



HPR 400P Family

Portable hydroacoustic positioning reference systems

The Kongsberg Simrad HPR 400P Portable Family consists of:

- HPR 408P - Portable LBL System with Dunking Transducer and Portable LBL System with Subsea Transceiver (HPR 408S)
- HPR 410P - Portable SSBL System with Portable Mini Transducer
- HPR 418P - Portable Combined LBL/SSBL System with Portable Mini Transducer

A HPR 400P system is based around a rugged, splashproof, shock resistant and «all in one » portable cabinet. It contains all the surface electronics necessary for underwater positioning. The portable cabinet is equipped with strong carrying handles and has detachable covers on the front and rear. Together with applicable software and a selection of transducers, the systems are easy to move by simply interfacing the applicable transducer to the back-plane of the HPR portable unit.

The connectors for all interfaces are made easily available from the rear. All systems are based around the same portable electronic cabinet, but software and transducer interfaces will vary. All the HPR 400P systems can be directly interfaced to a Differential Global Positioning System (DGPS) receiver, enabling transponder position indication, Super Short Base Line (SSBL) or vessel position, Long Base Line (LBL) in UTM coordinates.

The transducer may be deployed from any vessel or platform.

System units: A complete HPR 400 portable system comprises: • Operator Station (Compact PC), HPR 400 Transceiver Unit, Transducer with cable, Transponder(s)

Operator station: The portable computer contains the APOS (system) software.

HPR 400 Transceiver Unit

There are two types of transceiver units available: the Surface unit and the Subsea unit. The transceiver is the acoustic signal processor with transmitter and receiver electronics and software. It processes the acoustic signals, calculates the transponder position(s) and the acoustic telemetry data, and sends the information to the Compact PC where it is presented on the display.

- The transceiver has interfaces for the transducer(s), a gyro and a pitch / roll sensor.
- The Surface unit can operate up to 4 transducers. (2 SSBL + 2 LBL)
- The Subsea unit can operate up to 2 transducers. (LBL only)
- The acoustic telemetry functions are also controlled from this unit, using the same transducers.

Transducers

Several SSBL and LBL transducer types are available, and can be supplied with the system. The transducer must be lowered to a depth well below the lowest point of the vessel's hull. The "free end" of the cable must be connected to the transceiver unit. A standard transducer mounted on a hull unit may also be used if required. This would enable the portable system to be used as an emergency system if the standard system should develop a fault.

Transponders

Several transponder types are available. The HPR 400P system can operate with up to 56 transponder channels and feature transponder telemetry communication for use with transponder release, sensor readings and all LBL functionalities. In addition the 14 "old old" SSBL channels from the HPR 300 family can also be used.

HPR 408P

HPR 408P with surface dunking transducer

Available dunking transducers:

- Dunking Wide beam (MF)
- Dunking Narrow beam (MF)
- Dunking (LF)

HPR 408P with Subsea transceiver unit

- HPR 400 subsea unit and the RTD 333 (MF) (ROV transducer)

Available subsea units:

- HPR 400 S31 - a MF system, deep rated to 1000 m
- HPR 400 S33 - a MF system, deep rated to 3000 m
- HPR 400 S16 - a LF system, deep rated to 6000 m

HPR 410P / HPR 418P

The HPR 410P is normally delivered with the PMT 301 Portable Mini Transducer. This transducer can be used for SSBL and LBL operation. Other available transducers:

- HPR Standard, MF - used for LBL and SSBL operations. The HPR 400 system then requires an external VRU.
- HPR Narrow beam, MF - used for LBL and SSBL operations. The HPR system then requires an external VRU.
- HPR Wide beam, LF - used for LBL operations.



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HPR 408P - LBL Surface system

For the HPR 408P system, the transducer is delivered with cable and cable drum. It is a stand-alone portable LBL system. By using LBL software and dedicated over-the-side dunking transducer, the system becomes a surface system for any LBL or telemetry application.

HPR 408 - LBL Subsea system

The HPR 408P system can also be delivered with a subsea transceiver (HPR 408S) connected to the portable unit. This system may be used for Remotely Operated Vehicle (ROV) LBL positioning, as well as for any other subsea module positioning requiring LBL accuracy accuracy's.

HPR 410P - SSBL

The HPR 410P is a SSBL system. Together with dedicated SSBL software and the Portable Mini Transducer (PMT 301), a single compact transducer unit, it is applicable as a stand-alone underwater navigation system. The calculation of position is based on range, vertical and horizontal angle measurements, giving three-dimensional transponder positions relative to the system system's transducer.

- The PMT 301 has an internal Roll / Pitch inclinometers
- The PMT 301 includes an adapter for pole mounting

HPR 418P - combined LBL and SSBL

The HPR 418P system is a powerful portable underwater positioning system. It is capable of solving most underwater positioning applications. The system is a combination of the HPR 408P and the HPR 410P, and can work in a combined mode using a SSBL transducer.

- For details, see the HPR 408P and HPR 410P information above

External sensors

Vertical Reference Unit (VRU)

A VRU can be interfaced to the HPR 400P transceiver if required. The system can thereby automatically compensate for the vessel vessel's roll and pitch movements. A HPR 400 system can use the same VRU as the Dynamic Positioning (DP) system (if one is fitted).

Gyro

A number of different gyro types can be interfaced to the HPR 400 Portable System transceiver if required (syncro or serial).

TECHNICAL SPECIFICATIONS

Portable unit

The HPR 400P Portable unit is a 19 inch wide and 6U high transport housing. This housing has an internal support frame with anti-vibration mounts. The unit contains the HPR 400 Transceiver and the Compact PC.

General

Width x height x depth (534 x 360 x 560) mm
Weight 33 kg

Frequencies

Medium Frequency (MF) 21,000 Hz - 32,500 Hz
Low Frequency (LF) 9,500 Hz - 15,750 Hz
Mains supply 230 Vac (110 Vac on request)

Temperatures

Operating -10 ° to +55 ° C
Storage -40 ° to +70 ° C

HPR 400 Transceiver Unit

HPR 400S units

Power supply 110/230 Vac or 24 Vdc
Power consumption max. 25 W

HPR S31

- Length / diameter 1100 mm / 200 mm
- Weight in air / water 18 kg / 8 kg

Note: Dynamic Positioning Services reserve the right to amend this specification without prior notice.



HPR 400P Family

Portable hydroacoustic positioning reference systems

TECHNICAL SPECIFICATIONS

HPR S33:

Length / diameter 1035 mm / 195 mm
Weight in air / water 32 kg / 22 kg

HPR S16:

Length / diameter 1100 mm / 178 mm
Weight in air / water 30 kg / 15 kg

Dunking transducer

Height / diameter 220 mm / 128 mm
Weight in air 4 kg
Transducer-cable 75 meter, on a drum with winch

RTD 333 transducer / Bronze

Depth rating 3000 m
Height / diameter 300 mm / 102 mm
Weight in air 5 kg

RTD 333 transducer / Aluminium

Depth rating 3000 m
Height / diameter 300 mm / 102 mm
Weight in air 5 kg
ROV transducer
Depth rating 3000 m
Height / diameter 296.5 mm / 112 mm
Weight in air 5 kg
Transducer-cable 5 m
PMT 301 Portable Mini Transducer
Height / diameter 410 mm / 100 mm
Weight 8.6 kg
Accuracy inclinometer 0.2^a
Transducer-cable 30 m (standard) or 60 m (option)

Transducer type Accuracy TD type

HPR PMT 301, MF 20-32 kHz:		PMT-089962
-Wide beam ±80 °	= 2 % of slant range	
HPR Standard, MF 20-32 kHz:		TDS-067538
-Wide beam ±80 °	= 5 % of slant range	
-Medium beam ±55 °	= 2 % of slant range	
HPR Narrow beam, MF 20-32 kHz:		TDN-081633
-Wide beam ±80 °	= 5 % of slant range	
-Narrow beam ±22.5 °	= 1 % of slant range	
HPR, LF 10-15 kHz:		TDL-0834290
-Wide beam ±80 °	= 5 % of slant range	
-Medium beam ±55 °	= 2 % of slant range	
Dunking, MF 20-32 kHz:	*	100-080377
-Narrow beam approx ±50 °		
Dunking, MF 20-32 kHz:	*	100-082260
-Wide beam approx ±100 °		
Dunking, LF 10-15 kHz:	*	100-102880
-Beam approx ±50 °		
ROV - RTD 333, MF 20-32 kHz:	*	312-089793
- «Doughnut » shape		

Transponder type

Standard transponder w/ 188 dB SL
High power transponder w/ 195 dB SL
High power transponder w/ 206 dB SL

Operating range

Typical 1000 m - 1500 m
Typical 1500 m - 2000 m
Typical 2500 m - 4000 m

The range capabilities depends on the vessels noise level, transponder signal level and transducer type.
Ray-bending effects may also reduce the operating range.

The specification is based on:

- Line of sight from transducer to transponder
- No influence from ray-bending
- Signal-to-Noise ratio in the receiver = 20 dB. rel. 1 µPa
- Relevant signal output from transponder
- No error from heading and roll/pitch sensors

* The position accuracy for LBL operation depends on the transponder array geometry, sound velocity errors and Signal-to-Noise ratio. However, the accuracy can be shown by simula- simulations. Range accuracy tions. accuracy's down to a few centi- s centimetres can be obtained, while ROV and vessel metres positions can be calculated to within a few decimetres.

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