130314 / 4AA029 / 6–15

HPR 400 Transceiver Unit

This document describes the installation of the HPR 400 Transceiver Unit. This unit is used with all HPR 400 Series Hydroacoustic Positioning Reference systems.

Document revisions

Rev	Date	Written by	Checked by	Approved by
A	14.01.94	–		
B	31.01.94	–		
C	04.02.97	RBr	HAA	JEF
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E				
F				
G				

(The original signatures are recorded in the company's logistic database)

Contents

Document history

(The information on this page is for internal use)

Rev. A Original issue based on P2420 rev.D

Rev. B Drawing 830–089477 added to the reference list. Refer to D143.

Rev. C Document simplified and limited to describe the HPR 400 Transceiver Unit. Only rack installation covered, the other options briefly mentioned. Refer to D533.

Rev. D 6U cabinet installation added. Refer to 130314D.

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1 INTRODUCTION

This document describes the installation of the HPR 400 Transceiver Unit. The Transceiver Unit contains the transmission and reception electronics for the system, and will normally be located in the sonar room next to the hull unit. Some drawings and diagrams are included in the text, though refer to the *Cable layout* document for detailed instructions on the interconnections.

Note !

The guidelines for installation presented here must be regarded as a base for detailed plans to be prepared by the installation shipyard. These plans must include drawings, instructions and procedures specific to the ship in which the equipment is to be installed. These drawings must be approved by the local maritime classification society before use.

Kongsberg Simrad accepts no responsibility for any damage or injury to the system, ship or personnel caused by drawings, instructions and procedures not prepared by Kongsberg Simrad.

2 TECHNICAL SPECIFICATIONS

2.1 Physical

Transceiver Unit dimensions:

- Height ..... 135 mm
- Width ..... 483 mm
- Depth ..... 310 mm

Weight ..... Approximately 9 kg

6U cabinet dimensions:

- Height ..... 371 mm
- Width ..... 600 mm
- Depth ..... 480 mm

Weight ..... Approximately 43 kg

Refer to drawing no. 830–102971 in the drawing file for further details of the 6U cabinet dimensions.

2.2 Power

Power supply:

- Voltage ..... 196 to 253 Vac, 1 phase or 39 to 64 Vdc
- Frequency ..... 50 – 60 Hz
- Power consumption ..... 55 W
- Maximum current ..... 10 A

The power supply to the Transceiver Unit must be kept within ±10% of the unit's nominal voltage. The maximum transient voltage variations on the main switchboard's bus-bars which could occur (except under fault conditions), are not to exceed –15% to +20% of the nominal voltage.

2.3 Environmental

Temperature:

- Storage ..... –20 to +65°C
- Operational ..... 0 to +55°C

Humidity:

- Storage ..... 90% relative
- Operational ..... 80% relative

Degree of protection (in cabinet) ..... IP 22

If the HPR 400 Transceiver Unit is mounted in a 19" rack, the appropriate protection must be prepared by the installation personnel.

The unit must be kept in an operational environment with the room temperature and humidity within the specified limits, and in a dust–free atmosphere.

3 INSTALLATION

3.1 Introduction

The Transceiver Unit comprises an aluminium strip and plate framework intended for mounting into a standard 19″ rack. Ensure that the depth of the rack is sufficient for the required cabling. The HSC 400 System Controller, keyboard and colour display may be mounted into the same 19″ rack.

The HPR 400 Transceiver Unit can be supplied installed in a small 19″ rack with height 6U. It may also be mounted in an operator console with an integrated keyboard, joystick and display. In such cases, the procedures in this document are for reference only.

3.2 Unit location

3.2.1 Physical location

The HPR Transceiver Unit should be located in the vicinity of the hull unit, either in the same compartment or in another compartment close by.

3.2.2 Cable lengths

The maximum distance between the Transceiver Unit and the hull unit is restricted by the length of the transducer cable. This cable may be maximum 300 meters long, but you are recommended to keep it as short as possible.

The serial line cable between the HPR 400 Transceiver Unit and the HSC 400 System Controller can be a maximum of 1000 meters.

3.3 Logistics

Safety:	Refer to the general safety procedures
Personnel:	Trained mechanical/electrical workers
Number:	Minimum 1
Ship location:	No recommendations. The vessel's watertight integrity will not be effected.
Special tools:	None

3.4 Procedures

3.4.1 19" rack

3.4.1.1 Introduction

The 19" rack is normally a free standing unit, designed to hold a variety of electronic units. The electronic units will normally be positioned in retractable draws or on shelves, or have runners attached directly to them to allow their easy withdrawal from the rack. Some types of unit, e.g. some display units, are designed to be bolted directly into the rack, requiring no further mounting brackets/runners etc.

The rack will normally be constructed of formed and welded aluminium struts, and has a rectangular base. The side and rear panels are often removable to simplify installation and maintenance, and it is open to the front to allow operation of the units contained in the rack. The rear panel should have ventilation outlets to allow cooling air to be circulated around the units while they are in use.

The rack is normally installed such that it is supported on four shock absorbers at the floor. Two more shock absorbers are often located at the upper rear edge of the unit to provide further support to the top.

It is recommended to install the rack at least 60 cm (2 feet) from any wall, bulkhead or other unit. This will allow access to the sides and rear of the unit for installation and maintenance of the electronic units.

Note ! *The thickness of some types of cable can make them inflexible. This can make installation and subsequent maintenance of the electronic units extremely difficult if the rack is positioned close against a wall or other unit.*

Installing the rack away from a wall or bulkhead will probably require an extension bracket to be manufactured to support the upper shock absorbers. This bracket should be run to the closest convenient solid structure, and should be bolted in at both ends to enable later alterations/adjustments.

3.4.1.2 19" rack installation

Note ! *Kongsberg Simrad AS will normally not supply the 19" rack. Any drawings and detailed instructions for installation should therefore be available from the rack supplier.*

Remove all electronic units before attempting to install the rack. This will significantly lighten the rack, simplifying the installation procedure considerably. It will also enable easy access to the bolt holes in the base plate.

Caution ! ***Always ascertain what is on the other side of bulkheads and decks before welding and/or drilling.***

1 Find a suitable location for the rack, bearing in mind the constraints mentioned above.

2 Mark the positions of the holes required to mount the rack.

3 Position the rack to fit over the holes, and bolt it down using nuts and bolts.

4 Manufacture an extension bracket (if required) to support the top of the unit, and secure into position using nuts and bolts.

3.4.1.3 Drawers and shelves

Mount the required drawers and shelves into the rack using the following procedure.

Note ! *Mounting kits containing the required nuts, bolts washers etc. should be supplied with the shelves and drawers.*

1 Select the required position in the rack in which the drawer or shelf is to be located.

2 Set four M6 "Captive" nuts into the appropriate holes, (two at the front of rack, two at the back), ensuring that the seating claws face up/down.

3 Screw four brass M6 "Collar" screws into the nuts till the threaded part of the screw passes through the nut.

4 Secure two mounting brackets to the telescopic slide rail or shelf using the steel M5 screws, nuts, washers and shake–proof washers provided.

5 Position a rectangular threaded strip behind the captive nuts, and screw the brass collar screws into the threaded strip for two or three turns.

6 Position the assembled shelf/slide unit into the rack, locating the lugs on the mounting brackets between the captive nuts and the threaded strips.

7 Ensure the assembled shelf/slide unit is positioned correctly, then tighten the collar screws.

Repeat this procedure for the remaining shelf/slide units.

3.4.1.4 Units and cables

1 Secure the electronic units to the appropriate shelves/rails as required.

Note ! *You do not need to remove the circuit boards and modules from the cabinet during the installation process. Keep the cabinet door firmly shut. Ensure that the cabinet is not exposed to dust, moisture, vibration or physical damage during the installation process.*

2 Install the electronic units into the rack.

3 Connect in the required cables and secure the cables to the rack framework using suitable cable clamps. Ensure enough slack is left to enable maintenance to be performed on the units.

4 Mount the rear interconnection panel.

5 Mount the rack side panels (if not already mounted).

6 Referring to the applicable cabling and wiring documentation and interconnection diagrams, connect in the cables.

WARNING ! **Ensure all power supplies are switched off and the fuses removed before attempting to connect in the cables.**

7 Once all the cables have been installed and the installation has been checked, remove all "foreign" matter from the cabinet and shut the door.

Caution ! *Do not attempt to run the system before the checks listed in the* **Test and Alignments** *section have been completed.*

3.4.2 6U cabinet

3.4.2.1 Introduction

The 6U cabinet is constructed of formed and welded steel plates, and has a rectangular base. The cabinet has a lockable front door, and divided vertically towards the rear such that it can be hinged open to the left to enable access to the rear of the Transceiver Unit. The cables enter through cable glands in the base of the unit.

The cabinet must be mounted on a bulkhead using four M8 bolts or studs. It must be located at least 400 mm from any obstructions to the left of the unit such that it can be opened for maintenance etc.

3.4.2.2 Cabinet installation

Remove the Transceiver Unit from the cabinet before commencing the installation. This will significantly lighten the cabinet, simplifying the installation procedure considerably. It will also enable easy access to the bolt holes in the rear of the unit.

Caution ! *Always ascertain what is on the other side of bulkheads and decks before welding and/or drilling.*

1 Find a suitable location for the cabinet, bearing in mind the constraints mentioned above.

2 Mark the positions of the holes / studs required to mount the unit, and drill the required holes / weld the studs into position.

3 Lift the cabinet into position over the holes / studs, and secure it.

3.4.2.3 Cables

WARNING ! **Ensure all power supplies are switched off and the fuses removed before attempting to connect in the cables.**

1. Referring to chapter 4 *Cabling* and the *Cable layout and interconnections* module, fit the required cables throught the appropriate cable glands and connect the cable cores into the appropriate terminal blocks within the cabinet. Ensure enough slack is left to enable maintenance to be performed on the unit.
2. Install the Transceiver Unit into the cabinet.
3. Once all the cables have been installed and the installation has been checked, remove all "foreign" matter from the cabinet and shut the door.

Caution ! *Do not attempt to run the system before the checks listed in the* **Test and Alignments** *section have been completed.*

4 CABLING

4.1 General information

All cables to and from the Transceiver Unit are terminated in plugs on the rear of the unit.

If the Transceiver Unit is mounted in a rack, operator console or other unit mounted on shock absorbers, ensure that 10 cm of slack cable is provided outside the cabinet to allow the unit to move on its shock absorbers without damaging the cable.

Ensure that a "service loop" of approximately 15 cm of slack cable is provided inside the cabinet to allow for future maintenance of the unit.

4.2 References

Refer to the *Cable Layout and interconnections* module for the cable terminals and connections.

4.3 Procedure

1 Select one cable.

2 Referring to the *Cable gland assembly procedure* given in the *Cable layout* module, prepare the end of the cable.

- Cable glands are only required if the cables are pulled through cabinets sides or bottom plates.

3 Referring to the *Cable layout* module, introduce the cable into its designated cable gland in the bottom of the cabinet.

- Ensure enough slack is left in the cable to permit alterations, maintenance etc.

4 Assemble the cable gland.

5 Connect the cores into the relevant terminals on the plug. Insert the plug into the socket.

6 Check all wiring, especially the power supplies, before switching power onto the unit.

4.4 Transducer cable connection

1 Remove the protective cover from the connector on the cable.

2 Align the connector with the socket on the Transceiver Unit, then carefully press the connector into the socket.

- Ensure the pins are not damaged.

3 Tighten the securing screws to hold the connector firmly into the socket.

4.5 HPR 400 Transceiver Unit connectors

All connections to and from the HPR 400 Transceiver Unit are made on the connection panel on the rear of the unit. All connectors are male except where stated female.

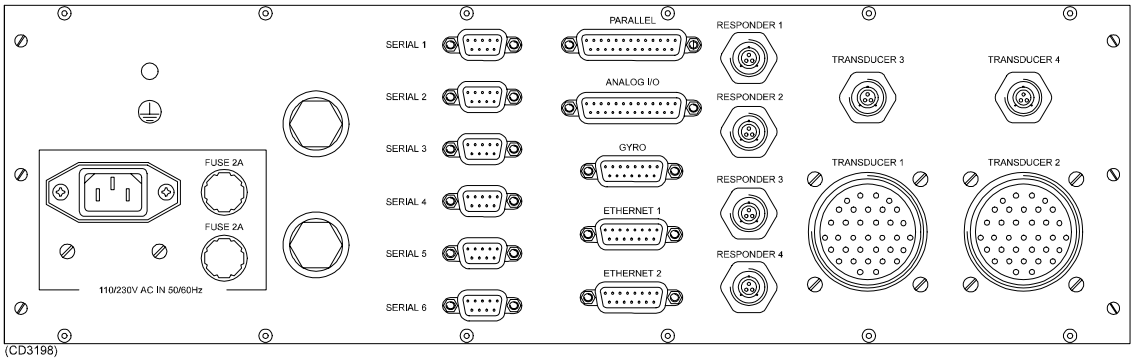


Figure 1 The connectors on the Transceiver Unit's rear panel

This panel holds the following connectors and fuses (top to bottom, left to right when looking at the rear panel):

1 Standard 3–pin, 230 Vac, 50/60 Hz mains power in.

2 Fuse, 230 Vac, 2 A.

3 Fuse, 230 Vac, 2 A.

4 9–pin D–connector for Serial line 1.

- This connector is used to communicate with the HSC 400 System Controller on a RS422 serial line with optical isolation. Use either this or Serial line 5.

5 9–pin D–connector for Serial line 2.

- This connector is used when the HPR system is equipped with a HL 3880 TR Tracking Hull Unit. This serial line is then used to control the movements of transducer 1.

6 9–pin D–connector for Serial line 3.

- This connector is used either when the HPR system is equipped with a HL 3880 TR Tracking Hull Unit; this serial line is then used to control the movements of transducer 2.
  On other HPR systems, this connector is used to connect a serial line gyro, or any of the following Vertical Reference Unit types: SKR, STL or MRU5.

7 9–pin D–connector for Serial line 4.

- This connector is used for synchronization.

8 9–pin D–connector for Serial line 5.

- This connector is used to communicate with the HSC 400 System Controller on a standard RS422 serial line. Use either this or Serial line 1.

9 9–pin D–connector for Serial line 6.

- This connector is not used with the HPR 400. Is is dedicated for software debugging purposes.

10 25–pin D–connector for Parallel input.

- This connector is not used with the HPR 400.

11 25–pin D–connector for Analogue input/output.

- This connector is used to connect an analogue Vertical Reference Unit. Any of the following types of VRU may be used:
  - √ Piro 40 ±15°
  - √ Piro 40 ±90°
  - √ PMT Accustar ±60°
  - √ Shaevitz ±4.5°
  - √ MRU ±20°

12 15–pin D–connector for Gyro input.

- This connector is used to connect a synchro gyro. The following input types are supported:
  - √ 26 V / 400 Hz
  - √ 115 V / 400 Hz

13 15–pin D–connector for Ethernet 1.

14 15–pin D connector for Ethernet 2.

15 3–pin Amphenol connector for Responder 1.

16 3–pin Amphenol connector for Responder 2.

17 3–pin Amphenol connector for Responder 3.

18 3–pin Amphenol connector for Responder 4.

- The responder connectors are used with HMT responders.

19 3–pin Amphenol connector for Transducer 3.

20 3–pin Amphenol connector for Transducer 4.

- These transducer connectors are used with LBL MF and LBL LF transducers.

21 35–pin Amphenol connector for Transducer 1.

22 35–pin Amphenol connector for Transducer 2.

- These transducer connectors are used with PMT–301, SSBL MF medium, SSBL MF narrow and SSBL LF medium transducers.

Note ! *The two white plastic caps are the securing nuts for two capacitors located on the inside of the Transceiver Unit rear panel.*

All connectors are marked with labels as indicated on the previous drawing.

4.6 Transceiver Unit pin allocations

4.6.1 Introduction

The connectors on the rear of the HPR 400 Transceiver Unit have the pin allocations as follows (as seen from outside, looking at the rear of the unit).

4.6.2 Serial 1

The "Serial 1" socket is a 9–pin delta connector. It is located on the rear panel of the HPR 400 Transceiver Unit, and is identified with the label "SERIAL 1".

It is used for communication with the HSC 400 System Controller. The inputs and outputs are optically isolated.

The pins are allocated as follows:

1 422+ input
2 232 input
3 232 output
4 422– input
5 Ground
6 422– output
9 422+ output

Pins 7 and 8 are not used.

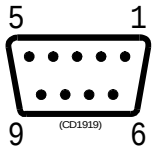


Figure 2 9–pin Delta connector, seen from the outside, looking at the rear of the unit

4.6.3 Serial 2

The "Serial 2" socket is a 9–pin delta connector. It is located on the rear panel of the HPR 400 Transceiver Unit, and is identified with the label "SERIAL 2". It is only used for communication with the HL 3880 TR hull unit modules to control transducer 1.

4.6.4 Serial 3

The "Serial 3" socket is a 9–pin delta connector. It is located on the rear panel of the HPR 400 Transceiver Unit, and is identified with the label "SERIAL 3".

The Serial 3 line serves two purposes:

- On HPR systems equipped with the HL 3880 TR Tracking Hull Unit, this line is used for communication with the HL 3880 TR hull unit modules to control transducer 2.
- On other HPR systems, this serial line is used to connect a serial line gyro or Vertical Reference Unit (VRU).

The pins are allocated as follows:

1 422+ input
4 422– input
5 Ground
6 422– output
9 422+ output

The remaining pins are not used.

See figure 2.

4.6.5 Serial 4

The "Serial 4" socket is a 9–pin delta connector. It is located on the rear panel of the HPR 400 Transceiver Unit, and is identified with the label "SERIAL 4".

The serial line is used for synchronization.

The pins are allocated as follows:

1/4 Sync 1 in
7/8 Sync 2 in
9/6 Sync 1 out
3/2 Sync 2 out
5 Ground

See figure 2.

4.6.6 Serial 5

The "Serial 5" socket is a 9–pin delta connector. It is located on the rear panel of the HPR 400 Transceiver Unit, and is identified with the label "SERIAL 5".

The serial line is used for communication with the HSC 400 System Controller. The serial line is an RS 422, but it is not equipped with optical isolation.

The pins are allocated as follows:

1 422+ input
2 232 input
3 232 output
4 422– input
5 Ground
6 422– output
9 422+ output

Pins 7 and 8 are not used.

4.6.7 Serial 6

The "Serial 6" socket is a 9–pin delta connector. It is located on the rear panel of the HPR 400 Transceiver Unit, and is identified with the label "SERIAL 6".

It is not used for operational purposes.

4.6.8 Parallel

The "Parallel" socket is a 25–pin delta connector. It is located on the rear panel of the HPR 400 Transceiver Unit, and is identified with the label "PARALLEL".

It is not used for operational purposes.

4.6.9 Analogue I/O

The "Analogue" socket is a 25–pin delta connector. It is located on the rear panel of the HPR 400 Transceiver Unit, and is identified with the label "ANALOG IO/". The pins are allocated as follows:

10 Analogue ground
11 Roll
12 Pitch
22 +15 Vdc
23 –15 Vdc
24 Common

The remaining pins are not used.

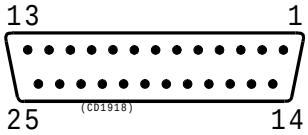


Figure 3 25–pin Delta connector, seen from the outside, looking at the rear of the unit

4.6.10 Gyro/synchro

The "Gyro / synchro" socket is a 15–pin delta connector. It is located on the rear panel of the HPR 400 Transceiver Unit, and identified with the label "GYRO". The pins are allocated as follows:

1 S_1
2 S_2
3 S_3
9 R_H
10 R_L

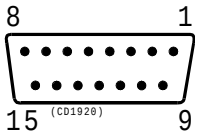


Figure 4 15–pin Delta connector, seen from the outside, looking at the rear of the unit

4.6.11 Responder 1 – 4

The Responder 1 to 4 connectors are 4–pin AMP sockets. They are located on the rear panel of the HPR 400 Transceiver Unit, and are identified with the label "TRANSPONDER 1–4".

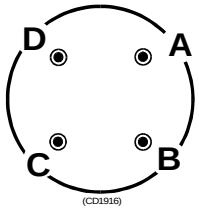


Figure 5 Responder connector, seen from the outside, looking at the rear of the unit

The pins for all four connectors are allocated as follows:

A + 24 V
B Trigger
C Reference
D Screen

4.6.12 Transducers 1 and 2

These are the transducer connectors for Standard, LF and Narrow beam transducers.

4.6.13 Transducers 3 and 4

The "TRANSDUCER 3" and "TRANSDUCER 4" connectors are 3–pin amp connectors. The pins are allocated as follows:

A Signal
B Ground
C Signal

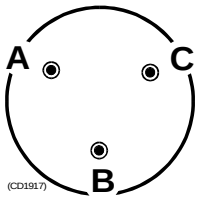
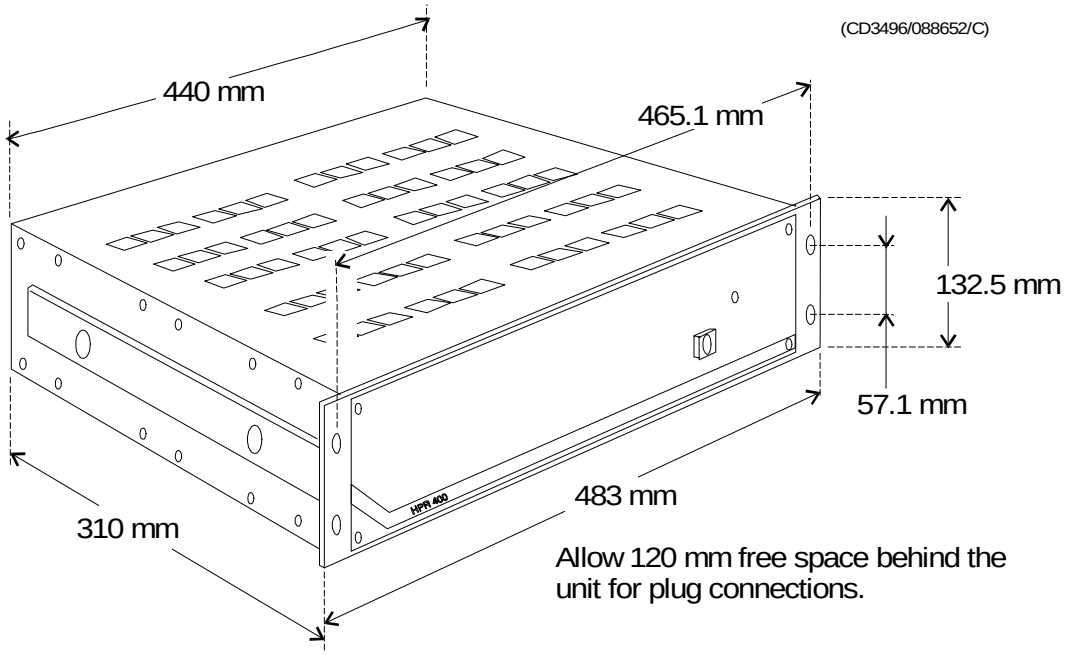


Figure 6 Transducer 3/4 connector, seen from the outside, looking at the rear of the unit

5 DRAWINGS

5.1 Outline dimension, base unit



5.2 6U cabinet drawings

Outline dimensions – Transceiver cabinet 6HU 830–102971 (665–56)

Terminal strip – Transceiver Unit 380–088990 (611–77)

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