KONGSBERG

HiPAP
602/502/452/352/102 System
Instruction Manual

396013/F

Document information

- **Product**: Kongsberg HiPAP
- **Document**: Instruction Manual
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Warning

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

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

Disclaimer

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

Support information

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

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About this manual

This manual includes all necessary documentation to safely install, operate and maintain the system.

Target audience

This manual is intended for all users of the system.

Online information

All end-user documentation can be downloaded from our website.

https://www.kongsberg.com/maritime/

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HiPAP

Topics

System description

The system is used to position subsea objects in both shallow and deep water.

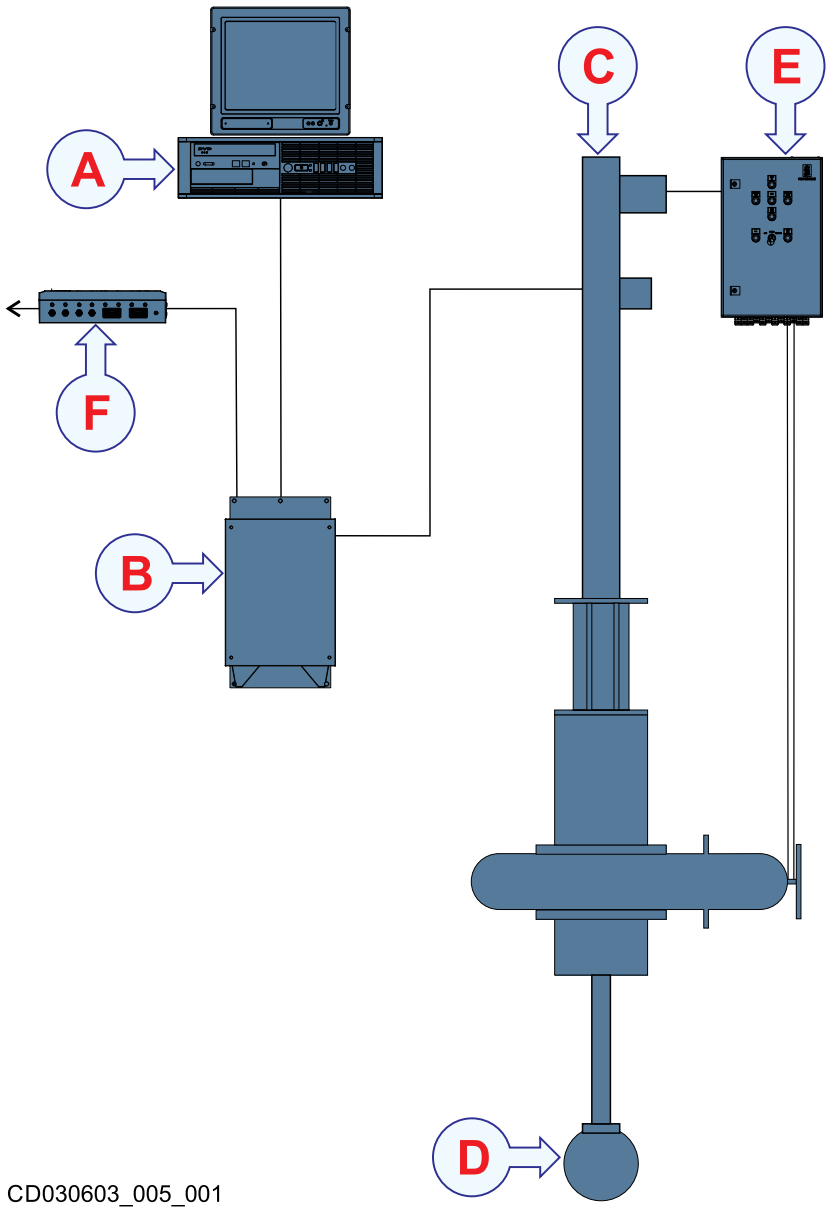
The HiPAP systems calculates the accurate positions of subsea objects such as Remotely Operated Vehicles (ROVs), Autonomous Underwater Vehicles (AUV's), towed bodies or fixed seabed transponders.

The system offers the user a wide range of transponder channels and cNODE transponder models for depths rating down to 11000 metres.

The HiPAP systems use a signal processing technique which enables narrow transmitter and receiver beams to be generated in all directions within the lower half of the transducer, using electronic beam control to achieve accuracy.

System diagram

The System diagram identifies the main components of the system, as well as the connections between the main units.



CD030603_005_001

A Computer

B Transceiver

C Hull unit

D Transducer

E Hull Unit Controller

F Responder Driver Unit (optional)

System units

Transceiver

The transceiver transmits pulses of acoustic energy, or sound, through water and receives reflections, or echoes, of said pulses when they are reflected back from underwater objects. A pulse of acoustic energy is commonly referred to as a ping.

The transceiver is a stainless steel cabinet that contains racks holding the system electronic modules. It contains a number of circuit boards and modules. The transceiver is designed to be installed on a suitable bulkhead and are fitted with vibration/shock absorbers to reduce the effects of vessel vibrations.

1PPS Converter (Optional)

The 1PPS Converter is a special made module designed for interfacing GPS signals to the High Precision Acoustic Positioning Operator station and to the 602/502/452/352/102 System.

The GPS signal consists of RS-232 serial NMEA data, and a 1PPS TTL pulse to synchronise the internal timing clock on High Precision Acoustic Positioning operator station and 602/502/452/352/102 System Control processor to the GPS clock.

The RS-232 serial NMEA data is transferred straight through the module, while the 1PPS TTL pulse is shaped to a fixed pulse length.

Responder Driver Unit (optional)

The Responder Driver Unit provides responder trigger signals to responders.

The Responder Driver Unit is a stand-alone unit. The unit is interfaced to the HiPAP system via the transceiver unit. APOS controls which drive is being active while the sync/timing is received from the transceiver.

APOS - the HiPAP operator system

The HiPAP system is operated from an acoustic positioning operator station (APOS). The operator station is a Windows based computer running dedicated acoustic positioning software.

The system can be operated from one single APOS station or from a wide number of APOS operator stations connected on a network.

Scope of supply

The main units you need are provided with the standard delivery. Some items are optional.

When you unpack the parts provided with the HiPAP system delivery, make sure that the following items are included.

- Computer
- Transceiver
- Cables

Optional items

- Responder Driver Unit
- 1PPS Converter

General supply conditions

General supply conditions apply to this HiPAP delivery.

Receipt, unpacking and storage

Upon accepting shipment of the equipment, the shipyard and/or the dealer must ensure that the delivery is complete and inspect each shipping container for evidence of physical damage.

If the inspection reveals any indication of crushing, dropping, immersion in water or any other form of damage, the recipient should request that a representative from the company used to transport the equipment be present during unpacking.

All equipment must be inspected for physical damage, i.e. broken controls and indicators, dents, scratches etc. during unpacking. If any damage to the equipment is discovered, the recipient must notify both the transportation company and Kongsberg Maritime so that Kongsberg Maritime can arrange for replacement or repair of the damaged equipment.

Once unpacked, the equipment must be stored in a controlled environment with an atmosphere free of corrosive agents, excessive humidity or temperature extremes.

The equipment must be covered to protect it from dust and other forms of contamination when stored.

Equipment responsibility

Unless otherwise stated in the contract, the shipyard doing the installation and/or equipment dealer becomes fully responsible for the equipment upon receipt.

The duration of responsibility cover:

- The period of time the equipment is stored locally before installation
- The entire installation process
- Commissioning
- The period of time between commissioning and the final acceptance of the equipment by the end user or owner

Unless other arrangements have been made in the contract, the Kongsberg HiPAP warranty period (as specified in the contract) begins when the acceptance documents have been signed.

Support information

Should you need technical support for your HiPAP system you must contact a Kongsberg Maritime office. A list of all our offices is available on our website. You can also contact our main support office in Norway.

Manuals and technical information can be downloaded from our support website.

Company name	Kongsberg Maritime AS
Address	Strandpromenaden 50, 3183 Horten, Norway
Telephone	+47 33 03 41 00
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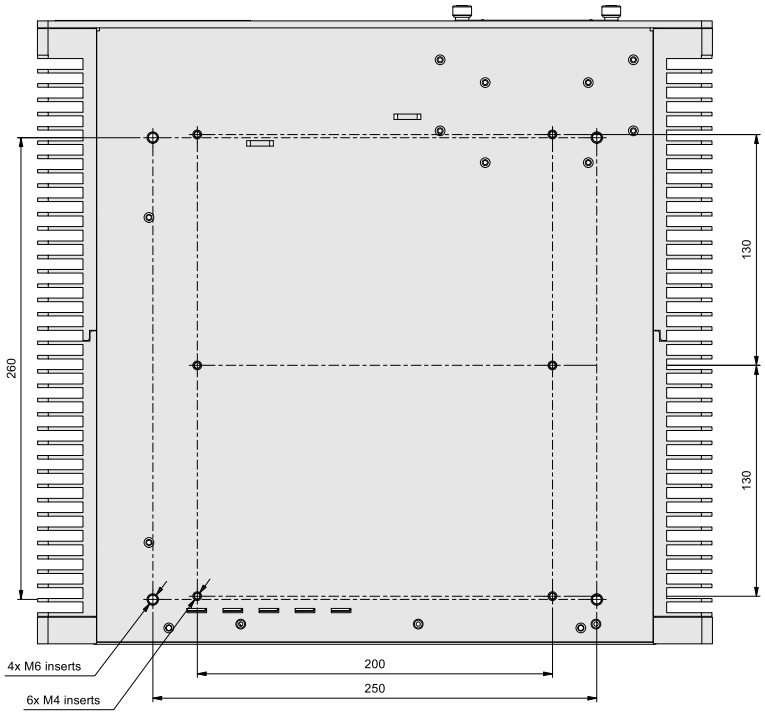
Installing the HiPAP hardware units

Topics

Installing the computer

The computer can be installed inside a console, inside a suitable cabinet, in a 19" rack or on a desk.

Context



The computer has two different hole patterns included. Use four M6 or six M4 fasteners to mount the computer.

Choose a position to fit the available cable lengths between the computer and the other units it connects to. Make sure that enough space is made available for maintenance purposes. Make sure that the installation method allows for the physical vibration, movements and forces normally experienced on a vessel.

Procedure

1 Prepare the selected hole pattern, following the illustration.

2 Mount the computer using countersunk screws or bolts.

Further requirements

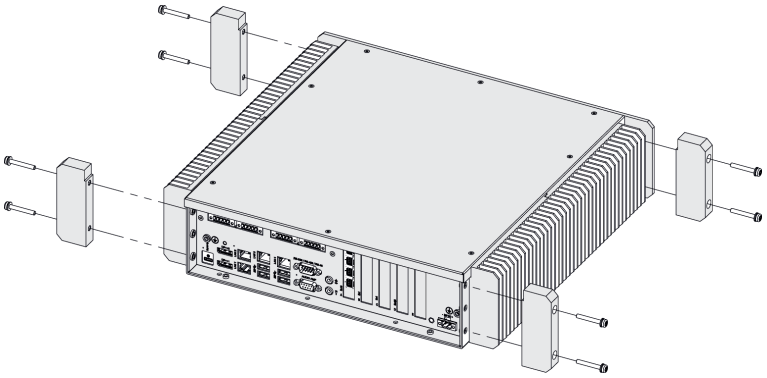
Connect the cables.

Installing the computer in a 19" rack

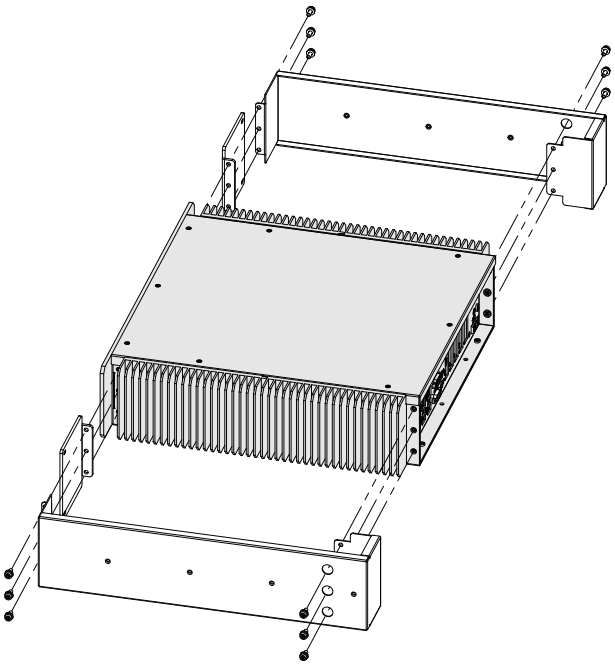
The computer can be installed inside a console, inside a suitable cabinet, in a 19" rack or on a desk. This is the procedure for rack kit 473676.

Procedure

1 Remove the four cooling extrusion pieces.



2 Fasten the rack adapter parts on each side with 12 M4 pan headed screws.



Further requirements

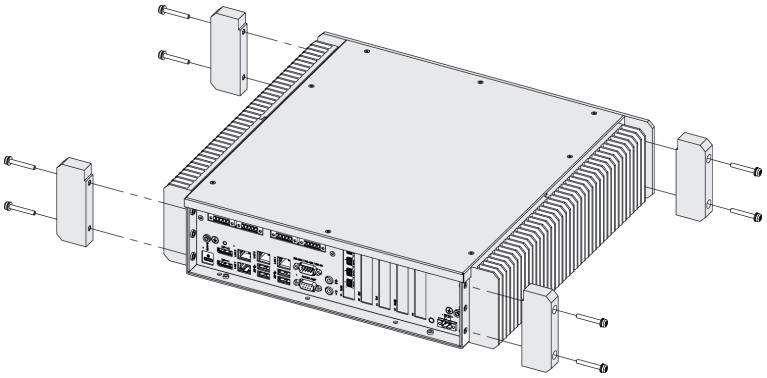
Connect the cables.

Installing the computer in a console

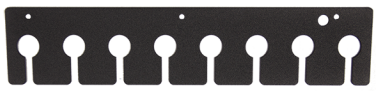
The computer can be installed inside a console, inside a suitable cabinet, in a 19" rack or on a desk. This is the procedure for console kit 476195.

Procedure

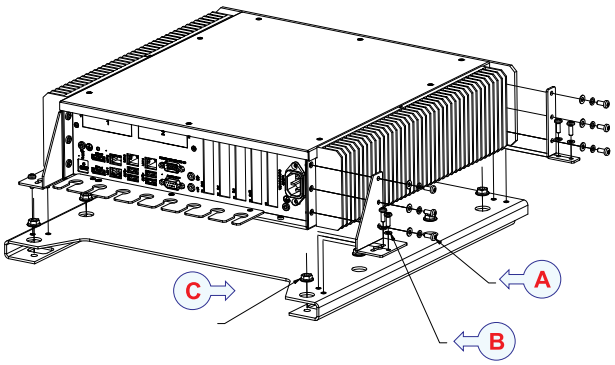
1 Remove the four cooling extrusion pieces.



2 Mount the cable retainer under the connectors on the back of the computer with 3 M3x4 screws.



3 Fasten the brackets on the sides with 12 M4x10 screws and washers. (**A**)



4 Fasten the computer with the brackets to the mounting kit with 8 M4x10 screws and washers. (**B**)

5 The nut (**C**) can be replaced with M6 bolts when mounting the computer, depending on the surface the computer is mounted on.

Further requirements

Connect the cables.

Installing the transceiver

The physical length of the cables limit the distance between the transducer and the transceiver.

Prerequisites

There must be a clear space of at least 500 mm in front of the unit for maintenance and 200 mm under the unit for the cables.

The transceiver unit must be mounted on a bulkhead. You do not need to remove the circuit boards or modules from the transceiver unit during the installation process. Keep the transceiver unit door on during the installation. Make sure that the unit is not exposed to dust, moisture, vibration or physical damage during the installation process.

The brackets for hanging up the transceiver is delivered with the unit.

Caution

Do not weld in the vicinity of the transceiver unit. First weld the brackets, then bring in the transceiver unit.

Procedure

1 Measure and mark the locations where to mount the brackets.

   Make sure the transceiver is at a suitable height for easy access.

2 Weld the brackets to the bulkhead.

3 Clean the welds and brackets, and paint them with an appropriate preservation medium.

4 Once the paint is dry, lift the unit into position and align the unit onto the brackets.

5 Start with the upper bracket, and bolt the shock absorbers to the brackets.

Further requirements

Connect the cables.

Installing the 1PPS Converter

The 1PPS converter is mounted on the cable between the GPS receiver and the COM port used on the computer.

Prerequisites

The 1PPS converter requires a power of 9-15 VDC and 100 mA.

We advice you to mount the 1PPS converter closer than 10 m to the GPS receiver.

Procedure

1 Mount the box wherever suitable.

2 Fasten the 4 screws on either side of the 1PPS converter.

Installing the Responder Driver Unit

The Responder Driver Unit provides responder trigger signals to responders. The RDU is a stand-alone unit and can be mounted horizontally or vertically.

Prerequisites

The unit should be located where it is most suitable for connecting the cables to the responders. This can be close to the Remote Operating Vehicle (ROV) operation room. The unit must be installed so it is easily accessible for operators to check the working condition of the responder trigger status diodes.

Procedure

1 Open the unit by removing the four screws that secures the lid.

2 Lift off the lid and see the four mounting holes, one in each corner.

3 Mount the responder driver unit where suitable.

The mounting screws with nuts and washers are delivered with the unit.

4 Close the unit.

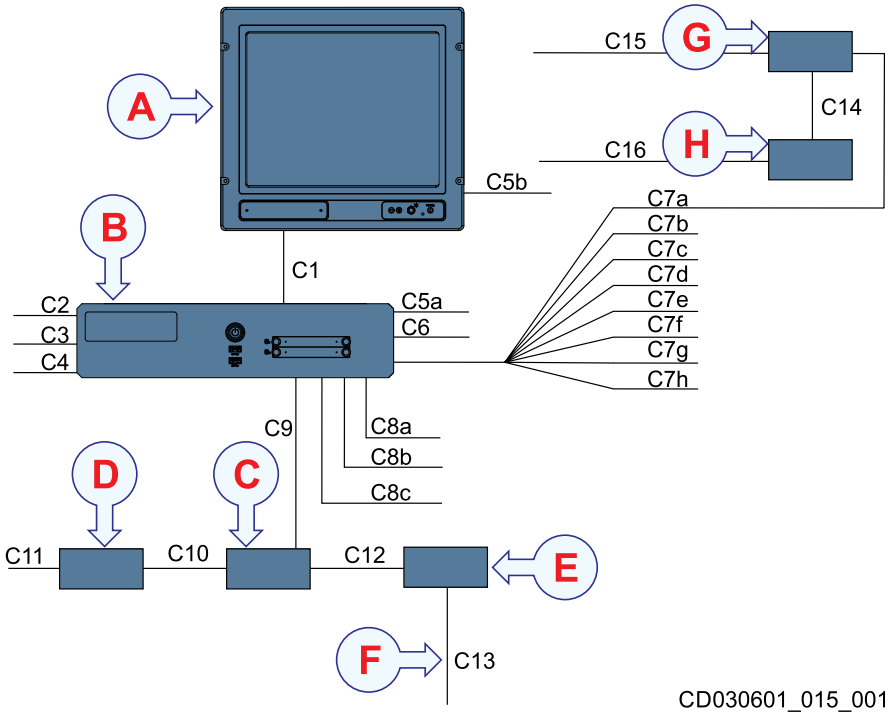
Cabling

See document 325840 HiPAP Cable plan, for all cables in the system.

Topics

Topside cable plan

The topside/bridge cables include those used to connect the computer and the display to each other, to AC mains power, and to external devices.



A Display

B Computer

C Ethernet switch

D Power supply, Ethernet switch

E Patch panel

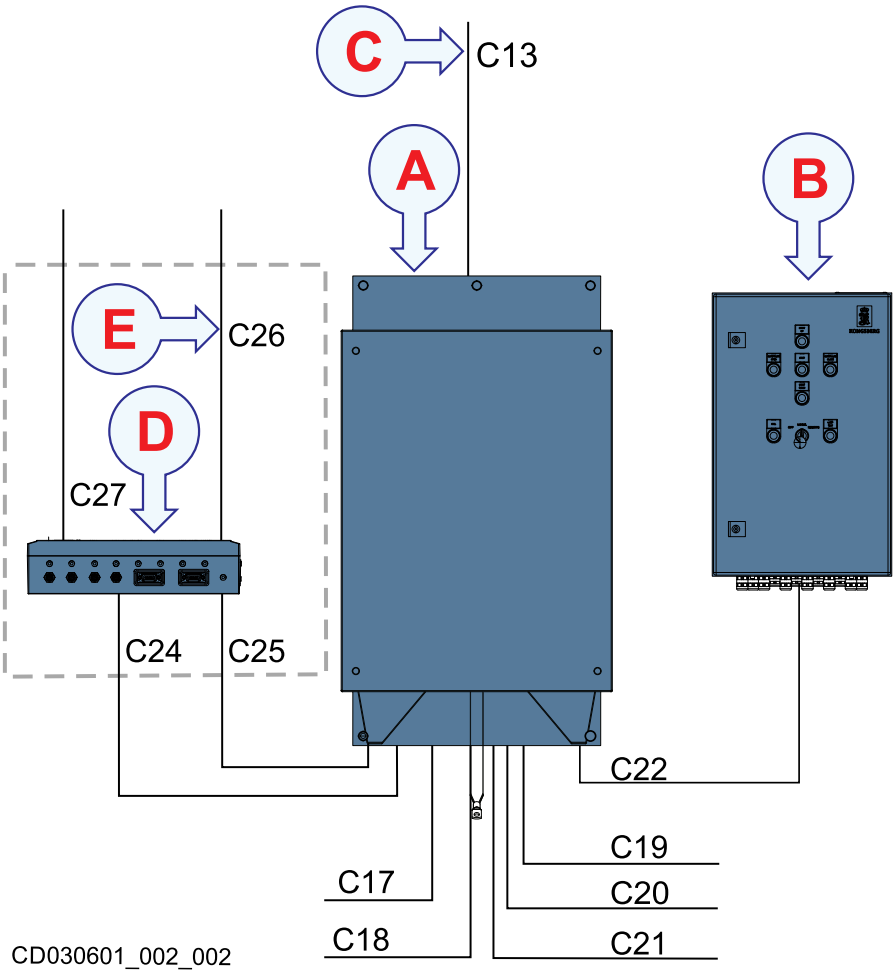
F Fibre optic cables to the transceiver

G 1PPS Converter

H Power supply, 1PPS Converter

Transceiver cable plan

The sonar room cables include those used to connect the HiPAP units to AC mains power, as well as the control cables between the units.



A Transceiver

B Hull unit controller

C Fibre optic cables to the computer

D Responder Driver Unit

E Responder

List of cables

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

Topside cables

Cable	Type	From/To	Minimum requirements
C1	Video cable	From computer to display	
C2	Computer cable	From computer to keyboard	
C3	Computer cable	From computer to mouse (or other pointing device)	
C4	Serial cable	From computer to external device(s)	
C5 (a)	AC Power cable	From computer to AC power outlet	
C5 (b)	AC Power cable	From display to AC power outlet	
C6	Ground cable	From computer to vessel ground	
C7 (a)	Serial cable	From computer to external device(s)	
C7 (b)	Serial cable	From computer to external device(s)	
C7 (c)	Serial cable	From computer to external device(s)	
C7 (d)	Serial cable	From computer to external device(s)	
C7 (e)	Serial cable	From computer to external device(s)	
C7 (f)	Serial cable	From computer to external device(s)	
C7 (g)	Serial cable	From computer to external device(s)	
C7 (h)	Serial cable	From computer to external device(s)	
C8 (a)	Ethernet cable	From computer to local area network (LAN) A	
C8 (b)	Ethernet cable	From computer to local area network (LAN) B	
C8 (c)	Ethernet cable	From computer to local area network (LAN) C	
C9	Ethernet cable	From computer to Ethernet switch	
C10	DC Power cable	From Ethernet switch to switch power	

Cable	Type	From/To	Minimum requirements
C11	AC Power cable	From switch power to AC power outlet	
C12	Fibre optic cable	From Ethernet switch to fibre optic patch panel	
C13	Fibre optic cable	From transceiver to fibre optic patch panel	
C14	DC Power cable	From 1PPS converter to 1PPS power, Optional	
C15	Serial cable	From 1PPS converter to GPS, Optional	
C16	AC Power cable	From 1PPS power to AC power outlet, Optional	

Sonar room cables (Transceiver)

Cable	Type	From/To	Minimum requirements
C13	Fibre optic cable	From transceiver to fibre optic patch panel	
C17	AC Power cable	From transceiver to AC power outlet	3 x 1.5 mm^2
C18	AC Power cable	From transceiver to AC power outlet	3 x 1.5 mm^2
C19	Ground cable	From transceiver to vessel ground	
C20	Serial cable	From transceiver to transceiver, Optional	2 x 2 x 0.75 mm^2
C21	Transducer cable	From transceiver to hull unit junction box	
C22	Ethernet cable	From Hull Unit Controller to transceiver	Cat7
C24	Ethernet cable	From transceiver to Responder Driver Unit, Optional	Cat7
C25	Serial cable	From transceiver to Responder Driver Unit, Optional	
C26	Serial cable	From Responder Driver Unit to Responder, Optional	
C27	AC Power cable	From Responder Driver Unit to AC power outlet, Optional	

Installing the HiPAP cables

Topics

Installing the topside cables

The topside/bridge cables include those used to connect the computer and the display to each other, to AC mains power, and to external devices.

Procedure

1 Connect the power cable from the display to the AC power outlet. (C5b)

2 Connect the power cable from the computer to the AC power outlet. (C5a)

3 Connect the video cable from the computer to the display. (C1)

4 Connect the cable from the computer to the keyboard. (C2)

5 Connect the cable from the computer to the mouse (or other pointing device). (C3)

6 Connect the serial cable from the computer to the external device. (C4)

7 Connect the ground cable from the computer to vessel ground. (C6)
The cable must be provided by the installation shipyard.

8 Connect the Ethernet cable from the computer to the local area network (LAN). (C8a, C8b, C8c)

9 Connect the serial cables from the computer to the relevant external devices. (C7)

10 Connect the serial cable from the computer to the 1PPS. (C7a) (Optional)

11 Connect the power cable from the 1PPS converter to the 1PPS power. (C14) (Optional)

12 Connect the cable from the 1PPS converter to the GPS. (C15) (Optional)

13 Connect the power cable from the 1PPS power to the AC power outlet. (C16) (Optional)

14 Connect the Ethernet cable from the computer to the Ethernet switch. (C9)

15 Connect the power cable from the Ethernet switch to the switch power. (C10)

16 Connect the power cable from the switch power to the AC power outlet. (C11)

17 Connect the fibre optic cable from the Ethernet switch to the fibre optic patch panel. (C12)

Installing the sonar room cables

The sonar room cables include those used to connect the HiPAP units to AC mains power, as well as the control cables between the units. See HiPAP Hull Unit Instruction Manual, for the cables to the Hull Unit.

Procedure

1 Connect the power cable from the transceiver to the AC power outlet. (C17, C18)

Connecting power and ground to the transceiver, page 25

2 Connect the ground cable from the transceiver to vessel ground. (C19)

Connecting power and ground to the transceiver, page 25

3 Connect the cable from the transceiver to the fibre optic patch panel. (C13)

4 Connect the Ethernet cable from the Hull Unit Controller to the transceiver. (C22)

5 Connect the cable from the transceiver to the Responder Driver Unit. (C24)

6 Connect the cable from the transceiver to the Responder Driver Unit. (C25)

Connecting the Responder Driver Unit to the transceiver, page 30

7 Connect the power cable from the RDU to the AC power outlet. (C27)

8 Connect the cable from the Responder Driver Unit to the Responder. (C26)

9 Connect the synchronization cable from the transceiver to the transceiver. (C20)

Connecting the transceivers, page 31

10 Connect the transducer cable from the transceiver to the hull unit junction box. (C21)

Connecting the transducer to the transceiver, page 28

Connecting power and ground to the transceiver

The transceiver must be connected to AC mains and it must be properly grounded.

Prerequisites

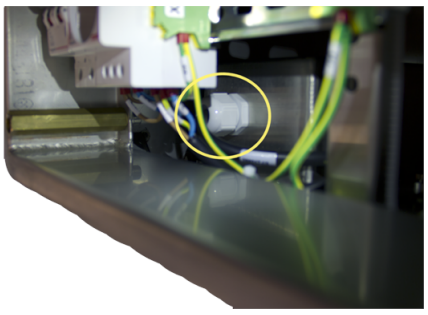
The transceiver is delivered with a power cable for test use only. The power cable must be provided by the yard.

Procedure

1 Produce the cable according to the specification.

2 Connect the cable between the power source and the transceiver.

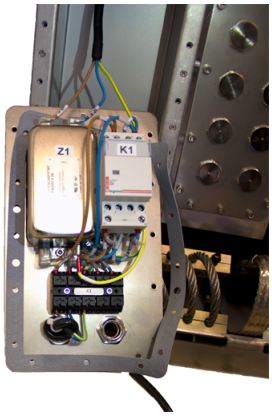
3 Loosen the cable gland on the cable to the filter. The top part needs to be loosened, not the nut.



The cable gland is located near the bottom of the cabinet.

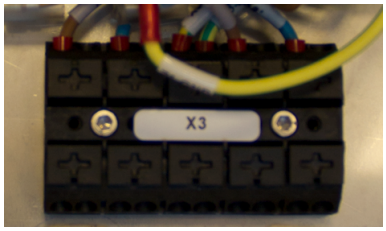
4 Remove the 16 screws on the power box underneath the transceiver cabinet.

5 Take care not to lose the gasket around the box.



6 Remove the test cable.

7 Enter the cable through the gland, connecting it as shown in the wiring diagram and the cable description.



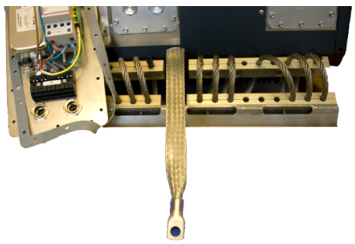
There are room for two individual power cables, for redundancy.

8 Block the cable gland not in use, if there is no redundancy in the power supply. Use a F/M20 cable gland blind plug.

9 Screw the power box back on with the gasket fitted.

10 Fasten the cable glands, both the one loosened and the one/s for the power cable/s.

11 Connect the grounding cable to ships ground.



Connecting the transducer to the transceiver

The transducer cable is part of the hull unit delivery.

Prerequisites

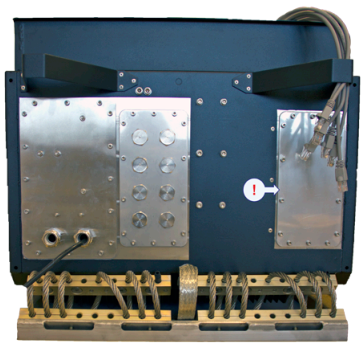
The transducer cable is connected from the junction box that moves up and down with the transducer. Make sure this cable moves as smooth as possible without any unnecessary wear.

Procedure

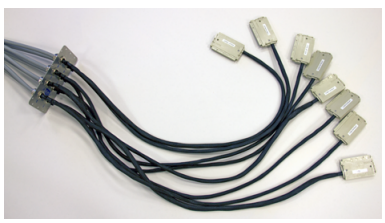
1 Fasten the cable between the HiPAP junction box and the transceiver.

Make sure the cable can move freely when the transducer goes up and down.

2 Remove the blind cover from underneath the transceiver on the right side, keeping the screws for the cover and EMC gasket.



3 Insert the cable and connectors.

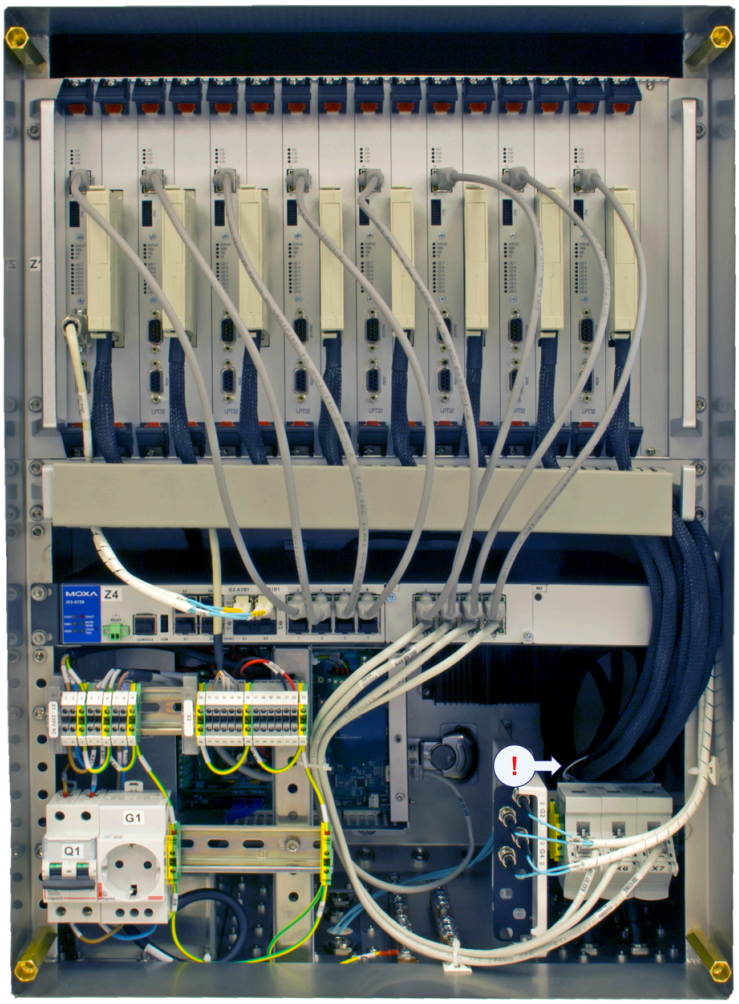


4 Fasten the cover with the gasket and the screws from the blind cover.
Make sure cable 1 is closest to the front.

5 Connect the cables to the correct circuit board.

The connectors are numbered. Circuit board 1 is to the left following in sequence to board number 8 to the far right.

6 Bundle the cables to the bracket inside the transceiver unit.



7 Insert the cable ends of the other end of the cable into the junction box and fasten the cover.

8 Open the side door to get access to the cables inside the junction box.

9 Connect the cables according to the markings.

10 Close the unit.

Further requirements

See HiPAP Hull Unit Instruction Manual, for the cables to the Hull Unit.

Connecting the Responder Driver Unit to the transceiver

The synchronization cable for the Responder Driver Unit is provided by the yard.

Prerequisites

The 9-pin D-sub plug is delivered with the Responder Driver Unit.

A Responder Driver Unit, **Input Responder Sync**

B Transceiver Unit, X2

Procedure

1 Select the cable according to the specification and cut it to the needed length.

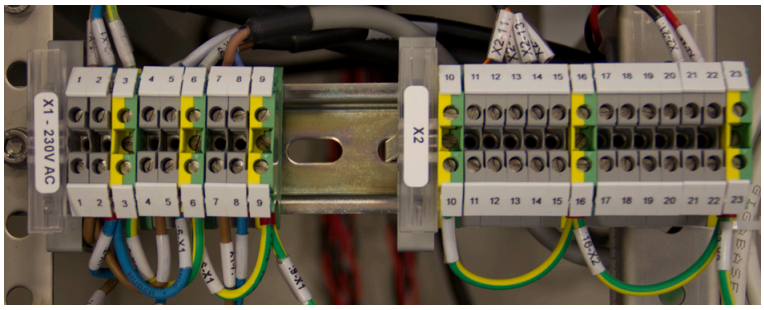
2 Install the 9-pin D-sub plug to the cable.

3 Support the cable between the transceiver and the Responder Driver Unit, making sure the D-sub connector ends at the Responder Driver Unit.

4 Remove one of the blind plugs in the bottom of the cabinet.

5 Insert the cable through one of the cable glands delivered with the transceiver cabinet.

6 Connect the wires to terminal block X2 according to the cable drawing or the wiring diagram.



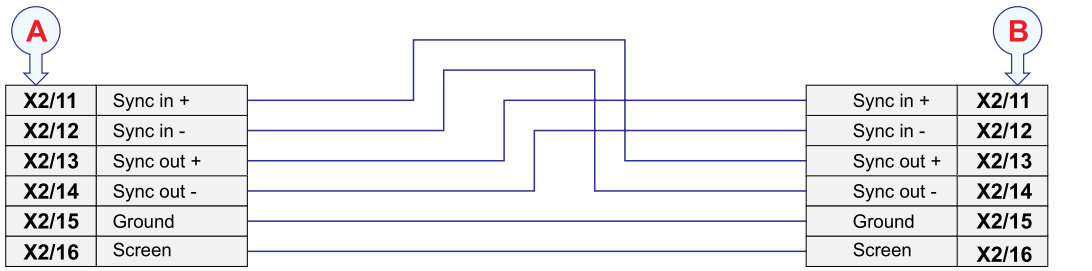
7 Provide a service loop on the cable and fasten the cable gland.

8 Connect the 9-pin D-sub plug to the **Input Responder Sync** connector on the Responder Driver Unit.

Connecting the transceivers

The synchronization cable for the transceiver is provided by the installation shipyard.

Prerequisites



A Transceiver

B Transceiver

Procedure

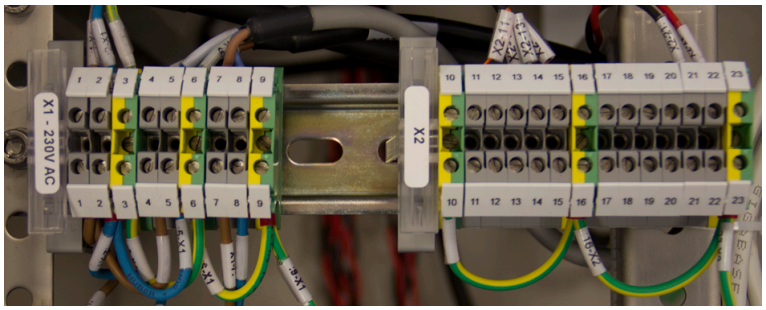
1 Manufacture the cable according to the minimum requirements provided.

2 Fasten the cable between the transceivers.

3 Remove one of the blind plugs at the bottom of the cabinet.

4 Insert the cable through one of the cable glands delivered with the unit.

5 Connect the wires to termination block X2 according to the cable drawing or the wiring diagram.



6 Fasten the cable gland.

7 Repeat step 3 to 6 for the other transceiver cabinet.

Operating procedures

See APOS online help.

Maintenance

Topics

About Electrostatic Discharge (ESD)

Electrostatic discharge (ESD) is the sudden flow of electricity between two electrically charged objects. Such flow can be caused by contact, an electrical short, or dielectric breakdown. Electrostatic discharge (ESD) can cause serious damage to printed circuit boards and electronic modules.

Beware of Electrostatic Discharge (ESD)!

Note

When you handle electronic circuit boards and modules, you must beware of the dangers of electrostatic discharge (ESD), both to yourself and to the equipment. In order to ensure safe transport and storage, circuit boards and other electronic units will always be wrapped in a clear plastic protective bag, and the bag will be sealed.

For correct and safe handling of printed circuit boards and electronic modules, you need a suitable working area. The working area must be covered by an approved conductive service mat that has a resistance of between 50 kΩ and 2 MΩ, and is connected directly to a reliable earth point via its earthing cord. You - and all other service personnel involved - must wear a wristband in direct contact with the skin. The wristband must be electrically connected to the service mat.

What is Electrostatic Discharge (ESD)?

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

> ESD can create spectacular electric sparks (thunder and lightning is a large-scale ESD event), but also less dramatic forms which may be neither seen nor heard, yet still be large enough to cause damage to sensitive electronic devices. Electric sparks require a field strength above approximately 4 kV/cm in air, as notably occurs in lightning strikes. Other forms of ESD include corona discharge from sharp electrodes and brush discharge from blunt electrodes.
>
> ESD can cause a range of harmful effects of importance in industry, including gas, fuel vapour and coal dust explosions, as well as failure of solid state electronics components such as integrated circuits. These can suffer permanent damage when subjected to high voltages. Electronics manufacturers therefore establish electrostatic protective areas free of static, using measures to prevent charging, such as avoiding highly charging materials and measures to remove static such as grounding human workers, providing antistatic devices, and controlling humidity.
>
> *http://en.wikipedia.org/wiki/Electrostatic_discharge (January 2014)*

Precautions to prevent Electrostatic Discharge (ESD)

Sensitive printed circuit boards and electronic modules must always be transported and stored in protective antistatic packing bags. It as also important that they are not transported or stored close to strong electrostatic, electromagnetic or radioactive fields. If it is necessary to open and touch the printed circuit board or module inside the protective bag, the following precautions must be taken.

1 For correct and safe handling of printed circuit boards and electronic modules, you need a suitable working area. The working area must be covered by an approved conductive service mat that has a resistance of between 50 kΩ and 2 MΩ, and is connected directly to a reliable earth point via its earthing cord.

2 You - and all other service personnel involved - must wear a wristband in direct contact with the skin. The wristband must be electrically connected to the service mat.

3 Printed circuit boards and electronic modules must be placed on the conductive service mat during installation and maintenance operations.

4 If, for any reason, it is necessary to move the circuit board from the conductive service mat, it must be placed in an approved antistatic transportation container (for example a static shielding bag) before transportation.

5 During installation and servicing, all electrical equipment (for example soldering irons and test equipment) must be earthed.

Preventive maintenance schedule

The preventive maintenance intervals indicated in this section are recommended intervals. The maintenance needs are dependent on the use of the equipment.

- Actions to be taken every month
  - Dust the units.
  - Make a backup of the APOS configuration.
- Actions to be taken every six months
  - Check all cable connections.
  - Check all units for physical damage.

Creating a backup

For backup procedures, refer to the backup files document, doc. no. 476331. This is a separate manual supplied with the system delivery.

Take a backup of all operator stations at regular intervals (1-3 months), and every time major changes have been performed in the configuration and/or user settings.

Important

A backup must be performed when the software has been upgraded.

Transceiver parts replacement

Replacing the Ethernet switch

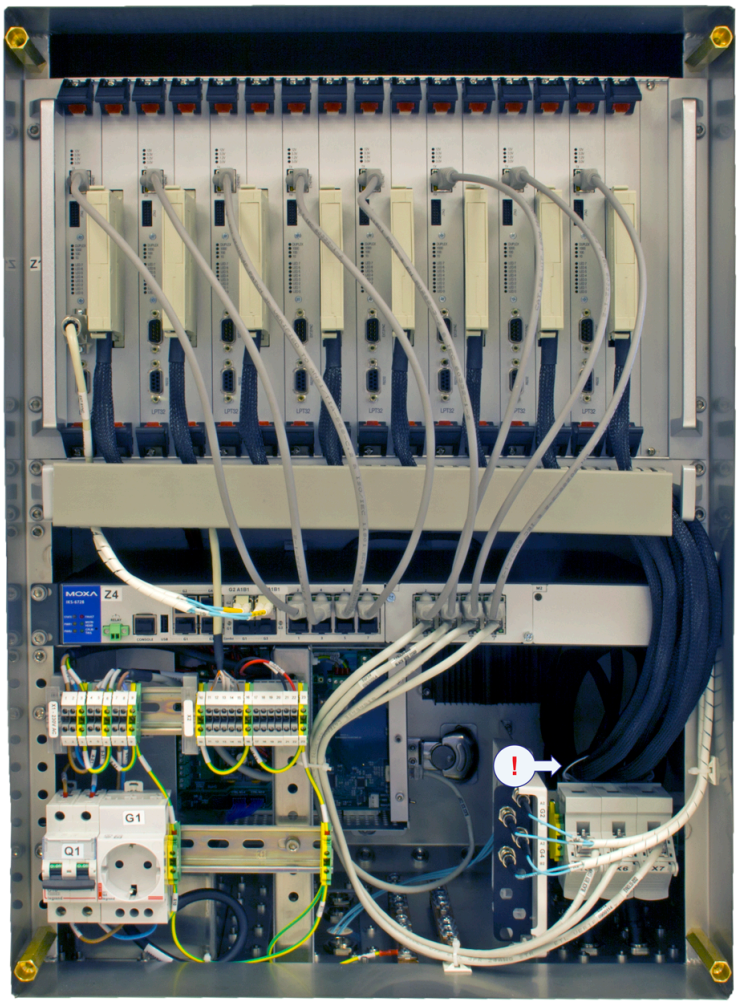
This procedure is for the switch inside the transceiver.

Procedure

1 Turn off the transceiver.

2 Unplug the cables connected to the Ethernet switch.

3 Cut the strips to loosen the transducer cables.



4 Loosen the mounting screws and remove the unit.

5 Unplug the connectors at the back of the unit.

6 Replace the unit.

7 Reconnect all cables.

8 Bundle the cables to the bracket inside the transceiver unit.

9 Turn on the transceiver.

Removing the LPT32 board

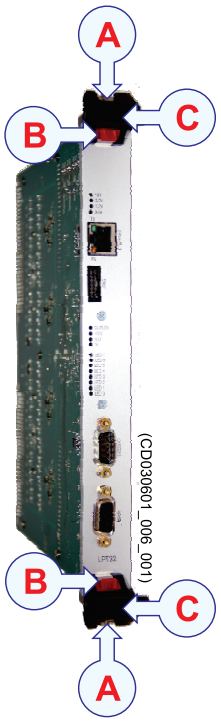
The boards are located inside the unit.

Context

Caution

Be careful not to touch the sides of the circuit boards and filter boards as the capacitors might still be charged.

Procedure



1 Turn off the transceiver.

2 Make sure the light on the power unit inside goes from **blue to red/off** before touching any of the boards.

3 Locate the faulty board.

4 Remove the cable connected to the front of the board.

5 Loosen the screws. (**A**)

6 Loosen the circuit board by pushing the two red locking devices on the handles.(**B**)

7 To loosen the board, push the top ejector up, and the bottom ejector down. (**C**)

8 Grab the handles and pull the circuit board straight out.

9 Place the circuit board inside an anti-static plastic bag. Place it on a clean and stable workbench.

Further requirements

To return the circuit board for repair or replacement, observe the relevant handling instructions.

Follow the procedure in reverse to install the new board.

Removing a filter board

The boards are located inside the unit.

Context

Caution

Be careful not to touch the sides of the circuit boards and filter boards as the capacitors might still be charged.

Procedure

1 Turn off the transceiver.

2 Make sure the light on the power unit inside goes from **blue to red/off** before touching any of the boards.

3 Locate the faulty board.

4 Remove the cable connected to the front of the board.

5 Loosen the screws.

6 Loosen the circuit board by pushing the two red locking devices on the handles.

7 To loosen the board, push the top ejector up, and the bottom ejector down.

8 Grab the handles and pull the circuit board straight out.

9 Place the circuit board inside an anti-static plastic bag. Place it on a clean and stable workbench.

Further requirements

To return the circuit board for repair or replacement, observe the relevant handling instructions.

Follow the procedure in reverse to install the new board.

Replacing the power module in the transceiver

The power module is located in the back of the transceiver cabinet.

Prerequisites

Older models of x82 have a smaller distance between the power module and the overlying modules. For these models you have to remove the fibre optic splice box to remove the power module.

Tip

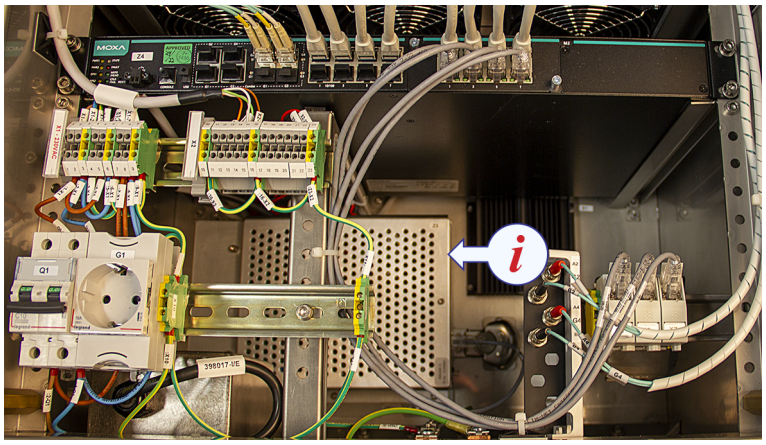
The fibre optic cables are fragile, handle them with care.

Procedure

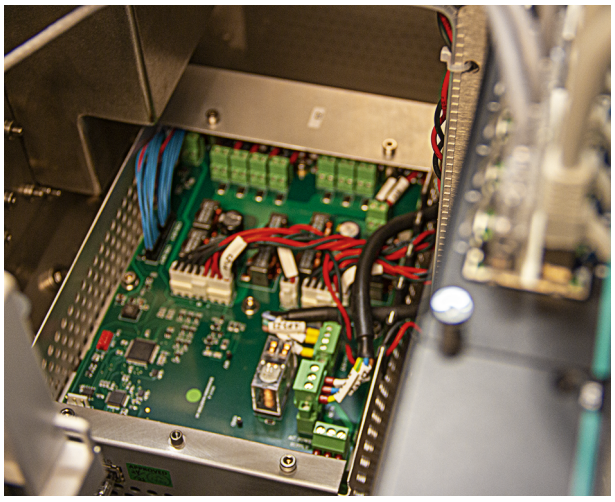
1 Turn off the transceiver with the main switch.

2 Turn off the power supply to the transceiver.

3 Locate the power module in the back of the transceiver.

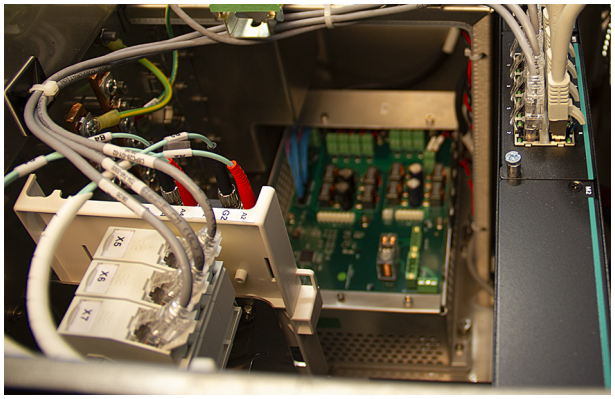


4 Remove the cover.



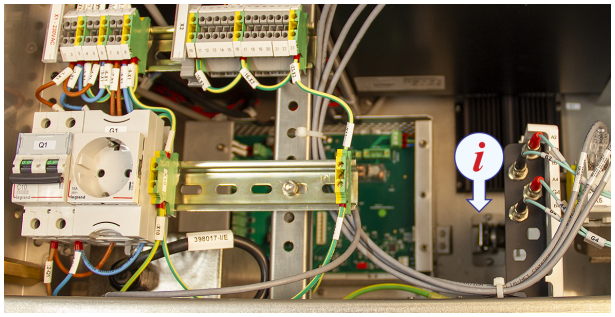
Notice where the cables are, to make it easy to connect the new unit.

5 Disconnect the cables to the power module.

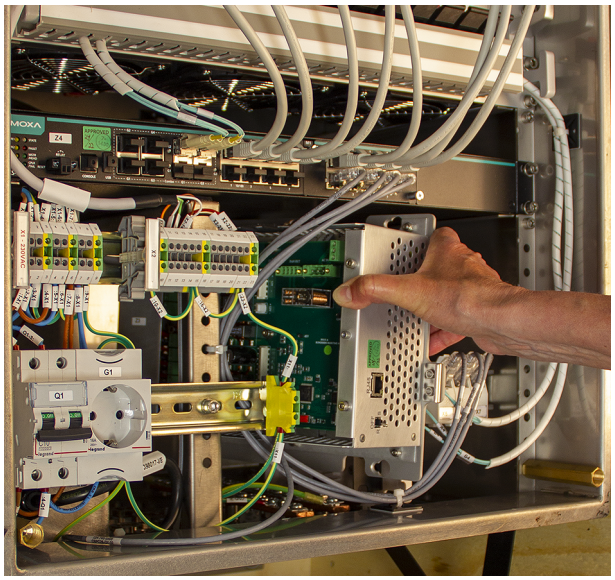


Make sure the cables are tucked in at the sides, so they won't be damaged when the module is removed.

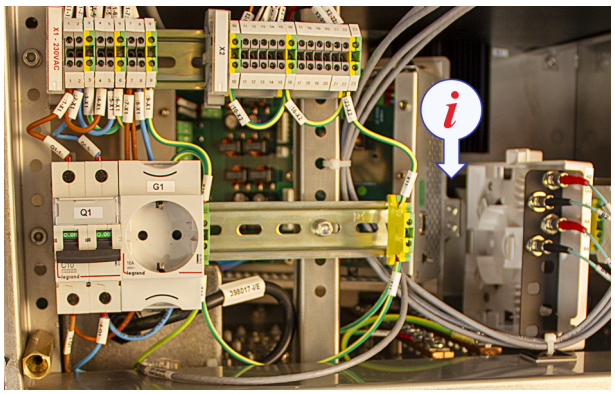
6 Open the lock on the right hand side of the power unit and turn it 180° counter-clockwise to release the power unit.



7 Slide the power unit to the left and pull out the power module.



8 Older models of the x82 transceiver will not get past the fibre optic splice box.



For these models you have to remove the fibre optic splice box to remove the power module.

Caution

The fibre optic cables are fragile, handle them with care.

9 Insert the new power module the same way.

Replacing the fan unit in the transceiver unit

The fan unit is located below the circuit boards inside the transceiver unit.

Prerequisites

Removing some of the circuit boards at the left side makes the job of replacing the fan unit easier.

Procedure

1 Switch off the transceiver unit using the Main switch.

2 Remove the four screws in the front.

3 Unplug the power cable by pressing the IEC lock on the connector at the back of the fan unit.

4 Remove the fan unit.

5 Replace the old fan unit with the new one.

6 Plug the power cable back in at the back of the fan unit.

7 Screw in the four screws in the front.

8 Switch on the transceiver unit using the Main switch.

Replacing the terminal block in the transceiver unit

The Ethernet switch/Converter is located below the PCB rack in the transceiver unit.

Procedure

1 Switch off the transceiver unit using the Main switch.

2 Remove the power cables in to the cabinet.

3 Disconnect the terminal block module.

4 The module is snapped on. To remove it, pull down the lock-tab in the lower end, and pull it directly out from the support rail.

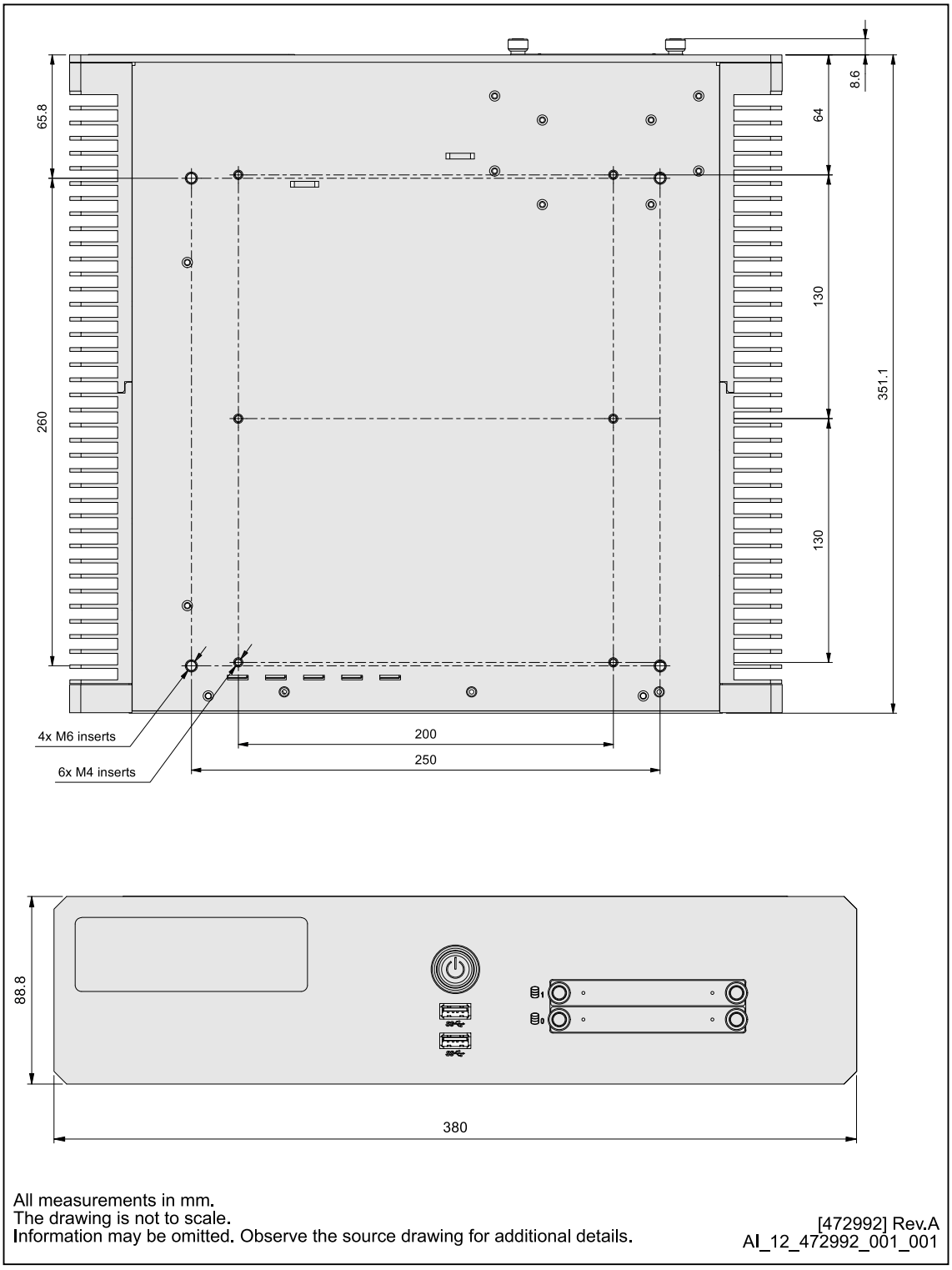
5 Align the new module on the support rail.

6 Press the module and pull down the lock-tab until it snaps into place.

Drawing file

Topics

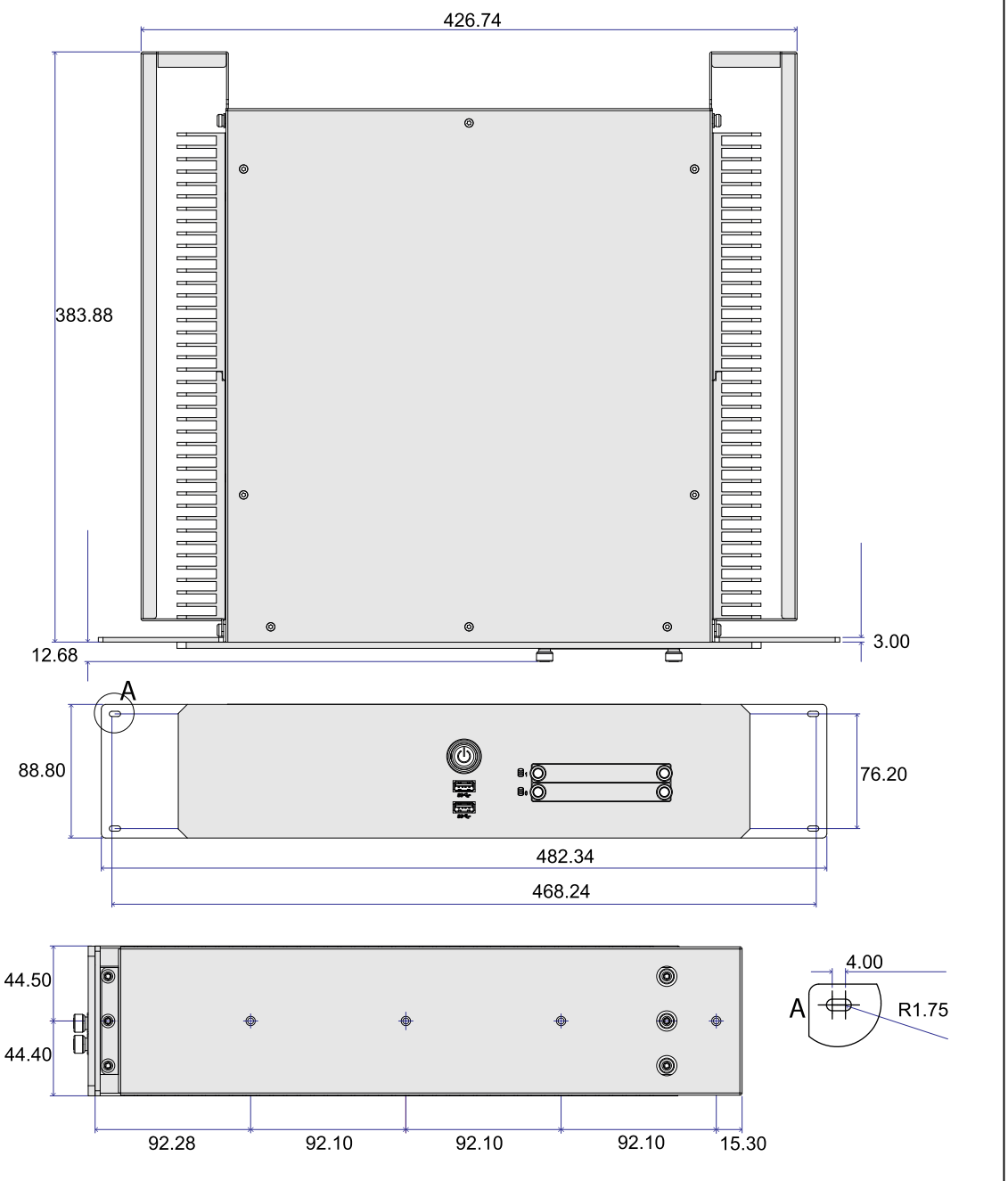
Computer dimensions



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

[472992] Rev.A
AI_12_472992_001_001

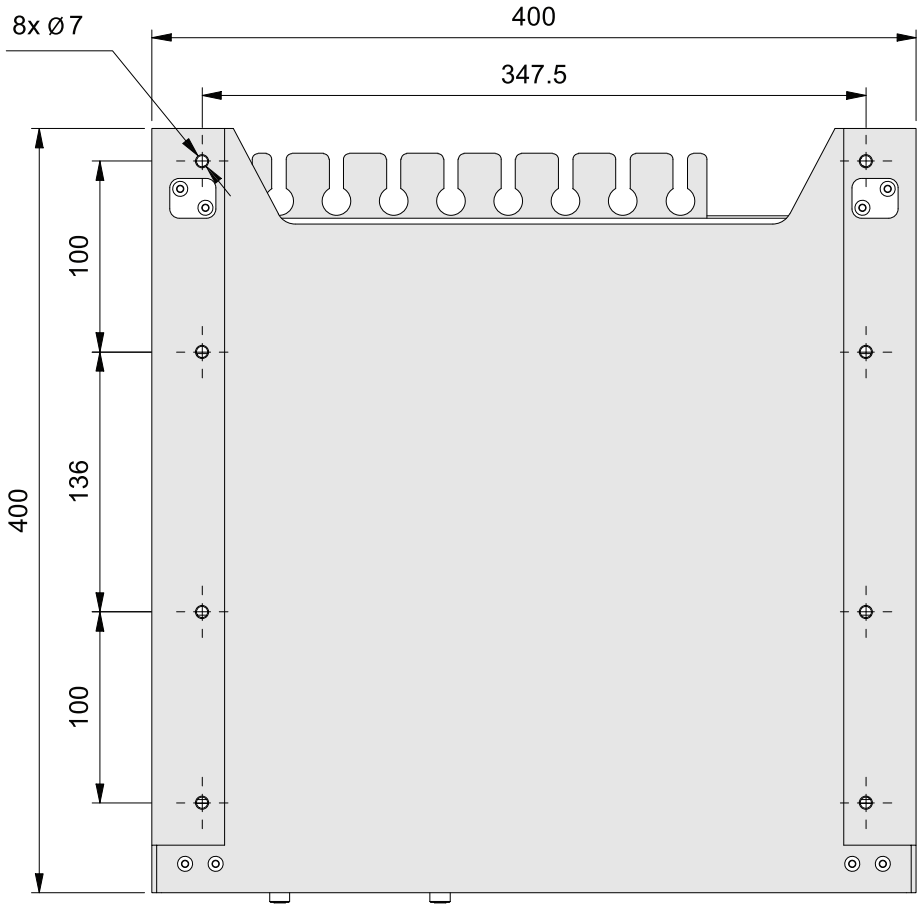
Rack mounting kit dimensions



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

[473676] Rev.A
AI12_473676_001_001

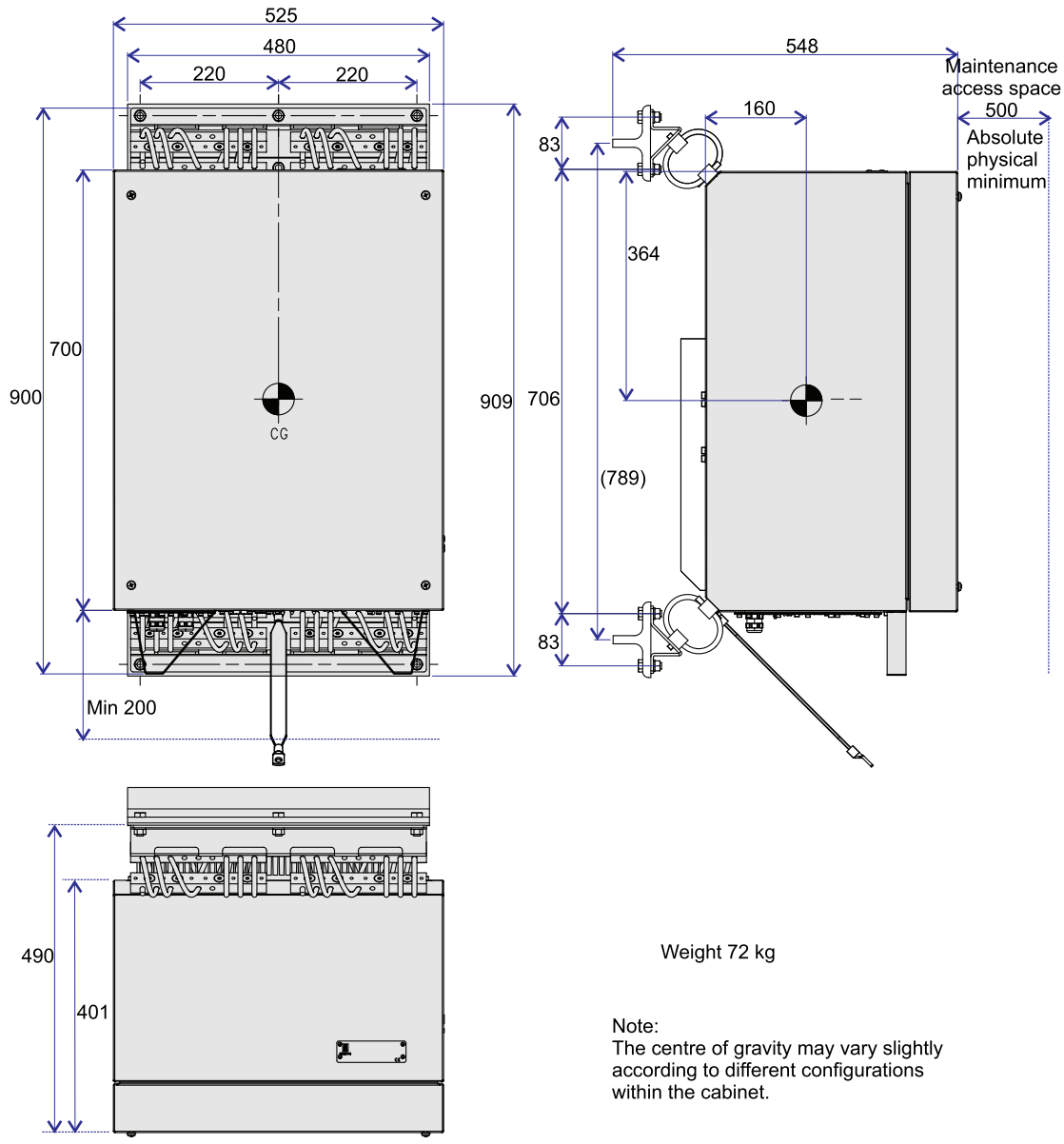
Console mounting kit dimensions



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

[490447] Rev.A
AI12_490447_001_001

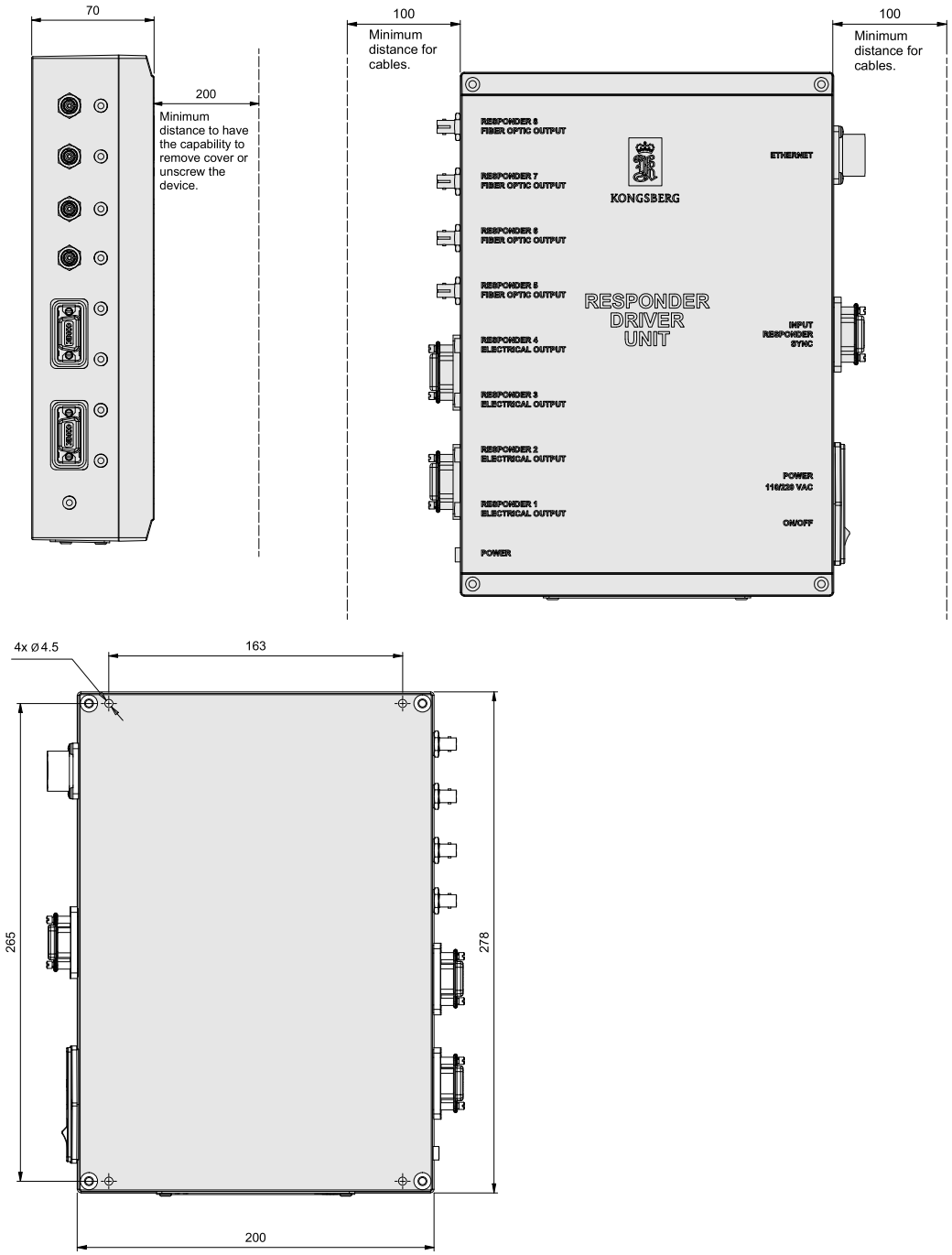
Transceiver dimensions



All measurements in mm.
The drawing is not in scale.

[400538] Rev.A
CD12_400538_001_001

Responder Driver Unit dimensions



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

[316067] Rev.D
AI12_316067_001_001

Technical specifications

Topics

Interface specifications

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

Supported datagram formats for motion information

- NMEA $**HDT
- NMEA $**VHW
- Yokogawa $**HRC
- SKR
- STL
- EM 3000
- $SPSXN,10
- $SPSXN,23
- IxSea Octans TAH ($PHOCT) R-P-H (UTC)
- IxSea Octans $PHTRO
- Ixsea Octans $PHLIN

The data rate should be at least 25 Hz, 100 Hz is recommended for attitude data.

Data input can be either serial line RS-232,RS-422 or Ethernet UDP.

Serial line speeds can be from 1200 baud up to 115200 baud, 1 or 2 stop bits, 7/8 bit data and parity none, even or odd.

Weights and outline dimensions

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

Computer

- **Make and model**: Hatteland HSC 1 5i
- **Depth**: 351 mm
- **Width**: 380 mm
- **Height**: 89 mm
- **Weight**: 7.5 kg

Transceiver

- **Make and model**: HiPAP x82
- **Depth**: 548 mm
- **Width**: 525 mm
- **Height**: 909 mm
- **Weight**: 72 kg

Responder Driver Unit

- **Make and model**: HiPAP Responder Driver Unit
- **Depth**: 200 mm
- **Width**: 280 mm
- **Height**: 73 mm
- **Weight**: 2.8 kg

Power specifications

These power characteristics summarize the supply power requirements for the system.

Computer

- **Make and model**: Hatteland HSC 1 5i
- **Voltage requirement**: 100/240 VAC, 50 to 60 Hz, autosensing
- **Maximum power consumption**: 240 W

Transceiver

- **Make and model**: HiPAP Transceiver x82
- **Voltage requirement**: 115/230 VAC, 50/60 Hz
- **Maximum voltage deviation**: 15 %
- **Maximum current draw**: 40 A
- **Normal current draw**: 0.8 A

Responder Driver Unit

- **Make and model**: HiPAP Responder Driver Unit
- **Voltage requirement**: 88–264 VAC, 47–63 Hz
- **Maximum current draw**: 0.4 A
- **Normal current draw**: 0.06 A
- **Nominal power consumption**: 15 W

Environmental requirements

These technical specifications summarize the physical and environmental specifications.

Computer

- **Make and model**: Hatteland HSC1-i5 H
- **Operating temperature**: -15 to 55 °C
- **Storage temperature**: -20 to 70 °C
- **Relative humidity**: Up to 95% non-condensing

Transceiver

- **Make and model**: HiPAP x82
- **Operating temperature**: 0 to +55 °C
- **Storage temperature**: -20 to 65 °C
- **Degree of protection**: IP44
- **Vibration range**: 5–100 Hz
- **Excitation level**: 5–13.2 Hz ± 1.5 mm, 13.2–100 Hz 1 g
- **Relative humidity**: 15 to 95% relative non-condensing

Responder Driver Unit

- **Make and model**: HiPAP Responder Driver Unit
- **Operating temperature**: 0 to +55 °C
- **Storage temperature**: -40 to 75 °C
- **Degree of protection**: IP44
- **Vibration range**: 5–100 Hz
- **Excitation level**: 5–13.2 Hz ± 1.5 mm, 13.2–100 Hz 1 g
- **Relative humidity**: 15 to 95% relative non-condensing

Equipment handling

Topics

Inspection of units and transportation boxes after arrival

A visual inspection must be done immediately after the box(es) have arrived at their destination.

Prerequisites

If you suspect that the equipment has been damaged during the transport, request that a representative of the carrier is present during the inspection.

Procedure

1 Check all boxes (wooden or cardboard boxes, plastic bags and/or pallets) for physical damage.

Look for signs of dropping, immersion in water or other mishandling.

2 If external damage is detected, open the box to check its contents.

Request that a representative of the carrier to be present while the box is opened, so any transportation damage can be identified and documented.

3 If a unit has been damaged, prepare an inspection report stating the condition of the unit and actions taken.

Describe the damage, and collect photographic evidence if possible. Return the inspection report to Kongsberg Maritime as soon as possible.

4 If units are not damaged, check the humidity absorbing material.

If required, dry or replace the bags, then re-pack the unit(s) according to the packing instructions.

Unpacking standard parts and units

Prior to installation or use, parts and units must be inspected, and then unpacked from their transport boxes. It is important that this unpacking is done without inflicting damage to the equipment.

Context

This procedure provides the basic tasks of unpacking units (main unit, spare parts etc) from boxes shipped from Kongsberg Maritime.

Note

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

Do not use a knife to open cardboard boxes - the contents may be located close to the surface, and can then be damaged by the blade.

Procedure

1 Check the carton before opening it to ensure it shows no signs of dropping, immersion in water or other mishandling.

   1 If external damage is detected, open the box to check its contents.

   2 Request that a representative of the carrier to be present while the box is opened, so any transportation damage can be identified and documented.

   3 If a unit has been damaged, prepare an inspection report stating the condition of the unit and actions taken.

     Describe the damage, and collect photographic evidence if possible. Return the inspection report to Kongsberg Maritime as soon as possible.

2 Place the box on a stable work bench or on the floor with the top of the box facing upwards.

3 In the absence of other instructions, always open the top of the carton first.

   The contents of the box will normally have been lowered into the carton from above, so this will usually be the easiest route to follow. Be careful when you open the box, and make sure that the contents are not damaged. Do not use a knife to open cardboard boxes.

4 If the box has been closed using staples, remove the staples from the carton as you open it.

   This will reduce the possibilities of scratch injury to yourself and damage to the contents.

5 If a wooden box has been closed using screws, always remove them using a screwdriver.

   Do not attempt to force the lid open with a crowbar or similar tool.

6 Once the carton is open, carefully remove all loose packing and insulation material.

7 Check for user manuals and other documents that may have been added to the carton during packing.

8 Check also for special tools, door keys etc.

Specifications for storage after unpacking

The unit must whenever possible be stored in its original transportation crate until ready for installation.

General specifications

During storage, each box must not be used for any purpose for which it was not intended (work platform, table, steps etc.).

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

Note

Do not break the seal to open a circuit board package before the board is to be used. If the board package is returned to Kongsberg Maritime with the seal broken, we will assume that the unit has been used and you will be billed accordingly.

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

Caution

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

Refer to the applicable product data sheets or battery handling procedures for further details.

Temperature protection

Any units that requires protection against extreme temperatures are identified as such in the applicable documentation. The box used to transport and store such units are clearly marked, for example:

Must not be transported or stored in temperatures below -5 °C.

Other temperature limits may be used if applicable.

If a unit needs temperature protection, the box to be used for storage and transportation must be lined on all walls, base and lid, using minimum 5 cm thick polyurethane or polystyrene foam.

Most system units can normally be stored in temperatures between -30° C and +70° C. Refer to the relevant technical specifications for details.

Note

Unless otherwise specified, transducers and hydrophones must not be stored in temperatures below −10°C and above +50°C.

Transporting Kongsberg Maritime equipment

Unless otherwise stated in the accompanying documentation, electronic, electromechanical and mechanical units supplied by Kongsberg Maritime can be only transported using methods approved for delicate and fragile equipment.

Prerequisites

Transportation methods approved for delicate equipment includes transportation by road, rail, air or sea.

Context

The units are to be transported in accordance with general or specific instructions for the appropriate unit(s), using pallets, transport cases, wooden boxes, or carton boxes as appropriate.

Observe the packing instructions.

Note

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

Procedure

1 Ensure that all local transportation is done according to the same specifications as for the initial delivery.

2 Make sure that the box containing the unit is kept dry at all times, and sheltered from the weather.

It must not be subjected to shocks, excessive vibration or other rough handling. The box will normally be marked with text or symbols indicating which way it is to be placed. Follow the instructions provided, and make sure that the box is always placed with its “top” facing upwards.

3 Make sure that the box is not used for any purpose for which it was not intended (step, table, etc.).

In the absence of other information, no other boxes must be stacked on top of it.

4 Handle all boxes and units with care.

Note

Due to the nature of Kongsberg Maritime's products, and the extensive use of delicate electronic parts, all units and boxes must be regarded and handled as fragile equipment.

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