote Interface Cabinet.

4 Connect the power cable (X3–24 VDC) from X3 to the MRU terminal at the rear of the Processing Unit.

5 Connect the uninterrupted power supply (UPS) to the S1 switch on the Local Interface Rail.

6 Provide power to the display.

   a If UPS power is not required, use an ordinary power socket close to the display.

   b If UPS is required, the display power cable can be connected to the Q1 switch on the LIFR.

7 Connect the AC power cables from the Local Interface Rail to the Processing Unit.

8 Connect the display VGA cable to the VGA connector at the rear of the Processing Unit.

9 Connect the green/yellow cable from the UPS, or other AC power source, to the GND connector.

Further requirements

Write down the length of the cables for later use.

Related topics

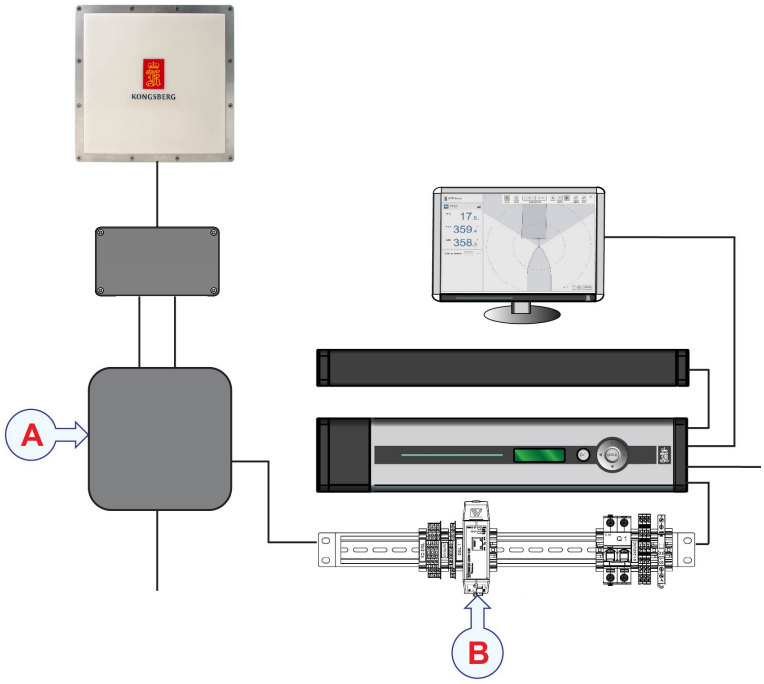
Cable recommendations, page 19
Cabling between RIFC and Local Interface Rail, page 47
Installing a standard display, page 31
Installing a touch display, page 32
Setting modem DIP switches, page 50

Setting modem DIP switches

The Sensor Unit is connected to the Processing Unit with modems. These modems transmit data between the units.

Context

There is one modem located inside the Remote Interface Cabinet and one on the Local Interface Rail. The DIP switch settings in the modems must be correct in order to obtain optimal system communication.



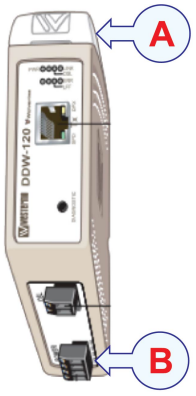
A *Modem inside Remote Interface Cabinet (bow, close to mast)*

B *Modem on Local Interface Rail in rack (bridge)*

Procedure

1 Locate the modem in the Remote Interface Cabinet.

   a Remove the modem power plug.

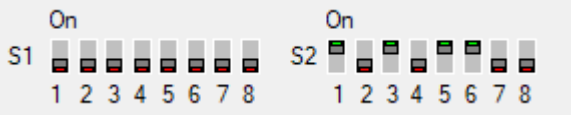


A *Modem lid*

B *Modem power plug*

b Open the modem lid to reveal the DIP switch

c Set the DIP switch according to the illustration.



d Close the modem lid.

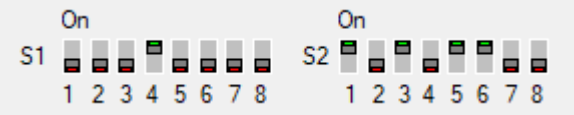
e Replace the power plug.

2 Locate the modem on the Local Interface Rail in the rack.

a Remove the modem power plug.

b Open the modem lid to reveal the DIP switch

c Set the DIP switch according to the illustration.



d Close the modem lid.

e Replace the power plug.

3 Make sure that the communication between the Sensor Unit and the Processing Unit is up and running after 5 minutes.

Enter the **Sensors** page and check if IP addresses for the Sensor Units are available. If there are no IP addresses available, the modem settings are not correct.

Or you can enter the **Network** page and check if the Sensor Unit is listed under **Sensors**.

Related topics

Installing the Remote Interface Cabinet, page 30
Installing the system units in a rack, page 29
Enabling Sensor Units for operation, page 63

Setting to work

Topics

Setting to work summary

When all hardware units have been installed, and all the cables have been connected, the XPR system can be turned on and set to work.

Prerequisites

- All system units have been installed.
- All system cables have been installed.
- All connections have been made.
- All operating power is available.

Procedure

1 Verify that all hardware and cable installation have been made correctly.
2 Verify that the Sensor Unit is connected to a power source.
3 Turn on the Processing Unit.
4 Turn on the display.

5 Configure the XPR system for operational use.

The XPR operator software is pre-installed on the Processing Unit.

6 Verify that the XPR system is operational.

Related topics

Turning on the XPR system, page 53
LED indicators Processing Unit, page 54
Entering and navigating the system configuration, page 55
Configuring the XPR 100 system for normal operation, page 59
Verifying that the XPR 100 system is ready for operational use, page 72

Turning on the XPR system

When you have verified that all hardware units and cables have been properly installed, and that the supply power is correct, you can turn on the XPRsystem for the first time.

Context

After it has been turned on, the Processing Unit will go through an initialization phase. Then the leftmost LED is red. This will turn green when the system is operational.

The software is pre-installed and the system will start automatically after it has been turned on.

A *S1 power switch in Remote Interface Cabinet.*

Procedure

1 Turn on the S1 switch in the Remote Interface Cabinet to apply power to the Sensor Unit.

2 Turn on the S1 switch on the Local Interface Rail.

3 Turn on the Q1 switch on the Local Interface Rail, if it is used to power the system display.

4 Turn on the Processing Unit by pressing the power switch located under the lid at the front of the unit.

5 Turn on the display.

Result

When the Power/SW LED at the front of the Processing Unit is green, it indicates that the unit is running and is ready for configuration. The system will start up automatically in *Standby* mode.

LED indicators Processing Unit

At the front of the Processing Unit there are four LED indicators (Light Emitting Diode). The LED to the left indicates power and software status. The other LEDs have no function in this system. They are always turned off.

A *Power/SW LED*

B *No function in this system*

C *No function in this system*

D *No function in this system*

Power/SW LED

This LED indicates power and software status.

- During start-up the LED is red.
- When the software is up and running, it turns green.

Entering and navigating the system configuration

Topics

Entering the configuration parameters

You must set up the system according to the requirements for your operation.

Context

It is recommended to write down the setup parameters for the specific installation. In this way, the parameters for the actual installation will be easier to find when requested later.

Procedure

1 Select the **System menu** button **[+]** in the top right corner of the **Main** view to open the **System** menu.

When the **System** menu is open, this button changes to a **Close** button **[x]**.

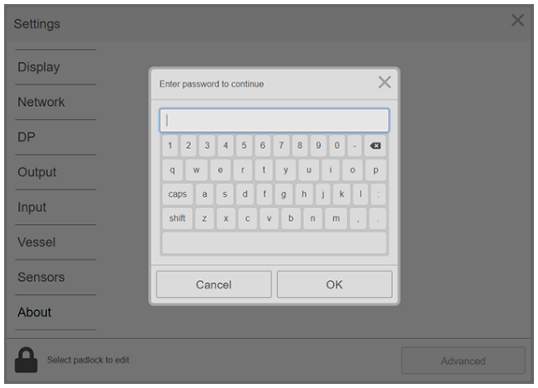
2 Select **Settings** to access the configuration parameters.

3 Select the **Padlock** and type the password: **stx** to activate the parameters.

Activating the configuration parameters

You must unlock the configuration **Settings** to be able to make changes to the parameters. This is to avoid unintentional changes to the parameters.

Context



Procedure

1 Select the **System** menu **[+]** —> **Settings**.

2 Select the **Padlock** symbol. Type the password: **stx**.

Note

The password is case sensitive.

3 Select **OK** to close the dialog box.

Selecting configuration parameters

There are three ways to select a configuration parameter.

1 Selecting a button directly.

2 Selecting from a drop-down menu.

3 Editing in text boxes.

Editing in text boxes

Changes to the configuration are sometimes done in text boxes.

Procedure

1 Select the **Pencil** next to the box to modify the value.

2 Select **OK** when the correct information is entered.

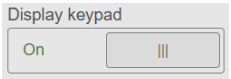
Confirming parameter changes

If you change a parameter, you are not always prompted to confirm the changes. The new values are saved when you exit the page or dialog box.

Displaying the keypad

If you do not use a mouse and keyboard you can select to display a keypad on the screen for entering values.

Context



Procedure

1 Select the **System** menu **[+]** —> **Settings** —> **Display**.

2 Select the **Padlock** and type the password: **stx** to activate the parameters.

3 Select **Display keypad** ON or OFF.

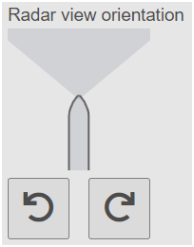
Setting up the display presentation

Topics

Selecting Radar view orientation

You can select the orientation of the **Radar** view to four different orientations. This can be done to fit how the display is installed on the vessel.

Context



Procedure

1 Select the **System** menu **[+]** —> **Settings** —> **Display**.

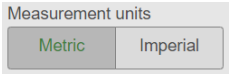
2 Select the **Padlock** and type the password: **stx** to activate the parameters.

3 Select the **Right** or **Left** arrow to change the vessel orientation in steps of 90 degrees.

Selecting measurement unit in display

You can select which measurement unit you want to use in the display.

Context



Procedure

1 Select the **System** menu **[+]** —> **Settings** —> **Display**.

2 Select the **Padlock** and type the password: **stx** to activate the parameters.

3 Select **Metric** to select metres as measurement unit or select **Imperial** to select feet as measurement unit.

Configuring the XPR 100 system for normal operation

Topics

Setting up system as transponder or interrogator

The system can be set up to operate as an interrogator or a transponder.

On a shuttle tanker the system will operate as an interrogator. On an FPSO the system will operate as a transponder.

DP and telegram settings are only applicable if there is a DP (dynamic positioning) system onboard the vessel.

The table gives an overview of the configuration sections which apply to transponder or interrogator setup.

Section	Transponder setup	Interrogator setup
Setting system operation mode	X	X
Setting vessel details	X	X
Setting the parameters for network communication	X	X
Entering Sensor Unit bracket location	X	X
Enabling Sensor Units for operation	X	X
Setting up the DP interface	(X)	X
Sending telegrams to other systems	(X)	X

Section	Transponder setup	Interrogator setup
Setting up automatic target selection		X
Setting frequency pair and address code	X	
Enabling heading – Receiving heading from DP – Receiving heading on Input port – Using Fixed heading	X (X) X X	X X X

Setting system operation mode

The system can be set up to operate as an interrogator or a transponder.

Context

On a shuttle tanker the system will operate as an interrogator. On an FPSO the system will operate as a transponder.

Procedure

1 Select the **System** menu **[+]** —> **Settings**.

2 Select the **Padlock** and type the password: **stx** to activate the parameters. Select **OK**.

3 Select **Advanced**.

4 Select **System**.

5 Type the wanted **Role** parameter.

- **0** = Interrogator
- **1** = Transponder

6 Select **Save**.

7 Close the dialog box when finished.

Setting vessel details

Under **Vessel** you can identify your vessel with the vessel name and enter vessel dimensions. This is useful for a correct scaling of the vessel in the **Radar** view.

Context

Procedure

1 Select the **System** menu **[+]** —> **Settings** —> **Vessel**.

2 Select the **Padlock** and type the password: **stx** to activate the parameters.

3 Select the **Pencil** to modify the value.

4 Type the vessel name. Type the value for **Length** and **Width**.

Select **OK**.

5 If the vessel is fixed (for example moored or anchored), you can set **Fixed heading** to **On**.

6 Type the value for **Fixed heading [°]**.

Select **OK**.

Setting the parameters for network communication

The Processing Unit must be set up for communication with the Sensor Unit(s). These parameters are pre-configured on delivery.

Context

Note

As the network parameters are set up from factory, you do not need to do anything with these parameters.

The Processing Unit has four network ports (LAN). LAN3 (Local Area Network) on the Processing Unit is used to communicate with the Sensor Unit(s).

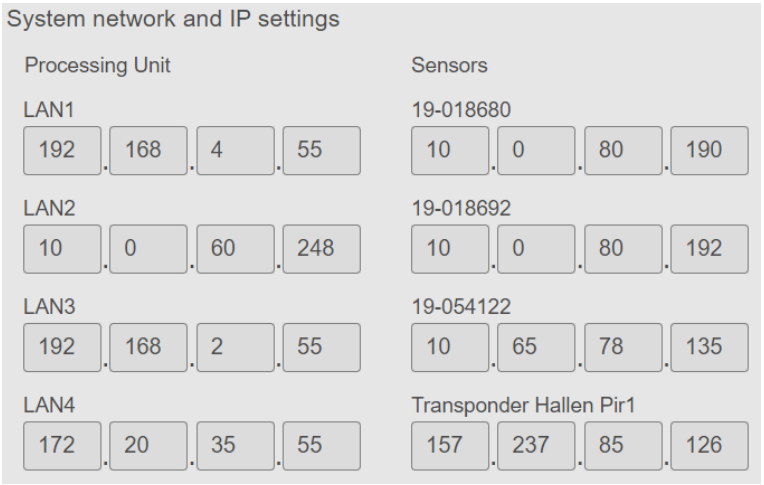
Processing Unit default network port and subnet settings

- LAN 1 corresponds to the Ethernet port at the front of the Processing Unit. It can be used for ad hoc communication with a computer during maintenance.
- LAN 2 is used for distribution of data from the Processing Unit.
- LAN 3 is used for communication with the Sensor Unit(s).
- LAN 4 is not used in this product.

The table shows the default IP addresses and subnet assignments for the network ports on the Processing Unit.

Port	Internet protocol (IP) address	Subnet	Subnet mask
LAN 1	192.168.4.55	192.168.4.0	255.255.0.0
LAN 2	192.168.1.55	192.168.1.0	255.255.0.0
LAN 3	192.168.2.55	192.168.2.0	255.255.0.0
LAN 4	192.168.3.55	192.168.3.0	255.255.0.0

The illustration shows an example of the IP addresses for the available Sensor Units. Example only.



Entering Sensor Unit bracket location

After installation you must measure the exact position and orientation of the Sensor Unit mounting bracket and enter the measurements into the system.

Prerequisites

This procedure requires that you have measured the exact position of the Sensor Unit mounting bracket.

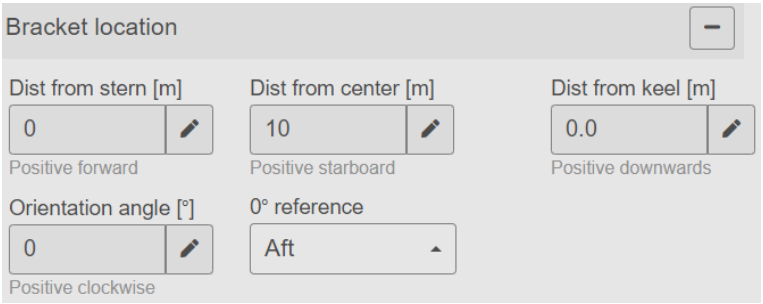
Context

The placement and orientation (orientation angle) of the Sensor Unit mounting bracket is important for the system to be able to provide accurate measurements to the dynamic positioning (DP) system. If you have multiple Sensor Units, they are all mounted on the Multi Sensor Stand.

An XPR Sensor Units can act as both an interrogator Sensor Unit and a transponder Sensor Unit. The system outputs the direction from the interrogator Sensor Unit mounting bracket to the transponder Sensor Unit located on the other vessel. This direction output is relative to the vessel's centre line (0 forward, positive to starboard). The orientation angle is in the range 0.00 to 359.99 degrees.

The **0° reference** parameter is only available if the system is set to operate as a transponder.

It is recommended to set this parameter to **Aft** if the Sensor Unit is located in the stern and to **Forward** if the Sensor Unit is located in the bow of the vessel.



Procedure

1 Select the **System** menu **[+]** —> **Settings** —> **Sensor**.

2 Select the **Padlock** and type the password: **stx** to activate the parameters.

3 Select the **Pencil** to type the mounting bracket measurements for **Distance from stern**, **Distance from center** and **Distance from keel** in metres.

Select **OK**.

4 Select the **Pencil** to type the orientation angle in degrees.

Select **OK**.

5 If you operate as a transponder, select the location for the **0° reference**.

Enabling Sensor Units for operation

When you start up the system after installation, you must select which Sensor Units to use in your operation. You can configure up to three Sensor Units on each XPR system.

Prerequisites

This procedure requires that you know the serial number of the Sensor Unit. The serial number of the Sensor Unit is located at the rear of the unit.

Context

Procedure

1 Select the **System** menu **[+]** —> **Settings** —> **Sensor**.

2 Select the **Padlock** and type the password: **stx** to activate the parameters.

3 Select the IP address for the Sensor Unit you want to use from the list.

The serial number for the Sensor Unit will appear.

4 Select the **Enable** box to enable the Sensor Unit.

Related topics

Setting modem DIP switches, page 50

Setting up the DP interface

The **DP interface settings** control output from the XPR system to a dynamic positioning (DP) system. You must select which data you want the dynamic positioning (DP) system to receive.

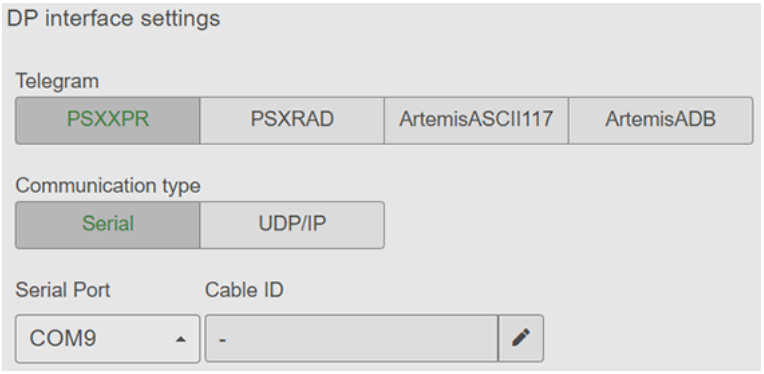
Prerequisites

You must check what kind of telegrams the dynamic positioning (DP) system is set up to receive.

Context

The baud rate for serial communication is 9600 baud. The electrical interface for COM 1 and COM 2 is RS-232. The electrical interface for COM 9 to COM 14 is RS-422.

It is recommended to write down all relevant parameters for future reference.



Procedure

1 Select the **System** menu **[+]** —>**Settings** —> **DP**.

2 Select the **Padlock** and type the password: **stx** to activate the parameters.

3 Select the telegram type you want to send to the dynamic positioning (DP) system.

4 Select communication type. Select **Serial** if the DP system is connected with serial cable. Select **UDP/IP** if the DP system is connected with a UDP network connection.

5 For **Serial**, select the wanted serial port from the list. Select the **Pencil** and type the Cable ID for the corresponding cable.

   For **UDP/IP** broadcast, type the UDP port number on the destination system. Select the **Pencil** and type the Cable ID for the corresponding cable.

6 Select **OK** to save the chosen settings.

Related topics

Setting up automatic target selection, page 68

Sending telegrams to other systems

Topics

Adding an additional output telegram

Additional output controls output from the XPR system to other systems.

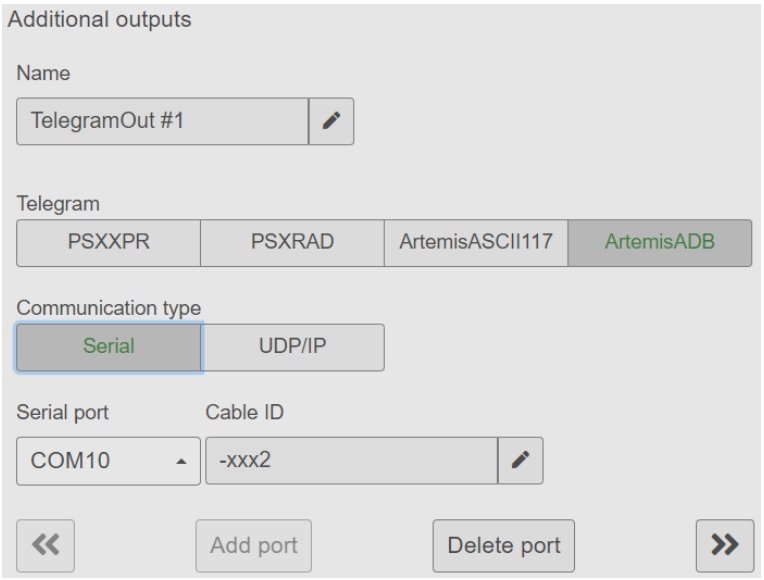
Context

The system supports up to five additional outputs. You can navigate between outputs with the left and right **Arrow** buttons. These buttons are only enabled when at least two outputs are set up.

You can only have two outputs set up at the same time. If you want to add another output, you must delete one of the two first.

The telegram type is locked to the type specified for the DP connection in the **DP** page.

The baud rate for serial communication is 9600 baud. The electrical interface for COM 1 and COM 2 is RS-232. The electrical interface for COM 9 to COM 14 is RS-422.



Procedure

1 Select the **System** menu **[+]** —> **Settings** —> **Output**.

2 Select the **Padlock** and type the password: **stx** to activate the parameters.

3 Select **Add port** to add a new output on that port.

4 Select the **Pencil** in the **Name** box and type a name for the new output. Select **OK**.

5 Select communication type. Select **Serial** if the DP system is connected with serial cable. Select **UDP/IP** if the DP system is connected with a UDP network connection.

6 For **Serial**, select the wanted serial port from the list. Select the **Pencil** and type the Cable ID for the corresponding cable. Select **OK**.

For **UDP/IP** broadcast, type the UDP port number on the destination system. Select the **Pencil** and type the Cable ID for the corresponding cable. Select **OK**.

Related topics

Setting up automatic target selection, page 68

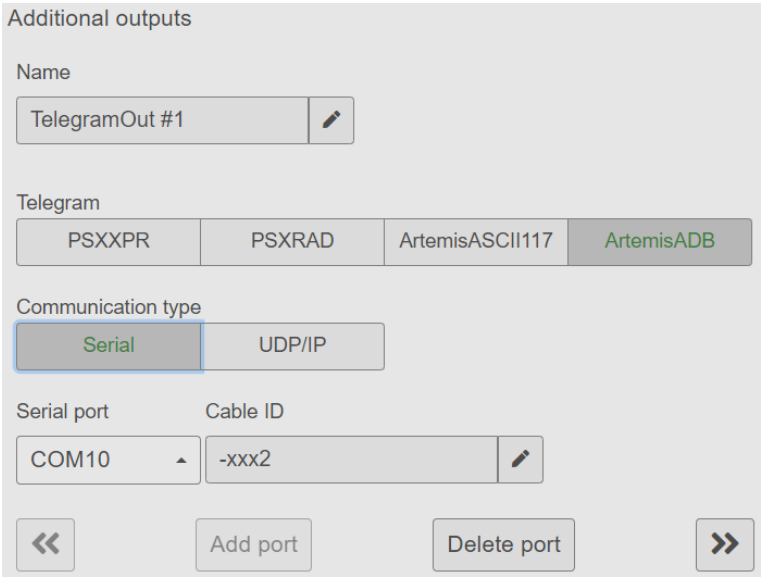
Deleting an existing output telegram

If an additional output telegram is no longer needed, it can be removed.

Context

The system supports up to five additional outputs. You can navigate between outputs with the left and right **Arrow** buttons. These buttons are only enabled when at least two outputs are set up.

You can only have two outputs set up at the same time.



Procedure

1 Select the **System** menu **[+]** —> **Settings** —> **Output**.

2 Select the **Padlock** and type the password: **stx** to activate the parameters.

3 Use the left or right **Arrow** button to select the output you want to delete.

4 Select **Delete port**.

Setting up automatic target selection

You can set up the system to select a target and to enter Acitve/Standby mode automatically.

Prerequisites

This item is only available when the system is set up to operate as an interrogator.

This requires additional input from external systems. For example a DP (dynamic positioning) or a DARPS (differential absolute and relative positioning) system. Input from a DARPS system is preferred since this will ensure correct time and date on the XPR system and log files.

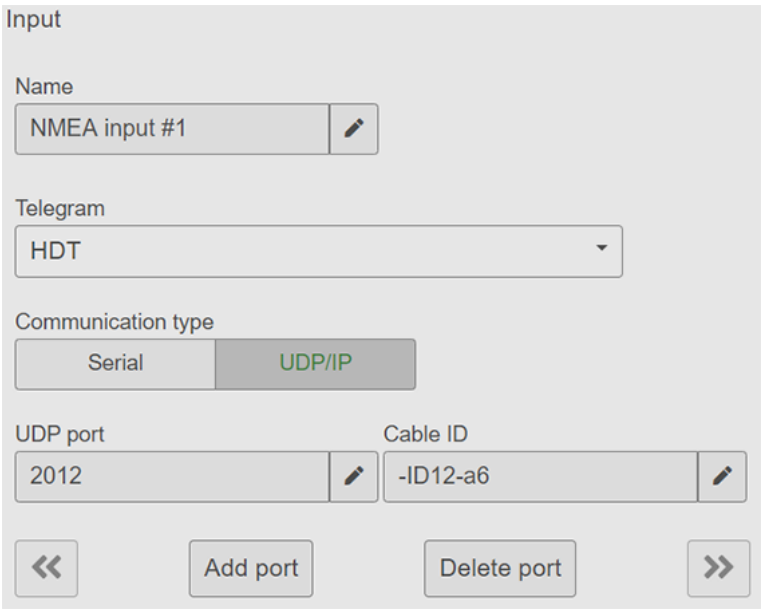
Required input is:

- PSALB. Proprietary NMEA sentence.
- GGA. Standard NMEA sentence.
- THS/HDT. Standard NMEA sentence.

Optional input is:

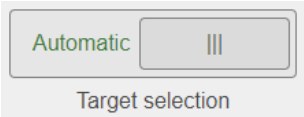
- ZDA. Standard NMEA sentence.

Context



Procedure

1 If you have already set up the DP interface and/or added a telegram input, set the **Target selection** button on the **System menu** to **Automatic**.



2 If you have not set up the DP interface, or do not receive the required input from DP, you must set up an Input port with the required input.

   a Select the **System** menu **[+]** —> **Settings** —> **Input**.

   b Select the **Padlock** and type the password: **stx** to activate the parameters.

   c Select the telegram type you want to receive. See required input above.

   d Select communication type.

   For **Serial**, select the wanted serial port from the list. Select the **Pencil** and type the Cable ID for the corresponding cable.

   For **UDP/IP** broadcast, type the UDP port number on the destination system. Select the **Pencil** and type the Cable ID for the corresponding cable.

3 Select **OK** to save the chosen settings.

Related topics

Setting up the DP interface, page 64
Adding an additional output telegram, page 66

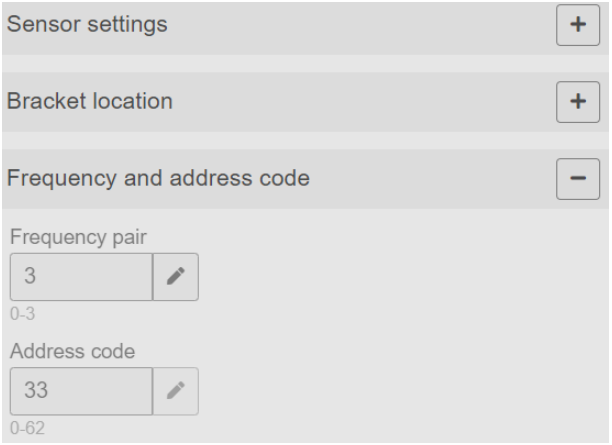
Setting frequency pair and address code

You must establish a communication link between the transponder Sensor Unit and the interrogator Sensor Unit.

Prerequisites

This item is only available when the system is set up to operate as a transponder.

Context



Procedure

1 Select the **System** menu **[+]** —> **Settings** —> **Sensor**.

2 Select the **Padlock** and type the password: **stx** to activate the parameters.

3 Select the **Pencil** to modify the value.

4 Type the wanted values for **Frequency pair** and **Address code**.

5 Select **OK**.

Enabling heading

Heading is used to keep track of the direction of signals when the vessel is rotating. On a vessel operating as a transponder, heading is also used to calculate the heading of the remote vessel, **HDG Remote**. There are three ways to enable heading on the XPR system: Receive heading from DP (dynamic positioning), receive heading through an Input port or use Fixed heading.

Receiving heading from DP

Heading from DP (dynamic positioning) can be received through THS or PSALS telegrams. These telegrams are pre-configured in the system, and are received on the same port as telegrams are output to DP. There is no need to set up a separate input port.

If the telegrams from the XPR system are received from the DP system, and the DP system sends either a THS or a PSALS telegram, heading should be received on the XPR system.

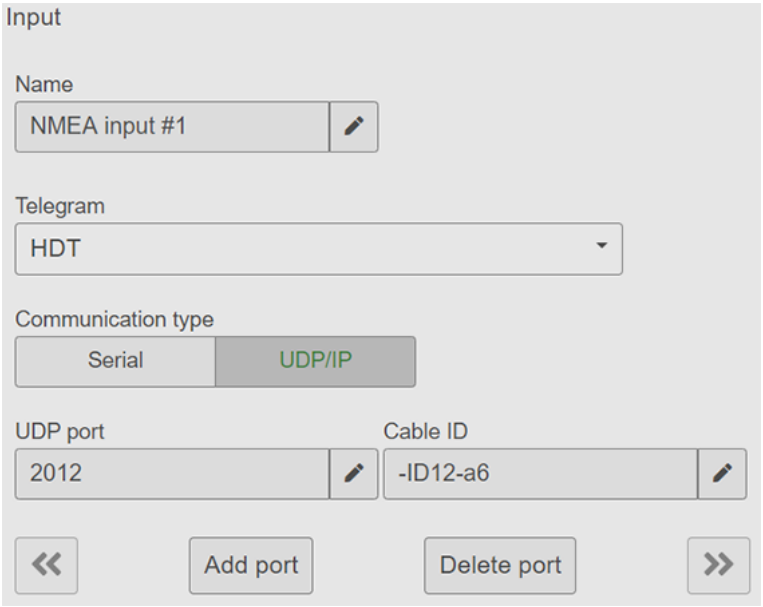
Telegrams which are sent and received can be monitored by using the **Port Monitor** tool.

Receiving heading on Input port

Heading can be received through an **Input** port by using the THS, HDT or PSALS telegrams.

Context

Telegrams which are sent and received can be monitored by using the **Port Monitor** tool.



Procedure

1 Select the **System** menu **[+]** —> **Settings** —> **Input**.

2 Select the **Padlock** and type the password: **stx** to activate the parameters.

3 **Add port**

4 Select the telegram type you want to receive. This must be THS (recommended), HDT or PSALS.

5 Select which communication type you want to use. Select between Serial communication or UDP/IP broadcast.

For **Serial**, select the wanted serial port from the list.

For **UDP/IP** broadcast, type the UDP port number on the destination system.

6 Select **OK** to save the chosen settings.

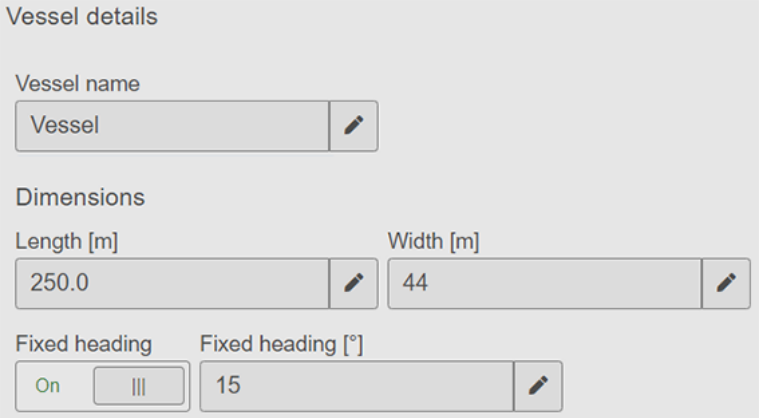
Using Fixed heading

If the vessel is fixed, for example moored or anchored, and a heading source is not available, you may use fixed heading.

Prerequisites

This item is only available when the system is set up to operate as a transponder.

Context



Procedure

1 Select the **System** menu **[+]** —> **Settings** —> **Vessel**.

2 Select the **Padlock** and type the password: **stx** to activate the parameters.

3 Set **Fixed heading** to **On**.

4 Select the **Pencil** to modify the value.

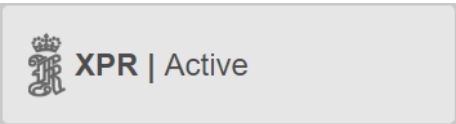
5 Type the value for **Fixed heading [°]**.

Select **OK**.

Verifying that the XPR 100 system is ready for operational use

When the XPR system configuration is completed, you must verify that the system is operational.

Context



Procedure

1 Check that the **System status** box shows **Active**.

2 Check that the time indicator in the **Main** view is incrementing.

System backup and restore

Topics

About system backup and restore

We strongly advice you to create your own backup once the installation has been completed. Your backup will then include the operating system, the XPR 100 software, as well as all the interface parameters that you have defined.

The **Secure Backup and Restore** tool (SBR) is developed to facilitate backup and restore of the system image.

Note

For this product you must use SBR version 2.02.03 or newer.

A USB flash drive is delivered with the product for backup and restore purposes. This flash drive contains a full image of the system. We recommend that you keep the USB flash drive updated with the latest system image at any time.

We recommend that you create a copy of the system image on the supplied USB flash drive. You can also use any commercial USB flash drive which has the necessary storage capacity.

You can restore the system image from the updated USB flash drive or from the local copy stored on the hard disk. Restoring the system image from the local disk copy is a lot faster than restoring it from the USB flash drive. This option is useful if the system suffers from a file system failure, rather than a complete disk failure.

All data on the system drive (normally **C:**) of the unit on which the restore is performed, will be cleared and replaced by the contents of the backup. The **D:** drive is not backed up and therefore not modified during restore from the local hard disk copy.

Creating a backup of the system image

We strongly advice you to create your own backup once the installation has been completed. Your backup will then include the operating system, the XPR 100 software, as well as all the interface parameters that you have defined.

Prerequisites

To create the backup image you need the USB flash drive delivered with the system. You can also use any commercial USB flash drive. The USB flash drive must have a capacity of at least 8 GB. The USB ports on the system are not compatible with USB 3 devices.

We recommend that you use the USB flash drive delivered with the system.

A keyboard and a mouse must be connected to the Processing Unit in order to perform this procedure.

Context

The local backup on the hard disk will be lost in case of disk failure. We recommend that the USB flash drive with the system image is always updated.

This procedure describes the backup procedure using the USB flash drive delivered with the system for backup purposes.

Note

This procedure will stop all output from the system for about 45 minutes.

Procedure

1 Select the **System** menu **[+]** —> **Tools** —> **Reboot**.

2 Press **ESC** repeatedly during boot to open the startup menu. The startup menu has these items: Start system, Secure Backup and Restore and Memtest.

3 Select **Secure Backup and Restore**. Press **ENTER** to open the SBR **Main** menu.

4 Select **System Backup**. Press **ENTER** to open the **Backup** menu.

5 Insert the USB flash drive.

6 Select **Create backup stick and local copy**.

This will update the USB flash drive. It will also update the local copy of the system image which is stored on the hard disk of the Processing Unit.

7 Type another description for the backup if you want to. Press **ENTER** to start the backup process.

This process takes around 45 minutes to complete. The progress of the process is indicated.

The message `Successfully created backup stick` is displayed when the backup is ready.

8 Press **ENTER** to return to the **Backup** menu.

9 Press **ESC** to return to the SBR **Main** menu.

10 Select **Reboot HWP**. Press **Enter**.

11 Remove the USB flash drive.

The operator software will start automatically after reboot.

12 Store the USB flash drive with the system backup in the XPR 100 *Site Manual*.

Result

An updated copy of the latest system image is now stored on both the USB flash drive and the hard disk.

Restoring system image from local copy on disk

You can restore the system image from the updated USB flash drive or from the local copy stored on the hard disk. Restoring the system image from the local disk copy is a lot faster than restoring it from the USB flash drive. This option is useful if the system suffers from a file system failure, rather than a complete disk failure.

Prerequisites

A keyboard and a mouse must be connected to the Processing Unit in order to perform this procedure.

Context

This procedure will stop all output from the system for about 15 minutes.

Caution

All data on the system drive (normally **C:***) of the unit on which the restore is performed, will be cleared and replaced by the contents of the backup. The* **D:** *drive is not backed up and therefore not modified during restore from the local hard disk copy.*

Procedure

1 Turn on the Processing Unit.

2 Select the **System** menu **[+]** —> **Tools** —> **Reboot**.

3 Press **ESC** repeatedly during boot to open the startup menu. The startup menu has these items: Start system, Secure Backup and Restore and Memtest.

4 Select **Secure Backup and Restore**. Press **ENTER** to open the SBR **Main** menu.

5 Select **System Restore**. Press **ENTER** to open the **Restore** menu.

6 Select **Restore from local copy**. Press **Enter**.

7 Select **OK**. Press **ENTER** to confirm to start the restore process.

Caution

You cannot stop the restore process after you have confirmed to restore. Select **Cancel** *and press* **ENTER** *if you are not absolutely certain that a restore is OK.*

The progress of the process is indicated.

The message `Local backup of system partition successfully restored` is displayed when the restore is finished.

8 Press **ENTER** to return to the **Restore** menu.

9 Press **ESC** to return to the SBR **Main** menu.

10 Select **Reboot HWP**. Press **Enter**.

The operator software will start automatically after reboot.

Result

A system identical to the one at the time the backup, was created.

Restoring system image from USB flash drive backup

You can restore the system image from the updated USB flash drive or from the local copy stored on the hard disk. A USB flash drive is delivered with the product for backup and restore purposes. Restoring the system image from the USB flash drive is useful if the system for some reason should fail.

Prerequisites

A keyboard and a mouse must be connected to the Processing Unit in order to perform this procedure.

Context

This procedure will stop all output from the system for about 15 minutes.

Caution

All data on the unit on which the restore is performed, will be cleared and replaced by the contents of the USB flash drive with the system image backup.

Procedure

1 Select the **System** menu **[+]** —> **Tools** —> **Shutdown**.

2 Turn off the Processing Unit.

3 Insert the USB flash drive.

4 Turn on the Processing Unit.

The **Secure Backup and Restore** tool will start automatically and display the SBR **Main** menu. If the **SBR** tool does not start automatically, the BIOS settings may need to be altered.

5 Select **System Restore**. Press **ENTER** to open the **Restore** menu.

6 Select **Restore from backup stick**. Press **Enter**.

7 Select **OK**. Press **ENTER** to confirm to start the restore process.

Caution

You cannot stop the restore process after you have confirmed to restore. Select **Cancel** *and press* **ENTER** *if you are not absolutely certain that a restore is OK.*

The progress of the process is indicated.

The message `Backup successfully restored` is displayed when the restore is finished.

8 Press **ENTER** to return to the **Restore** menu.

9 Press **ESC** to return to the SBR **Main** menu.

10 Select **Reboot HWP**. Press **Enter**.

11 Wait 10 seconds.Remove the USB flash drive.

The operator software will start automatically after reboot.

Result

A system identical to the one at the time the backup, was created.

Technical specifications

Topics

Performance specifications

These performance specifications summarize the main functional and operational characteristics of the XPR 100.

- **Operating range**: 10 m – 5 km
- **Range accuracy**: 1 m
- **Range resolution**: 0.1 m
- **Range update rate**: 4 Hz
- **Bearing accuracy**: ±0.02°
- **Bearing update rate**: 4 Hz
- **Horizontal opening angle**: ±50°
- **Vertical opening angle**: 25°

- **Operating frequency band**: 9.2 – 9.3 GHz

Weights and outline dimensions

These weights and outline dimension characteristics summarize the physical properties of the XPR 100.

Sensor Unit

- **Outline dimensions**:
  - **Height**: 391 mm
  - **Width**: 391 mm
  - **Depth**: 50 mm
- **Weight**:
  - **Without mounting bracket**: 9.9 kg
  - **Includes mounting bracket**: 11.2 kg

Junction Box

- **Outline dimensions**:
  - **Height**: 220 mm
  - **Width**: 120 mm
  - **Depth**: 91 mm
- **Weight**: 2.88 kg

Remote Interface Cabinet, single

- **Outline dimensions**:
  - **Height**: 400 mm
  - **Width**: 300 mm
  - **Depth**: 210 mm
- **Weight**: 9.7 kg (Incl. power and modem)

Remote Interface Cabinet, dual or triple

- **Outline dimensions**:
  - **Height**: 500 mm
  - **Width**: 500 mm
  - **Depth**: 210 mm
- **Weight**: 19 kg (Incl. power and modem)

Processing Unit

- **Outline dimensions**:
  - **Depth**:
    - **Minimum**: 357 mm (Includes connectors on the rear panel)
    - **Maximum**: 412 mm (Includes cable relief bracket)
  - **Width**: 485 mm (Will fit in a 19" rack)
  - **Height**: 88.1 mm (2U)
- **Weight**: 5.4 kg

Power specifications

These power characteristics summarize the supply power requirements for the XPR 100.

Sensor Unit

- **Voltage**: 18 – 36 V DC
- **Power consumption**: Max. 70 W

Remote Interface Cabinet, single

- **Voltage**: 100 – 240 VAC
- **Power consumption**: Max 200 W

Remote Interface Cabinet, dual or triple

- **Voltage**: 100 – 240 VAC
- **Power consumption**: Max 400 (dual)/600 (triple) W

Processing Unit

- **Voltage**: 100 – 240 VAC, 50/60 Hz
- **Power consumption**: Max. 60 W
- **Batteries**: None. Connection to UPS recommended.

Environmental specifications

These specifications summarize the temperature requirements and other environmental standards for the XPR 100.

Sensor Unit

- **Operating temperature**: –25 °C – 55 °C

- **Storage temperature**: –40 °C – 70 °C
- **Operating humidity**: 100 %
- **Storage humidity**: Max. 60 %
- **Ingress protection (IP) code**: IP66
- **Enclosure material**:
  - **Front**: ABS/PMMA
  - **Rear**: Aluminium

Junction Box

- **Operating temperature**: –40 °C – 100 °C
- **Storage humidity**: < 55%
- **Ingress protection (IP) code**: IP66
- **Enclosure material**: Polyester fiberglass reinforced
- **Ingress protection (IP) code**: II

Remote Interface Cabinet (With contents)

- **Ambient temperature range**: -20 °C - 55 °C
- **Storage temperature**: -20 °C - 55 °C
- **Relative humidity**: < 50 % at +40 °C (higher humidity levels are permitted at lower temperatures)
- **Storage humidity**: < 50 % at +40 °C (higher humidity levels are permitted at lower temperatures)
- **Ingress protection (IP) code**: IP66
- **Enclosure material**: Sheet steel

Processing Unit

- **Operating temperature**: -15 to 55 °C

  Do not operate for more than 10 hours at maximum temperature.
- **Recommended operating temperature**: Room temperature (20 °C)
- **Storage temperature**: -20 to 70 °C

  Long term storage temperature: 5 to 35 °C (Recommended)
- **Operating humidity**: 5 to 95% relative, non-condensing
- **Storage humidity**: < 55%
- **Ingress protection (IP) code**:
  - **Front**: IP42
  - **Rear**: IP21

- **Standards**:
  - **Electromagnetic compatibility**: IEC 60945/EN 60945 (Immunity and radiation)
  - **Vibration**: IEC 60945/EN 60945
- **Enclosure material**: Aluminium

Interface specifications

The system will interface with external systems and sensors via serial port and Ethernet.

Sensor Unit

- **LAN/Ethernet**: 1 Port

Processing Unit

- **Serial ports**: 6 non-dedicated isolated ports, RS-232 or RS-422*)

  Isolated COM1 and COM2, 9-pin DSub, RS-232

  *) The number of serial ports may be extended by using a serial port extender.
- **Baud rate**: Up to 115 200 bytes/sec
- **LAN**: 4 Ethernet ports
- **USB**: 3 ports, 1 in front and 2 in rear

Data output specifications

The XPR 100 system will interface with peripheral systems and sensors using standard and/or proprietary datagram formats.

Processing Unit

- **Message format**: Proprietary NMEA 0183
- **Message types**: PSXXPR, PSXRAD, Artemis ADB, Artemis BCD

Telegram specifications

The XPR 100 supports these telegrams.

- PSXXPR
- PSXRAD
- Artemis ADB (9 char BCD)

- Artemis ASCII 17

Cable specifications

Junction Box to Remote Interface Cabinet data cable

Use recommended cable types for outdoor marine environments.

- **Type**: CAT5e or better
- **Length, Max.**: 100 m
- **Overall diameter**: > 7.0 mm

Remote Interface Cabinet to Junction Box power cable

Use recommended cable types for outdoor marine environments.

- **Diameter**: 2 x 1.5 mm^2 or 2 x 2.5 mm^2, depending on cable length.

Remote Interface Cabinet to Local Interface Rail data cable

Use cable types suited for the specific installation. 1 pair in a single cable.

Related topics

Cable recommendations, page 19

Standards and regulations

This product is in compliance with relevant directives and product standards.

All system units

- IEC 60945, ed. 4

Sensor Unit

- Radio Equipment Directive (RED) 2014/53/EU
- Radio standard, ETSI EN 302 248 v2.1.1
- Environmental standards:
  - DNVGL-CG-0339 (2016)
  - IACS E10 (2018)

Manufacturer's conformity declaration

KONGSBERG

EU DECLARATION OF CONFORMITY

Manufacturer's name: **Kongsberg Seatex AS**

Manufacturer's address: **Havnegata 9, N-7010 Trondheim, Norway**

declares that the product:

Model number: **XPR 100, Long-Range Relative Positioning System**

is in conformity with the **Radio Equipment Directive, RED, 2014/53/EU** and with reference to ETSI guide **ETSI EG 203 367,** using relevant sections of the following product standards:

Essential requirements	**Standards**
Health and Safety (Article 3.1(a)	EN 61010-1:2010/IEC 61010-1:2010
EMC (Article 3.1(b)	IEC/EN 60945:2002 + Corr1:2008; IACS E10:2018
Spectrum (Article 3.2)	ETSI EN 302 248 V2.1.1: 2016

Test references
Report EMC: E19031.00, issued by Nemko AS.
Report Spectrum: 388659-01, issued by Nemko AS.
Report Safety: XPR100_HW_Safety_Report_2019_1, issued by Kongsberg Seatex AS.

The product is compliant with RoHS Directive **2011/65/EU** with reference to standard **EN 50581:2012**.

Supplementary information
XPR Sensor Equipment is environmentally compliant with IEC/EN 60945:2002, IACS E10:2018 and DNVGL-CG-0339:2016. The product was tested in its normal configuration with Junction Box and Remote Interface Cabinet.

Date and signature
2019-06-13

Erlend Vågsholm, Vice President R&D

Drawings

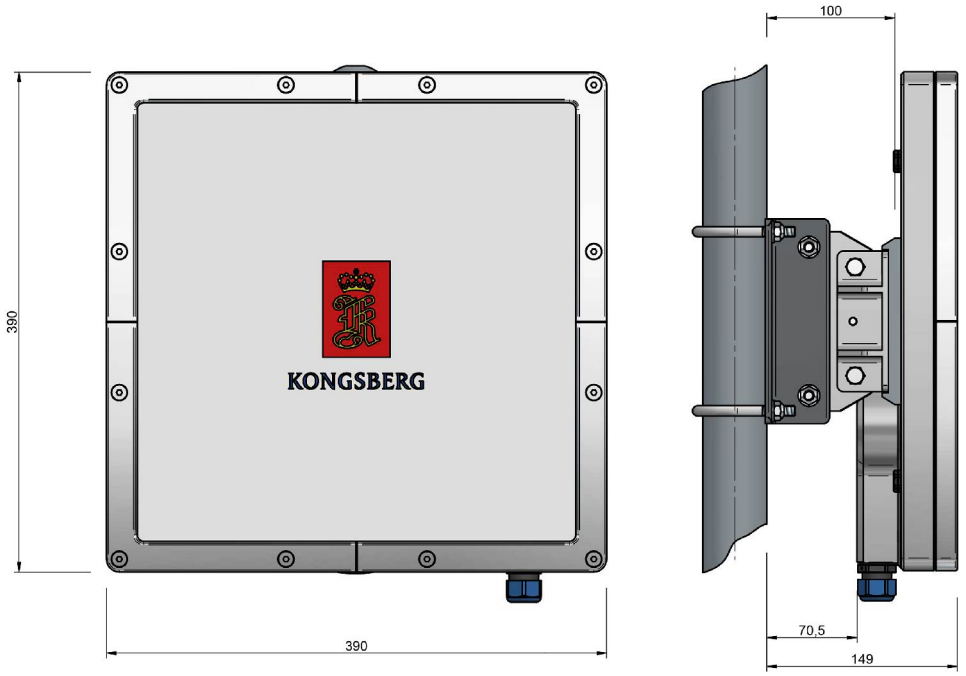
Topics

About drawings

These drawings are for information and planning purposes only.

Unless otherwise specified, all measurements are in millimetres. The drawings are not to scale.

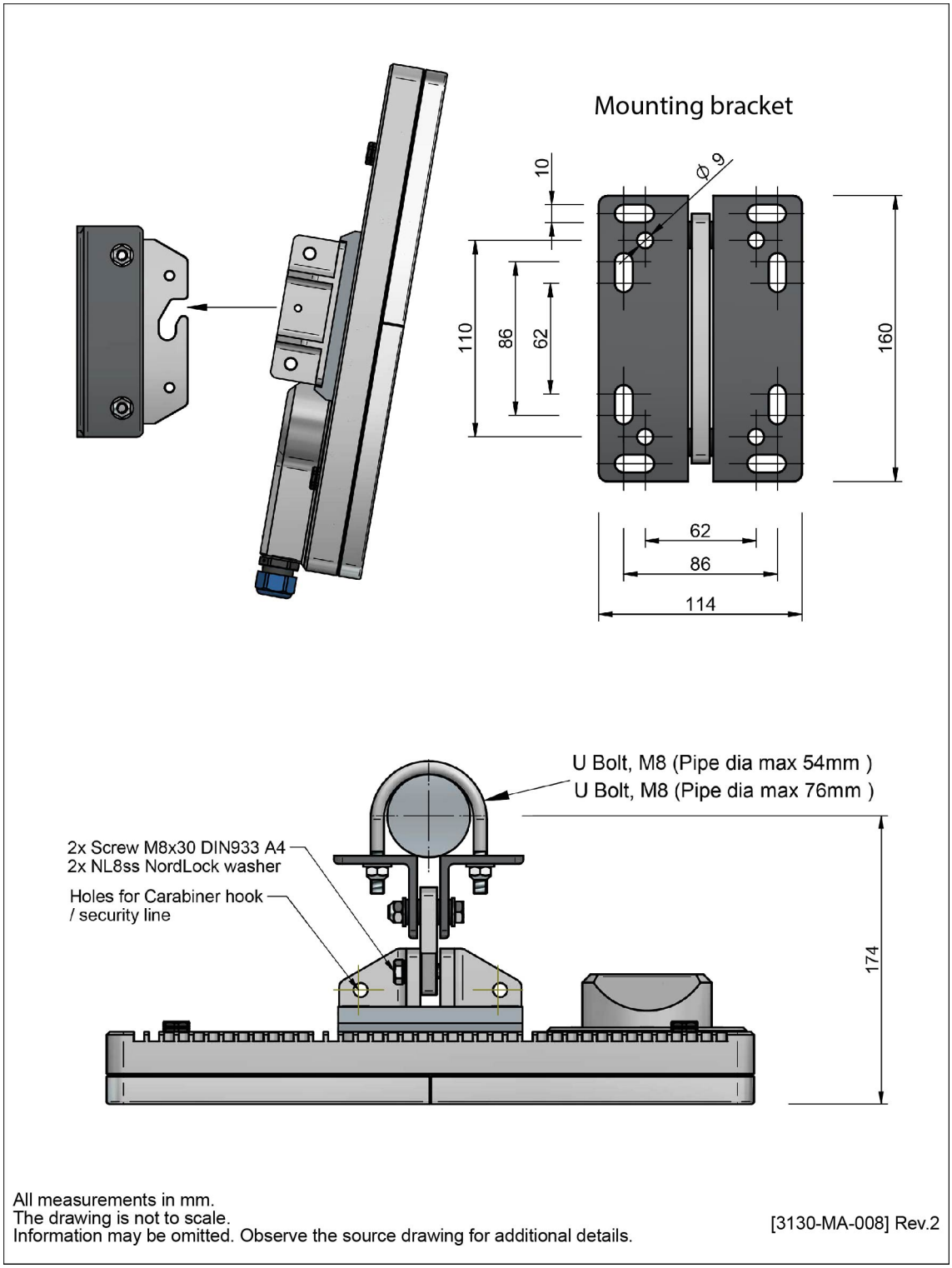
Sensor Unit dimensions



All measurements in mm.
The drawing is not to scale.
Information may be omitted. Observe the source drawing for additional details.

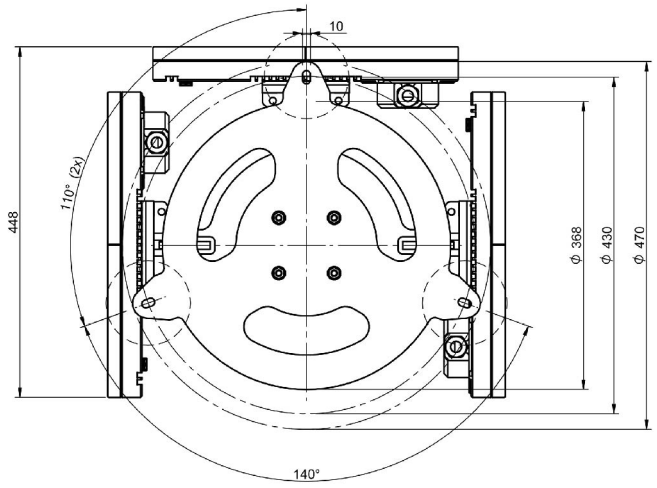
[3130-MA-008] Rev.2

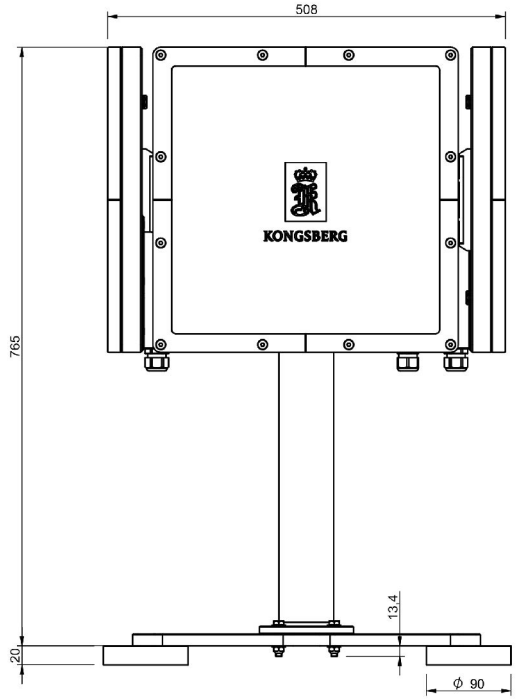
Sensor Unit mounting

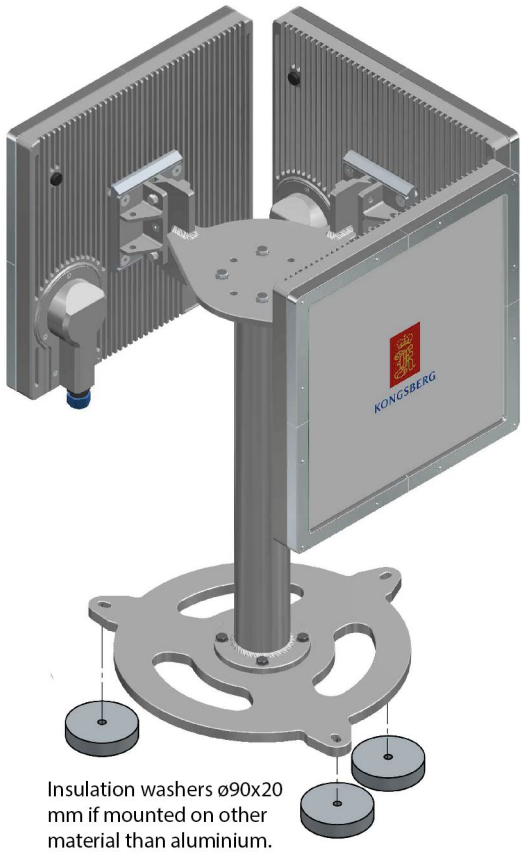


Multi Sensor Stand dimensions

For Artemis system replacement.



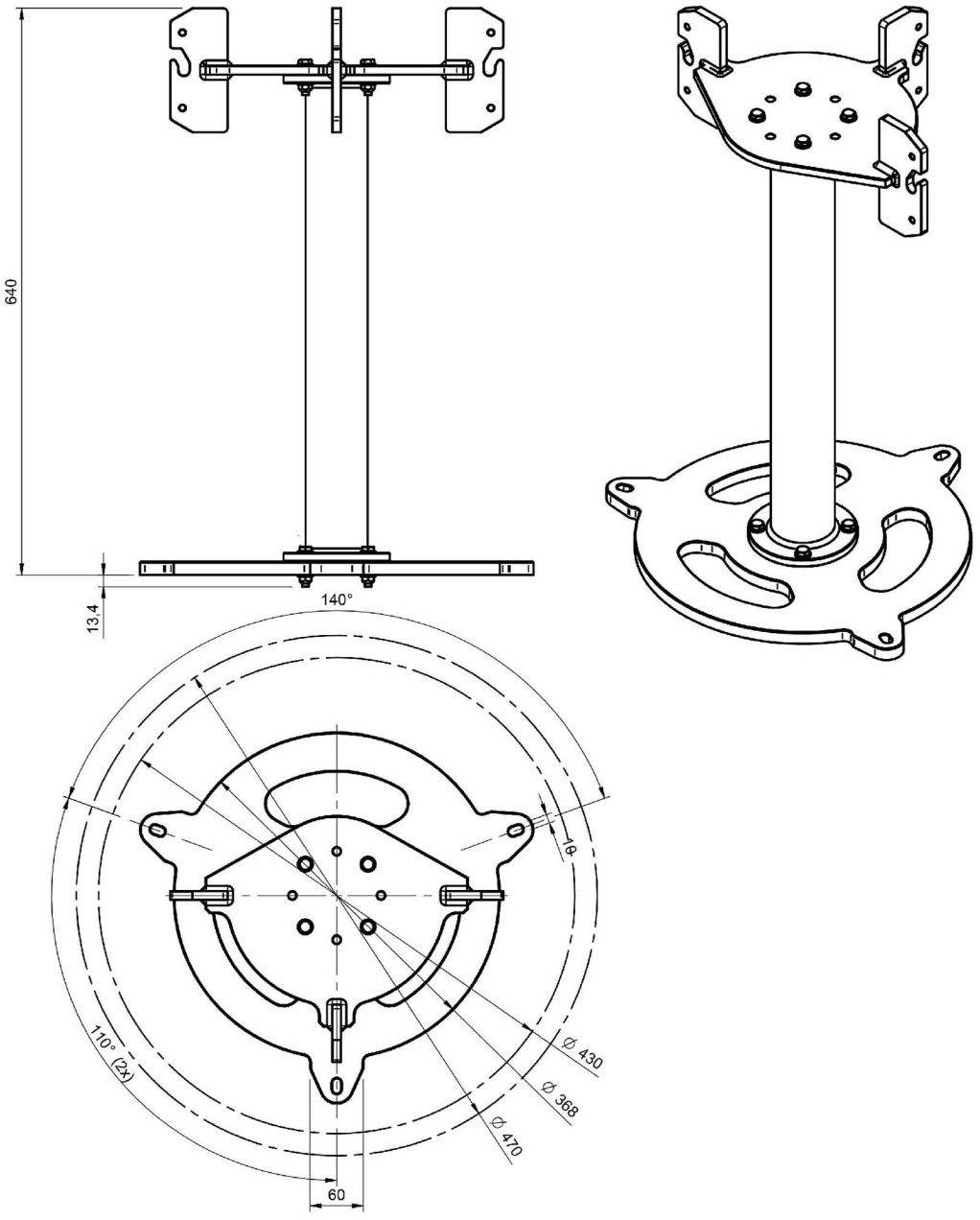




Insulation washers ø90x20 mm if mounted on other material than aluminium.

All measurements in mm.
The drawing is not to scale.
Information may be omitted. Observe the source drawing for additional details.

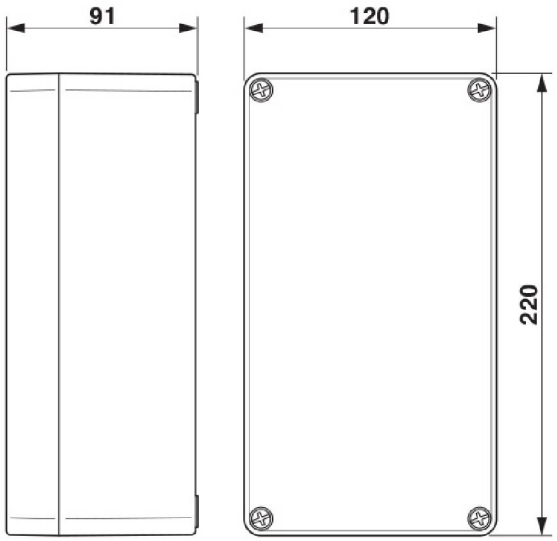
[3130-MA-012] Rev.1

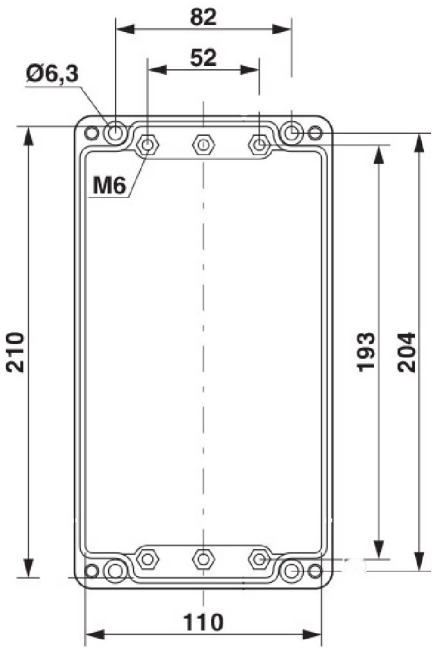


All measurements in mm.
The drawing is not to scale.
Information may be omitted. Observe the source drawing for additional details.

[3130-MA-013] Rev. 01

Single Junction Box dimensions

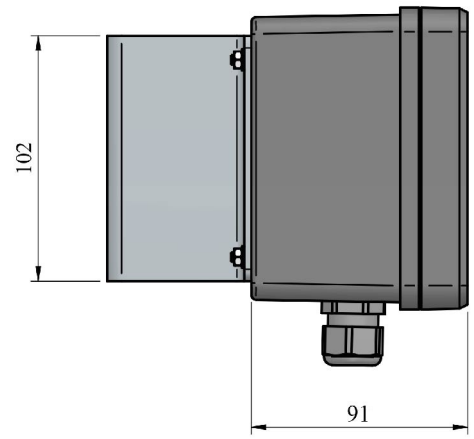


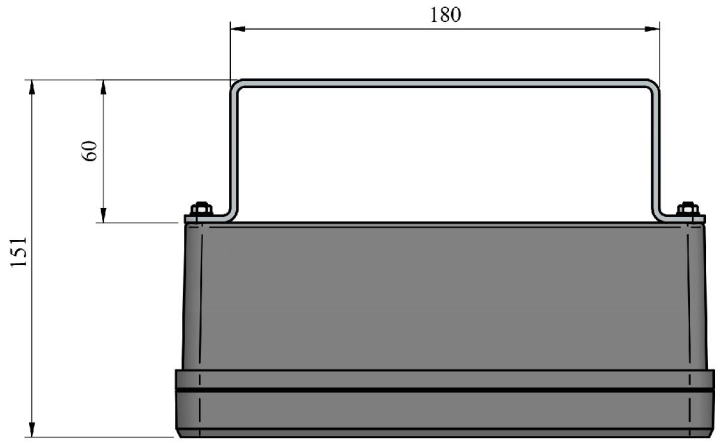


All measurements in mm.
The drawing is not to scale.
Information may be omitted. Observe the source drawing for additional details.

E-PE-A_120x220x91 Rev.1

Single Junction Box bracket dimensions



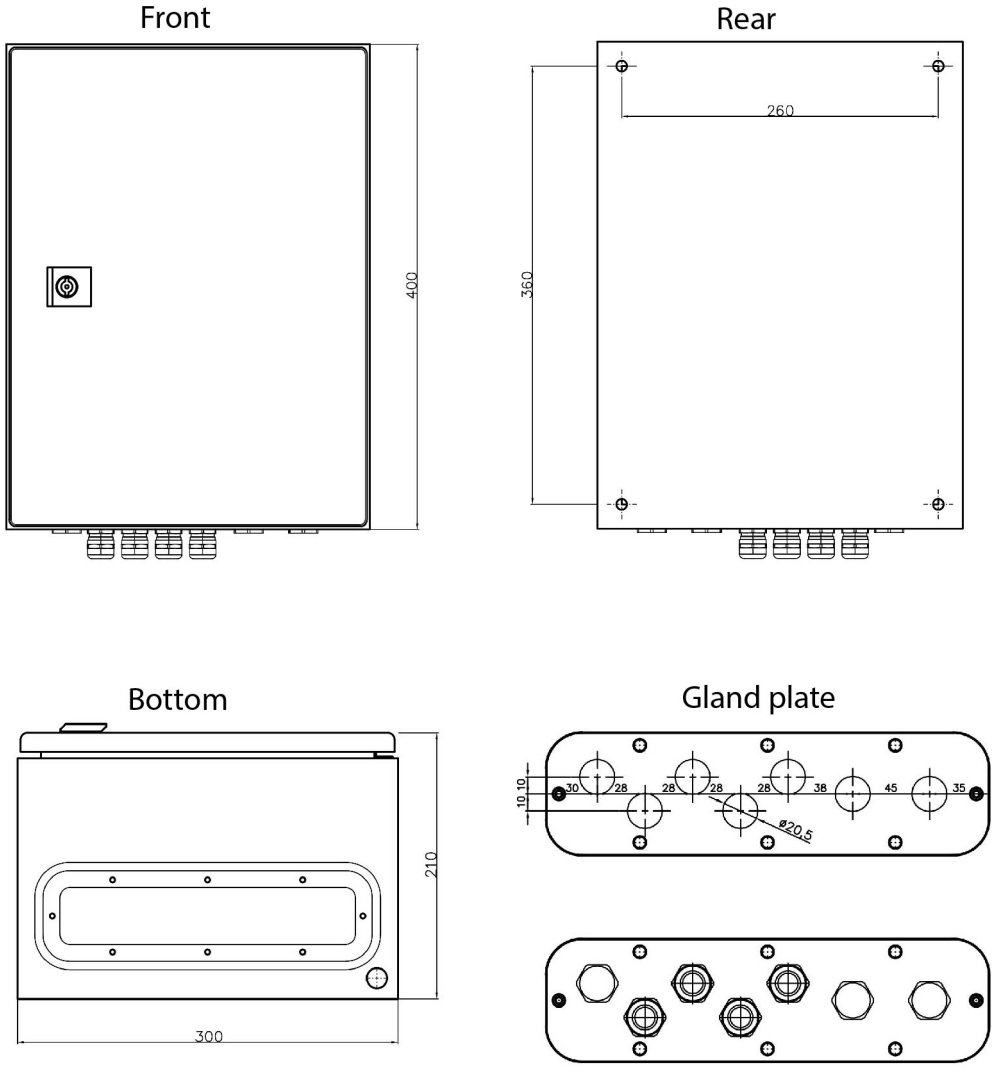


All measurements in mm.
The drawing is not to scale.
Information may be omitted. Observe the source drawing for additional details.

[3840-MA-042] Rev.0

Single Remote Interface Cabinet dimensions

Rittal AE 1034.500

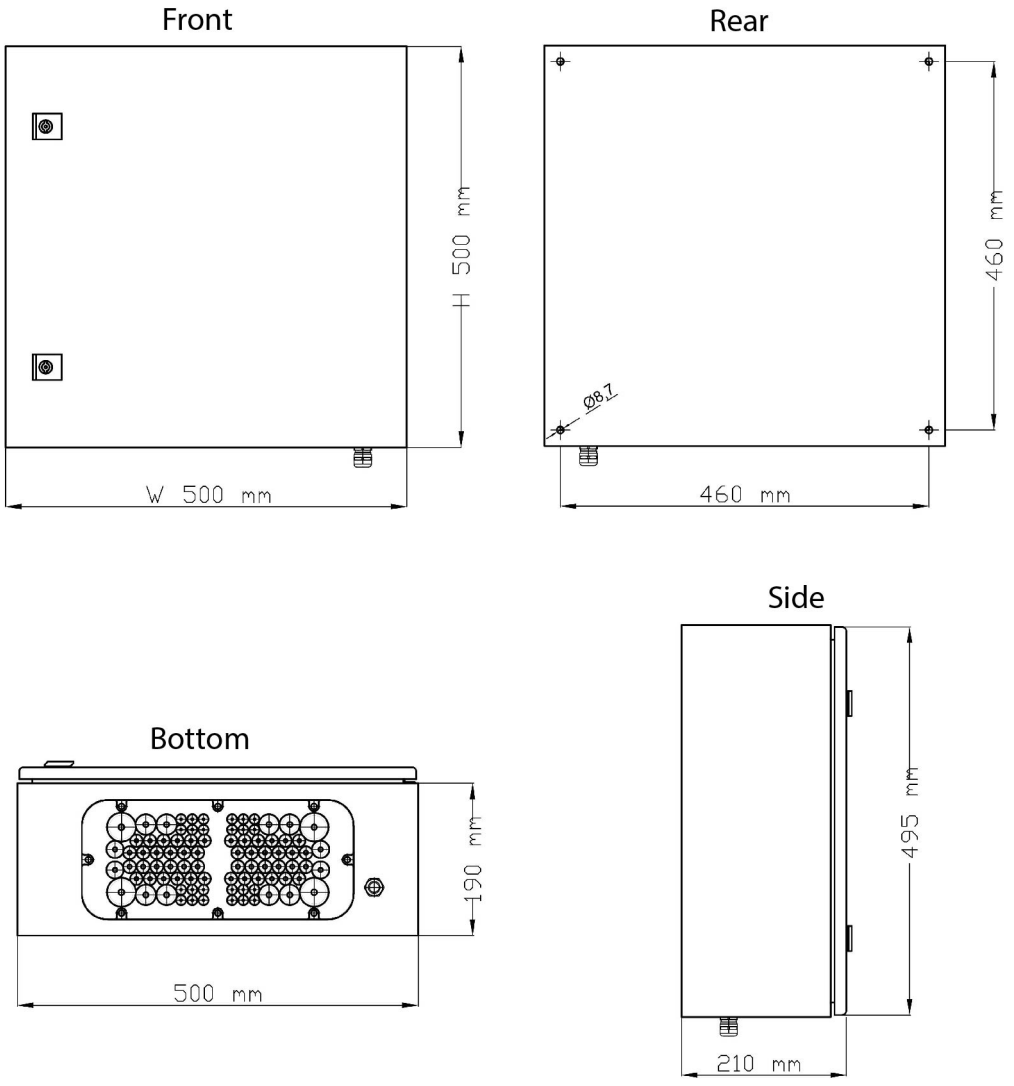


All measurements in mm.
The drawing is not to scale.
Information may be omitted. Observe the source drawing for additional details.

[N/A] Rev.0

Dual/triple Remote Interface Cabinet dimensions

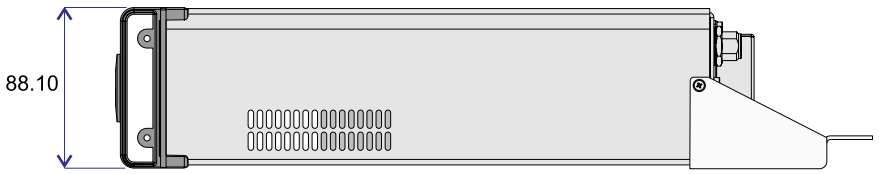
Rittal AE 1050.500

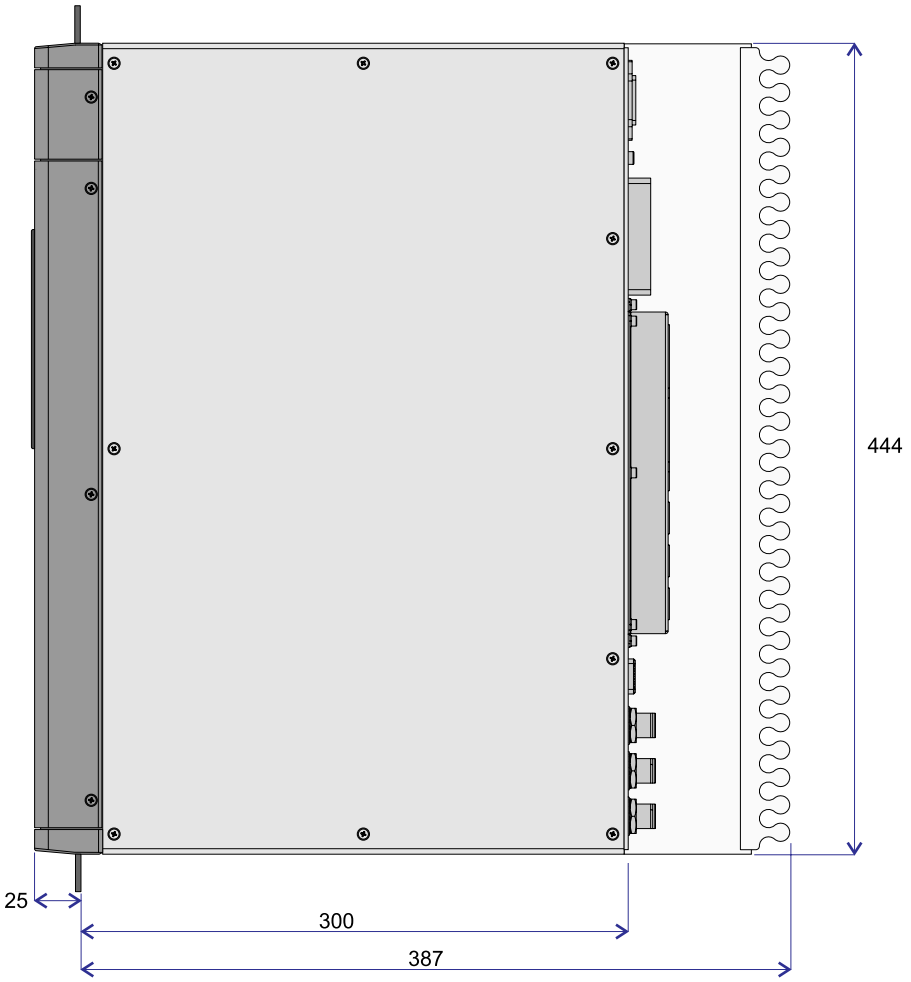


All measurements in mm.
The drawing is not to scale.
Information may be omitted. Observe the source drawing for additional details.

[N/A] Rev.0

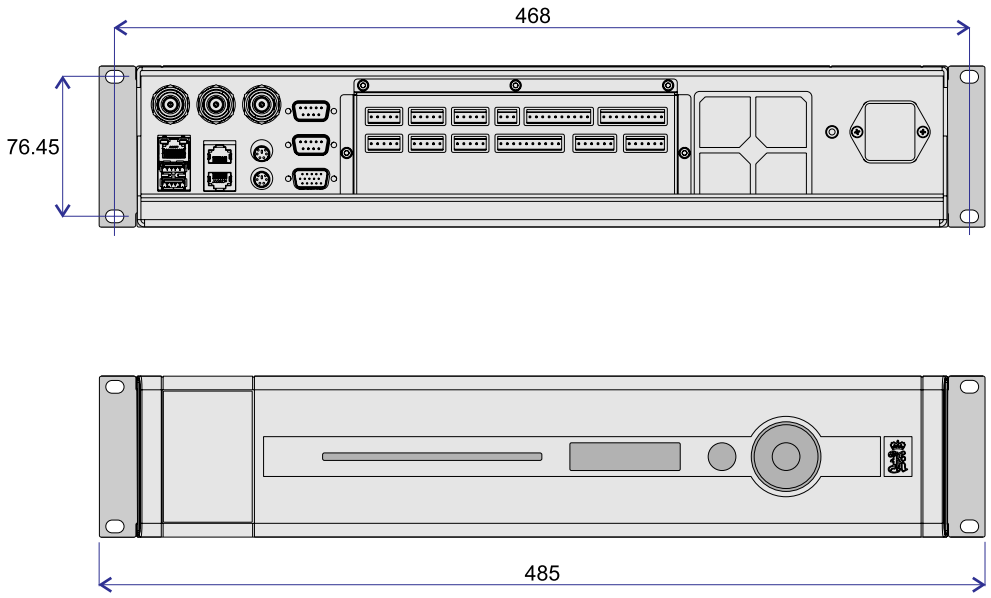
Processing Unit dimensions





All measurements in mm.
The drawing is not in scale.
Information may be omitted. Observe the source drawing for additional details.

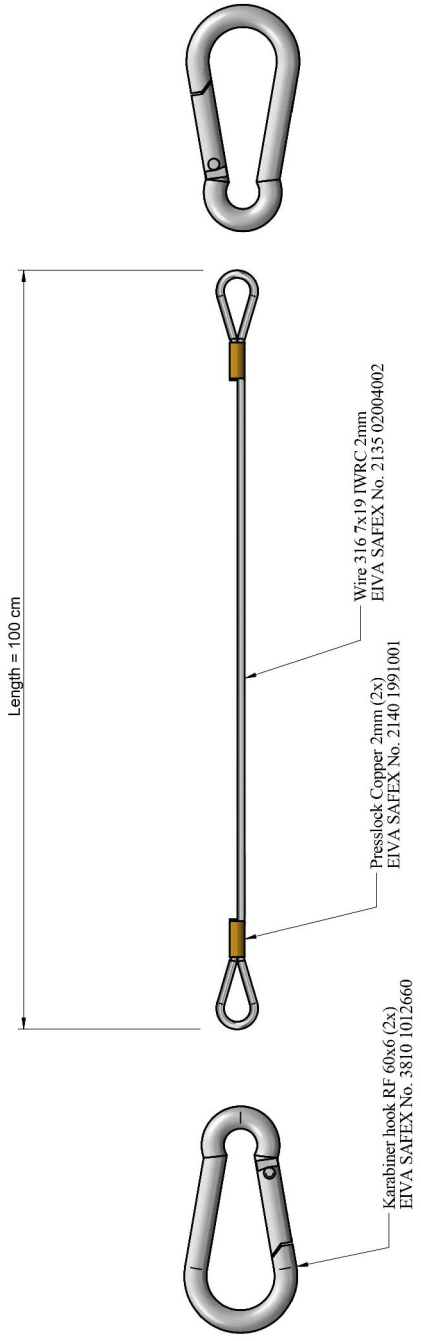
[07004-A01] Rev.00
CD12_07004_A01_001



All measurements in mm.
The drawing is not in scale.
Information may be omitted. Observe the source drawing for additional details.

[07004-A01] Rev.00
CD12_07004_A01_002

Safety wire



All measurements in mm.
The drawing is not to scale.
Information may be omitted. Observe the source drawing for additional details.

[3840-MD-117] Rev.0

Processing Unit interface descriptions

Topics

Front interfaces Processing Unit

The power on/off switch, local area network (LAN) port and USB connection are located behind the lid to the left on the front panel. Push lid on left side to open.

LAN 1 is type RJ-45, 10/100 Mbits/s and reserved for support.

Note

The USB port is not compatible with USB 3 devices.

Connector name	Connector type	Connected to
LAN 1	RJ-45, 10/100 Mbit/s	For service purposes only
USB	USB	For software upgrade and data logging

Rear interfaces Processing Unit

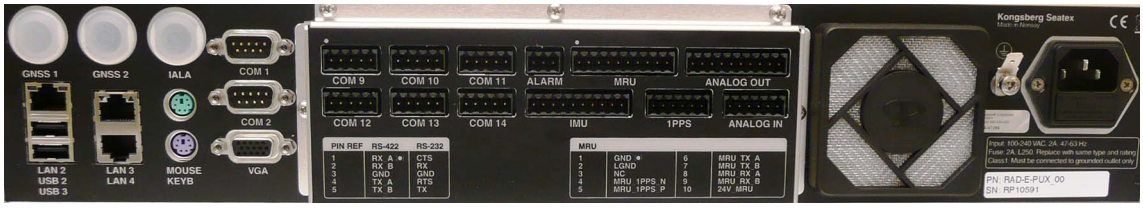
The rear panel of the unit contains communication interface ports for interfacing to external equipment. These ports are individually galvanically isolated.

Note

The USB ports are not compatible with USB 3 devices.

Note

All terminal pin numbering goes from left (no. 1) to right.



Connector name	Connector type	Connected to
GNSS 1	N connector 50 Ohm female	Not used in this system
GNSS 2	N connector 50 Ohm female	Not used in this system
IALA	N connector 50 Ohm female	Not used in this system
LAN 2	RJ-45, 10/100/1000 Mbit/s	User configurable
USB 2	USB	User configurable
USB 3	USB	User configurable
LAN 3	RJ-45, 10/100/1000 Mbit/s	Sensor Unit (Local Interface Rail)
LAN 4	RJ-45, 10/100/1000 Mbit/s	User configurable
Mouse	PS/2	Mouse
Keyboard	PS/2	Keyboard
COM 1	9-pin DSub male, RS-232	User configurable
COM 2	9-pin DSub male, RS-232	User configurable
VGA	HD15 female	Display
COM 9 – COM 14	5-pin terminal, RS-232/422	User configurable
ALARM	3-pin terminal, Relay	Not used in this system
MRU	10-pin terminal, RS-422	Power to DSL modem
IMU	10-pin terminal	Not used in this system

Connector name	Connector type	Connected to
1PPS	6-pin terminal	External equipment
ANALOG OUT	10-pin terminal	Not used in this system
ANALOG IN	6-pin terminal	Not used in this system
Power	100 - 240 VAC	Input of 100 - 240 VAC

RS-422 A and B signal definition

Signal state definition according to the IEC 61162-1 standard from the International Electrotechnical Committee.

The idle, marking, logical 1, OFF or stop bit states are defined by a negative voltage on line A with respect to line B. The active, spacing, logical 0, ON or start bit states are defined by a positive voltage on line A with respect to line B. It should be noted that the above A with respect to B levels are inverted from the voltage input/output requirements of standard UARTs and that many line drivers and receivers provide a logic inversion.

With reference to the table showing the pin layout for the serial ports on the rear panel screw terminals, note that the separate GND (ground) pin for each port is isolated from the chassis and shall act as a common signal intended to be connected between the talker (-TX) and the listener side (RX) of other equipment, for example the corresponding isolated GND (ground) pin or common pin. The purpose of the common signal is to increase the reliability of the hardware transmission. It must not be connected to the chassis or the cable screen. This applies to both sides of a connection. The cable screen shall be connected to the equipment chassis on one side only, preferably talker side, -TX.

COM 1 and COM 2

COM 1 and COM 2 at the rear of the Processing Unit are 9-pin DSub male. The table shows the pin layout on the COM 1 and COM 2 ports.

Note

The COM 1 and COM 2 ports are not as accurate with regard to timing as COM 9 to COM 14. Thus they are not recommended used for timing critical outputs.

Pin no.	RS-232	Pin no.	RS-232
1	DCD1	6	DSR1
2	RXD1	7	RTS1
3	TXD1	8	CTS1

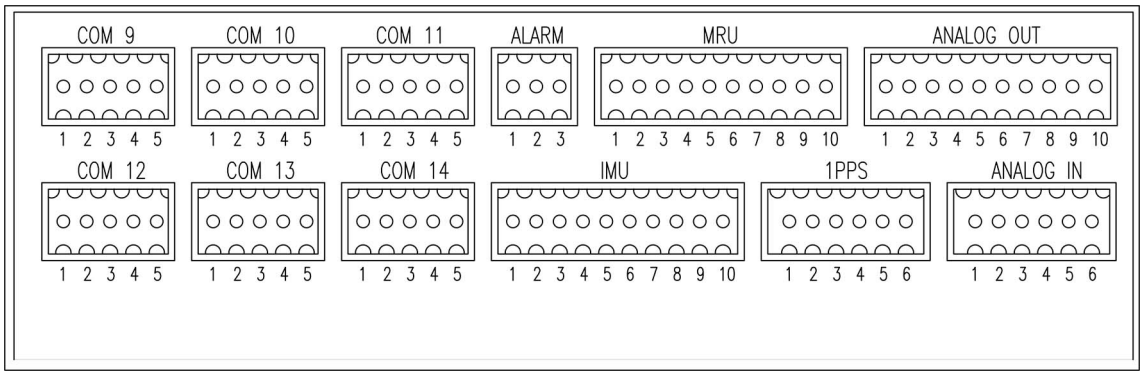
Pin no.	RS-232	Pin no.	RS-232
4	DTR1	9	RI1
5	GND		

Connector board

The connector board is located at the rear of the unit. The illustration shows the screw terminal pin layout on the connector board.

Note

All terminal pin numbering goes from left (no. 1) to right.



Serial lines

This system communicates with external equipment through the RS-422 serial input and output lines.

The table shows the pin layout of the serial input and output lines.

Pin no.	RS-422
1	RX_A
2	RX_B
3	GND isolated
4	TX_A
5	TX_B

Alarm signal

The ALARM terminal is not used in this system.

MRU

The MRU terminal is power to the DSL modem. 24 Volt.

Analog output

The ANALOG OUT terminal is not used in this system.

IMU

The IMU terminal is not used in this system.

PPS signal

The PPS terminal is not used in this system.

Analog input

The ANALOG IN terminal is not used in this system.

Ethernet connection

The unit has the possibility to input and output data on individually configurable network ports. The format and update rate are configured for each port under **Settings**.

The unit has five Ethernet connections (LAN). LAN 1 at the front of the unit. LAN 2, LAN 3 and LAN 4 at the rear of the unit.

LAN 1

This is a service port and has less capacity (10/100 Mbps) than the other LAN ports. For direct connection to a PC you may need a crossover cable instead of a straight-through cable.

The table shows the pin layout for the different cable configurations.

Note

Pins 4, 5, 7 and 8 are not used.

Straight-through			Crossover			
Signal	**Pin no.**		**Signal**	**Pin no.**	**Pin no.**	**Signal**
TX+	1		TX+	1	3	RX+
TX–	2		TX–	2	6	RX–
RX+	3		RX+	3	1	TX+
RX–	6		RX–	6	2	TX–

LAN 2, 3, 4

These local area networks (LAN) are high capacity (10/100/1000 Mbps). They are of type auto crossover and auto-negotiation.

The table shows the pin layout for these LANs connected to different network capacities.

10/1000 or 100/1000 Mbps Ethernet			1000/1000 Mbps Ethernet		
Pin no.	**Signal**	**Description**	**Pin no.**	**Signal**	**Description**
1	TX_DA+	Transceive data +	1	BI_DA+	Bi-directional pair +A
2	TX_DA-	Transceive data –	2	BI_DA-	Bi-directional pair –A
3	RX_DB+	Receive data +	3	BI_DB+	Bi-directional pair +B
4			4	BI_DC+	Bi-directional pair +C
5			5	BI_DC-	Bi-directional pair –C
6	RX_DB-	Receive data –	6	BI_DB-	Bi-directional pair –B
7			7	BI_DD+	Bi-directional pair +D
8			8	BI_DD-	Bi-directional pair –D

Cables

To connect the unit network, use twisted pair (TP) cable with RJ-45 connectors.
To comply with the IEC 60945 standard, shielded (screened) cable has to be used.
Recommended cable type is CAT-5e. A Category 5e cable is an enhanced version of Category 5 that adheres to more stringent standards. It is capable of transmitting data at speeds of up to 1000 Mbps (1 Gigabit per second). The maximum length of the cable which can be used is 100 metres (328 ft).

Equipment handling

Topics

Taking delivery

When the equipment arrives at its destination:

- Perform an inspection immediately to register any damage that may have occurred in transit.
- If you find any damage, both the insurance company and the shipping agent must be informed immediately.

Unpacking and handling

Care should be taken when unpacking and handling the equipment. A visual inspection should be made to check that the equipment has not been damaged during shipment and that all components and parts are present according to the packing list.

The equipment contains delicate electronic components – handle with care and avoid shocks.

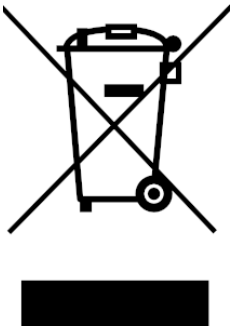
The equipment can be lifted by hand.

Storage

After the equipment in the boxes has been inspected and it has been verified that no damage has occurred, the equipment must be stored in its original packaging until the time of installation. The storage premises must be dry and well protected.

Disposal

At the end of the product lifetime, all Kongsberg Seatex AS 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.

The equipment can be returned to Kongsberg Seatex AS if there is no local WEEE collection. The equipment is marked with this waste pictogram.

Free and open source software

Topics

General information

Some of the software components in this product are free and open source software. These components are released under the licenses given here.

The source code for the relevant software components may be available upon request.

- **Company name**: Kongsberg Seatex AS
- **Address**: Havnegata 9, 7010 Trondheim, Norway

- **Telephone**: +47 73 54 55 00
- **Telephone, 24h support**: +47 33 03 24 07
- **E-mail address**: km.support.seatex@km.kongsberg.com
- **Website**: http://www.kongsberg.com/maritime

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Version 3.1, 31 March 2009

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