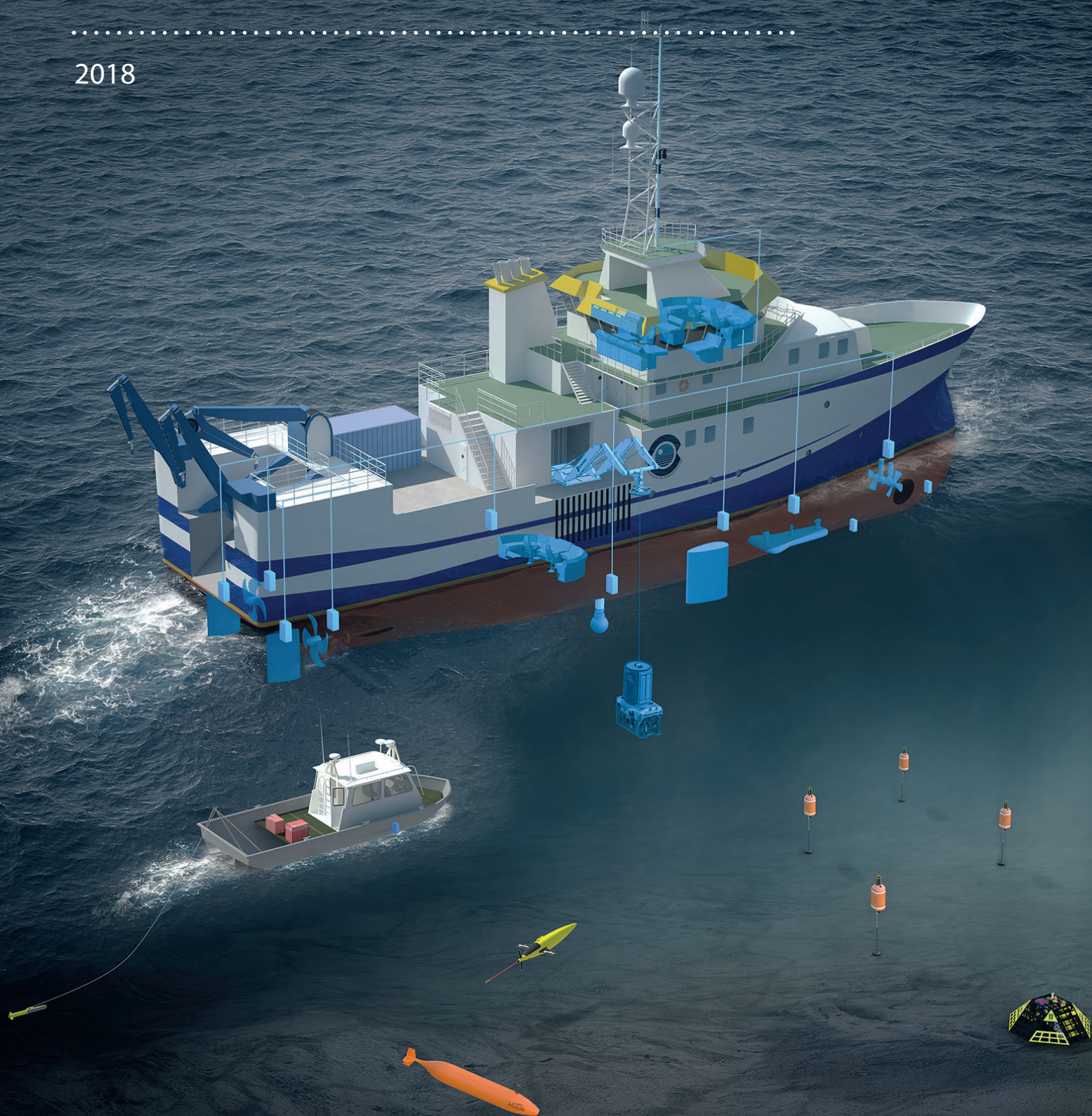




KONGSBERG

RENTAL CATALOGUE

2018



MAXIMIZING PERFORMANCE BY PROVIDING THE FULL PICTURE

OUR MISSION

We shall earn the respect and recognition for our dedication to provide innovative and reliable marine electronics that ensure optimal operation at sea. By utilising and integrating our technology, experience and competencies in positioning, hydroacoustics, communication, control, navigation, simulation, and automation, we aim to give our customers The Full Picture.

The Full Picture yields professional solutions and global services that make a difference enabling you to stay ahead of the competition.

OUR PHILOSOPHY

Our success depends on the success of our customers. Actively listening to our customers and truly understanding their needs, and then translating these needs into successful products and solutions is central to achieving our goal.

Our people are the key to our success and we empower them to achieve. Working together in a global network of knowledge, guided by our values, engenders innovation and world class performance. Every day we have to think a little differently, because every client is unique. We aspire to translate the imagination and dedication of our staff into successful technologies and solutions. Our commitment is to add value to your operations by providing you with The Full Picture.

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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.

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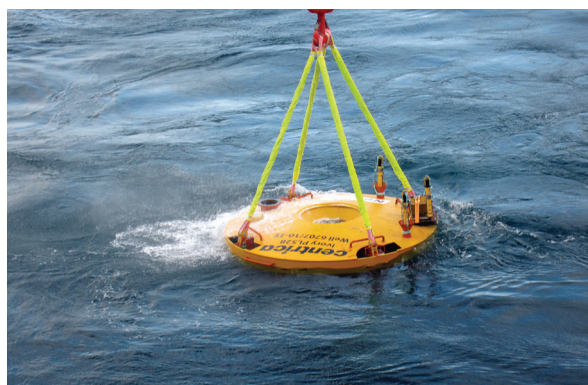
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ACOUSTIC POSITIONING – POSITIONING SYSTEMS

HiPAP® 352P Portable System

Portable Hydroacoustic Positioning Reference

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

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 μ 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 transducer cable

Supplied with an APOS laptop or 19" rack mounted computer

Optional system item:

- Responder drive kit.



HiPAP® 351P-MGC Portable System

Calibration Free Portable Hydroacoustic Positioning Reference

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

Fully compatible with Cymbal® and HPR400 acoustic protocols

Inbuilt 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 μ Pa]): 0.18°

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

Dynamic accuracy roll & pitch: 0.01° RMS

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

Supplied with a 50 m or 70 m 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) functionality

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 μ 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 transducer cable

Supplied with an APOS laptop or 19" rack mounted computer

Optional system item:

- Responder drive kit.



HiPAP® 351P Portable System

Portable Hydroacoustic Positioning Reference

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

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 μ 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 transducer cable

Supplied with an APOS laptop or 19" rack mounted computer

Optional system item:

- Responder drive kit.



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. 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: 400,190 mm; 17 kg/9 kg
Supplied with a 50 m or 70 m 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. 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: 400,190 mm; 17 kg/9 kg
Supplied with a 50 m or 70 m transducer cable
Supplied as standard with an APOS laptop computer
Optional system item:

- Responder drive kit.



Note: No Export Licence required.

µPAP® 201-2 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-2 / 0.1°
Operating range: 1 - 4000 m
Angular accuracy: 0.25°
Position accuracy: 0.47% (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: 400,190 mm; 17 kg/9 kg
Supplied with a 50 m or 70 m transducer cable
Supplied as standard with an APOS laptop computer
Optional Item:

- Responder drive kit.



µPAP® 200-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: Xsens / <1.0°
Operating range: 1 - 995 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 transducer cable
Supplied as standard with an APOS laptop computer
Optional system item:

- Responder drive kit.



Note: No Export Licence required.

**cPAP® 34, Subsea LBL Positioning System
ROV Mount Transceiver**

30 kHz band (MF)
FSK and PSK (Cymbal®) signaling mode
For use in Long Base Line (LBL) mode
Aluminium housing, depth rating to 4000 m
Supplied as standard with two 30° horizontal beam pattern transducers
Housing in hard anodized aluminum coated with tough polyurethane
RS-232/422/485 isolated interfaces
110/220 Vac external power interfaces (100-300 W)
Pigtail (3m) for the power/data interface cable
Optional system item:

- HiPAP® 501 Survey APOS Operator Station – MP8300/MP5810
- Remote HiPAP®50x Operator Station – MP8300/MP5810



**cPAP® 30, Portable Telemetry Unit
Portable Medium Frequency (MF) Transceiver Unit**

Fully compatible with all Kongsberg (MF) acoustic channels, including Cymbal® protocol
Supplied with TDD 180 dunking transducer (70 m cable length)
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.



Note: For operations outside the UK/EU due to export restrictions, an export licence may be required for the “HiPAP® “ and “cPAP®” systems.

If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions.

In most instances an end user statement will be required from the customer prior to despatch of the equipment.

ACOUSTIC POSITIONING – TRANSDUCERS

µPAP® 201-3-NEL Transducer

Part No. 334422

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

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

Note: No Export Licence required.



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



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



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



Dunking Transducer TDD 180

MF Transducer & Cable

180° beam pattern transducer

Depth rating: 500 m

Supplied with 70 m cable on drum

Compatible with cPAP® 30 portable transceiver unit

Width, height, depth: 430, 500, 590 mm



Note: For operations outside the UK/EU due to export restrictions, an export licence may be required for the “HiPAP® and cPAP® transducers”.

If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions.

In most instances an end user statement will be required from the customer prior to despatch of the equipment.

ACOUSTIC POSITIONING – CABLES

HiPAP®35xP and µPAP® 20x Transducer Cable

50 m or 70 m cable length

Cable diameter: 12 mm

Subsea plug diameter: Approx 44 mm

Length, weight: 50 m, 10 kg.



ACOUSTIC POSITIONING – HAIN SYSTEM

Subsea Hydroacoustic Aided Inertial Navigation System HAIN System minus Inertial Measurement Unit

The Subsea HAIN solution offers:

- Improved position accuracy compared to acoustics only
- Smoother position output compared to acoustics only
- Higher position update rate
- Continuous position output in event of acoustic dropout
- Accurate heading, roll and pitch measurements
- Increased QA and QC
- Accurate velocity measurements.



Compatible IMU types: Seatex MGC® R3, CDL MiniRLG/POS 2,
Honeywell HG 9900, IXSEA IMU90/120 and
TSS Orion.

Subsea HAIN computer type: MP8300/MP5810

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 ROV sensors required:-

- Inertial Measurement Unit
- Paroscientific Digiquartz® Depth Sensor
- RDI 300/600/1200 kHz Doppler Velocity Log.

Inertial Measurement Unit for Subsea HAIN System

IMU type: Kongsberg Seatex MGC® R3

Product specification:

Heading accuracy (GNSS aided): 0.1° 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

Data output type/rate: Ethernet 10/100 Mbit / 200 Hz

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

Housing connector type: SubConn (1 x 16-pin and 2 x 8-pin)

Titanium housing, depth rating to 4000 m

Length, diameter: 337, 281 mm

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



Note: Non ITAR product

Inertial Measurement Unit for Subsea HAIN System

IMU type: Honeywell HG 9900

Product specification:

Heading accuracy: 0.03° sec (lat), (>0.5 hr operation)

Pitch & Roll accuracy: 0.01°

Angle random walk: <0.002°/vhr

Gyro bias: <0.003°/hr

Gyro scale factor: <5 ppm

Accelerometer bias: <25 micro g

Accelerometer scale factor: <100 ppm

Data output type/rate: Ethernet 10 or 100 Mbit, 300 Hz

Power requirements: 16-75 Vdc, <15 W

Housing connector type: 19-pin Gisma (10.00.4.19.1.10)

Titanium housing, depth rating to 4000 m

Diameter, length, weight (air/water): 240, 280 mm, 29 kg/16 kg



Note: ITAR product

Note: For operations outside the UK/EU due to export restrictions, an export licence will be required for the "Subsea HAIN System".

The "Honeywell IMU HG 9900" IMU's is subject to ITAR restrictions and US DoS approval must be obtained prior to despatch.

If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions.

In most instances an end user statement will be required from the customer prior to despatch of the equipment.

ACOUSTIC POSITIONING – HAIN POST-PROCESSING SOFTWARE

NavLab Post-Processing Computer

Installed with latest NavLab software

Supplied with software licence dongle

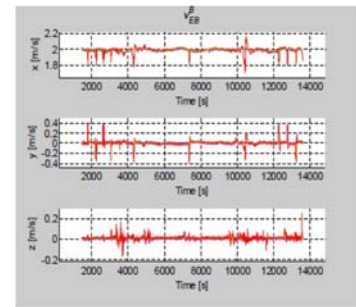
Used for post-processing of real time subsea HAIN data.

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 also analyse the on-line performance of the subsea HAIN system and fine-tune its parameters, and be used for these purposes during 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”.

If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions.

In most instances an end user statement will be required from the customer prior to despatch of the equipment.

ACOUSTIC POSITIONING – ROV TRANSPONDERS (MST)

MST 319/N

ROV Positioning Transponder

Small lightweight HPR series mini-transponder
Fully compatible with HiPAP® and HPR systems
Beamwidth: ± 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



MST 342/N

ROV Positioning Transponder

Small lightweight HPR series mini-transponder
Fully compatible with HiPAP® and HPR systems
Beamwidth: ± 20 degrees. Sensitivity 100 dB
Switchable source level: 200/203 dB
Rechargeable battery pack
Polyurethane coated aluminium housing: depth rating to 4000 m
Length, diameter; weight air/water: 349, 82 mm; 4.1/2.2 kg



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



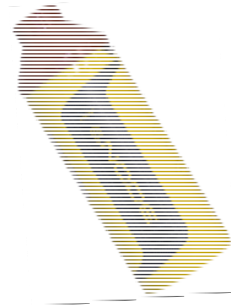
Note: For operations outside the UK/EU due to export restrictions, an export licence may be required for the “MST mini-transponder”. If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions. In most instances an end user statement will be required from the customer prior to despatch of the equipment.

ACOUSTIC POSITIONING – ROV TRANSPONDERS (CNODE MINIS)

cNODE® MiniS 34-180

ROV Positioning Transponder

30 kHz band (MF) Transponder / Responder
Fully compatible with Cymbal® and HPR400 acoustic protocols
SSBL / USBL and LBL positioning modes
Beamwidth: ± 90 degrees
Max source level: up to 188 dB
Internal tilt sensor: ± 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.



cNODE® MiniS 34-40V

ROV Positioning Transponder

30 kHz band (MF) Transponder / Responder
Fully compatible with Cymbal® and HPR400 acoustic protocols
SSBL / USBL and LBL positioning modes
Beamwidth: ± 20 degrees
Max source level: up to 203 dB
Internal tilt sensor: ± 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.



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.



Note: For operations outside the UK/EU due to export restrictions, an export licence may be required for the “cNODE MiniS transponder”.

If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions.

In most instances an end user statement will be required from the customer prior to despatch of the equipment.

ACOUSTIC POSITIONING – CNODE MINI TRANSPONDERS

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: ± 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.



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: ± 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.



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.



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.



Note: For operations outside the UK/EU due to export restrictions, an export licence may be required for the “cNODE Mini transponder”.

If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions.

In most instances an end user statement will be required from the customer prior to despatch of the equipment.

ACOUSTIC POSITIONING – SPT/MPT TRANSPONDERS (1000 M)

MPT 319/DTR

Multifunction Positioning Transponder**

Fitted with depth, temperature sensors and release mechanism
Long/Super Short Baseline (LBL/SSBL), Intelligent Telemetry
Fully compatible with HiPAP® and all HPR systems
Beamwidth: ± 90 degrees
Switchable source levels, max 188 dB
Polyurethane coated aluminium housing, depth rated to 1000 m
Length, diameter, weight air/water: 1470, 131/171mm, 27/11kg.



MPT 319

Multifunction Positioning Transponder**

Long/Super Short Baseline (LBL/SSBL), Intelligent Telemetry
Fully compatible with HiPAP® and all HPR systems
Beamwidth ± 90 degrees
Switchable source levels, maximum 188 dB
Polyurethane coated aluminium housing, depth rated to 1000 m
Length, diameter, weight air/water: 1470, 131/171 mm, 27/11 kg.



SPT 314/319/R

SSBL Positioning Transponder**

Fitted with release mechanism
Super Short Baseline (SSBL), Intelligent Telemetry
Fully compatible with HiPAP® and all HPR systems
Beamwidth: 314 ± 45 degrees, 319 ± 90 degrees
Switchable source levels to a max 188 dB - 319, 195 dB - 314
Polyurethane coated aluminium housing, depth rated to 1000 m
Length, diameter, weight air/water: 1470, 131/171 mm, 27/11 kg.



SPT 314/319

SSBL Positioning Transponder**

Super Short Baseline (SSBL), Intelligent Telemetry
Fully compatible with HiPAP® and all HPR systems
Beamwidth: 314 ± 45 degrees, 319 ± 90 degrees
Switchable source levels to a max 188 dB - 319, 195 dB - 314
Polyurethane coated aluminium housing, depth rated to 1000 m
Length, diameter, weight air/water: 1255, 131/171 mm, 27/11 kg.



SPT 314/319I

SSBL Positioning Transponder**

Fitted with X, Y inclinometers: ± 15 degrees (300 channels),
 ± 60 degrees (400 channels)
Super Short Baseline (SSBL), Intelligent Telemetry
Fully compatible with HiPAP® and all HPR systems
Beamwidth: 314 ± 45 degrees, 319 ± 90 degrees
Switchable source levels to a maximum of 195 dB
Polyurethane coated aluminium housing, depth rated to 1000 m
Length, diameter, weight air/water: 1470, 131/171 mm, 27/11 kg.



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

♦ **Note:** Can be supplied with an alkaline battery pack (optional).

Note: For operations outside the UK/EU due to export restrictions, an export licence may be required for the "SPT/MPT transponder". If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions. In most instances an end user statement will be required from the customer prior to despatch of the equipment.

ACOUSTIC POSITIONING – SPT/MPT TRANSPONDERS (3000 M)

MPT 331/DTRDuB

£57 £50 £42

Multifunction Positioning Transponder with Sidebeam**

Fitted with depth, temperature sensors and release mechanism
Long/Super Short Baseline (LBL/SSBL), Intelligent Telemetry
Fully compatible with HiPAP® and all HPR systems
Beamwidth ± 15 degrees with doughnut sidebeam
Switchable source levels, max 206 dB main and 192 dB sidebeam
Supplied with a lithium or alkaline battery pack
Aluminium or stainless steel housing, depth rated to 3000 m
Length, diam., weight air/water (Alu): 1691, 138/200 mm, 38/14 kg
Length, diam., weight air/water (S/S): 1850, 125/178 mm, 65/46 kg.



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

♦ **Note:** Can be supplied with an alkaline battery pack (optional).

Note: For operations outside the UK/EU due to export restrictions, an export licence may be required for the “SPT/MPT transponder”. If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions. In most instances an end user statement will be required from the customer prior to despatch of the equipment.

ACOUSTIC POSITIONING – CNODE MIDI TRANSPONDERS

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.



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 interfaced to Gyrocompass.



***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”.
If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions.
In most instances an end user statement will be required from the customer prior to despatch of the equipment.

ACOUSTIC POSITIONING – CNODE MAXI TRANSPONDERS

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 / kg.



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 / kg.



cNODE® Maxi 34-180-R-MTS/Sv

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 / kg
Modular top section incorporates a Valeport sound velocity sensor
Sensor specifications:

- Sound Velocity: +/- 0.02 m/s.



cNODE® Maxi 34-180-R-MTS/SvP

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 / kg
Modular top section incorporates a Paroscientific Digiquartz® pressure sensor and a Valeport sound velocity sensor
Sensor specifications:

- Sound Velocity: +/- 0.02 m/s
- Depth: +/- 0.01% FS (FS = 2000 psi).



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 / 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
- Depth: +/- 0.01% FS (FS = 2000 psi / 1400 m).
- Inclinometers: 0.05°.



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°.



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))

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 price when an external power supply is used to power the MGC module.

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 / kg.



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 / kg.



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 / kg.



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.



***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”.

If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions.

In most instances an end user statement will be required from the customer prior to despatch of the equipment.

ACOUSTIC POSITIONING – CNODE MAXI/MIDI TRANSPONDER MODULES

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.



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.



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



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.



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.



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

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



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.



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

Part No. 388700

Module incorporates a Paroscientific Digiquartz® pressure sensor,
pitch/roll sensor and sound velocity sensor

Specifications:

- Depth: +/- 0.01% FS (FS = 3000 psi)
- Inclinator: 0.05°
- Sound velocity: +/- 0.02 m/s.

Polyurethane coated anodised aluminium unit

Depth rated to 4000 m

Length, diameter: 184, 144 mm.



**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 pitch/roll sensor

Specifications:

- Depth: +/- 0.01% FS (FS = 3000 psi)
- Inclinator: 0.05°

Polyurethane coated anodised aluminium unit

Depth rated to 4000 m

Length, diameter: 190.5, 191.2 mm.



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

Polyurethane coated anodised aluminium unit

Depth rated to 4000 m

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

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



Note: For operations outside the UK/EU due to export restrictions, an export licence may be required for cNODE® products. If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions. In most instances an end user statement will be required from the customer prior to despatch of the equipment.

ACOUSTIC POSITIONING – TRANSPONDER FLOATATION COLLARS

cNODE® Maxi Floatation Collar

Deepwater Flotation Collar for cNODE® Maxi 34 Transponder

Part No. 319301
Depth rating: 4000m
Compatible with aluminum cNODE® Maxi 34 transponders
Buoyancy: 30 kg
Width, height, depth: 455, 948, 350 mm
Weight air/water: 70 kg / -30 kg.



cNODE® Maxi Floatation Collar

Flotation Collar for cNODE® Maxi 34 Transponder

Part No. 320772
Depth rating: 2000m
Compatible with aluminum cNODE® Maxi 34 transponders
Buoyancy: 30 kg
Width, height, depth: 358, 949, 300 mm
Weight air/water: 45 kg / kg.



SPT/MPT Floatation Collar

Flotation collar for SPT/MPT Transponder

Depth rating: 1000 m
Buoyancy: 30 kg
Width, height, depth, weight: 450, 950, 450 mm, 28.5 kg.



Deepwater SPT/MPT Floatation Collar

Deepwater Flotation collar for SPT/MPT Transponder

Depth rating: 3000 m
Buoyancy: 65 kg
Width, height, depth, weight: 450, 950, 450 mm, 77 kg.



MST Floatation Collar

Flotation collar for Mini-transponder

Depth rating: 2000 m
Buoyancy MST 319, MST 324: 4.5 kg, 4 kg
Height with cage, diameter, weight: 549, 275 mm, 9 kg.



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: For operations outside the UK/EU due to export restrictions, an export licence may be required for the “transponder floatation collar”.

If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions.

In most instances an end user statement will be required from the customer prior to despatch of the equipment.

ACOUSTIC POSITIONING – ANCILLARY EQUIPMENT

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.



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:
 - o Read transponder configuration settings (serial number, acoustic channel and mode, battery capacity, transducer type)
 - o Configure Cymbal or FSK Mode and channels
 - o Upload new transponder firmware.
- Perform acoustic tests (requires cNODE MiniS) to:
 - o Read transponder configuration settings (serial number, acoustic channel and mode, channel number, battery capacity, read sensors)
 - o Configure Cymbal or FSK Mode and channels
 - o Execute acoustic release
 - o 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.

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

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

Unit 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.



Remote HiPAP®50x Operator Station

Acoustic Positioning System Computer: MP8200/MP8300/MP5810

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.



HiPAP® Survey APOS Operator Station

Acoustic Positioning System Computer: MP8300/MP5810

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

Supplied with the latest Survey APOS software and licence dongle key.

Includes the following enabled 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: For operations outside the UK/EU due to export restrictions, an export licence may be required for these “ancillary item options”. If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions. In most instances an end user statement will be required from the customer prior to despatch of the equipment.

UNDERWATER MAPPING – MULTIBEAM ECHO SOUNDER SYSTEMS

Mesotech M3 Bathy System

Shallow Water High Resolution Bathymetric Sonar

Frequency: 500 kHz
Range: 1 to 50m
Maximum 120° view angle
Depth resolution: 3 mm
Vertical Beamwidth: 3°
Number of Beams: 256
Update Rate: up to 40 Hz
M3 Sonar Processor Laptop Computer
Supplied with a 15 m deck cable to laptop PC
Input Voltage/Power: 12 to 36 VDC / 22 W (typical)
Titanium sonar head, depth rated to 4000 m
Height, diameter, weight air/water: 159, 193 mm, 8.5/5.3 kg
Supplied with an over-the-side mounting pole assembly
Optional auxiliary sensors and hardware/software:

- Valeport miniSVS sound velocity sensor
- Seatex Seapath 130 system.
- QINSy Survey Lite data acquisition software.



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)
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 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)
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 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:

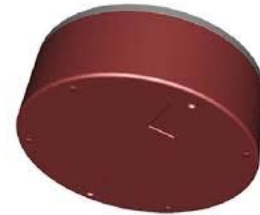
- Transducer mounting bracket.



EM 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
Supplied with a 15 m, 30 m or 50 m transducer cable
HWS computer c/w Seafloor Information System (SIS) software
Sonar Head height, diameter, weight air/water: 119, 332 mm, 21/12.6kg
Optional system item:

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



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
Supplied with a 15 m, 30 m or 50 m transducer cables
HWS computer c/w Seafloor Information System (SIS) software
Sonar Head height, diameter, weight air/water: 119, 332 mm, 21/12.6kg
Optional system item:

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



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 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 item:

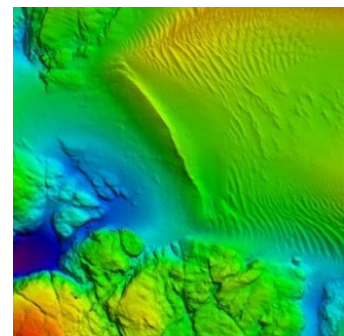
- Dual Swath mode
- Transducer mounting POD.



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 a 15 m, 30 m or 50 m 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 item:

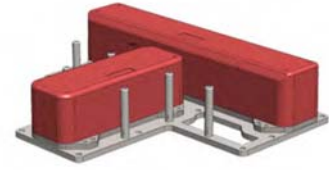
- Dual Swath mode
- Transducer mounting bracket, Dual RX - (POA).



**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 a 15 m, 30 m or 50 m 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:

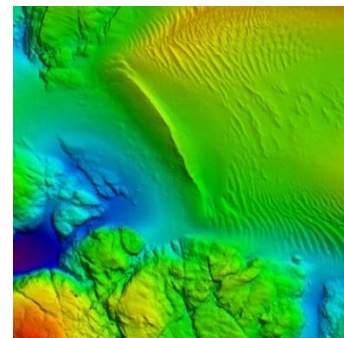
- Dual Swath mode
- Transducer mounting POD.



**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 a 15 m, 30 m or 50 m 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, Dual RX - (POA).



**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 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.



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”.

If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions.

In most instances an end user statement will be required from the customer prior to despatch of the equipment.

UNDERWATER MAPPING – SYSTEM PARTS

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.



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.



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, diameter, weight air/water: 159, 193 mm, 8.5/5.3 kg.



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

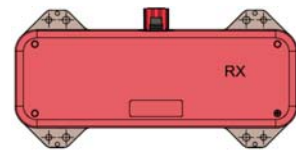
Supplied with 15 m or 50 m transducer cable

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.



EM 2040-0.7° Transmit Transducer

Single TX Transducer

Frequency range: 200 to 400 kHz

Transducer depth rated to 6000 m

Supplied with 15 m or 50 m transducer cable

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.



EM 2040-0.4° Transmit Transducer

Single TX Transducer

Frequency range: 200 to 400 kHz

Transducer depth rated to 6000 m

Supplied with 15 m or 50 m transducer cable

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.



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.



EM 2040 Compact and Portable Sonar Head Cable

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



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".

If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions.

In most instances an end user statement will be required from the customer prior to despatch of the equipment.

UNDERWATER MAPPING – WIDE SWATH BATHYMETRY SYSTEMS

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 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)
- Over-the-side pole mount assembly.



UNDERWATER MAPPING – ECHO SOUNDERS

EA 400SP Hydrographic Echo Sounder Portable Dual Frequency Echo Sounder

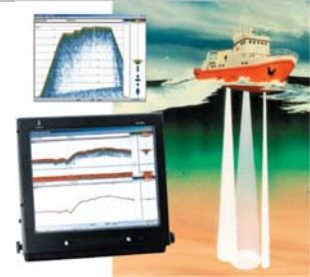
Frequency: 38 kHz and 200 kHz
Variable power output up to 1 kW
Max depth range at 38 kHz/1 kW: 2100 m
Transducer type: 38/200D Combi (13° x 21°/7° x 7°)
Supplied as standard with 15 m transducer cable
Ruggedised case with operator laptop computer
Power requirements: 95-265 Vac, 11-15 Vdc, 30-50 W
Width,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



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

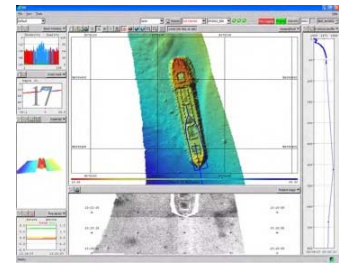


UNDERWATER MAPPING – ACQUISITION & PROCESSING SOFTWARE

Seafloor Information System - SIS

Acquisition software for EM multibeam systems

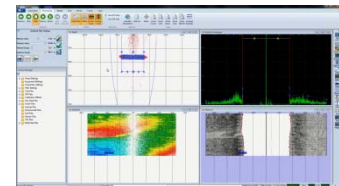
Supplied with a software license key and/or Hydrographic Workstation.



GeoSwath 4 (GS4) Software

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

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

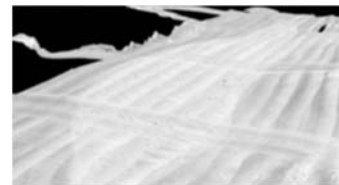


GeoTexture Software

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.



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.



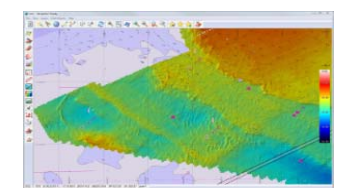
Note Software and USB license dongle key for customer supplied PC.

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.



Note: For operations outside the UK/EU due to export restrictions, an export licence may be required for the “SIS Software”. If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions. In most instances an end user statement will be required from the customer prior to despatch of the equipment.

UNDERWATER MAPPING – SUB-BOTTOM PROFILERS & SIDE SCAN SONAR SYSTEMS

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: L110 cm x D9 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 300 m soft tow cable on hand reel and 10 m deck cable.



OCEANOGRAPHIC – SOUND VELOCITY SENSORS & PROFILERS

Valeport 650 Sound Velocity Profiler

True Velocity Sound Measurement

Self-Recording & Direct Reading

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

Temperature: -5 to +35°C, acc. ± 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.



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. ± 0.02 , res. 0.001 m/s

Temperature: -5 to +35°C, acc. ± 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.



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. ± 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.



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. ± 0.10 m/s, res. 0.001 m/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.



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. ± 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 a with deployment cage

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



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. ± 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

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.

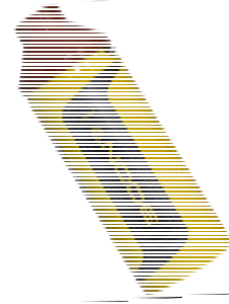


DATA TELEMETRY – ACOUSTIC MODEM

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: ± 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.



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: ± 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.



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.



cNODE® Maxi 34-180-Mi

Positioning and Transparent Modem Transponder*

30 kHz band (MF) Transponder
Fully compatible with Cymbal® acoustic link protocol
SSBL / USBL and LBL positioning modes
Beamwidth: ± 90 degrees
Max source level: 190 dB
Data transfer rate: up to 2 kilobit per second (bit/s)
Interface up to a maximum of three (3) external sensors
Serial input types: RS-232 or RS-485/422
Polyurethane coated aluminium housing, depth rating to 4000 m
Supplied with Lithium battery pack (Type: D48-Li, Reg no. 319554)
Length, diameter: 1014, 166 mm
Weight in air / water: 28 / kg
Note: Operates in conjunction with compatible HiPAP and cPAP 30 systems enabled with APOS Cymbal and Transparent Modem functions.



***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 Modem transponder”.
If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions.
In most instances an end user statement will be required from the customer prior to despatch of the equipment.

DATA TELEMETRY – RADIO MODEM

Maritime Broadband Radio System

MBR 179 Single System with Power Supply Unit~

Operational range: 0 to 45 km (28 miles)
User data: 1 to 15 Mbps
Operational coverage area: 360° (omni-directional)
Frequency band: 4.9 GHz to 5.9 GHz
Channel bandwidth: 20 MHz
Transmission power: 4 W
Data Interface: 1 x Ethernet, RJ-45
MBR Unit power consumption (max): 210 W
MBR Power Supply Unit: 110 to 240 V AC
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.



Maritime Broadband Radio System

MBR 189 Single System with Power Supply Unit~

Operational range: 0 to 50 km (>30 miles)
User data: 1 to 15 Mbps
Operational coverage area: 100° (azimuth)
Frequency band: 4.9 GHz to 5.9 GHz
Channel bandwidth: 20 MHz
Transmission power: 4 W
Data Interface: 1 x Ethernet, RJ-45
MBR Unit power consumption (max): 210 W
MBR Power Supply Unit: 110 to 240 V AC
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.



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).

DP REFERENCE – RELATIVE POSITIONING SYSTEMS

RADius 1000S System – Single Interrogator

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.



RADius 1000D System – Dual Interrogator

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.



RADius 1000T System – Triple Interrogator

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.



RADius 1000Q System – Quad Interrogator

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.



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.

DP REFERENCE – RELATIVE POSITIONING SYSTEM PARTS

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.



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.



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



DP REFERENCE – RELATIVE POSITIONING SYSTEM TRANSPONDERS

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



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



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



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



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

DP REFERENCE – LASER BASED RANGING SYSTEMS

SpotTrack System

£180 £150 £125

High Precision Positioning and Tracking System

Vertical angular coverage: 65° (min)
Horizontal angular coverage: 360°
DP range: 10 to 1000 m
Horizontal position accuracy: (2σ) 1 m @ 1000 m range
Bearing accuracy: (2σ) 1 mrad (0.06°)
Vertical stabilization: < ± 0.5° for roll, pitch < ± 20°
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.



MDL Fanbeam Mk5 System

£180 £150 £125

Precision Positioning and Tracking System

AutoTilt laser tracking system
AutoTilt mechanism: ±15° 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.



Fanbeam and SpotTrack Reflector / Prism

£3 £2 £2

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



6-way prism cluster (6 prisms)

£6 £4 £3

Max range: 1000 m / 1 km – 2000 m / 2 km
Angle coverage: 150°



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.

DP REFERENCE – GNSS POSITIONING SYSTEMS

Kongsberg 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, SeaSTAR XP, SeaSTAR G2

SBAS accuracy: < 1 m, 95 % CEP, 0.6 m, 1 σ

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 display/keyboard unit

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

Optional system item:

- 3610/3710 DGNSS Receiver.



Kongsberg Seatex DPS 132 System

GPS Based Position Reference Sensor

Combined GPS L1/L2 and SBAS receiver
MULTIREF capability

Accepts DGPS corrections: RTCM-SC104 ver. 2.2, 2.3, 3.0, 3.1, SeaSTAR XP

SBAS accuracy: < 1 m, 95 % CEP

DGPS accuracy: < 1 m, 95 % CEP

SeaSTAR XP accuracy 10 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 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

Optional system item:

- 3610/3710 DGNSS Receiver.



Kongsberg Seatex DPS 200 System

GNSS Based Position Reference Sensor

Combined GPS L1, GLONASS L1 and SBAS receiver
MULTIREF capability

Accepts DGPS / DGLONASS corrections: RTCM-SC104 ver. 2.2, 2.3, 3.0, 3.1

SBAS accuracy: < 1 m, 95 % CEP, 0.6 m, 1 σ

DGPS/DGLONASS accuracy: < 1 m, 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 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

Optional system item:

- 3610/3710 DGNSS Receiver.



3610/3710 DGNSS Receiver

DGNSS Correction Services Receiver Unit

Fugro Seastar XP/HP/G2/DGNSS capability

Supplied with type AD430-3141 DGNSS (Spotbeam) antenna

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

Note: Subscription to Fugro correction services not included.



DP REFERENCE – GNSS POSITIONING SYSTEM PARTS

Kongsberg 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.



Kongsberg Seatex DPS 200 Processing Unit**GNSS Based Position Reference Sensor**

Combined GPS L1, GLONASS L1 and SBAS receiver

19" rack mount

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



VESSEL REFERENCE SENSORS – MOTION REFERENCE UNITS

Vessel Motion Monitor (VMM) 200

Vessel Motion Analyser System

Ability to monitor motion at multiple vessel points

Real time statistical data analysis

Extensive data recording functionality

Supplied with MRU-5 motion sensor

Dynamic accuracy roll & pitch: 0.02° RMS

Dynamic accuracy heave: 5 cm or 5 % whichever highest

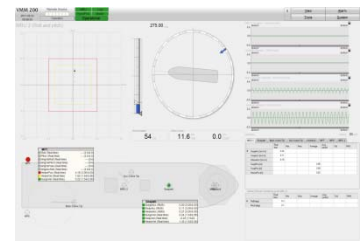
Data inputs: up to six RS-232 or 422 serial and ethernet

Power: 110-240 VAC, 140 W (max)

System Cabinet width, height, depth: 553, 390, 600 mm

Optional vessel data sensor inputs (NMEA format):

- Gyrocompass
- Wind direction/speed sensor
- Meteorological sensors
- GNSS positioning sensor.



Kongsberg Seatex MRU-6

Motion Sensor

Real-time, Roll, Pitch, Heave & Heading

Static Accuracy Roll & Pitch: 0.025° RMS

Dynamic Accuracy Roll & Pitch; Hdg: 0.03°; 1° RMS

Dynamic Accuracy Heave: 5 cm or 5 % whichever highest

Power Supply 12-30 V dc, 14.5 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.



Kongsberg Seatex MRU-5+

Motion Sensor

Real-time Roll, Pitch and Heave Measurements

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:

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



Kongsberg 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.



Kongsberg Seatex MRU-5 (5th Generation)**Motion Sensor**

Real-time Roll, Pitch and Heave Measurements

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:

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



Kongsberg 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 ±5° 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.



Kongsberg Seatex MRU-H (5th Generation)**Motion Sensor**

Real-time Roll, Pitch and Heave Measurements

Angular Orientation Range: ±180°

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:

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



Kongsberg Seatex MRU-3 (5th Generation)**Motion Sensor**

Real-time Roll, Pitch and Heave Measurements

Angular Orientation Range: ±45°

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:

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



Note: No export licence required.

Kongsberg 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 ±5° 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.



Kongsberg 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.



Kongsberg Seatex MRU-D (5th Generation)**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 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.



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". If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions. In most instances an end user statement will be required from the customer prior to despatch of the equipment.

VESSEL REFERENCE SYSTEMS – POSITION, HEADING & ATTITUDE SYSTEMS

Kongsberg Seapath 130-3 System

GNSS Aided Heading, Attitude and Positioning Sensor

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

Supplied with a MRU-3 Motion Sensor

Position Accuracy: 0.5m RMS or 1m (95% CEP) with DGNSS/SBAS

Dynamic Accuracy Roll/Pitch; Heading: 0.08°; 0.2° 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: 1200, 200, 100 mm; 3.7 kg

Supplied as standard with a 20 m sensor spider cable.



Note: No export licence required.

Kongsberg Seapath 130-H System

GNSS Aided Heading, Attitude and Positioning Sensor

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

Supplied with MRU-H Motion Sensor in Subsea Housing

Position Accuracy: 0.5m RMS or 1m (95% CEP) with DGNSS/SBAS

Dynamic Accuracy Roll/Pitch; Heading: 0.03°; 0.2° 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: 1200, 200, 100 mm; 3.7 kg

Supplied as standard with a 20 m sensor spider cable.



Kongsberg Seapath 130-5 System

GNSS Aided Heading, Attitude and Positioning Sensor

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

Supplied with MRU-5 Motion Sensor in Subsea Housing

Position Accuracy: 0.5m RMS or 1m (95% CEP) with DGNSS/SBAS

Dynamic Accuracy Roll/Pitch; Heading: 0.02°; 0.2° 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: 1200, 200, 100 mm; 3.7 kg

Supplied as standard with a 20 m sensor spider cable.



Kongsberg Seapath 130-5+ System

GNSS Aided Heading, Attitude and Positioning Sensor

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

Supplied with MRU-5+ Motion Sensor in Subsea Housing

Position Accuracy: 0.5m RMS or 1m (95% CEP) with DGNSS/SBAS

Dynamic Accuracy Roll/Pitch; Heading: 0.008°; 0.2° 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: 1200, 200, 100 mm; 3.7 kg

Supplied as standard with a 20 m sensor spider cable.



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

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

Supplied with MRU-5 Motion sensor

Position Accuracy: 0.7m RMS /1.5m (95% CEP) with DGNSS corrns

Heading Accuracy: 0.065° RMS (2.5m baseline)

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

Dynamic Accuracy Heave: 5cm or 5% whichever is highest

Data Output Rate: up to 100 Hz

Power: 115-230 VAC, 125 W (max).

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

Supplied as standard with 2 x 25 m GNSS cables

Optional system item:

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



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

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

Supplied with MRU-5+ Motion sensor

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

Dynamic Accuracy Heave: 5cm or 5% whichever is highest

Data Output Rate: up to 200 Hz

Power: 115-230 VAC, 125 W (max).

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

Supplied as standard with 2 x 25 m GNSS cables

Optional system item:

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



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.



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

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.



Note: For operations outside the UK/EU due to export restrictions, an export licence will be required for the "Seatex MRU-5+/5/H".

If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions.

In most instances an end user statement will be required from the customer prior to despatch of the equipment.

AUTONOMOUS UNDERWATER VEHICLE – MUNIN AUV SYSTEM

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 - 4-24 kHz
- HiPAP®351P-5 or MGC Portable System
- GNSS Positioning and/or Heading Sensor

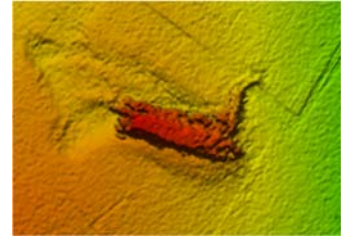
Note: It is mandatory due to ITAR restrictions that the MUNIN System is
accompanied by Kongsberg Maritime Ltd. Support Engineer(s).

Note: The MUNIN AUV system is subject to US Department of State and UK Department for International Trade export restrictions.

The MUNIN system is subject to UK and US ITAR export control restrictions and must be operated by and be under the control of authorised Kongsberg personnel at all times during rental and use. The MUNIN system can only be operated in approved territories and will not be shipped or used in any country listed on 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.



AUTONOMOUS UNDERWATER VEHICLE – SEAGLIDER AUV SYSTEM

Seaglider Autonomous Underwater Vehicle Small, Lightweight, AUV System*



Sensor Payload:

Seabird CT (conductivity/temperature) Sail Sensor
Contros HydroFlash Oxygen Sensor
Seabird SeaOWL UV-A (oil-in-water) Sensor

Technical Specification:

Navigation: GPS
Communication: Iridium
Energy: Internal 15 V Lithium Battery Pack
Endurance: Up to 10 months (sensor dependant)
Operating Depth Range: 50 to 1000 m
Speed: Typical 25 cm/s (0.5 kt)
Glider Angle: 16-45° (1:3.5 to 1:1 slope)
Vehicle Diameter, Length: 300, 2000 mm
Wing Span: 1000 mm
Weight in air: 52 kg

Optional:

- Iridium data services
- Piloting services.

Note: For operations outside the UK/EU due to export restrictions, an export licence will be required for the “Seaglider System”. If in doubt please contact the Export Control Organisation (ECO) (<https://www.gov.uk/government/organisations/export-control-organisation>), in some cases delays may be unavoidable due to export restrictions.

In most instances an end user statement will be required from the customer prior to despatch of the equipment.

***Note:** Supplied with lithium battery cells which are subject to the IATA Dangerous Goods Regulations UN3090/UN3091 for transportation by air.

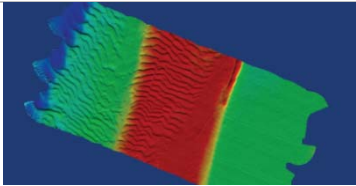
AUTONOMOUS UNDERWATER VEHICLE – AUV PAYLOAD MODULES

GeoSwath Plus Module for REMUS 100 AUV
Phase Measuring Bathymetric Sonar System
Ultra High Resolution Swath Bathymetry
Co-registered Geo-referenced Side Scan

£450 £380 £325

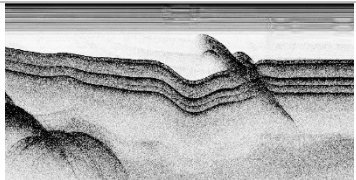
Technical Specification:

Frequency: 500 kHz
Range: 1 to 50 m
Max Swath Width: 190 m
Max Coverage: up to 9 x water depth or fly height
Depth Resolution: 1.5 mm
Two Way Beam Width (Horizontal): 0.5°
Transmit Pulse Length: 32 µs to 224 µs
Max Swath Update Rate: 30 per sec (range dependant)
Anodised Aluminium Module Housing, depth rated to 100m
Module Diameter, Length: 190, 489 mm
Module Weight in air / water: 12.5 / 3 kg
Power Consumption: (50 W full operation, 20 W standby)
Full GeoAcoustics software solution included: data acquisition, processing, presentation.



Sub-Bottom Profiler for MUNIN AUV
EdgeTech Sub-Bottom Profiler: 4-24 kHz
Depth Rating: 600 m

£750 £640 £540



GLOBAL SUPPORT 24/7

We are always there, wherever you need us. KONGSBERG customer services organisation is designed to provide high-quality, global support, whenever and wherever it is needed. We are committed to providing easy access to support and service, and to responding promptly to your needs. Support and service activities are supervised from our headquarters in Norway, with service and support centres at strategic locations around the globe – where you are and the action is.

As part of our commitment to total customer satisfaction, we offer a wide variety of services to meet individual customers' operational needs. KONGSBERG support 24 is a solution designed to give round-the-clock support. For mission-critical operations, KONGSBERG support 24 can be extended to include remote monitoring. We can adapt the level of support needs by offering service agreements, on-site spare part stocks and quick on-site response arrangements.

Global and local support

We provide global support from local service and support facilities at strategic locations world wide. Service and support work is carried out under the supervision of your personal account manager, who will ensure that you receive high-quality service and support where and when you need it.

Your account manager will ensure continuity and work closely with your personnel to improve and optimise system availability and performance. Under the direction of your account manager, and with a local inventory of spare parts, our wellqualified field service engineers will be able to help you quickly and effectively.

GLOBAL SUPPORT 24/7

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KONGSBERG