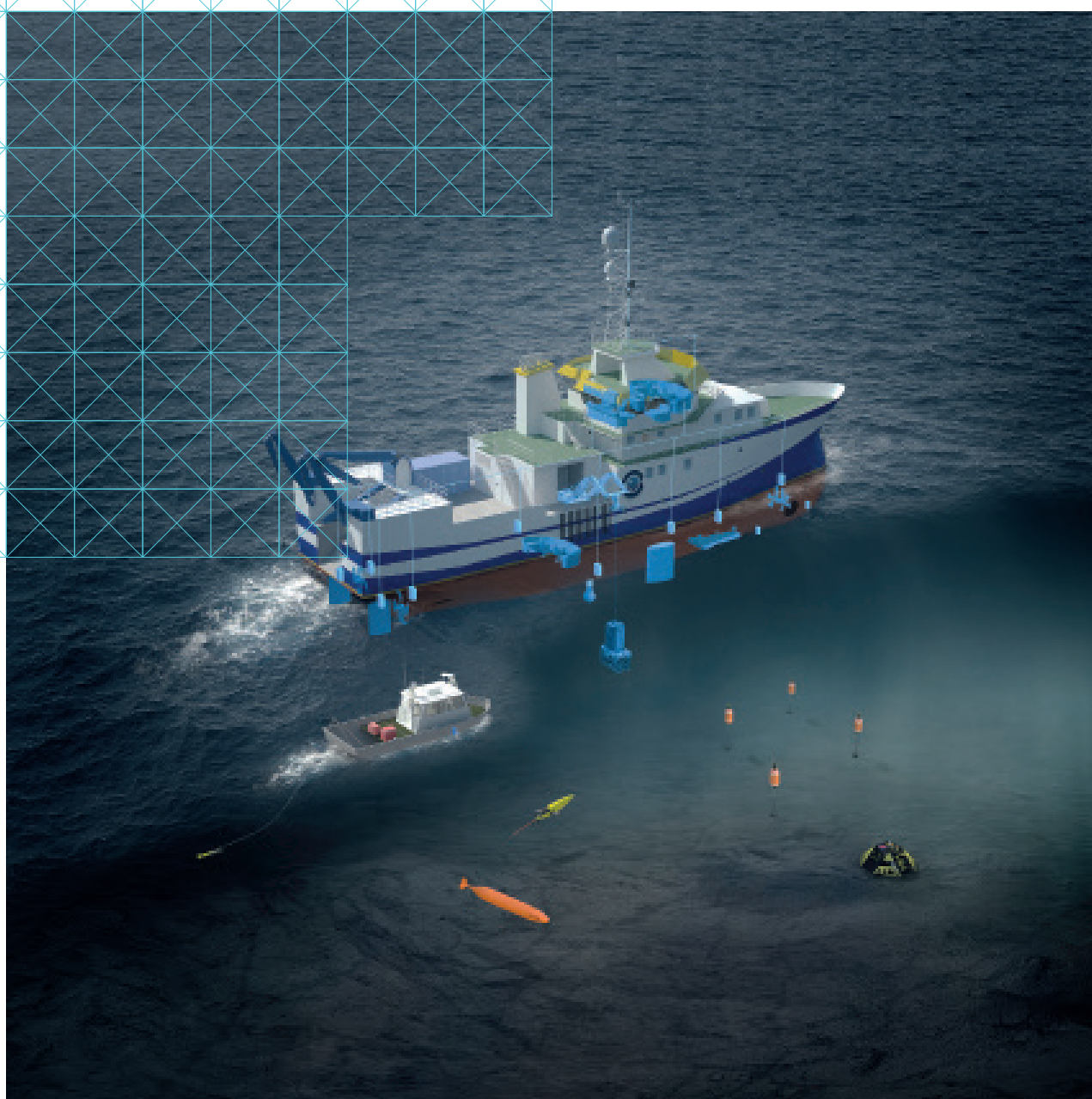




KONGSBERG

# RENTAL BROCHURE

GLOBAL



# KONGSBERG MARITIME RENTAL

Kongsberg Maritime's rental division supplies and supports our customers by providing a full rental solution anywhere in the world. The rental pool offers a range of KONGSBERG equipment to key markets including offshore oil and gas, subsea and merchant marine.

There are many benefits to renting equipment and it can often save you time and money. Through our rental service you can rent for short-term or long-term projects and you will have access to KONGSBERG's expertise and customer support. We will develop a solution that meets your specific requirements.

## UNITED KINGDOM

Kongsberg Maritime Ltd.  
Thermopylae House  
Prospect Road  
Arnhall Business Park  
Westhill  
Aberdeen AB32 6FE  
United Kingdom

Tel: +44 (0)1224 278300

E-mail: [km.rental.uk@kongsberg.com](mailto:km.rental.uk@kongsberg.com)

## SINGAPORE

Kongsberg Maritime Pte. Ltd.  
No. 6 Tuas Drive 1  
Singapore 638673  
Singapore

Tel: +65 6411 6400

E-mail: [km.support.singapore@kongsberg.com](mailto:km.support.singapore@kongsberg.com)

## UNITED STATES OF AMERICA

Kongsberg Maritime Inc.  
145 James Drive East  
Saint Rose, LA 70087  
United States of America

Tel: : +1 504 712 2799

E-mail: [km.rental.us@kongsberg.com](mailto:km.rental.us@kongsberg.com)

## BRAZIL

Kongsberg Maritime do Brasil S.A.  
Rua Teófilo Otono, 44 Centro -  
Rio de Janeiro CEP: 20040 007  
Brazil

Tel: +65 (21)3525 0251

Email: [km.rental.rio@kongsberg.com](mailto:km.rental.rio@kongsberg.com)



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## UNDERWATER POSITIONING – POSITIONING SYSTEMS

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### HiPAP® 352P-MGC Portable System

#### Calibration Free Portable Hydroacoustic Positioning Reference

Long Base Line (LBL) and Supershort Base Line (SSBL) compatibility

Fully compatible with Cymbal® and HPR400 acoustic protocols

Inbuilt motion and heading sensor: Seatex MGC® R3

Operating range: 1 - 5000 m

Main operational coverage area:  $\pm 80^\circ$

Range detection accuracy (Cymbal): 2 cm

Angular accuracy (S/N [20 dB Rel. 1 $\mu$ Pa]): 0.10°

Heading accuracy (GNSS aided): 0.1° RMS (secant latitude)

Dynamic accuracy roll & pitch: 0.01° RMS

Depth rating: up to 50 m

Length, diameter; weight (air): 661, 338 mm; 51 kg

Supplied with a 50 m or 70 m length transducer cable

Supplied with an APOS laptop or 19" rack mounted computer

Optional system item:

- Responder drive kit.



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### HiPAP® 352P Portable System

#### Portable Hydroacoustic Positioning Reference

Long Base Line (LBL) and Supershort Base Line (SSBL) compatibility

Fully compatible with all Cymbal® "M" channels

Inbuilt motion sensor type / accuracy: Seatex MRU-H / 0.05°

Operating range: 1 - 5000 m

Main operational coverage area:  $\pm 80^\circ$

Range detection accuracy (Cymbal): 2 cm

Angular accuracy (S/N [20 dB Rel. 1 $\mu$ Pa]): 0.10°

Depth rating: up to 50 m

Length, diameter; weight (air): 513, 341 mm; 42 kg

Supplied with a 50 m or 70 m length transducer cable

Supplied with an APOS laptop or 19" rack mounted computer

Optional system item:

- Responder drive kit.



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### HiPAP® 351P-MGC Portable System

#### Portable Hydroacoustic Positioning Reference

Long Base Line (LBL) and Supershort Base Line (SSBL) compatibility

Fully compatible with Cymbal® and HPR400 acoustic protocols

Inbuilt motion and heading sensor: Seatex MGC® R3

Operating range: 1 - 4000 m

Main operational coverage area:  $\pm 80^\circ$

Range detection accuracy (Cymbal): 2 cm

Angular accuracy (S/N [20 dB Rel. 1 $\mu$ Pa]): 0.18°

Heading accuracy (GNSS aided): 0.1° RMS (secant latitude)

Dynamic accuracy roll & pitch: 0.01° RMS

Depth rating: up to 50 m

Length, diameter; weight (air): 663, 341 mm; 51 kg

Supplied with a 50 m or 70 m length transducer cable

Supplied with an APOS laptop or 19" rack mounted computer

Optional system item:

- Responder drive kit.



---

### HiPAP® 351P-5 Portable System

#### Portable Hydroacoustic Positioning Reference

Long Base Line (LBL) and Supershort Base Line (SSBL) compatibility

Fully compatible with Cymbal® and HPR400 acoustic protocols

Inbuilt motion sensor type / accuracy: Seatex MRU-5 / 0.02°

Operating range: 1 - 4000 m

Main operational coverage area:  $\pm 80^\circ$

Range detection accuracy (Cymbal): 2 cm

Angular accuracy (S/N [20 dB Rel. 1 $\mu$ Pa]): 0.18°

Depth rating: up to 50 m

Length, diameter; weight (air): 513, 341 mm; 42 kg

Supplied with a 50 m or 70 m length transducer cable

Supplied with an APOS laptop or 19" rack mounted computer

Optional system item:

- Responder drive kit.



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**HiPAP® 351P Portable System****Portable Hydroacoustic Positioning Reference**

Long Base Line (LBL) and Supershort Base Line (SSBL) compatibility

Fully compatible with Cymbal® and HPR400 acoustic protocols

Inbuilt motion sensor type / accuracy: Seatex MRU-H / 0.05°

Operating range: 1 - 4000 m

Main operational coverage area:  $\pm 80^\circ$

Range detection accuracy (Cymbal): 2 cm

Angular accuracy (S/N [20 dB Rel. 1 $\mu$ Pa]): 0.18°

Depth rating: up to 50 m

Length, diameter; weight (air): 513, 341 mm; 42 kg

Supplied with a 50 m or 70 m length transducer cable

Supplied with an APOS laptop or 19" rack mounted computer

Optional system item:

- Responder drive kit.



---

**µPAP® 201-MGC R3 System****Calibration Free Portable Hydroacoustic Positioning Reference**

Operational modes: SSBL, LBL and data telemetry

Fully compatible with all Cymbal® "M" channels

Inbuilt motion and heading sensor: Seatex MGC® R3

Heading accuracy: 0.08° RMS (secant latitude)

Roll & pitch accuracy: 0.01° RMS

Operating range: 1 - 4000 m

Angular accuracy: 0.25°

Position accuracy: 0.45% (1 Sigma, SNR > 20dB rel. 1 $\mu$ Pa in bandwidth)

Data telemetry: up to 2,5kBit/s (application dependent)

Transducer beam width:  $\pm 80^\circ$

Material, depth rating: Bronze/Stainless steel, up to 50 m

Length, diameter; weight air/water: 400,190 mm; 17 kg/9 kg

Supplied with a 50 m or 70 m length transducer cable

Supplied as standard with an APOS laptop computer

Optional system item:

- Responder drive kit.



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**µPAP® 201-H System****Portable Hydroacoustic Positioning Reference**

Operational modes: SSBL, LBL and data telemetry

Fully compatible with all Cymbal® "M" channels

Inbuilt motion sensor type / accuracy: Seatex MRU-H / 0.05°

Operating range: 1 - 4000 m

Angular accuracy: 0.25°

Position accuracy: 0.45% (1 Sigma, SNR > 20dB rel. 1 $\mu$ Pa in bandwidth)

Data telemetry: up to 2,5kBit/s (application dependent)

Transducer beam width:  $\pm 80^\circ$

Material, depth rating: Bronze/Stainless steel, up to 50 m

Length, diameter; weight air/water: 400,190 mm; 17 kg/9 kg

Supplied with a 50 m or 70 m length transducer cable

Supplied as standard with an APOS laptop computer

Optional system item:

- Responder drive kit.



---

**µPAP® 201-3-NEL System****Portable Hydroacoustic Positioning Reference**

Operational modes: SSBL, LBL and data telemetry

Fully compatible with all Cymbal® "M" channels

Inbuilt motion sensor type / accuracy: Seatex MRU-3 / 0.08°

Operating range: 1 - 995 m

Angular accuracy: 0.25°

Position accuracy: 0.45% (1 Sigma, SNR > 20dB rel. 1 $\mu$ Pa in bandwidth)

Data telemetry: up to 2,5kBit/s (application dependent)

Transducer beam width:  $\pm 80^\circ$

Material, depth rating: Bronze/Stainless steel, up to 50 m

Length, diameter; weight air/water: 400,190 mm; 17 kg/9 kg

Supplied with a 50 m or 70 m length transducer cable

Supplied as standard with an APOS laptop computer

Optional system item:

- Responder drive kit.



**Note:** No export licence required.

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### **μPAP® 200 System**

#### **Portable Hydroacoustic Positioning Reference**

Operational modes: SSBL, LBL and data telemetry  
Fully compatible with all Cymbal® "M" channels  
Inbuilt motion sensor type / accuracy: Xsens / <1.0°  
Operating range: 1 - 4000 m  
Angular accuracy: 0.25°  
Position accuracy: 0.45% (1 Sigma, SNR > 20dB rel. 1μPa in bandwidth)  
Data telemetry: up to 2,5kBit/s (application dependent)  
Transducer beam width: ± 80°  
Material, depth rating: Bronze/Stainless steel, up to 50 m  
Length, diameter; weight air/water: 250,190 mm; 13 kg/8 kg  
Supplied with a 50 m or 70 m length transducer cable  
Supplied as standard with an APOS laptop computer  
Optional system item:  

- Responder drive kit.



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### **cPAP® 34, Subsea LBL Positioning System**

#### **ROV Mount Transceiver**

30 kHz band (MF)  
FSK and PSK (Cymbal®) signalling modes  
For use in support of Long Base Line (LBL) positioning operations  
Polyurethane coated aluminium housing, depth rated to 4000 m  
RS-232/422/485 isolated interfaces  
110/220 Vac external power interfaces (100-300 W)  
Transceiver supplied with the following items:  

- 2 x Transducer 34-30H for cPAP (part no. 345773)
- 2 x Subsea Cable for cPAP to transducer, 6 m, (part no. 345772)
- 1 x Subsea Pigtail for cPAP (part no. 345771).

Optional system item:  

- HiPAP® Survey APOS Operator Station.



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### **cPAP® 34 MKII, Subsea LBL Positioning System**

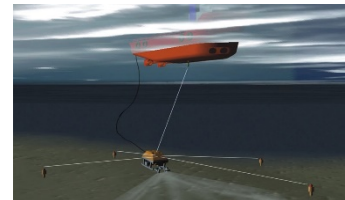
#### **ROV Mount Transceiver**

30 kHz band (MF)  
FSK and PSK (Cymbal®) signalling modes  
For use in support of Long Base Line (LBL) positioning operations  
Polyurethane coated aluminium housing  
Depth rated: up to 4000 m  
APOS interface: RS-232  
User interface: RS-232/422/485  
Power supply: 20-28 Vdc, 1 Ampere (max)  
Internal battery type: Lithium Iron Phosphate (Li-Fe - rechargeable)  
Length, diameter; weight air/water: 278,105 mm; 4.2 kg/2.2 kg  
Transceiver supplied with the following items:  

- Transducer 34-30H for cPAP (part no. 345773)
- Subsea Cable for cPAP to transducer, 6 m, (part no. 345772)
- Subsea Pigtail for cPAP (part no. 408094).

Optional system items:  

- cNODE® MiniS / Micro Battery Charger
- HiPAP® Survey APOS Operator Station.



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### **cPAP® 30, Portable Telemetry Unit**

#### **Portable Medium Frequency (MF) Transceiver Unit**

Fully compatible with all Kongsberg (MF) acoustic channels, including Cymbal® protocol  
Supplied with a TDD 180 dunking transducer (70 m cable on reel)  
Operation temperature: -5 to +55°C  
Splash proof IP 54 case  
Internal rechargeable lead/acid battery pack (3 hours operation)  
Power supply: 100-240 Vac  
Diameter, weight: 488 x 185 mm, 16 kg.



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**Note:** For operations outside the UK/EU due to export restrictions, an export licence may be required for the "HiPAP®", "μPAP®" and "cPAP®" systems. In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## UNDERWATER POSITIONING – SUBSEA HAIN SYSTEM

### HAIN Subsea 7K MKII System

#### Hydroacoustic Aided Inertial Navigation Package

System benefits:

- precise, smooth and accurate positioning
- higher position update rate
- precise and accurate depth
- precise and accurate orientation (heading, roll and pitch)
- precise and accurate velocity estimate in 3D
- estimation and compensation of sensor errors
- much better QC and QA
- easily used with NavLab post-processing for even better accuracy, precision and integrity.

Package is supplied with a Subsea MGC® R3 IMU/Processing module, Nortek DVL1000 - 4000 m Doppler Velocity Log, Paroscientific Digiquartz® Depth sensor, and Survey APOS computer which enables independent HiPAP®, cPAP® and Subsea HAIN operations from the vessels ROV/Survey area.

The computer includes the following enabled APOS software functions:

- CYMBAL (requires HiPAP® X81/X82 transceiver unit)
- SSBL Fast Track
- LBL ROV, vessel and transponder positioning
- Interface to cPAP® ROV transceiver unit
- Subsea HAIN.

#### Survey APOS computer specifications:

8-port serial card: 4 x RS-232 and 4 x RS-422/485

Ethernet ports: Net A, B and C

Dimensions (L x W x H): 425 x 425 x 185 mm; Weight: 17 kg.

Power: 90-132 / 180-264 V ac, 80 W.

#### Subsea MGC® R3 IMU/Processing module specifications:

Heading accuracy (GNSS aided): 0.04° RMS (secant latitude)

Dynamic accuracy roll & pitch: 0.01° RMS

Dynamic accuracy heave: 5 cm or 5 % (whichever is highest)

Angle random walk: 0.008 ° / sq. root hour

Bias repeatability: 330 micro g (1 Sigma)

Dynamic range (Accelerometers): ±30 g

Housing connector types: SubConn (1 x 16-pin and 3 x 8-pin):

- Connection to topside: Ethernet 10 Mbit
- Interface to DVL and Depth sensor
- 1 PPS signal output.

Power input: 24 Vdc

Titanium housing, depth rated to 7000 m

Length, diameter: 343, 191 mm

Weight in air/water: 20 kg /12.5 kg.

**Note:** Package can be supplied without DVL and/or Depth Sensor.

**\*Note:** Seatex MGC-R3 is a Non-ITAR product.



**Note:** The Seatex MGC-R3 IMU is subject to export control restrictions. The equipment can only be operated in approved territories and will not be shipped or used in any country listed in the Norwegian, UK or US embargoed country list. In most instances an end user statement will be required from customer prior to despatch of equipment.

## UNDERWATER POSITIONING – HAIN POST-PROCESSING SOFTWARE

### NavLab Post-Processing Computer

Installed with latest NavLab software

Supplied with software licence dongle

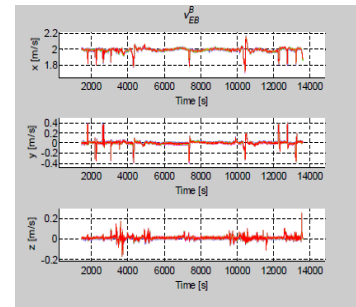
Used for post-processing of real time subsea HAIN data.

Improves quality of the logged real-time subsea HAIN position.

### IMPORTANT NOTES:

The Doppler Velocity Log calibration is processed using the NavLab software. Without NavLab software available onboard the vessel, the system cannot be setup correctly as it will not be possible to do a correct Doppler Velocity Log calibration.

**NavLab:** software package can also be used to improve the real-time estimates of ROV position and attitude produced by the on-line subsea HAIN system. NavLab is a software system intended not only for navigation data post-processing, but also for navigation system research and development and navigation system accuracy analysis. It can therefore be used to analyse the on-line performance of the Subsea HAIN system and fine-tune its parameters, can also be used to assist in system fault finding.



**Note:** For operations outside the UK/EU due to export restrictions, an export licence may be required for the “NavLab Post-Processing Computer”. In some instances, an end user statement will be required from the customer prior to despatch of the equipment.



## UNDERWATER POSITIONING – TRANSDUCERS & CABLES

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### cPAP® 34-30H Transducer

30 kHz band (MF)  
For use in Long Baseline (LBL) mode  
Aluminium housing, depth rated to 4000 m  
30° horizontal beam pattern  
Connector type: SubConn MCBH4MSS  
Diameter, length, weight (air/water): 77, 213 mm, 1.54 kg/0.8 kg



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### cPAP® 34-40V Transducer

30 kHz band (MF)  
Aluminium housing, depth rated to 4000 m  
40° vertical cone beam pattern  
Connector type: SubConn MCBH4MSS  
Diameter, length, weight (air): 100, 200 mm, 1.54 kg



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### cPAP® 34-180 Transducer

30 kHz band (MF)  
Aluminium housing, depth rated to 4000 m  
180° (omni) directional beam pattern  
Connector type: SubConn MCBH4MSS  
Diameter, length, weight (air): 86, 200 mm, 1 kg



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### Dunking Transducer TDD 180 MF Transducer & Cable

Part No. 320822  
180° beam pattern transducer  
To be used for depths down to 500 m  
Supplied with 70 m kevlar armoured cable on drum  
Compatible with cPAP® 30 portable transceiver unit  
Width, height, depth: 430, 500, 590 mm



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### Dunking Transducer TDD 30V MF Transducer & Cable

Part No. 320680  
30° vertical beam pattern transducer  
To be used for depths down to 4000 m  
Supplied with 70 m kevlar armoured cable on drum  
Compatible with cPAP® 30 portable transceiver unit  
Width, height, depth: 430, 500, 590 mm



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### HiPAP®35xP / µPAP® 20x Transducer Cable

Option of 50 m or 70 m length transducer cable  
Cable diameter: 12 mm  
Subsea plug diameter: Approx. 44 mm  
Length, weight: 50 m, 10 kg.



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**Note:** For operations outside the UK/EU due to export restrictions, an export licence may be required for the “HiPAP® and cPAP® transducers”. In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## UNDERWATER POSITIONING – OPTIONAL ITEMS & SOFTWARE

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### TTC 30

#### Transponder Test and Configuration Unit

Fully compatible with all Kongsberg (MF) acoustic channels, including Cymbal® protocol

Supplied with TT 30 test transducer (2.5 m cable length)

Supplied with a 5 m serial cable which enables connection to cNODE transponder

Operation temperature: -5 to +55°C

Splash proof IP 54 case

Internal rechargeable lead/acid battery pack (3 hours operation)

Power supply: 100-240 Vac

Diameter, weight: 488 x 185 mm, 16 kg.



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### TTC Light

#### Transponder Test and Configuration Tool

TTC Light software installed on PC running Windows 7 or above

The TTC Light software can be used to:

- Test cNODE transponders from PC via interface cable to:
  - Read transponder configuration settings (serial number, acoustic channel and mode, battery capacity, transducer type)
  - Configure Cymbal or FSK Mode and channels
  - Upload new transponder firmware.
- Perform acoustic tests (requires cNODE MiniS) to:
  - Read transponder configuration settings (serial number, acoustic channel and mode, channel number, battery capacity, read sensors)
  - Configure Cymbal or FSK Mode and channels
  - Execute acoustic release
  - In air acoustic range test.



**Note:** A cNODE MiniS transponder (not included) is required to be connected to the PC via the supplied serial cable and act as a transducer/transceiver to run acoustic tests to all cNODE transponder types.

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### Responder Drive Kit for HiPAP®35xP/50x or µPAP® 20x

#### Hardware for providing responder trigger signals from HiPAP or µPAP system to responder units

Technical specifications:

- Dust and water protected (IP 44 rated)
- Can be located near ROV control rooms
- Requires 230 Vac / 150 mA power supply
- Four + 24 V / 5 ms electrical trigger outputs
- Four optical pulse outputs
- Green LED's for every 8 responder outputs
- Dimensions (L x W x H): 280 x 200 x 73 mm, Weight: 2.9 kg.



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### Remote HiPAP®50x Operator Station

#### Acoustic Positioning System Computer

Supplied with the latest APOS software to allow system master/slave operations from different locations onboard the vessel.



APOS computer specifications:

Dimensions (L x W x H): 425 x 425 x 185 mm; Weight: 17 kg.

Power: 90-132 / 180-264 Vac, 80 W.

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**HiPAP® Survey APOS Operator Station****Acoustic Positioning System Computer for Survey**

Enables independent HiPAP, cPAP and Subsea HAIN system operations from the vessels ROV/Survey area.

Supplied with the latest Survey APOS software and licence.

Includes the following enabled APOS software functions:

- CYMBAL (requires HiPAP 351/451/501 transceiver)
- SSBL Fast Track
- LBL ROV, vessel and transponder positioning
- Interface to cPAP ROV transceiver unit

Survey APOS computer specifications:

8-port serial card: 4 x RS-232 and 4 x RS-422/485

Ethernet ports: Net A, B and C

Dimensions (L x W x H): 425 x 425 x 185 mm; Weight: 17 kg.

Power: 90-132 / 180-264 V ac, 80 W.



**Note:** Additional APOS software functions available on request.

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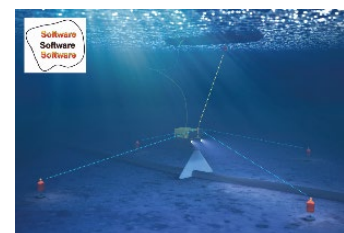
**APOS LBL Function**

APOS software option which enables Long Base Line operations when using HiPAP®, µPAP® and cPAP® systems.

Option includes:

- LBL Geographical Calibration
- Transponder LBL Positioning
- LBL and Sparse LBL Positioning for cPAP / ROV

**Note:** APOS software option available when supplied with acoustic positioning computer or with portable system.



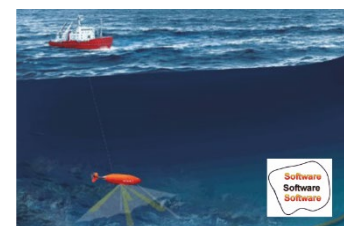
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**APOS Transparent Modem Function**

APOS software option which enables data communication with subsea modems.

Supports Hugin/Munin AUV positioning and data communication.

**Note:** APOS software option available when supplied with acoustic positioning computer or with portable system. Compatible with HiPAP®, µPAP® and cPAP® systems enabled with Cymbal acoustic protocol.



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**Note:** For operations outside the UK/EU due to export restrictions, an export licence may be required for these "optional items". In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## UNDERWATER POSITIONING – DIVER TRANSPONDERS (cNODE MICRO)

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### cNODE® Micro 31-180

#### Shallow Water ROV / Diver Positioning Transponder

30 kHz band (MF) Transponder / Responder  
Fully compatible with Cymbal® acoustic protocol  
SSBL and LBL positioning modes  
Beamwidth:  $\pm 90$  degrees  
Max source level: up to 170 dB  
Internal tilt sensor:  $\pm 90$  degrees  
Polyurethane coated aluminium housing, depth rated to 600 m  
Rechargeable battery pack (Li-Ion)  
Battery Lifetime (quiescent): < 10 days  
Battery Lifetime (operational): > 28 hours (Cymbal® (Low power, 1 sec update rate))  
External power: 24 Vdc, 1A  
Length, diameter (housing / transducer): 227 mm, 55 mm  
Weight in air / water: 1.0 / 0.4 kg.



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### cNODE® Micro Battery Charger

Suitable for cNODE® Micro and MiniS transponders  
Automatic fast / trickle charge modes  
Permit fast charge between 5° C and 40° C  
Maximum transponder battery charge time: 165 min  
Supply voltage: 110-230 Vac  
Enclosure protection: IP 30 rated  
Width x Height x Depth: 256 x 83 x 355 mm  
Weight: 2.9 kg.



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**Note:** For operations outside the UK/EU due to export restrictions, an export licence may be required for the “cNODE Micro transponder”. In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## UNDERWATER POSITIONING – ROV TRANSPONDERS (MST)

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### MST 319/N

#### ROV Positioning Transponder

Small lightweight HPR series mini-transponder  
Fully compatible with HiPAP® and HPR systems  
Beamwidth:  $\pm 90$  degrees  
Sensitivity: 110/100 dB  
Switchable source level: 192/188dB  
Rechargeable battery pack  
Polyurethane coated aluminium housing: depth rating to 1000 m  
Length, diameter; weight air/water: 328, 75 mm; 1.7/0.7 kg



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### MST Battery Charger

#### Battery Charger Kit

Suitable for MST 319, 324 and 342 mini-transponders  
Automatic fast/trickle charge modes  
Supply voltage: 110-230 Vac  
Charges MST's in less than 90 minutes



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**Note:** For operations outside the UK/EU due to export restrictions, an export licence may be required for the “MST mini-transponder”. In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## UNDERWATER POSITIONING – ROV TRANSPONDERS (cNODE MINIS)

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### **cNODE® MiniS 34-180**

#### **ROV/Towfish Positioning Transponder**

30 kHz band (MF) Transponder / Responder

Fully compatible with Cymbal® and HPR400 acoustic protocols

SSBL / USBL and LBL positioning modes

Beamwidth:  $\pm 90$  degrees

Max source level: up to 188 dB

Internal tilt sensor:  $\pm 90$  degrees

Polyurethane coated aluminium housing, depth rating to 4000 m

Rechargeable battery pack (Li-Ion)

Battery Lifetime (quiescent): >30 days

Battery Lifetime (operational): >2.5 days (Cymbal® (Low power, 1 sec update rate))

External power: 24 Vdc (18-36 Vdc), 1A

Length, diameter housing / transducer: 305.5 mm, 106 mm

Weight in air / water: 4.0 / 2.1 kg.

Optional item:

- Transducer guard.



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### **cNODE® MiniS 34-180 D**

#### **Positioning Transponder with Pressure Sensor**

30 kHz band (MF) Transponder / Responder

Integrated 100 bar or 400 bar pressure sensor, 0.05% FS

Fully compatible with Cymbal® and HPR400 acoustic protocols

SSBL / USBL and LBL positioning modes

Beamwidth:  $\pm 90$  degrees

Max source level: up to 188 dB

Internal tilt sensor:  $\pm 90$  degrees

Polyurethane coated aluminium housing, depth rating to 4000 m

Rechargeable battery pack (Li-Ion)

Battery Lifetime (quiescent): >30 days

Battery Lifetime (operational): >2.5 days (Cymbal® (Low power, 1 sec update rate))

External power: 24 Vdc (18-36 Vdc), 1A

Length, diameter housing / transducer: 305.5 mm, 106 mm

Weight in air / water: 4.0 / 2.1 kg.

Optional item:

- Transducer guard.



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### **cNODE® MiniS 34-40V**

#### **ROV/Towfish Positioning Transponder**

30 kHz band (MF) Transponder / Responder

Fully compatible with Cymbal® and HPR400 acoustic protocols

SSBL / USBL and LBL positioning modes

Beamwidth:  $\pm 20$  degrees

Max source level: up to 203 dB

Internal tilt sensor:  $\pm 90$  degrees

Polyurethane coated aluminium housing, depth rating to 4000 m

Rechargeable battery pack (Li-Ion)

Battery Lifetime (quiescent): >30 days

Battery Lifetime (operational): >2.5 days (Cymbal® (Low power, 1 sec update rate))

External power: 24 Vdc (18-36 Vdc), 1A

Length, diameter housing / transducer: 321 mm, 105 mm

Weight in air / water: 4.6 / 2.1 kg.

Optional item:

- Transducer guard.



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**cNODE® MiniS 34-40V D****Positioning Transponder with Pressure Sensor**

30 kHz band (MF) Transponder / Responder  
Integrated 400 bar pressure sensor, 0.05% FS  
Fully compatible with Cymbal® and HPR400 acoustic protocols  
SSBL / USBL and LBL positioning modes  
Beamwidth:  $\pm 20$  degrees  
Max source level: up to 203 dB  
Internal tilt sensor:  $\pm 90$  degrees  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Rechargeable battery pack (Li-Ion)  
Battery Lifetime (quiescent): >30 days  
Battery Lifetime (operational): >2.5 days (Cymbal® (Low power, 1 sec update rate))  
External power: 24 Vdc (18-36 Vdc), 1A  
Length, diameter housing / transducer: 321 mm, 105 mm  
Weight in air / water: 4.6 / 2.1 kg.  
Optional item:

- Transducer guard.



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**cNODE® MiniS 37-40V-Ti****ROV/Towfish Positioning Transponder**

30 kHz band (MF) Transponder / Responder  
Fully compatible with Cymbal® and HPR400 acoustic protocols  
SSBL / USBL and LBL positioning modes  
Beamwidth:  $\pm 20$  degrees  
Max source level: up to 203 dB  
Internal tilt sensor:  $\pm 90$  degrees  
Polyurethane coated titanium housing, depth rating to 7000 m  
Rechargeable battery pack (Li-Ion)  
Battery Lifetime (quiescent): >30 days  
Battery Lifetime (operational): >2.5 days (Cymbal® (Low power, 1 sec update rate))  
External power: 24 Vdc (18-36 Vdc), 1A  
Length, diameter housing / transducer: 321 mm, 105 mm  
Weight in air / water: 4.6 / 2.1 kg.  
Optional item:

- Transducer guard.



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**cNODE® MiniS Battery Charger**

Suitable for cNODE® MiniS 34-40V and 34-180 transponders  
Automatic fast / trickle charge modes  
Permit fast charge between 5° C and 40° C  
Maximum transponder battery charge time: 165 min  
Supply voltage: 110-230 Vac  
Enclosure protection: IP 30 rated  
Width x Height x Depth: 256 x 83 x 355 mm  
Weight: 2.9 kg.



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**Note:** For operations outside the UK/EU due to export restrictions, an export licence may be required for the “cNODE MiniS transponder”. In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## UNDERWATER POSITIONING – cNODE MINI TRANSPONDERS

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### cNODE® Mini 34-180

#### Positioning Transponder

30 kHz band (MF) Transponder / Responder  
Fully compatible with Cymbal® and HPR400 acoustic protocols  
SSBL / USBL and LBL positioning modes  
Beamwidth:  $\pm 90$  degrees  
Max source level: up to 190 dB  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Rechargeable battery pack (NiMH)  
Battery Lifetime (fully charged): Quiescent 60 days, 1 ping per sec / max source level 100,000 replies  
External power:  $15 \pm 10\%$  Vdc, Min 300 W  
Length, diameter housing / transducer: 598, 85 / 88 mm  
Weight in air / water: 6.7 / 3.4 kg



**Note:** Battery pack does not take charge from external power supply.

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### cNODE® Mini 34-40V

#### Positioning Transponder

30 kHz band (MF) Transponder / Responder  
Fully compatible with Cymbal® and HPR400 acoustic protocols  
SSBL / USBL and LBL positioning modes  
Beamwidth:  $\pm 20$  degrees  
Max source level: up to 203 dB  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Rechargeable battery pack (NiMH)  
Battery Lifetime (fully charged): Quiescent 60 days, 1 ping per sec / max source level 100,000 replies  
External power:  $15 \pm 10\%$  Vdc, Min 300 W  
Length, diameter housing / transducer: 600, 85 / 100 mm  
Weight in air / water: 6.7 / 3.4 kg



**Note:** Battery pack does not take charge from external power supply.

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### cNODE® Mini Battery Charger

Suitable for cNODE® Mini 34-40V and 34-180 transponders  
Automatic fast / trickle charge modes  
Permit fast charge between 5° C and 40° C  
Maximum transponder battery charge time: 165 min  
Supply voltage: 110-230 Vac  
Enclosure protection: IP 30 rated  
Width x Height x Depth: 256 x 83 x 355 mm  
Weight: 2.9 kg.



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### cNODE® Mini Power Convertor Module

Unit for supplying cNODE® Mini transponder with high DC power when not using the internal battery  
Depth rating to 4000 m  
Input: 110 / 230 Vac  
Output: 15 Vdc / 300 W.



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**Note:** For operations outside the UK/EU due to export restrictions, an export licence may be required for the “cNODE Mini transponder”. In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## UNDERWATER POSITIONING – cNODE MIDI TRANSPONDERS

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### cNODE® Midi 34-180

#### Positioning Transponder\*

30 kHz band (MF) Transponder with release mechanism  
Fully compatible with Cymbal® and HPR 400 acoustic protocols  
SSBL / USBL and LBL positioning modes  
Beamwidth: +/- 90 degrees  
Max source level: 190 dB  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Supplied with a lithium battery pack (Type: D24-Li), Reg no. 322374))  
Length, diameter: 704.5, 166 mm  
Weight in air / water: 16.5 / 8.5 kg.



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### cNODE® Midi 34-180-Si

#### Positioning Transponder\* with Sensor Interface Module

30 kHz band (MF) Transponder  
Fully compatible with Cymbal® and HPR 400 acoustic protocols  
SSBL / USBL and LBL positioning modes  
Beamwidth: +/- 90 degrees  
Max source level: 190 dB  
Fitted with a modular end cap that can interface up to 3 (max) external sensors via RS-232/422/485 serial communications lines  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Supplied with a lithium battery pack (Type: D24-Li), Reg no. 322374))  
Length, diameter: 704.5, 166 mm  
Weight in air / water: 16.5 / 8.5 kg



**Note:** External power source required if transponder is to be interfaced to a Gyrocompass.

---

### cNODE® Midi 34-180-MTS/I

#### Positioning Transponder\*

30 kHz band (MF) Transponder and Modular Top Section (MTS) fitted with inclinometers  
Fully compatible with Cymbal® and HPR 400 acoustic protocols  
SSBL / USBL and LBL positioning modes  
Beamwidth: +/- 90 degrees  
Max source level: 190 dB  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Supplied with a lithium battery pack (Type: D24-Li), Reg no. 322374))  
Length, diameter: 888.5, 166 mm  
Weight in air / water: 21 / 10 kg  
Modular top section incorporates inclinometers  
Sensor specifications:

- Inclinometers: 0.05° (range +/- 90 degrees).



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### cNODE® Midi 34-180-MTS/PI

#### Positioning Transponder\*

30 kHz band (MF) Transponder and Modular Top Section (MTS)  
Fully compatible with Cymbal® and HPR 400 acoustic protocols  
SSBL / USBL and LBL positioning modes  
Beamwidth: +/- 90 degrees  
Max source level: 190 dB  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Supplied with a lithium battery pack (Type: D24-Li), Reg no. 322374))  
Length, diameter: 888.5, 166 mm  
Weight in air / water: 21 / 10 kg  
Modular top section incorporates a Paroscientific Digiquartz® pressure sensor and Inclinometers  
Sensor specifications:

- Depth: +/- 0.01% FS (FS = 6000 psi)
- Inclinometers: 0.05° (range +/- 90 degrees).



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**\*Note:** Supplied with a lithium battery pack which is subject to the IATA Dangerous Goods Regulations UN3090/UN3091 for transportation by air.

**Note:** For operations outside the UK/EU due to export restrictions, an export licence may be required for the “cNODE Midi transponder”. In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## UNDERWATER POSITIONING – cNODE MAXI TRANSPONDERS

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### cNODE® Maxi 34-180

#### Positioning Transponder\*

30 kHz band (MF) Transponder  
Fully compatible with Cymbal® and HPR 400 acoustic protocols  
SSBL / USBL and LBL positioning modes  
Beamwidth: +/- 90 degrees  
Max source level: 190 dB  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Supplied with a lithium battery pack (Type: D48-Li), Reg no. 319554))  
Length, diameter: 1014, 166 mm  
Weight in air / water: 28 / 12.6 kg.



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### cNODE® Maxi 34-180-Si

#### Positioning Transponder\* with Sensor Interface Module

30 kHz band (MF) Transponder  
Fully compatible with Cymbal® and HPR 400 acoustic protocols  
SSBL / USBL and LBL positioning modes  
Beamwidth: +/- 90 degrees  
Max source level: 190 dB  
Fitted with a modular end cap that can interface up to 3 (max) external sensors via RS-232/422/485 serial communications lines  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Supplied with a lithium battery pack (Type: D48-Li), Reg no. 319554))  
Length, diameter: 1034, 166 mm  
Weight in air / water: 28 / 12.6 kg.



**Note:** External power source required if transponder is to be interfaced to a Gyrocompass

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### cNODE® Maxi 34-180-MEC/Si 24 VDC

#### Positioning Transponder\* with Sensor Interface Endcap Module

30 kHz band (MF) Transponder  
Fully compatible with Cymbal® and HPR 400 acoustic protocols  
SSBL / USBL and LBL positioning modes  
Beamwidth: +/- 90 degrees  
Max source level: 190 dB  
Fitted with a serial interface modular end cap  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Supplied with a lithium battery pack (Type: D48-Li), Reg no. 319554))  
Length, diameter: 1165, 191 (approx.) mm  
Weight in air / water: 29 / 13 kg.



**Note:** The transponder endcap module can be preconfigured to accept a RS-232 serial input from external instruments like a Paroscientific Digiquartz® pressure sensor or Mesotech 1007/1107D altimeter, etc. The serial endcap module can supply an output voltage of 24 VDC to the external sensor.

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### cNODE® Maxi 34-180-R

#### Positioning Transponder\*

30 kHz band (MF) Transponder with release mechanism  
Fully compatible with Cymbal® and HPR 400 acoustic protocols  
SSBL / USBL and LBL positioning modes  
Beamwidth: +/- 90 degrees  
Max source level: 190 dB  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Supplied with a lithium battery pack (Type: D48-Li), Reg no. 319554))  
Length, diameter: 1219, 166 mm  
Weight in air / water: 30 / 14 kg.





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**cNODE® Maxi 34-180-MTS/I  
Positioning Transponder\***

30 kHz band (MF) Transponder and Modular Top Section (MTS) fitted with inclinometers

Fully compatible with Cymbal® and HPR 400 acoustic protocols

SSBL / USBL and LBL positioning modes

Beamwidth: +/- 90 degrees

Max source level: 190 dB

Polyurethane coated aluminium housing, depth rating to 4000 m

Supplied with a lithium battery pack (Type: D48-Li), Reg no. 319554))

Length, diameter: 1198, 166 mm

Weight in air / water: 32 / 15 kg

Modular top section incorporates inclinometers

Sensor specifications:

- Inclinometers: 0.05° (range +/- 90 degrees).



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**cNODE® Maxi 34-180-R-MTS/PI  
Positioning Transponder\***

30 kHz band (MF) Transponder with release mechanism and Modular Top Section (MTS)

Fully compatible with Cymbal® and HPR 400 acoustic protocols

SSBL / USBL and LBL positioning modes

Beamwidth: +/- 90 degrees

Max source level: 190 dB

Polyurethane coated aluminium housing, depth rating to 4000 m

Supplied with a lithium battery pack (Type: D48-Li), Reg no. 319554))

Length, diameter: 1403, 166 mm

Weight in air / water: 34 / 15 kg

Modular top section incorporates a Paroscientific Digiquartz® pressure sensor and Inclinometers

Sensor specifications:

- Depth: +/- 0.01% FS (FS = 6000 psi)
- Inclinometers: 0.05° (range +/- 90 degrees).



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**cNODE® Maxi 34-180-R-MTS/SvPI  
Positioning Transponder\***

30 kHz band (MF) Transponder with release mechanism and Modular Top Section (MTS)

Fully compatible with Cymbal® and HPR 400 acoustic protocols

SSBL / USBL and LBL positioning modes

Beamwidth: +/- 90 degrees

Max source level: 190 dB

Polyurethane coated aluminium housing, depth rating to 4000 m

Supplied with a lithium battery pack (Type: D48-Li), Reg no. 319554))

Length, diameter: 1403, 166 mm

Weight in air / water: 34.6 / 15 kg

Modular top section incorporates a Paroscientific Digiquartz® pressure sensor, Inclinometers and a Valeport sound velocity sensor

Sensor specifications:

- Sound Velocity: +/- 0.02 m/s (25 mm path length)
- Depth: +/- 0.01% FS (FS = 6000 psi / 4000 m).
- Inclinometers: 0.05° (range +/- 90 degrees).



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**cNODE® Maxi 34-180-MEC/SiPI**

**Positioning Transponder with instrumented modular end cap\***

30 kHz band (MF) Transponder

Fully compatible with Cymbal® and HPR 400 acoustic protocols

SSBL / USBL and LBL positioning modes

Beamwidth: +/- 90 degrees

Max source level: 190 dB

Polyurethane coated aluminium housing, depth rating to 4000 m

Supplied with a lithium battery pack (Type: D48-Li), Reg no. 319554))

Length, diameter: 1165 (approx.), 230 mm

Weight in air / water: / kg

Modular end cap incorporates an external serial sensor interface, Paroscientific Digiquartz® pressure sensor and Inclinometers

Sensor specifications:

- Depth: +/- 0.01% FS (FS = 2000 psi)
- Inclinometers: 0.05° (range +/- 30 degrees).



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**cNODE® Maxi 34-180-MEC/MGC****Positioning Transponder with instrumented modular end cap\***

30 kHz band (MF) Transponder  
Fully compatible with Cymbal® and HPR 400 acoustic protocols  
SSBL / USBL and LBL positioning modes  
Beamwidth: +/- 90 degrees  
Max source level: 190 dB  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Supplied with a lithium battery pack (Type: D48-Li), Reg no. 319554))  
Battery endurance with MGC: up to 72 hours  
Length, diameter: 1213, 221 mm  
Weight in air / water: 40.5 / 20.2 kg  
Modular end cap incorporates a Motion Gyro Compass (MGC) sensor  
Sensor specifications:

- Heading accuracy: 0.15° RMS (secant latitude)
- Dynamic accuracy roll & pitch: 0.01° RMS.

**Note:** Day rate cost when an external power supply is used to power the MGC module.



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**cNODE® Maxi 34-30V30H****Positioning Transponder\***

30 kHz band (MF) Transponder  
Fully compatible with Cymbal® and HPR 400 acoustic protocols  
SSBL / USBL and LBL positioning modes  
Dual transducer beam: 30° vertical and 30° horizontal  
Max vertical beam source level: 206 dB  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Supplied with a lithium battery pack (Type: D48-Li), Reg no. 319554))  
Length, diameter: 1199, 184 mm  
Weight in air / water: 28 / 12.6 kg.



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**cNODE® Maxi 34-30V30H-R****Positioning Transponder\***

30 kHz band (MF) Transponder with release mechanism  
Fully compatible with Cymbal® and HPR 400 acoustic protocols  
SSBL / USBL and LBL positioning modes  
Dual transducer beam: 30° vertical and 30° horizontal  
Max vertical beam source level: 206 dB  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Supplied with a lithium battery pack (Type: D48-Li), Reg no. 319554))  
Length, diameter: 1366, 184 mm  
Weight in air / water: 30 / 14 kg.



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**cNODE® Maxi 36-30V30H-R-St****Positioning Transponder\***

30 kHz band (MF) Transponder with release mechanism  
Fully compatible with Cymbal® and HPR 400 acoustic protocols  
SSBL / USBL and LBL positioning modes  
Dual transducer beam: 30° vertical and 30° horizontal  
Max vertical beam source level: 206 dB  
Polyurethane coated stainless steel housing, depth rating to 6000 m  
Supplied with a lithium battery pack (Type: D48-Li), Reg no. 319554))  
Length, diameter: , mm  
Weight in air / water: / kg.



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**cNODE® Maxi 34-30V****Positioning Transponder\***

30 kHz band (MF) Transponder  
Fully compatible with Cymbal® and HPR 400 acoustic protocols  
SSBL / USBL positioning modes  
Beamwidth: +/- 15 degrees  
Max vertical beam source level: 206 dB  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Supplied with a lithium battery pack (Type: D48-Li), Reg no. 319554))  
Length, diameter: 1034, 166 mm  
Weight in air / water: 28 / 12.6 kg.



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**cNODE® Maxi 34-30V-R****Positioning Transponder\***

30 kHz band (MF) Transponder with release mechanism

Fully compatible with Cymbal® and HPR 400 acoustic protocols

SSBL / USBL positioning modes

Beamwidth: +/- 15 degrees

Max vertical beam source level: 206 dB

Polyurethane coated aluminium housing, depth rating to 4000 m

Supplied with a lithium battery pack (Type: D48-Li, Reg no. 319554))

Length, diameter: 1239, 166 mm

Weight in air / water: 30 / 14 kg.



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**\*Note:** Supplied with a lithium battery pack which is subject to the IATA Dangerous Goods Regulations UN3090/UN3091 for transportation by air.

**Note:** For operations outside the UK/EU due to export restrictions, an export licence may be required for the “cNODE Maxi transponder”. In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## UNDERWATER POSITIONING – cNODE TRANSPONDER MODULES

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### **cNODE® Maxi/Midi 34 Transducer TD180** **Transducer for cNODE® Maxi 34 transponder**

Part No. 319750  
Beam width: 180°  
Receiver sensitivity: 100 dB  
Max source level: 190 dB  
Anodised aluminium, depth rated to 4000 m  
Length, diameter: 169.5, 166 mm.




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### **cNODE® Maxi/Midi 34 Transducer TD30V30H** **Transducer for cNODE® Maxi 34 transponder**

Part No. 313455  
Beam width: 30° vertical / 30° horizontal  
Receiver sensitivity: 85 dB  
Max source level: 206 dB / 190 dB  
Anodised aluminium, depth rated to 4000 m  
Length, diameter: 316, 184 mm.




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### **cNODE® Maxi/Midi 34 Transducer TD30V** **Transducer for cNODE® Maxi 34 transponder**

Part No. 320662  
Beam width: 30° vertical  
Receiver sensitivity: 85 dB  
Max source level: 206 dB  
Anodised aluminium, depth rated to 4000 m




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### **cNODE® Maxi/Midi 34 Top End Cap** **Top end cap for remote transducer**

Part No. 320949  
Polyurethane coated anodised aluminium unit  
Depth rated to 4000 m  
Bulkhead connector type: Subconn  
Length, diameter: , mm.




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### **cNODE® Maxi/Midi 34 Serial Sensor Interface** **Bottom end cap Si for cNODE® Maxi 34 transponder**

Part No. 347652  
Interface up to a maximum of three (3) external sensors  
Serial input types: RS-232 or RS-485/422  
Polyurethane coated anodised aluminium unit  
Depth rated to 4000 m  
Bulkhead connector type: Subconn MCBH16M  
Length, diameter: 72.8, 144 mm.




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### **cNODE® Maxi/Midi 34 Modular Top Section** **Modular Top Section (MTS/I)**

Part No. 407000  
Module incorporates inclinometers  
Specifications:  
• Inclinometer: 0.05°  
Polyurethane coated anodised aluminium unit  
Depth rated to 4000 m  
Length, diameter: 184, 144 mm.




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### **cNODE® Maxi/Midi 34 Modular Top Section** **Modular Top Section (MTS/Sv)**

Part No. TBC  
Module incorporates a Valeport miniSVS sound velocity sensor  
Specifications:  
• Sound velocity: +/- 0.02 m/s  
Polyurethane coated anodised aluminium unit  
Depth rated to 4000 m  
Length, diameter: 184, 144 mm.



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**cNODE® Maxi/Midi 34 Modular Top Section**  
**Modular Top Section (MTS/PI)**

Part No. 449270

Module incorporates a Paroscientific Digiquartz® pressure sensor and inclinometers

Specifications:

- Depth: +/- 0.01% FS (FS = 6000 psi)
- Inclinometer: 0.05°

Polyurethane coated anodised aluminium unit

Depth rated to 4000 m

Length, diameter: 184, 144 mm.



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**cNODE® Maxi/Midi 34 Modular Top Section**  
**Modular Top Section (MTS/SvPI)**

Part No. 388700

Module incorporates a Paroscientific Digiquartz® pressure sensor, inclinometers and sound velocity sensor

Specifications:

- Depth: +/- 0.01% FS (FS = 6000 psi)
- Inclinometer: 0.05°
- Sound velocity: +/- 0.02 m/s.

Polyurethane coated anodised aluminium unit

Depth rated to 4000 m

Length, diameter: 184, 144 mm.



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**cNODE® Maxi/Midi 34 Modular End Cap**  
**Modular End Cap (MEC/SiPI)**

Part No. 395555

Module incorporates an external serial sensor interface, Paroscientific Digiquartz® pressure sensor and inclinometers

Specifications:

- Depth: +/- 0.01% FS (FS = 2000 psi)
- Inclinometer: 0.05°

Polyurethane coated anodised aluminium unit

Depth rated to 4000 m

Length, diameter: 190.5, 191.2 mm.



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**cNODE® Maxi/Midi 34 Modular End Cap**  
**Modular End Cap (Seatex MGC® R3)**

Part No. 397960

Module incorporates a Motion Gyro Compass sensor

Specifications:

- Heading accuracy (unaided): 0.08° RMS (secant latitude)
- Dynamic accuracy roll & pitch: 0.01° RMS

Polyurethane coated anodised aluminium unit

Aluminium housing depth rated to 4000 m

Power requirements: 10-36 Vdc, 20 W (max)

Length (with blanking cap), diameter: 337, 281 mm

Weight in air / water (estimated): 18.2 / 7.5 kg.



**Note:** Non ITAR product.

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**Note:** For operations outside the UK/EU due to export restrictions, an export licence may be required for cNODE® products. In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## UNDERWATER POSITIONING – TRANSPONDER FLOATATION COLLARS

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### **cNODE® Maxi Floatation Collar**

#### **Flotation Collar for cNODE® Maxi Transponder**

Part No. 320772

Depth rating: 2000 m

Compatible with aluminium cNODE® Maxi 34 transponders

Buoyancy: 30 kg

Width, height, depth: 358, 949, 300 mm

Weight air/water: 45 kg / kg.



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### **cNODE® Maxi Floatation Collar**

#### **Flotation Collar for cNODE® Maxi Transponder**

Part No. 319301

Depth rating: 4000 m

Compatible with aluminium cNODE® Maxi 34 transponders

Buoyancy: 30 kg

Width, height, depth: 455, 948, 350 mm

Weight air/water: 70 kg / -30 kg.



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### **cNODE® Maxi Floatation Collar**

#### **Deepwater Flotation Collar for cNODE® Maxi Transponder**

Part No. 331151

Depth rating: 6000 m

Compatible with stainless steel cNODE® Maxi 36 transponders

Buoyancy: kg

Width, height, depth: , , mm

Weight air/water: kg / kg.



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### **cNODE® Maxi Floatation Collar**

#### **Flotation Collar for cNODE® Maxi Transponder**

Part No. 331150

Depth rating: 7000 m

Compatible with stainless steel cNODE® Maxi X7 transponders

Buoyancy: kg

Width, height, depth: 572, 945, 488 mm

Weight air/water: 98 kg / kg.



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### **cNODE® MiniS Floatation Collar**

#### **Flotation Collar for cNODE® MiniS transponder**

Part No. 442750

Depth rating: 4000 m

Buoyancy (collar only): 6.3 kg

Height with cage, diameter; weight in air: 524, 350 mm; 16.66 kg.

**Note:** transponder not included.



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### **cNODE® Mini Floatation Collar**

#### **Flotation Collar for cNODE® Mini transponder**

Part No. 366186

Depth rating: 4000 m

Buoyancy: 3.5 kg

Height with cage, diameter, weight: 597, 290 mm, 9 kg.

**Note:** transponder not included.



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### **MST Floatation Collar**

#### **Flotation Collar for Mini-transponder**

Part No. 119-099206

Depth rating: 2000 m

Buoyancy MST 319, MST 324: 4.5 kg, 4 kg

Height with cage, diameter, weight: 549, 275 mm, 9 kg.



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**Note:** For operations outside the UK/EU due to export restrictions, an export licence may be required for the “transponder floatation collar”. In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## UNDERWATER MAPPING – MULTIBEAM ECHO SOUNDER SYSTEMS

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### GeoSwath 4R Bathymetric Sonar System

#### Portable Wide Swath Bathymetry and Side Scan Sonar

IHO SP-44, special order

Frequency: 500 kHz

Range: 1 to 50 m

Maximum swath width: 190 m

Depth resolution: 1.5 mm

Seafloor coverage: up to 12 times water depth

Splash proof deck unit, IP66 rated

Power supply requirements: 24 Vdc, 40 W

Laptop PC running GS4 data acquisition and processing software

Supplied with assembly for mounting transducers and optional sensors

Transducer head dimensions: 330 x 109 x 75 mm

Supplied with 10 m or 20 m length transducer and sensor cables

Optional system items:

- Valeport miniSVS sound velocity sensor
- Seatex Seapath 130 or MRU-3/H/5 (fitted in subsea housing).



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### Mesotech M3 Sonar - Bathym System

#### Shallow Water High Resolution Bathymetric Sonar

Sonar head part no. 922-20220000

Frequency: 500 kHz

Range: 0.2 m to 50 m

Maximum 120° view angle

Range resolution: 1 cm

Vertical beamwidth: 3°

Number of beams: 256

Update rate: up to 40 Hz

Supplied with M3 Sonar processor computer and interface unit

Supplied with 6 m or 15 m sonar head cable assembly

Input voltage/power: 12 to 36 VDC / 22 W (typical)

Anodised aluminium sonar head, depth rated to 500 m

Height, width, weight air/water: 145, 213 mm, 4.6/1.7 kg

Optional auxiliary sensors and hardware/software:

- AML Micro X or Valeport miniSVS sound velocity sensor
- Seatex Seapath 130 system
- Over-the-side mounting pole assembly
- QINSy Survey Lite data acquisition software.



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### Mesotech M3 Sonar - Single Head ROV System

#### High Resolution Imaging and Profiling Sonar

Sonar head part no. 922-20060000

Frequency: 500 kHz

Range: 0.2 m to 50 m

Field of view: 120° / (EIQ 140°)

Beamwidth (Imaging): 1.6° x (3° / 7° / 15° / 30°)

Beamwidth (EIQ): 0.95° x 30°

Beamwidth (Profiling / Bathymetry): 1.6° x 3°

Telemetry: Ethernet (10/100/1000 Mbps)

Input voltage/power: 12 to 36 VDC / 22 W (typical)

Titanium sonar head, depth rated to 4000 m

Height, width, weight air/water: 159, 217 mm, 8.5/5.3 kg

Supplied with items:

- M3 sonar head, 4000m depth rated
- M3 Sonar Head Accessory Kit
- M3 Sonar cable whip, 4.5m
- M3 Sonar cable whip, 6.1m, Sync/1PPS
- M3 Sonar mounting bracket
- M3 Sonar software.



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**Mesotech M3 Sonar - Dual Head ROV System**  
**High Resolution Imaging and Profiling Sonar**

Sonar head part no. 922-20060000

Frequency: 500 kHz

Range: 0.2 m to 50 m

Field of view: 120° / (EIQ 140°)

Beamwidth (Imaging): 1.6° x (3° / 7° / 15° / 30°)

Beamwidth (EIQ): 0.95° x 30°

Beamwidth (Profiling / Bathymetry): 1.6° x 3°

Telemetry: Ethernet (10/100/1000 Mbps)

Input voltage/power: 12 to 36 VDC / 22 W (typical)

Titanium sonar head, depth rated to 4000 m

Height, width, weight air/water: 159, 217 mm, 8.5/5.3 kg

Package supplied with items:

- 2 x M3 sonar head, 4000m depth rated
- M3 Sonar Head Accessory Kit
- 2 x M3 Sonar cable whip, 4.5m
- M3 Sonar dual head sync cable, 6.1m
- M3 Sonar mounting bracket
- M3 Sonar software.



---

**EM 2040P MKII Multibeam Echo Sounder System**  
**Portable Transducer System with Single Swath**

Frequency range: 200 to 700 kHz

Swath coverage sector: up to 170°

Beam width: 1° x 1° @ 400 kHz

Max ping rate: 50 Hz

Number of beams per ping: 512

Range: 0.5 to 270 m (400 kHz, FM mode, cold ocean water)

Depth accuracy: 2 cm

Beam pattern: Equidistant, Equiangular & High Density

Roll, Pitch & Yaw stabilised beams

HWS or laptop computer c/w Seafloor Information System software

Sonar head depth rating: 30 m

Sonar head dimensions (L x W x H): 560 x 300 x 166 mm

Sonar Head weight air/water: 19.5/1.7 kg

Supplied with a 15 m, 30 m or 50 m length transducer cable

Optional system items:

- Transducer mounting bracket
- Universal Sonar Mount (USM) expeditionary pole
- Seatex Seapath 130
- AML Sound velocity sensor.



---

**EM 2040P MKII Multibeam Echo Sounder System**  
**Portable Transducer System with Dual Swath**

Frequency range: 200 to 700 kHz

Swath coverage sector: up to 170°

Beam width: 1° x 1° @ 400 kHz

Max ping rate: 50 Hz

Number of beams per ping: 1024

Range: 0.5 to 270 m (400 kHz, FM mode, cold ocean water)

Depth accuracy: 2 cm

Beam pattern: Equidistant, Equiangular & High Density

Roll, Pitch & Yaw stabilised beams

HWS or laptop computer c/w Seafloor Information System software

Sonar head depth rating: 30 m

Sonar head dimensions (L x W x H): 560 x 300 x 166 mm

Sonar Head weight air/water: 19.5/1.7 kg

Supplied with a 15 m, 30 m or 50 m length transducer cable

Optional system items:

- Transducer mounting bracket.
- Universal Sonar Mount (USM) expeditionary pole
- Seatex Seapath 130
- AML Sound velocity sensor.



---

**EM 2040P Multibeam Echo Sounder System  
Portable Transducer System with Single Swath**

Frequency range: 200 to 400 kHz  
Swath coverage sector: up to 140°  
Beam width: 1° x 1° @ 400 kHz  
Max ping rate: 50 Hz  
Number of soundings per ping: 400  
Range: 0.5 to 450 m (300 kHz, FM mode, cold ocean water)  
Depth accuracy: 2 cm  
Beam pattern: Equidistant, Equiangular & High Density  
Roll, Pitch & Yaw stabilised beams  
Supplied with a 15 m, 30 m or 50 m length transducer cable  
HWS computer c/w Seafloor Information System (SIS) software  
Sonar head depth rating: 30 m  
Sonar head dimensions (L x W x H): 560 x 300 x 166 mm  
Sonar Head weight air/water: 19.5/1.7 kg  
Optional system item:

- Transducer mounting bracket.



---

**EM 2040P Multibeam Echo Sounder System  
Portable Transducer System with Dual Swath**

Frequency range: 200 to 400 kHz  
Swath coverage sector: up to 140°  
Beam width: 1° x 1° @ 400 kHz  
Max ping rate: 50 Hz  
Number of soundings per ping: 800  
Range: 0.5 to 450 m (300 kHz, FM mode, cold ocean water)  
Depth accuracy: 2 cm  
Beam pattern: Equidistant, Equiangular & High Density  
Roll, Pitch & Yaw stabilised beams  
HWS computer c/w Seafloor Information System (SIS) software  
Sonar head depth rating: 30 m  
Sonar head dimensions (L x W x H): 560 x 300 x 166 mm  
Sonar Head weight air/water: 19.5/1.7 kg  
Supplied with a 15 m, 30 m or 50 m length transducer cable  
Optional system item:

- Transducer mounting bracket.



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**EM 2040C Multibeam Echo Sounder System  
Single Compact Transducer System with Single Swath**

Frequency range: 200 to 400 kHz in steps of 10 kHz  
Swath coverage sector: up to 130°  
Beam width: 1° x 1° (400 kHz)  
Max ping rate: 50 Hz  
Number of soundings per ping: 400 (single swath) / 800 (dual swath)  
Range: 0.5 to 450 m (300 kHz, FM mode, cold ocean)  
Depth accuracy: 2 cm  
Beam pattern: Equidistant, Equiangular & High Density  
Roll, Pitch & Yaw stabilised beams  
HWS computer c/w Seafloor Information System (SIS) software  
Sonar Head height, diameter, weight air/water: 119, 332 mm, 21/12.6kg  
Supplied with a 15 m, 30 m or 50 m length transducer cable  
Optional system items:

- Dual Swath mode
- Transducer mounting bracket, Single RX.



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**EM 2040C Multibeam Echo Sounder System  
Dual Compact Transducer System with Single Swath**

Frequency range: 200 to 400 kHz in steps of 10 kHz  
Swath coverage sector: up to 200°  
Beam width: 1° x 1° (400 kHz)  
Max ping rate: 50 Hz  
Number of soundings per ping: 800 (single swath) / 1600 (dual swath)  
Range: 0.5 to 450 m (300 kHz, FM mode, cold ocean)  
Depth accuracy: 2 cm  
Beam pattern: Equidistant, Equiangular & High Density  
Roll, Pitch & Yaw stabilised beams  
HWS computer c/w Seafloor Information System (SIS) software  
Sonar Head height, diameter, weight air/water: 119, 332 mm, 21/12.6kg  
Supplied with a 15 m, 30 m or 50 m length transducer cables  
Optional system items:

- Dual Swath mode
- Transducer mounting bracket, Dual RX.



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**EM 2040 (0.7° x 0.7°) Multibeam Echo Sounder System  
Single RX Transducer System with Single Swath**

Frequency range: 200 to 400 kHz  
Swath coverage sector: up to 140°  
Max ping rate: 50 Hz  
Range: 0.5 to 470 m (300 kHz, cold ocean)  
Depth accuracy: 2 cm  
Beam pattern: Equidistant, Equiangular & High Density  
Roll, Pitch & Yaw stabilised beams  
Transducers depth rated to 6000 m  
Supplied with a 15 m, 30 m or 50 m length transducer cables  
HWS computer c/w Seafloor Information System (SIS) software  
TX transducer length, width, height (mm), weight air/water (kg):  
407 x 142 x 150 mm, 24/16 kg  
RX transducer length, width, height (mm), weight air/water (kg):  
407 x 142 x 136 mm, 23/16 kg  
Optional system items:

- Dual Swath mode
- Transducer mounting POD.



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**EM 2040 (0.7° x 0.7°) Multibeam Echo Sounder System  
Dual RX Transducer System with Single Swath**

Supplied with two (2) RX transducers and processing unit(s)  
Frequency range: 200 to 400 kHz  
Swath coverage sector: up to 200°  
Max ping rate: 50 Hz  
Range: 0.5 to 470 m (300 kHz, cold ocean)  
Depth accuracy: 2 cm  
Beam pattern: Equidistant, Equiangular & High Density  
Roll, Pitch & Yaw stabilised beams  
Transducers depth rated to 6000 m  
Supplied with 15 m, 30 m or 50 m length transducer cables  
HWS computer c/w Seafloor Information System (SIS) software  
TX transducer length, width, height (mm), weight air/water (kg):  
407 x 142 x 150 mm, 24/16 kg  
RX transducer length, width, height (mm), weight air/water (kg):  
407 x 142 x 136 mm, 23/16 kg  
Optional system items:

- Dual Swath mode
- Transducer mounting bracket, Dual RX.



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**EM 2040 (0.4° x 0.7°) Multibeam Echo Sounder System  
Single RX Transducer System with Single Swath**

Frequency range: 200 to 400 kHz  
Swath coverage sector: up to 140°  
Max ping rate: 50 Hz  
Range: 0.5 to 480 m (300 kHz, cold ocean)  
Depth accuracy: 2 cm  
Beam pattern: Equidistant, Equiangular & High Density  
Roll, Pitch & Yaw stabilised beams  
Transducers depth rated to 6000 m  
Supplied with 15 m, 30 m or 50 m length transducer cables  
HWS computer c/w Seafloor Information System (SIS) software  
TX transducer length, width, height (mm), weight air/water (kg):  
727 x 142 x 150 mm, 45/30 kg  
RX transducer length, width, height (mm), weight air/water (kg):  
407 x 142 x 136 mm, 23/16 kg  
Optional system item:

- Dual Swath mode
- Transducer mounting POD.

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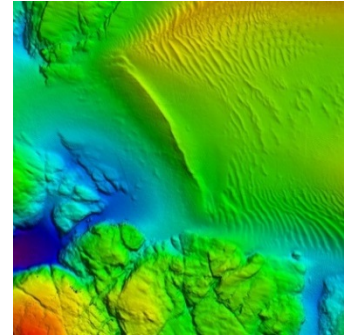


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**EM 2040 (0.4° x 0.7°) Multibeam Echo Sounder System  
Dual RX Transducer System with Single Swath**

Supplied with two (2) RX transducers and processing unit(s)  
Frequency range: 200 to 400 kHz  
Swath coverage sector: up to 200°  
Max ping rate: 50 Hz  
Range: 0.5 to 480 m (300 kHz, cold ocean)  
Depth accuracy: 2 cm  
Beam pattern: Equidistant, Equiangular & High Density  
Roll, Pitch & Yaw stabilised beams  
Transducers depth rated to 6000 m  
Supplied with 15 m, 30 m or 50 m length transducer cables  
HWS computer c/w Seafloor Information System (SIS) software  
TX transducer length, width, height (mm), weight air/water (kg):  
727 x 142 x 150 mm, 45/30 kg  
RX transducer length, width, height (mm), weight air/water (kg):  
407 x 142 x 136 mm, 23/16 kg  
Optional system item:

- Dual Swath mode
- Transducer mounting bracket.



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**EM 710 MKII (2° x 2°) Multibeam Echo Sounder System  
40-100kHz Multibeam Echo Sounder**

128 beams, Maximum angular coverage: 140°  
Range: 3 to 2000 m  
Depth resolution: 1 cm  
Beam pattern: Equidistant, Equiangular & High Density  
Roll, Pitch & Yaw stabilised  
25 m length transducer cables  
HWS computer c/w Seafloor Information System (SIS) software  
Supplied with a transducer array mounting pod  
Transducer length, width, height (mm) & weight (kg):  
490 x 224 x 118 mm, 18 kg  
Transceiver Unit, width x height x depth (mm) & weight (kg):  
540 x 573 x 750 mm, 83 kg  
Optional auxiliary sensors:

- Valeport miniSVS sound velocity sensor
- Seatex Seapath 330/330+ system.



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**Note:** For operations outside the UK/EU due to export restrictions, an export licence may be required for the “EM 2040 and EM 710 Multibeam Echo Sounder Systems”. In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## UNDERWATER MAPPING – MBES SYSTEM PARTS

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### Mesotech M3 Sonar Head

#### High Resolution Imaging and Profiling Sonar

Part No. 922-20060000

Frequency: 500 kHz

Titanium sonar head, depth rated to 4000 m

Height, width, weight air/water: 159, 217 mm, 8.5/5.3 kg



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### EM 2040 Compact Sonar Head

Frequency: 200 to 400 kHz

Maximum Angular Coverage: 130°

Power: 24 Vdc, 1 A

Titanium Housing, depth rated to 50 m or 1500 m

Height, diameter, weight air/water (50 m): 119, 332 mm, 23/12.6 kg

Optional item: 15 m, 30 m or 50 m sonar head cable.



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### EM 2040 Portable Sonar Head

Frequency: 200 to 400 kHz

Maximum Angular Coverage: 140°

Anodised aluminium housing depth rated to 30 m

Dimensions (L x W x H): 560 x 300 x 166 mm

Weight air/water: 19.5/1.7 kg

Optional item: 15 m, 30 m or 50 m sonar head cable.



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### EM 2040-0.7° Receive Transducer

#### Single RX Transducer

Frequency range: 200 to 400 kHz

Swath coverage sector: up to 140°

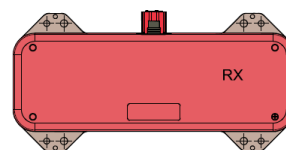
Transducer depth rated to 6000 m

RX transducer length, width, height (mm), weight air/water (kg):

407 x 142 x 136 mm, 23/16 kg

Optional items:

- Transducer RX-TX interlink cable.
- 15 m, 30 m or 50 m length RX transducer cable.



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### EM 2040-0.7° Transmit Transducer

#### Single TX Transducer

Frequency range: 200 to 400 kHz

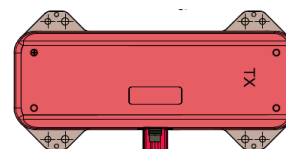
Transducer depth rated to 6000 m

TX transducer length, width, height (mm), weight air/water (kg):

407 x 142 x 150 mm, 24/16 kg

Optional items:

- Transducer RX-TX interlink cable.
- 15 m, 30 m or 50 m length TX transducer cable.



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### EM 2040-0.4° Transmit Transducer

#### Single TX Transducer

Frequency range: 200 to 400 kHz

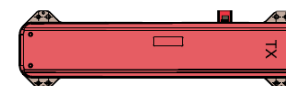
Transducer depth rated to 6000 m

TX transducer length, width, height (mm), weight air/water (kg):

727 x 142 x 150 mm, 45/30 kg

Optional items:

- Transducer RX-TX interlink cable.
- 15 m, 30 m or 50 m length TX transducer cable.



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### EM 2040 Single Processing Unit

19" rack mounted, 2U high

Dimensions (width x height x depth): 482.5 x 88.6 x 424 mm

Weight: 10.5 kg

Power: 115 Vac (60Hz) or 230 Vac (50Hz), <280 W.



---

**EM 2040 Dual Processing Unit**

19" rack mounted, 2U high

Dimensions (width x height x depth): 482.5 x 88.6 x 424 mm

Weight: 10.5 kg

Power: 115 Vac (60Hz) or 230 Vac (50Hz), <280 W.



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**EM 2040 Compact/Portable Sonar Head Cable**

Available in 15 m, 30 m, and 50 m cable lengths.



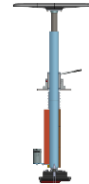
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**EM 2040P Universal Sonar Mount (USM) Expeditionary Pole**

Over the side pole vessel mount package

Supports fixture of EM 2040P transducer, AML sound velocity sensor,

Seapath 130 sensor unit, and Subsea Motion Reference Unit.



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**M3 Sonar Mounting Kit**

Part No. 803-0162000

Over the side pole mount assembly

Supports fixture of M3 sonar head, Sound velocity sensor, Seapath 130 sensor unit, and Subsea Motion Reference Unit.



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**Note:** For operations outside the UK/EU due to export restrictions, an export licence may be required for the "EM 2040 transducer and processing unit". In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## UNDERWATER MAPPING – SINGLE BEAM ECHO SOUNDERS

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### **EA 400SP Hydrographic Echo Sounder Portable Dual Frequency Echo Sounder**

Frequency: 38 kHz and 200 kHz  
Variable power output up to 1 kW  
Max depth range at 38 kHz/1 kW: 2100 m  
Transducer type: 38/200D Combi (13° x 21°/7° x 7°)  
Supplied as standard with 15 m transducer cable  
Ruggedised case with operator laptop computer  
Power requirements: 95-265 Vac, 11-15 Vdc, 30-50 W  
Width, height, depth, weight: 488, 220, 390 mm, 18 kg

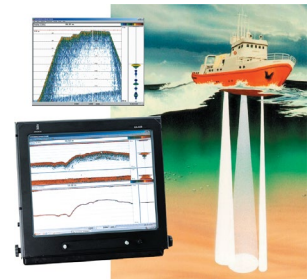


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### **EA 600 Hydrographic Single Beam Echo Sounder 15 kHz Precision Echo Sounder**

Frequency: 15 kHz  
Circular beam width: 17°  
Variable power output up to 2 kW  
Max depth range at 15 kHz /2 kW: 7000 m  
Transducer type: 15-17  
Supplied as standard with 15 m transducer cable  
Supplied with operator laptop computer  
Power requirements: 95-265 Vac, 11-15 Vdc, 30-50 W  
Width, height, depth, weight - 488, 220, 390 mm, 18 kg  
Optional system item:

- Seatex MRU-5



## UNDERWATER MAPPING – SUB BOTTOM PROFILERS

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### **TOPAS PS120 Sub-Bottom Profiler**

#### **Portable Parametric Sub-Bottom Profiler**

Primary frequency: 70 kHz - 100 kHz

Secondary frequency: 2 kHz - 30 kHz

Pulse lengths: 0.04 – 30 ms

Output power: >8 kW

Beamwidth (primary): ~3.5°

Beamwidth (secondary): 4° x 6°

Source level (12 kHz): >202 dB re  $\mu\text{Pa}$  @ 1m

Dynamic range: <110 dB

Range resolution: <0.05 m

Penetration capability: >50 m

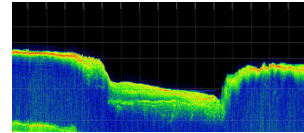
Depth range: 2 m - >400 m

Supplied with 15 m length transducer cable

Transducer dimensions, weight: 324 x 422 x 68 mm, 30 kg

Transceiver dimensions, weight: 520 x 700 x 400 mm, 45 kg.

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## UNDERWATER MAPPING – SIDE SCAN SONAR SYSTEMS

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### **PulSAR Side Scan Sonar System**

#### **High Resolution Side Scan Sonar**

Frequency: 600 kHz - 1000 kHz

Wide bandwidth FM and CW pulses

Max range (m per side): 600 kHz - 100 m CW or 150 m FM

Max resolution (across track): 10 mm

Tow speed: 1 to 12 knots

IP-66 rated Control unit containing acquisition/processing software

Integrated GPS module (SBAS corrections) in Control Unit

Tow fish: Stainless body steel with shear release carry handle/tow point, plastic nose cone

Depth rating: 1000 m

Dimensions: (L)110 cm x (D)9 cm, tail fins protrude by 7.5 cm

Weight: 16.5 kg

Power requirements: 10-30 Vdc or 110/230 Vac (50 W max)

Supplied with a ruggedized laptop computer

Supplied with 30 m soft tow cable

Optional system item(s):

- 300 m soft tow cable on hand reel.



### **PulSAR Side Scan Sonar Cable**

300 m length soft tow cable on hand reel.





## UNDERWATER MAPPING – MULTIBEAM SONARS

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### Flexview Sonar

#### Small Observation Class ROV Multibeam Sonar

Part No. 922-20200000-7804

Operating frequency: 950 kHz -1400 kHz

Field of view: Up to 140° (Imaging)

Range: 0.2 m to 100 m

Range resolution: 1 cm

Power (sonar head): 12-36 VDC, 22 W (avg.) <60 W (peak)

Telemetry: Ethernet (10/100 Mbps) / VDSL

Connector type: SubConn MCBHRA8MSS

Depth rating: 300 m

Material housing: Hard anodised aluminium

Dimensions: (W)169 mm x (H)86 mm x (D)249 mm

Weight air/water: 3.75 kg / 1.38 kg

Package includes:

- Accessory kit
- Cable whip, 4.5 m
- Datasheet and QuickStart guide
- Sonar software
- Equipment case.



## UNDERWATER MAPPING – SCANNING SONARS

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### MS1071 High Resolution Sonar Head

#### Geared Fan/Cone Transducer Head

Part No. 974-23050000

MS1000 software switchable between imaging and profiling modes.

Specifications:

- Operating Frequency: 675 kHz
- Beamwidth: 0.9°x30° (Fan), 1.7° (Cone)
- Range: 0.5 - 100 m (typical), 150 m (obtainable)
- Range/Sampling Resolution:  $\geq 19$  mm /  $\geq 2.5$  mm
- Mechanical Step Size:  $\geq 0.225^\circ$
- Power Input: 22-60 VDC, 33 W
- Telemetry: RS-232/RS-485
- Connector Type: Seacon RMG-4-BCL
- Depth rating: 3000 m
- Material Housing: Anodised Aluminium
- Dimensions Housing/Transducer: (L)569 mm x (D)89 mm / (W)140 mm
- Weight Air/Water: 6.1 kg / 2.9 kg

Optional sonar head items:

- MS1000 Sonar Processing Software with or without Laptop PC
- MS1000 Interface Unit
- Non-strain bearing umbilical cable
- Tripod for sonar head.



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### MS1171 High Resolution Multi-Frequency Sonar Head

#### Fan/Cone Transducer Head with Tilt Block & Internal Compass

Part No. 975-23800000

MS1000 software switchable between imaging and profiling modes.

Specifications:

- Operating Frequency: 600-1200 kHz
- Beamwidth: 0.6°x30° (Fan) @ 900 kHz, 1.0° (Cone) @ 1.5 MHz
- Range (max): up to 150+ m
- Power Input: 22-60 VDC, 28 W
- Telemetry: RS-232/RS-485
- Connector Type: Seacon RMG-4-BCL
- Depth Rating: 3000 m
- Material Housing: Anodised Aluminium
- Option: Tilt Block and Compass Module.
- Dimensions Housing/Transducer: (L)624 mm x (D)89 mm / (W)140 mm
- Weight Air/Water: 6.9 kg / 3.5 kg

Optional sonar head items:

- MS1000 Sonar Processing Software with or without Laptop PC
- MS1000 Interface Unit
- Non-strain bearing umbilical cable
- Tripod for sonar head.



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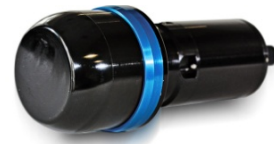
### Clariscan 1171 Multi-Frequency Imaging Sonar Head

#### Imaging Sonar Head with Composite Transducer & Acoustic Lens

Part No. 975-21190000

Specifications:

- Domed dual fan oil-filled transducer
- Operating Frequency: Tuneable in 5 kHz steps from 300 - 600 kHz and 605 - 1200 kHz in both CW and LFM modes
- Beamwidth: 2.7° x 26° @ 330 kHz, 1.4° x 36° @ 675 kHz, 0.9° x 22° @ 1000 kHz
- Range (max): 300 m @ 330 kHz, 100 m @ 675 kHz, 50 m @ 1000 kHz
- Power Input: 22 - 26 VDC @  $\leq 0.8$ A
- Telemetry: RS-232/RS-485
- Connector Type: Seacon RMG-4-BCL
- Depth Rating: 4000 m
- Material Housing: Anodised Aluminium
- Dimensions Housing/Transducer: (L)292 mm x (D)130 mm
- Weight Air/Water: 4.1 kg / 1.8 kg.



## UNDERWATER MAPPING – SCANNING SONAR PARTS

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### MS1000 Interface Unit

Part No. 901-60240001  
Telemetry: USB/RS-485  
Output Power: 56 VDC (long line)  
Enclosure Rating: IP66 (splashproof)



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### MS1000 Interface Unit

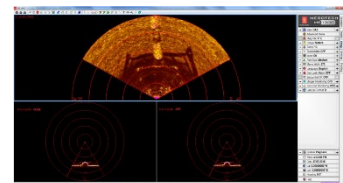
Part No. 901-60310001  
Telemetry: USB/RS-485  
Output Power: 28 VDC  
Enclosure Rating: IP66 (splashproof)



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### MS1000 Sonar Processing Software (standard version)

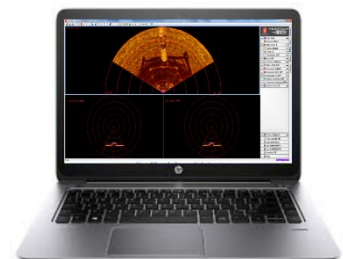
Acquisition software for Mesotech scanning sonars and altimeters  
Software and USB license dongle key for customer supplied PC.



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### MS1000 Sonar Processing Laptop PC

Laptop PC supplied with MS1000 Software (standard version) and  
USB license dongle key.



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### Sonar Cable on Reel with Slip Ring

Umbilical Cable Type/Function: Kevlar reinforced / Power & RS-485  
Umbilical Cable Length/Diameter: 150 m / 12 mm  
Deck Cable Length: 7.6 m  
Connector Type: RMG-4-FS



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### Tripod for High Resolution MS1071/1171 Sonar Head

Part No. 975-80110000



## UNDERWATER MAPPING – ALTIMETERS

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### MS1007D Altimeter

#### Compact Digital Altimeter

Part No. 974-70130000

Specifications:

- Operating Frequency: 200 kHz
- Beamwidth: 10° (nominal)
- Range (max): 300 m usable (807 mode)
- Output Resolution: Adjustable, > 2.4mm (807 mode)
- Operating Mode: Configurable 807, 809 or MS1000
- Serial Interface: RS-232/RS-485
- Aux. Analog Output: Configurable, 0-5V or 0-10V
- Power Input: 22-26 VDC, 1.8 A (start-up) and 250 mA (continuous)
- Connector Type: Seacon XSG-6-BCL
- Depth rating: 3000 m
- Material Housing: Anodised Aluminium
- Dimensions Housing/Transducer: (L)197 mm x (D)88 mm
- Weight Air/Water: 2.4 kg / 1.1 kg.



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### MS1107D Altimeter

#### Compact Digital Altimeter

Part No. 975-71500000

Specifications:

- Operating Frequency: 675 kHz
- Beamwidth: 2.7° (nominal)
- Range (max): up to 110 m
- Output Resolution: Between 2.4 mm and 25 mm (affected by mode and range settings)
- Operating Mode: Configurable 807, 808, 809 or MS1000
- Serial Interface: RS-232/RS-485
- Aux. Analog Output: Configurable, 0-5V or 0-10V
- Power Input: 22-26 VDC, 1.0 A (start-up) and 250 mA (continuous)
- Connector Type: Burton 5507-1508
- Depth rating: 6000 m
- Material Housing: Anodised Aluminium
- Dimensions Housing/Transducer: (L)212mm x (D)114 mm
- Weight Air/Water: 5.0 kg / 2.7 kg.



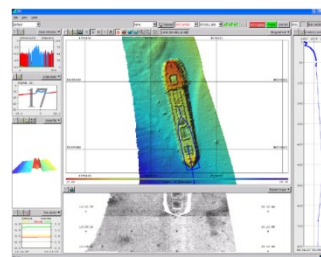
## UNDERWATER MAPPING – ACQUISITION & PROCESSING SOFTWARE

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### Seafloor Information System (SIS) Software

Acquisition software for EM multibeam systems

Supplied with a software license key and/or Hydrographic Workstation.

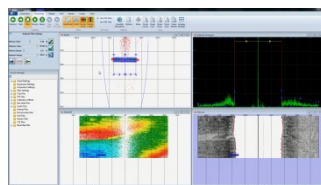


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### GeoSwath 4 (GS4) Software

Acquisition and post-processing software for GeoSwath shallow water wide swath bathymetry systems

**Note:** Software and USB license dongle key for customer supplied PC (offline processing).



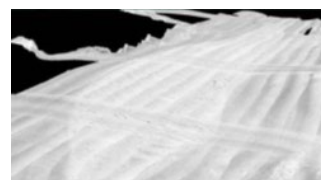
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### GeoTexture Software

Software and license dongle for analysis of GeoSwath side scan data

**Features:**

- Side Scan processing
- Side Scan mosaicing and normalisation
- Image classification
- Wide range of data input formats
- Close GeoSwath data support.



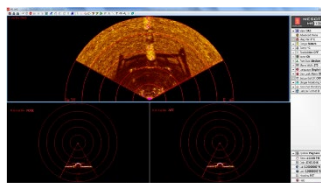
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### MS1000 Sonar Processing Software (standard version)

Acquisition software for Mesotech scanning sonars and altimeters

**Features:**

- Imaging, profiling and data storage to hard drive
- Data replay and image capture.
- Track Plotter module allows user to plot scanned area, geo-reference targets and create GeoTIFFs
- Simultaneous multi sonar head operation.



**Note:** Software and USB license dongle key for customer supplied PC.

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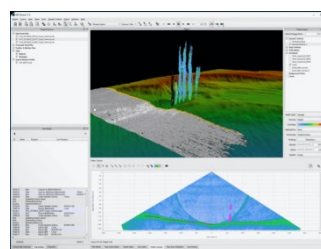
### QPS Multibeam Processing Bundle

Sonar data processing software package

**Features:**

- Qimera Pro
- Fledermaus Geocoder Toolbox add-on
- Fledermaus GIS add-on
- Fledermaus Midwater add-on
- Fledermaus Viz4D.

**Note:** Software and USB license dongle key for customer supplied PC.



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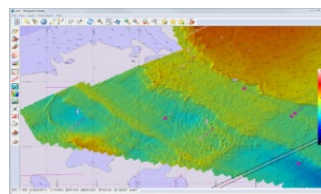
### QPS QINSy Survey Lite

Real-time data acquisition, full survey planning, data cleaning/validation and map plotting functionality

Supports single multibeam echo sounder system and includes

calibration/backscatter module

Supplied with a computer and/or software license key.



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**Note:** For operations outside the UK/EU due to export restrictions, an export licence may be required for the “SIS Software”. In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## OCEANOGRAPHIC – SOUND VELOCITY SENSORS & PROFILERS

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### Valeport 650 Sound Velocity Profiler

#### True Velocity Sound Measurement

Self-Recording & Direct Reading

Speed of Sound range: 1400 to 1600 m/s, acc.  $\pm 0.05$ , res. 0.001 m/s

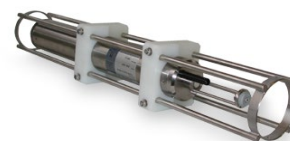
Temperature: -5 to +35°C, acc.  $\pm 0.01$ , res. 0.002°C

Pressure: 5000 dBar, acc.  $\pm 0.1\%$ FS, res. 0.005%FS dBar

Titanium Housing, depth rated to 5000 m

Supplied fitted with a deployment cage

Diameter, length; weight air/water: 88, 337 mm; 12.5/9 kg.



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### Valeport MIDAS Sound Velocity Profiler

#### Digital Time of Flight Sound Velocity Profiler

Self-Recording & Direct Reading

Speed of Sound range: 1375 to 1900 m/s, acc.  $\pm 0.02$ , res. 0.001 m/s

Temperature: -5 to +35°C, acc.  $\pm 0.01$ , res. 0.005°C

Pressure: 6000 dBar, acc.  $\pm 0.01\%$  FS, res. 0.001% range

Titanium Housing, depth rated to 6000 m

Supplied fitted with a deployment cage

Diameter, length; weight air/water (in cage): 88, 665 mm; 11.5/8.5 kg.



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### Valeport miniSVP Sound Velocity Profiler

#### True Velocity Sound Measurement

Self-Recording & Direct Reading

Part No.: 0660002

Speed of Sound range: 1375 to 1900 m/s, acc.  $\pm 0.02$ , res. 0.001 m/s

Pressure: 300 or 600 Bar, acc.  $\pm 0.05\%$  range, res. 0.001% range

External Power Supply: 9-28 Vdc, <250 mW

Titanium Housing, depth rated to 6000 m

Supplied fitted with a deployment cage

Diameter, length; weight air/water: 110, 450 mm; 1.6/- kg.



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### Valeport miniSVS Sound Velocity Sensor

#### True Velocity Sound Measurement

Small Direct Reading Sensor: SV only

Part No.: 0652006 (25 mm path length)

Speed of Sound range: 1400 to 1600 m/s, acc.  $\pm 0.10$ m/s, res. 0.001m/s

External Power Supply: 8-30 Vdc, 250 mW

Titanium Housing, depth rated to 6000 m

Supplied with a 20 m data / power cable

Diameter, length; weight air/water: 40, 217 mm; 0.53/- kg.



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### AML Minos X SVP/CTD Profiler

#### Real-time Vertical Profiler

Self-Recording & Direct Reading

Xchange™ field swappable sensors

Speed of Sound range: 1375 to 1625 m/s, acc.  $\pm 0.025$ , res. 0.001 m/s

Pressure: 6000 dBar acc.  $\pm 0.05\%$ FS, res. 0.01 dBar

Conductivity, Temperature: 0-90 mS/cm, -5-45 °C

Titanium Housing, depth rated to 6000 m

Supplied fitted with a deployment cage

Diameter, length; weight air/water: 76, 597 mm; 4.7/3.2 kg.



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### AML Micro X SVP Sensor

#### True Velocity Sound Measurement

Small Direct Real-time Reading Sensor: SV only

Xchange™ field swappable sensor

Speed of Sound range: 1375 to 1625 m/s, acc.  $\pm 0.025$ , res. 0.001 m/s

Pressure: 6000 dBar, acc.  $\pm 0.05\%$ FS, res. 0.01 dBar

Power Supply: 8-26 Vdc

Delrin or Titanium Housing: 500 m or 6000 m depth rating

Supplied with a 20 m or 50 m data / power cable

Diameter, length; weight air/water: 33 mm; 246 mm, 0.39/0.25 kg.





## OCEANOGRAPHIC – TIDE MONITORING

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### **Valeport TideMaster**

#### **Portable Water Level Recorder Set**

Vented strain gauge, with stainless steel mounting bracket

1 bar transducer c/w 20 m cable and connector

Accuracy:  $\pm 0.1\%$  Full Scale

GSM/GPRS transmitter in IP67 housing c/w integral antenna

**Note:** customer responsible to ensure the SIM card meets network coverage requirements.

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## DATA TELEMETRY – ACOUSTIC MODEM

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### **cNODE® MiniS Modem 34-180**

#### **Positioning and Transparent Modem Transponder**

Frequency: 21 - 30 kHz band (MF)  
Fully compatible with Cymbal® acoustic link protocol  
SSBL / USBL and LBL positioning modes  
Beamwidth:  $\pm 90$  degrees  
Source level (high): 182 dB  
Data Rate: up to 6 kB/s  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Rechargeable battery pack (Li-Ion)  
External power: 24 Vdc, 1A  
Length, diameter housing / transducer: 305.5 mm, 106 mm  
Weight in air / water: 4.0 / 2.1 kg.



**Note:** Operates in conjunction with compatible HiPAP and cPAP 30 systems enabled with APOS Cymbal and Transparent Modem functions.

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### **cNODE® MiniS Modem 34-40V**

#### **Positioning and Transparent Modem Transponder**

Frequency: 21 - 30 kHz band (MF)  
Fully compatible with Cymbal® acoustic link protocol  
SSBL / USBL and LBL positioning modes  
Beamwidth:  $\pm 20$  degrees  
Source level (high): 197 dB  
Data Rate: up to 6 kB/s  
Polyurethane coated aluminium housing, depth rating to 4000 m  
Rechargeable battery pack (Li-Ion)  
External power: 24 Vdc, 1A  
Length, diameter housing / transducer: 321 mm, 105 mm  
Weight in air / water: 4.6 / 2.1 kg



**Note:** Operates in conjunction with compatible HiPAP and cPAP 30 systems enabled with APOS Cymbal and Transparent Modem functions.

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### **cNODE® MiniS Modem Battery Charger**

Suitable for cNODE® MiniS Modem transponders  
Automatic fast / trickle charge modes  
Permit fast charge between 5° C and 40° C  
Maximum transponder battery charge time: 165 min  
Supply voltage: 110-230 Vac  
Enclosure protection: IP 30 rated  
Width x Height x Depth: 256 x 83 x 355 mm  
Weight: 2.9 kg.



**\*Note:** Supplied with a lithium battery pack which is subject to the IATA Dangerous Goods Regulations UN3090/UN3091 for transportation by air.

**Note:** For operations outside the UK/EU due to export restrictions, an export licence may be required for the “cNODE MiniS Modem transponder”. In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## DATA TELEMETRY – RADIO MODEM

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### Maritime Broadband Radio System

#### MBR 179 Single System with Power Supply Unit~

Operational range: 0 to 45 km (28 miles)  
User data: 0.7 to 16.5 Mbps  
Operational coverage area: 360° (omni-directional)  
Frequency band: 4.9 GHz to 5.9 GHz  
Channel bandwidth: 20 MHz  
Transmission power: up to 4 W  
Data Interface: 1 x Ethernet / LAN, RJ-45  
MBR Unit power consumption (max): 210 W  
MBR power supply unit: 110 to 240 V AC  
Operational temperature range: -40 °C to +55 °C  
MBR Unit enclosure protection: IP 66 rated  
MBR Unit dimensions (L x W x H): 500 x 500 x 318 mm  
MBR Unit weight: 16.5 kg.



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### Maritime Broadband Radio System

#### MBR 189 Single System with Power Supply Unit~

Operational range: 0 to 50 km (>30 miles)  
User data: 0.7 to 16.5 Mbps  
Operational coverage area: 100° (azimuth)  
Frequency band: 4.9 GHz to 5.9 GHz  
Channel bandwidth: 20 MHz  
Transmission power: up to 4 W  
Data Interface: 1 x Ethernet / LAN, RJ-45  
MBR Unit power consumption (max): 210 W  
MBR power supply unit: 110 to 240 V AC  
Operational temperature range: -40 °C to +55 °C  
MBR Unit enclosure protection: IP 66 rated  
MBR Unit dimensions (L x W x H): 500 x 500 x 318 mm  
MBR Unit weight: 16.5 kg.



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### Maritime Broadband Radio System

#### MBR 144 System for Fixed Installation~

Operational range: 0 to 20 km (>12 miles)  
User data: 0.7 to 16.5 Mbps  
Operational coverage area: 360° (omni-directional)  
Frequency band: 4.9 GHz to 5.9 GHz  
Channel bandwidth: 20 MHz  
Transmission power: up to 2 W  
Data Interface: 1 x Ethernet / LAN, RJ-45  
Supplied with 10 m cable  
MBR Unit power consumption (max): 25 W  
MBR power supply voltage: 24V DC  
Operational temperature range: -40 °C to +55 °C  
MBR Unit enclosure protection: IP 66 rated  
MBR Unit dimensions (L x W x H): 260 x 115 x 115 mm  
MBR Unit weight: 2.5 kg.



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**Note:** The operational range is dependent on antenna placement and height above sea level.

**~Note:** Radio frequency license for MBR system - the product contains a radio transmitting device and a national license for the use of 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).

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## VESSEL REFERENCE – RELATIVE POSITIONING SYSTEMS

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### **RADius 1000 Single Interrogator System**

#### **Relative Positioning System**

Operational range: up to 1100 metres (dependant on transponder type)

DP range: up to 550 m (dependant on transponder type)

Coverage sector: up to 90° (Horizontal)

Distance accuracy (within 200 m): < 0.5 m

Angle accuracy (within 200 m): 0.5°

Frequency band: 5.51 - 5.61 GHz

Interrogator opening angle:  $\pm 45^\circ$  (vertical/horizontal)

Interrogator enclosure protection: IP 66 rated

Interrogator height, width & depth, weight: 412 x 562 x 184 mm, 7 kg

19" rack mount cabinet (6U) c/w integrated keyboard/mouse

Width, height, depth (6 U cabinet): 553, 660, 600 mm

Power requirements: 110/220 Vac, 160 W

Standard LCD desktop monitor

Supplied with 60 m interrogator power & data cables

Supplied with a RADius 700 transponder for commissioning purposes.



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### **RADius 1000 Dual Interrogator System**

#### **Relative Positioning System**

Operational range: up to 1100 metres (dependant on transponder type)

DP range: up to 550 m (dependant on transponder type)

Coverage sector: up to 180° (Horizontal)

Distance accuracy (within 200 m): < 0.5 m

Angle accuracy (within 200 m): 0.5°

Frequency band: 5.51 - 5.61 GHz

Interrogator opening angle:  $\pm 45^\circ$  (vertical/horizontal)

Interrogator enclosure protection: IP 66 rated

Power requirements: 110-220 Vac, 160 W

Supplied with 60 m interrogator power & data cables

Supplied with a RADius 700 transponder for commissioning purposes

Interrogator height, width & depth, weight: 412 x 562 x 184 mm, 7 kg.



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### **RADius 1000 Triple Interrogator System**

#### **Relative Positioning System**

Operational range: up to 1100 metres (dependant on transponder type)

DP range: up to 550 m (dependant on transponder type)

Coverage sector: up to 270° (Horizontal)

Distance accuracy (within 200 m): < 0.5 m

Angle accuracy (within 200 m): 0.5°

Frequency band: 5.51 - 5.61 GHz

Interrogator opening angle:  $\pm 45^\circ$  (vertical/horizontal)

Interrogator enclosure protection: IP 66 rated

Power requirements: 110-220 Vac, 160 W

Supplied with 60 m interrogator power & data cables

Supplied with a RADius 700 transponder for commissioning purposes

Interrogator height, width & depth, weight: 412 x 562 x 184 mm, 7 kg.



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### **RADius 1000 Quad Interrogator System**

#### **Relative Positioning System**

Operational range: up to 1100 metres (dependant on transponder type)

DP range: up to 550 m (dependant on transponder type)

Coverage sector: up to 360° (Horizontal)

Distance accuracy (within 200 m): < 0.5 m

Angle accuracy (within 200 m): 0.5°

Frequency band: 5.51 - 5.61 GHz

Interrogator opening angle:  $\pm 45^\circ$  (vertical/horizontal)

Interrogator enclosure protection: IP 66 rated

Power requirements: 110-220 Vac, 160 W

Supplied with 60 m interrogator power & data cables

Supplied with a RADius 700 transponder for commissioning purposes

Interrogator height, width & depth, weight: 412 x 562 x 184 mm, 7 kg.



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**Note:** RADius transponders must be rented individually as standalone units for an existing system.

Units supplied on rental for DP use, assume that the vessel has a correctly installed and operational interface.

The use of "Pseudo" DP interfaces is not recommended, and is in no way supported by Kongsberg Maritime.

IMCA guidelines should be adhered to at all times when systems are used as DP reference.

Please make contact with the DP system supplier if any doubt exists, in the case of any of the Kongsberg Maritime range of DP systems, assistance can be supplied at the time of rental enquiry.

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## VESSEL REFERENCE – RELATIVE POSITIONING SYSTEM PARTS

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### **RADius 1000 Interrogator Unit**

#### **Interrogator unit for RADius 1000 System\***

Frequency band: 5.51 - 5.61 GHz

Interrogator opening angle:  $\pm 45^\circ$  (vertical & horizontal)

Interrogator enclosure protection: IP 66 rated

Power requirements: 48 Vdc  $\pm 10\%$ , 70 W (max)

Width, height & depth, weight: 562 x 412 x 184 mm, 8 kg

**\*Note:** The power / connection shelf may have to be upgraded if the interrogator is added to an existing RADius 1000 system.



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### **RADius 1000 Remote Interrogator Unit**

#### **Remotely located Interrogator unit for RADius 1000 System\***

RADius remote power and modem cabinet

Modem mounted on rail in RADius controller unit cabinet

Frequency band: 5.51 - 5.61 GHz

Interrogator opening angle:  $\pm 45^\circ$  (vertical & horizontal)

Interrogator and remote cabinet protection: IP 66 rated

Remote Cabinet power requirements: 110-240 Vac, 70 W (max)

Interrogator width, height & depth, weight: 562 x 412 x 184 mm, 8 kg

Remote Cabinet width, height, depth: 360, 360, 242 mm

**\*Note:** The cabling from the remote interrogator cabinet to controller unit is not supplied but maybe purchased on request.



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### **RADius 1000 Processing Unit**

#### **Processing unit for RADius 1000 System**

19" rack mounted, 2U high

Communication Ports: 8 x isolated serial ports (6 configurable between

RS-232 or RS-422), 4 x Ethernet ports, 3 x USB ports

Power: 110 to 240 Vac (50/60Hz), 60 W (max)

Width, Height, Depth: 485 x 88.1 x 412 mm

Weight: 5.4 kg



## VESSEL REFERENCE – RELATIVE POSITIONING SYSTEM TRANSPONDERS

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### **RADius 550X**

#### **Low Power, Long Range ATEX Rated Transponder\***

Operational Range: 550 metres

DP Range: 350 metres

Operating Sector:  $\pm 45^\circ$  (vertical & horizontal)

Intrinsically Safe (category 2) Zone 1 & 2 Rated

Powered from an encapsulated lithium battery

Width, height & depth, weight: 220 x 400 x 147 mm, 3.6 kg

ATEX Certificate: DNV-2005-ATEX-0040



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### **RADius 600X**

#### **High Gain ATEX Rated Transponder**

Operational Range: up to 1100 metres

Operating Sector:  $\pm 45^\circ$  (vertical & horizontal)

Intrinsically Safe (category 2) Zone 1 & 2 Rated

Powered from power supply located in safe area

Width, height & depth, weight: 220 x 400 x 147 mm, 3.3 kg

ATEX Certificate: DNV-2005-ATEX-0040



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### **RADius 700X**

#### **Low Power, Long Range ATEX Rated Transponder\***

Operational range: up to 1000 metres

DP range: >550 metres

Operating Sector:  $\pm 45^\circ$  (vertical & horizontal)

Intrinsically safe (category 2) hazardous zone 1 and 2 rated

Powered from an encapsulated lithium battery pack

Width, height & depth, weight: 560 x 564 x 214 mm, 7.4 kg

ATEX Certificate: DNV-2005-ATEX-0040



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### **RADius 700**

#### **Low Power, Long Range Transponder\***

Operational range: up to 1000 metres

DP range: >550 metres

Operating Sector:  $\pm 45^\circ$  (vertical & horizontal)

Powered by lithium metal battery cells

Width, height & depth, weight: 562 x 412 x 184 mm, 6 kg

**Note:** Not ATEX Rated



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**\*Note:** All supplied with Lithium battery packs which are subject to the IATA Dangerous Goods Regulations UN3090/UN3091 for transportation by air

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## VESSEL REFERENCE – LASER RANGING SYSTEMS

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### Seatex SpotTrack System

#### High Precision Positioning and Tracking System

Vertical angular coverage: 65° (min)

Horizontal angular coverage: 360°

DP range: 10 to 1000 m

Horizontal position accuracy:  $(2\sigma)$  1 m @ 1000 m range

Bearing accuracy:  $(2\sigma)$  1 mrad (0.06°)

Vertical stabilization:  $< \pm 0.5^\circ$  for roll, pitch  $< \pm 20^\circ$

Multi-target, up to 10 targets simultaneously

SpotTrack sensor operating conditions: IP 66 rated, -25°C to +55°C

SpotTrack sensor (diameter, height; weight): 173, 455 mm; 6 kg.



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### Fanbeam Mk5 System

#### Precision Positioning and Tracking System

AutoTilt laser tracking system

AutoTilt mechanism:  $\pm 15^\circ$  range (5° increments)

Operating range: up to a maximum of 2000m (weather dependant)

Range accuracy: 20 cm

Angular accuracy: 0.1°

Single target, auto & fixed sector tracking

Scanning head operating conditions: IP 66 rated, -20°C to +55°C

Power requirements: 85-264 Vac, 61 W

Scanning head width, height, depth, weight: 300, 290, 200 mm, 12.9kg.



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### Fanbeam and SpotTrack Reflector / Prism

Prism Single (1 prism) or Reflective Target tube (360 degree)



### 6-way prism cluster (6 prisms)

Max range: 1000 m / 1 km – 2000 m / 2 km

Angle coverage: 150°



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### Note: regarding reflectors:

4-way prism cluster covers 120 degrees, range out to around 800m

6-way prism cluster stacked by three, range out to around 2000m

\*Note: Regarding DP Use:

Units supplied on rental for DP use, assume that the vessel has a correctly installed and operational interface.

The use of "Pseudo" DP interfaces is not recommended, and is in no way supported by Kongsberg Maritime.

IMCA guidelines should be adhered to at all times when systems are used as DP reference.

Please make contact with the DP system supplier if any doubt exists, in the case of any of the Kongsberg Maritime range of DP systems, assistance can be supplied at the time of rental enquiry.

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## VESSEL REFERENCE – (D)GNSS POSITIONING SYSTEMS

### Seatex DPS 232 System

#### GNSS Based Position Reference Sensor

Combined GPS L1/L2, GLONASS L1/L2 and SBAS receiver  
MULTIREF capability

Accepts DGPS/DGLONASS corrections: RTCM-SC104 ver. 2.2, 2.3, 3.0, 3.1; SeaSTAR HP/XP/G2

SBAS accuracy: < 1 m, 95 % CEP, 0.6 m, 1 $\sigma$

SeaSTAR XP/HP/G2 horizontal accuracy: 10 cm, 95 % CEP

SeaSTAR XP/HP/G2 vertical accuracy 15 cm, 95 % CEP

Interface Ports: 8 x isolated serial ports (6 configurable between RS-232 and RS-422), 4 x Ethernet / LAN

19" rack mount cabinet (6U) c/w integrated keyboard & mouse

Width, height, depth (6 U cabinet): 553, 660, 600 mm

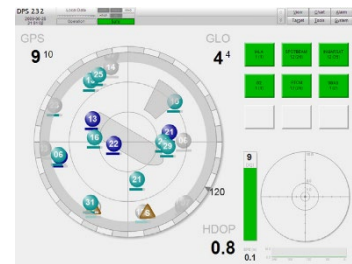
Power: 100 - 240 Vac, 50/60 Hz, max 60 W

Supplied with a DGPS IALA radio beacon antenna

Supplied as standard with 30 m length RG-214 antenna cables

Optional system item:

- 3610 or 3710 DGNSS receiver.



### Seatex DPS 432 System

#### GNSS Based Position Reference Sensor

Combined GPS L1/L2/L5, GLONASS L1/L2, Galileo E1/E5, Beidou B1/B2, QZSS and SBAS receiver

MULTIREF capability

Dual frequency ionospheric compensation

Accepts DGNSS corrections: RTCM-SC104 ver. 2.2, 2.3, 3.0, 3.1, 3.2;

SeaSTAR XP/XP2/G2/G2+/G4/G4+

High precision accuracy\*: 10 cm, 95 % CEP

DGPS/DGLONASS accuracy: < 1 m, 95 % CEP

SBAS accuracy: < 1 m, 95 % CEP

Velocity accuracy: < 0.05 m/s, 95 % CEP

Output rate: 1 Hz

Interface Ports: 8 x isolated serial ports (6 configurable between RS-232 and RS-422), 4 x Ethernet / LAN

19" rack mount cabinet (6U) c/w integrated keyboard & mouse

Width, height, depth (6 U cabinet): 553, 660, 600 mm

Power: 100 - 240 Vac, 50/60 Hz, max 60 W

Supplied with a DGPS IALA radio beacon antenna

Supplied as standard with 30 m length RG-214 antenna cables

Optional system item:

- 3610 or 3710 DGNSS receiver.



### Seatex 3710 DGNSS Receiver

#### DGNSS Correction Services Receiver Unit

Fugro Seastar XP2/G2/G2+/G4/Std L1 capability

External Interfaces: 1 x Serial port (RS-232 or RS-422)

Baud rate 115 200 bytes/sec, 1 x Ethernet / LAN, USB

Data Outputs:-

Message format: Multiplexed (MUX) correction format

Message type: Multiplexed correction data output with status

Power: 100 - 240 Vac, 50/60 Hz, max 75 W

Supplied with type AD430-3141 DGNSS (Spotbeam) antenna

**Note:** Subscription to Fugro correction services not included.



### Fugro 3610 DGNSS Receiver

#### DGNSS Correction Services Receiver Unit

Fugro Seastar XP/HP/G2/DGNSS capability

Power: 9-24 Vdc, 50/60 Hz, < 16 W

Dimensions (W x H x D): 109.5 x 65 x 235 mm

Supplied with type AD430-3141 DGNSS (Spotbeam) antenna

**Note:** Subscription to Fugro correction services not included.



# VESSEL REFERENCE – (D)GNSS POSITIONING SYSTEM PARTS

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**Seatex DPS 232 Processing Unit****GNSS Based Position Reference Sensor**

Combined GPS L1/L2, GLONASS L1/L2 and SBAS receiver  
19" rack mount, 2U height  
Power: 100 - 240 Vac, 50/60 Hz, max 60 W.



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**Seatex DPS 432 Processing Unit****GNSS Based Position Reference Sensor**

Combined GPS L1/L2/L5, GLONASS L1/L2, Galileo E1/E5, Beidou B1/B2, QZSS and SBAS receiver  
19" rack mount, 2U height  
Power: 100 - 240 Vac, 50/60 Hz, max 60 W.



## VESSEL REFERENCE SYSTEMS – POSITION, HEADING & ATTITUDE SYSTEMS

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### Seapath 130-3 System

#### Compact GNSS Aided Heading, Attitude and Positioning Sensor

Real-time, Position, Roll, Pitch, Heave & Heading  
Supplied with a MRU-3 Motion Sensor in Subsea Housing  
Dual frequency GPS/GLONASS and SBAS receiver  
Position accuracy: 0.5m RMS or 1m (95% CEP) with DGNSS/SBAS  
Dynamic accuracy Roll/Pitch; Heading: 0.08°; 0.10° RMS  
Heave accuracy (real-time): 5cm or 5% whichever is highest  
Heave accuracy (delayed signal): 4cm or 5% whichever is highest  
Data output rate: up to 100 Hz  
Data I/O Ports: 3 x Serial RS-232/422 lines, 8 x Ethernet UPD/IP ports  
Power: Sensor Unit: 24 Vdc, 10W; MRU: 24 Vdc, max. 5.5W  
Sensor Unit length, width, height; weight: 1210, 210, 94 mm; 6.8 kg  
Supplied as standard with a 20 m sensor spider cable.



**Note:** No export licence required.

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### Seapath 130-H System

#### Compact GNSS Aided Heading, Attitude and Positioning Sensor

Real-time, Position, Roll, Pitch, Heave & Heading  
Supplied with a MRU-H Motion Sensor in Subsea Housing  
Dual frequency GPS/GLONASS and SBAS receiver  
Position accuracy: 0.5m RMS or 1m (95% CEP) with DGNSS/SBAS  
Dynamic accuracy Roll/Pitch; Heading: 0.03°; 0.10° RMS  
Heave accuracy (real-time): 5cm or 5% whichever is highest  
Heave accuracy (delayed signal): 2cm or 2% whichever is highest  
Data output rate: up to 100 Hz  
Data outputs: 3 x Serial RS-232/422 lines, 8 x Ethernet UPD/IP ports  
Power: Sensor Unit: 24 Vdc, 10W; MRU: 24 Vdc, 12W  
Sensor Unit length, width, height; weight: 1210, 210, 94 mm; 6.8 kg  
Supplied as standard with a 20 m sensor spider cable.



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### Seapath 130-5 System

#### Compact GNSS Aided Heading, Attitude and Positioning Sensor

Real-time, Position, Roll, Pitch, Heave & Heading  
Supplied with a MRU-5 Motion Sensor in Subsea Housing  
Dual frequency GPS/GLONASS and SBAS receiver  
Position accuracy: 0.5m RMS or 1m (95% CEP) with DGNSS/SBAS  
Dynamic accuracy Roll/Pitch; Heading: 0.02°; 0.08° RMS  
Heave accuracy (real-time): 5cm or 5% whichever is highest  
Heave accuracy (delayed signal): 2cm or 2% whichever is highest  
Data output rate: up to 100 Hz  
Data outputs: 3 x Serial RS-232/422 lines, 8 x Ethernet UPD/IP ports  
Power: Sensor Unit: 24 Vdc, 10W; MRU: 24 Vdc, 12W  
Sensor Unit length, width, height; weight: 1210, 210, 94 mm; 6.8 kg  
Supplied as standard with a 20 m sensor spider cable.



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### Seapath 130-5+ System

#### Compact GNSS Aided Heading, Attitude and Positioning Sensor

Real-time, Position, Roll, Pitch, Heave & Heading  
Supplied with a MRU-5+ Motion Sensor in Subsea Housing  
Dual frequency GPS/GLONASS and SBAS receiver  
Position accuracy: 0.5m RMS or 1m (95% CEP) with DGNSS/SBAS  
Dynamic accuracy Roll/Pitch; Heading: 0.008°; 0.08° RMS  
Heave accuracy (real-time): 5cm or 5% whichever is highest  
Heave accuracy (delayed signal): 2cm or 2% whichever is highest  
Data output rate: up to 100 Hz  
Data outputs: 3 x Serial RS-232/422 lines, 8 x Ethernet UPD/IP ports  
Power: Sensor Unit: 24 Vdc, 10W; MRU: 24 Vdc, 12W  
Sensor Unit length, width, height; weight: 1210, 210, 94 mm; 6.8 kg  
Supplied as standard with a 20 m sensor spider cable.



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**Seapath 330-5 System****GNSS Aided Heading, Attitude and Positioning Sensor**

Real-time, Position, Roll, Pitch, Heave & Heading

Supplied with MRU-5 Motion sensor

Dual frequency GPS/GLONASS and SBAS receiver

Position accuracy: 0.5 m RMS / 1 m (95% CEP) with DGNSS corrns

Heading accuracy: 0.065° RMS (2.5m baseline)

Dynamic accuracy Roll & Pitch: 0.02° RMS for +/- 5° amplitude

Heave accuracy (real-time): 5cm or 5% whichever is highest

Data output rate: up to 200 Hz

Power: 100-240 VAC, 138 W (max).

Antenna Beam width, depth, length; weight: 250, 40, 2560 mm; 7 kg

Supplied as standard with 2 x 25 m GNSS cables (RG-214)

Optional system item:

- Trimble SPS 852 Reference Station
- 3610/3710 DGNSS Corrections Receiver.



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**Seapath 330-5+ System****GNSS Aided Heading, Attitude and Positioning Sensor**

Real-time, Position, Roll, Pitch, Heave & Heading

Supplied with a MRU-5+ Motion sensor

Dual frequency GPS/GLONASS and SBAS receiver

Position accuracy (X and Y): 1 cm + 1.6 ppm RMS with RTK corrns

Position accuracy (Z): 2 cm + 3.2 ppm RMS with RTK corrns

Heading accuracy: 0.065° RMS (2.5m baseline)

Dynamic accuracy Roll & Pitch: 0.008° RMS for +/- 5° amplitude

Heave accuracy (real-time): 5cm or 5% whichever is highest

Data output rate: up to 200 Hz

Power: 100-240 VAC, 138 W (max).

Antenna Beam width, depth, length; weight: 250, 40, 2560 mm; 7 kg

Supplied as standard with 2 x 25 m GNSS cables (RG-214)

Optional system item:

- Trimble SPS 852 Reference Station
- 3610/3710 DGNSS Corrections Receiver.



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**Seapath 380-3 System****GNSS Aided Heading, Attitude and Positioning Sensor**

Real-time, Position, Roll, Pitch, Heave & Heading

Supplied with a MRU-3 Motion sensor

Combined GPS, GLONASS, Galileo, Beidou, QZSS and SBAS receiver

Position accuracy (DGNSS/GLONASS): 0.5 m RMS or 1 m 95% CEP

Position accuracy (Fugro XP2/G2/G4): 0.1 m RMS or 2 m 95% CEP

Heading accuracy: 0.07° RMS (2.5m baseline)

Dynamic accuracy Roll & Pitch: 0.08° RMS for +/- 5° amplitude

Heave accuracy (real-time): 5cm or 5% whichever is highest

Data outputs: 8 x serial RS-232/RS-422 lines, 4 x Ethernet/LAN ports,

3 x Analogue channels and 1 x 1PPS

Data output rate: up to 200 Hz

Power: 100-240 VAC, 138 W (max).

Antenna Beam width, depth, length; weight: 250, 40, 2560 mm; 7 kg

Supplied as standard with 2 x 25 m GNSS cables (RG-214)

Optional system item:

- Trimble SPS 852 Reference Station
- 3610/3710 DGNSS Corrections Receiver.



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**Seapath 380-H System****GNSS Aided Heading, Attitude and Positioning Sensor**

Real-time, Position, Roll, Pitch, Heave & Heading

Supplied with a MRU-H Motion sensor

Combined GPS, GLONASS, Galileo, Beidou, QZSS and SBAS receiver

Position accuracy (DGNSS/GLONASS): 0.5 m RMS or 1 m 95% CEP

Position accuracy (Fugro XP2/G2/G4): 0.1 m RMS or 2 m 95% CEP

Heading accuracy: 0.07° RMS (2.5m baseline)

Dynamic accuracy Roll & Pitch: 0.03° RMS for +/- 5° amplitude

Heave accuracy (real-time): 5cm or 5% whichever is highest

Data outputs: 8 x serial RS-232/RS-422 lines, 4 x Ethernet/LAN ports,

3 x Analogue channels and 1 x 1PPS

Data output rate: up to 200 Hz

Power: 100-240 VAC, 138 W (max).

Antenna Beam width, depth, length; weight: 250, 40, 2560 mm; 7 kg

Supplied as standard with 2 x 25 m GNSS cables (RG-214)

Optional system item:

- Trimble SPS 852 Reference Station
- 3610/3710 DGNSS Corrections Receiver.



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### Seapath 380-5 System

#### GNSS Aided Heading, Attitude and Positioning Sensor

Real-time, Position, Roll, Pitch, Heave & Heading

Supplied with a MRU-5 Motion sensor

Combined GPS, GLONASS, Galileo, Beidou, QZSS and SBAS receiver

Position accuracy (DGNSS/GLONASS): 0.5 m RMS or 1 m 95% CEP

Position accuracy (Fugro XP2/G2/G4): 0.1 m RMS or 2 m 95% CEP

Heading accuracy: 0.04° RMS (2.5m baseline)

Dynamic accuracy Roll & Pitch: 0.02° RMS for +/- 5° amplitude

Heave accuracy (real-time): 5cm or 5% whichever is highest

Data outputs: 8 x serial RS-232/RS-422 lines, 4 x Ethernet/LAN ports,

3 x Analogue channels and 1 x 1PPS

Data output rate: up to 200 Hz

Power: 100-240 VAC, 138 W (max).

Antenna Beam width, depth, length; weight: 250, 40, 2560 mm; 7 kg

Supplied as standard with 2 x 25 m GNSS cables (RG-214)

Optional system item:

- Trimble SPS 852 Reference Station
- 3610/3710 DGNSS Corrections Receiver.



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### Seapath 380-5+ System

#### GNSS Aided Heading, Attitude and Positioning Sensor

Real-time, Position, Roll, Pitch, Heave & Heading

Supplied with a MRU-5+ Motion sensor

Combined GPS, GLONASS, Galileo, Beidou, QZSS and SBAS receiver

Position accuracy (DGNSS/GLONASS): 0.5 m RMS or 1 m 95% CEP

Position accuracy (Fugro XP2/G2/G4): 0.1 m RMS or 2 m 95% CEP

Heading accuracy: 0.04° RMS (2.5m baseline)

Dynamic accuracy Roll & Pitch: 0.008° RMS for +/- 5° amplitude

Heave accuracy (real-time): 5cm or 5% whichever is highest

Data outputs: 8 x serial RS-232/RS-422 lines, 4 x Ethernet/LAN ports,

3 x Analogue channels and 1 x 1PPS

Data output rate: up to 200 Hz

Power: 100-240 VAC, 138 W (max).

Antenna Beam width, depth, length; weight: 250, 40, 2560 mm; 7 kg

Supplied as standard with 2 x 25 m GNSS cables (RG-214)

Optional system item:

- Trimble SPS 852 Reference Station
- 3610/3710 DGNSS Corrections Receiver.



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### Seapath 380-R3 System

#### GNSS Aided Heading, Attitude and Positioning Sensor

Real-time, Position, Roll, Pitch, Heave & Heading

Supplied with a MGC R3 Motion and Gyrocompass

Combined GPS, GLONASS, Galileo, Beidou, QZSS and SBAS receiver

Position accuracy (DGNSS/GLONASS): 0.5 m RMS or 1 m 95% CEP

Position accuracy (Fugro XP2/G2/G4): 0.1 m RMS or 2 m 95% CEP

Heading accuracy: 0.04° RMS (2.5m baseline)

Dynamic accuracy Roll & Pitch: 0.01° RMS for +/- 5° amplitude

Heave accuracy (real-time): 5cm or 5% whichever is highest

Data outputs: 8 x serial RS-232/RS-422 lines, 4 x Ethernet/LAN ports,

3 x Analogue channels and 1 x 1PPS

Data output rate: up to 200 Hz

Power: 100-240 VAC, 138 W (max).

Antenna Beam width, depth, length; weight: 250, 40, 2560 mm; 7 kg

Supplied as standard with 2 x 25 m GNSS cables (RG-214)

Optional system item:

- Trimble SPS 852 Reference Station
- 3610/3710 DGNSS Corrections Receiver.



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### SeaNav 300

#### GNSS Heading and Positioning Sensor

Heading Accuracy (dynamic): 0.5° RMS

Position Accuracy: 1.2 m RMS / 2.5 m (95% CEP) with corrections

Power: 12 to 24 Vdc, <5 W

Data Outputs: Serial RS-232/422, Ethernet and 1PPS

Sensor Unit Dimensions / Weight: 780 x 180 x 100 mm / 2.5 kg.





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**Trimble SPS852 Reference Station****RTK Base Station for Seapath 330/380**

GNSS antenna type: Zephyr Geodetic™ 2

Signal tracking: GPS L1/L2, GLONASS, SBAS, OmniSTAR

Correction message types: RTCM 18 & 19, ver 3 or Trimble CMR™

Power: 12 VDC (external lead acid battery pack)

UHF radio receiver type: DGPS 464 (19" rack mounted)

Frequency band: 430 - 470 MHz

Power: 100 - 230 VAC / 50 - 60 Hz, 5 W (typical)

**Note:** A communications radio license maybe required to operate the unit in the location or country of use, subject to local regulations. It is the responsibility of the end user to obtain an operator's permit or license for the receiver for the location or country of use.



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**Note:** For operations outside the UK/EU due to export restrictions, an export licence will be required for the Seatex MRU-5+/5/H. In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## VESSEL REFERENCE SENSORS – MOTION REFERENCE UNITS

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### Seatex MGC® R3

#### Motion Sensor & Gyro Compass

Real-time, Roll, Pitch, Heave & Heading

Roll & Pitch accuracy: 0.01° RMS

Heave accuracy (real-time): 5 cm or 5 %, whichever is highest

Heading accuracy: 0.08° RMS (secant latitude)

Heading accuracy (GNSS aided): 0.04° RMS (secant latitude)

Heading settling time to full accuracy (typical): 17 min from start-up

Position output (free inertial): 5 nm/h

Data outputs: RS-232, RS-422 and Ethernet

Data output rate (max): 200 Hz

Power supply: 18-32 V dc, max 12 W

Height, length, width; weight: 188.9, 189.5, 189.5 mm; 8.0 kg

Supplied with items:

- MGC angle bracket
- Junction box c/w 3 m cable
- Transit case.



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### Seatex MRU-5+

#### Motion Sensor

Real-time Roll, Pitch and Heave

Dynamic Accuracy Roll & Pitch: 0.008° RMS

Dynamic Accuracy Heave (real-time): 5 cm or 5 % whichever highest

Data Outputs: RS-232, RS-422 and Ethernet

Data Output Rate (max): 200 Hz

Power Supply: 10-36 V dc, max 12 W

Diameter, height, weight: 105, 140 mm, 2.4 kg

Optional items:

- 10 m or 500 m MRU subsea housing
- MRU wall or floor mounting bracket
- MRU junction box (required for analogue channels).



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### Seatex MRU-5

#### Motion Sensor

Real-time, Roll, Pitch, Heave

Static Accuracy Roll & Pitch: 0.025° RMS

Dynamic Accuracy Roll & Pitch: 0.02° RMS (for a ±5° amplitude)

Dynamic Accuracy Heave: 5 cm or 5 % whichever highest

Power Supply 12-30 V dc, max 8 W

Diameter, height, weight: 105, 205 mm, 2.5 kg

Optional items:

- 10 m or 1000 m MRU subsea housing
- MRU wall mounting bracket
- MRU junction box.



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### Seatex MRU-5 (5<sup>th</sup> Generation)

#### Motion Sensor

Real-time Roll, Pitch and Heave

Dynamic Accuracy Roll & Pitch: 0.02° RMS

Dynamic Accuracy Heave (real-time): 5 cm or 5 % whichever highest

Data Outputs: RS-232, RS-422 and Ethernet

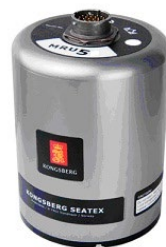
Data Output Rate (max): 200 Hz

Power Supply: 10-36 V dc, max 12 W

Diameter, height, weight: 105, 140 mm, 2.4 kg

Optional items:

- 10 m or 500 m MRU subsea housing
- MRU wall or floor mounting bracket
- MRU junction box (required for analogue channels).



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**Seatex MRU-H**  
**Motion Sensor**

Real-time, Roll, Pitch, Heave  
Static Accuracy Roll & Pitch: 0.04°/s RMS  
Dynamic Accuracy Roll & Pitch: 0.05° RMS (for a  $\pm 5^\circ$  amplitude)  
Dynamic Accuracy Heave: 5 cm or 5 % whichever highest  
Power Supply 12-30 V dc, 6 W  
Diameter, height, weight: 105, 205 mm, 2.5 kg

Optional items:

- 10 m or 1000 m MRU subsea housing
- MRU wall mounting bracket
- MRU junction box.



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**Seatex MRU-H (5<sup>th</sup> Generation)**  
**Motion Sensor**

Real-time Roll, Pitch and Heave  
Angular Orientation Range:  $\pm 180^\circ$   
Dynamic Accuracy Roll & Pitch: 0.05° RMS  
Dynamic Accuracy Heave (real-time): 5 cm or 5 % whichever highest  
Data Outputs: RS-232, RS-422 and Ethernet  
Data Output Rate (max): 200 Hz  
Power Supply: 10-36 V dc, max 12 W  
Diameter, height, weight: 105, 140 mm, 2.4 kg

Optional items:

- 10 m or 500 m MRU subsea housing
- MRU wall or floor mounting bracket
- MRU junction box (required for analogue channels).



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**Seatex MRU-3 (5<sup>th</sup> Generation)**  
**Motion Sensor**

Real-time Roll, Pitch and Heave  
Angular Orientation Range:  $\pm 45^\circ$   
Dynamic Accuracy Roll & Pitch: 0.08° RMS  
Dynamic Accuracy Heave (real-time): 5 cm or 5 % whichever highest  
Data Outputs: RS-232, RS-422 and Ethernet  
Data Output Rate (max): 200 Hz  
Power Supply: 10-36 V dc, max 12 W  
Diameter, height, weight: 105, 140 mm, 2.4 kg

Optional items:

- 10 m or 500 m MRU subsea housing
- MRU wall or floor mounting bracket
- MRU junction box (required for analogue channels).



**Note:** No export licence required.

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**Seatex MRU-2**  
**Roll & Pitch Sensor**

Real-time, Roll, Pitch  
Static Accuracy Roll & Pitch: 0.08° RMS  
Dynamic Accuracy Roll & Pitch: 0.1° RMS (for a  $\pm 5^\circ$  amplitude)  
Power Supply 12-30 V dc, 6 W  
Diameter, height, weight: 105, 205 mm, 2.5 kg

Optional items:

- MRU wall mounting bracket
- MRU junction box.



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**Seatex MRU-D**  
**Roll & Pitch Sensor**

Real-time, Roll, Pitch  
Static Accuracy Roll & Pitch: 0.3° RMS  
Dynamic Accuracy Roll & Pitch: 0.35° RMS (for a  $\pm 5^\circ$  amplitude)  
Power Supply 12-30 V dc, 3 W  
Diameter, height, weight: 105, 129 mm, 1.5 kg  
Note: No export licence required.

Optional items:

- MRU wall mounting bracket
- MRU junction box.



**Note:** No export licence required.

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**Seatex MRU-D (5th Generation)****Roll & Pitch Sensor**

Real-time, Roll, Pitch

Static Accuracy Roll & Pitch:  $0.3^{\circ}$  RMS

Dynamic Accuracy Roll & Pitch:  $0.35^{\circ}$  RMS (for a  $\pm 5^{\circ}$  amplitude)

Power Supply 10-36 V dc, max 3 W

Diameter, height, weight: 105, 140 mm, 2.4 kg

Optional items:

- MRU wall mounting bracket
- MRU junction box.

**Note:** No export licence required.



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**Note:** For operations outside the UK/EU due to export restrictions, an export licence will be required for the Seatex MRU-6/5+/5/H/2. In some instances, an end user statement will be required from the customer prior to despatch of the equipment.

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## UNMANNED & MANNED SURFACE VESSELS

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### GeoSwath 4R USV

#### Unmanned Surface Vessel (USV)

Technical specifications:

Platform type: EchoBoat-ASV™ portable survey boat

Remote control frequency, range: 2.4 GHz, up to 1.5 km (line of sight)

Hull length, width: 168 cm, 81 cm

Weight: Approx. 55 kg (payload dependent)

Max speed: up to 4 knots (2 m/s)

Endurance: up to 2.5 hours (exchangeable battery pack)

Operational limits: Sea State 1-2 (max)

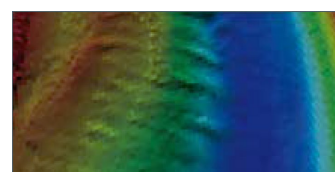
Position, attitude and heading sensor type: Seapath 130-5+

Fitted with Valeport MiniSVS

Bathymetric sonar type, frequency: GeoSwath, 500 kHz

Sonar Range: 1 to 50 m

Max seafloor coverage: up to 12 times water depth.



#### Optional item:

- Trimble SPS 852 Reference Station.

**Note:** Equipment Support Engineer(s) to assist in vehicle mobilisation/demobilisation and during missions available on request.

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### GeoSwath CSV

#### Compact Surface Vessel (CSV)

Technical specifications:

Platform type: Road transportable two-person catamaran

Construction: Polythene catamaran with stainless steel fittings

Length, width, draft: 3 m, 1.62 m, 0.35 m

Dry weight (hull, base boat): 120 kg

Motor: 30 HP, remote throttle

Max speed: up to 27 knots

Fuel capacity: 31 litres (8 gallons)

Equipped with VHF radio

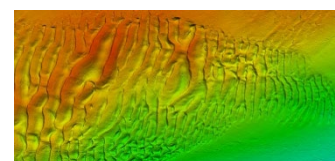
Position, attitude and heading sensor type: Seapath 130-5+

Fitted with Valeport MiniSVS

Standard bathymetric sonar type, frequency: GeoSwath, 500 kHz

Sonar Range: 1 to 50 m

Max seafloor coverage: up to 12 times water depth.



#### Optional Item(s):

- Trimble SPS 852 Reference Station
- EM 2040P multibeam echosounder (instead of GeoSwath).

**Note:** Equipment Support Engineer(s) to assist in vehicle mobilisation/demobilisation and during missions available on request.

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**Note:** For operations outside of the UK/EU, due to export restrictions, a licence will be required for the MRU-5+ which is contained within the GeoSwath USV and CSV systems. In most instances an end user statement will be required from the customer prior to despatch of equipment.

**\*Note:** The GeoSwath USV system is supplied with lithium-ion polymer batteries which are subject to the IATA Dangerous Goods Regulations UN3480/UN3481 for transportation by air.

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## AUTONOMOUS UNDERWATER VEHICLES

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### MUNIN Autonomous Underwater Vehicle Modular, Low-logistics AUV System\*

#### Sensor Payload:

Kongsberg NavP Aided Inertial Navigation System (AINS) with  
Honeywell HG9900 Inertial Measurement Unit (IMU)  
Teledyne RDI 300 kHz Broadband Doppler Velocity Log (DVL)  
Imagenex Forward Looking Sonar/Anti-Collision System  
EM 2040M (1° x 1°) MBES - 200/300/400 kHz  
EdgeTech 2205 Dual Frequency Side Scan Sonar (230/540 kHz)  
NBOS Conductivity and Temperature Sensor  
Paroscientific Digiquartz® Depth Sensor

#### Technical Specification:

Navigation: Novatel L1/L2 GPS, USBL (Cymbal®), DVL and INS  
Communication: Hydroacoustic (HiPAP®351/501), WiFi and Iridium  
Integrated pipeline inspection with pipeline detection and tracking  
Energy: 10 kWh (5 kWh plus 5 kWh with swappable battery module)  
Endurance: up to 9 hours per battery module  
Min to Max Speed: 2 to 4.5 knots (payload sensor dependant)  
Operating Depth: 5 - 600 m  
Vehicle Diameter, Length: 340, 4000 mm (payload sensor dependant)  
Weight in air: <300 kg (payload sensor dependant)

**Note:** System supplied with Mini Stinger Launch & Recovery System  
(Freeboards up to 2 m), HUGIN and Payload Operator Station, MUNIN  
Battery Charger, NavLab and Reflection PMA Software and Spares Kit.

#### Optional System Items:

- EdgeTech Sub-Bottom Profiler Payload Sensor - 4-24 kHz
- HiPAP®502-MGC or HiPAP®35x-P/5/MGC Portable System
- GNSS Positioning and/or Heading Sensor

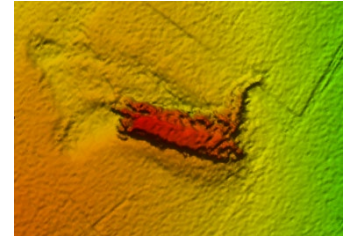
**Note:** Equipment Support Engineer(s) to assist in vehicle  
mobilisation/demobilisation and during missions available on request

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**Note:** The MUNIN system is subject to export control restrictions. The MUNIN system can only be operated in approved territories and will not be shipped or used in any country listed in the Norwegian, UK or US embargoed country list. In most instances an end user statement will be required from the customer prior to despatch of equipment.

**\*Note:** The MUNIN system is supplied with lithium battery cells which are subject to the IATA Dangerous Goods Regulations UN3480/UN3481 for transportation by air.

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KONGSBERG

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