

Seapath® 130 series



KONGSBERG



The compact GNSS aided Inertial Navigation System

The Seapath 130 series is developed specifically for hydrographic surveying where high-precision heading, position, velocity, roll, pitch, heave and timing are critical measurements. The product combines state-of-the-art multi-frequency GNSS receivers, inertial technology and processing algorithms in a compact and portable package.

Function

The advanced Seapath sensor fusion algorithms integrate raw inertial sensor data from our unique and very high-performance MGC® (Motion Gyro Compass), MRU (Motion Reference Unit) or miniMRU, together with raw GNSS data and RTK, PPP or DGNSS corrections. Our unique navigation algorithms enable high accuracy position output even when no correction signals are available.

The Seapath is robust against GNSS dropouts by using the inertial sensor for dead reckoning navigation, providing all measurements even when GNSS is not available.

Post-processing of the Seapath data is possible to further enhance accuracy in position and attitude. The Seapath 130 includes a new post-processing format that contains all necessary data and system configuration in a single file. Centimetre position accuracy can be achieved through downloaded satellite orbit and clock data or data logged from base stations.

Product components

The main component is the Sensor Unit with the integrated GNSS antennas and receivers. The Sensor Unit is mounted on top of the vessel mast or a pole. The inertial sensor is mounted on top of the

transducer within a light-weight subsea housing. The Sensor Unit supports all 3-axis IMU versions of our MGC®, MRU or miniMRU lines.

The Seapath operator software is installed on the customer's computer for configuration and monitoring. The latest Seapath software includes Automatic Online Calibration (AOC) which significantly improves the roll and pitch accuracy. With the AOC functionality, a recalibration of the MGC/MRU/miniMRU is no longer required.

Interfaces

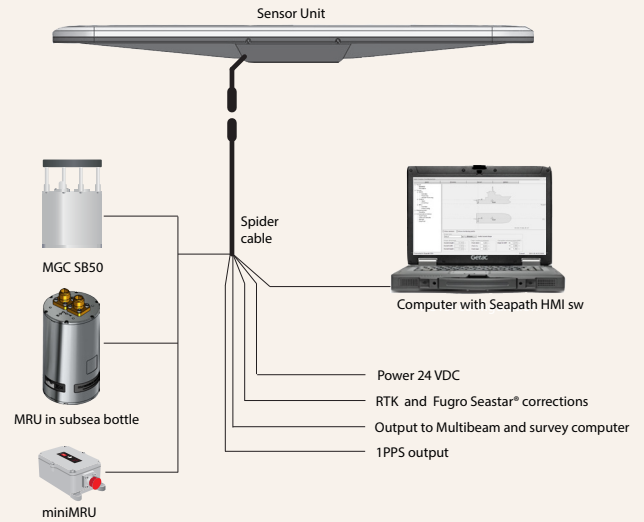
The product has three configurable RS-232/422 serial lines and eight Ethernet ports for output of motion data and NMEA messages to the multibeam and survey computer. DGNSS corrections of various quality and sources are input on a configurable RS-232/422 serial line or Ethernet.

Product range	Motion			Position				
	Roll/pitch	Heading	Heave	Non-differential	Galileo HAS	RTK	Real-time PPP	Dead reckoning 60 s
Seapath 130-3/40	0.010°	0.10°	2 cm or 2 %	0.3 m	0.1 m	0.01 m	0.05 m	1.6 m
Seapath 130-5/60	0.008°	0.08°	1 cm or 1 %	0.3 m	0.1 m	0.01 m	0.05 m	0.6 m
Seapath 130-5+	0.005°	0.08°	1 cm or 1 %	0.3 m	0.1 m	0.01 m	0.05 m	0.3 m
Seapath 130-R2	0.008°	0.06°	1 cm or 1 %	0.3 m	0.1 m	0.01 m	0.05 m	0.6 m
Seapath 130-R3	0.007°	0.05°	1 cm or 1 %	0.3 m	0.1 m	0.01 m	0.05 m	0.2 m

All data are RMS values, 1-metre antenna baseline and for horizontal position. All roll and pitch values are with Automatic Online Calibration (AOC). Heave values are valid for delayed heave up to a 50-second heave period and real-time heave up to a 10-second heave period. Longer periods will increase uncertainty. Roll, pitch, heading and heave are unaffected by a 60-second GNSS dropout.

FEATURES

- Compact and robust integrated INS/GNSS system
- 0.005° to 0.010° roll & pitch accuracy dependent on IMU (Inertial Measurement Unit) model
- No accuracy degradation in roll, pitch and heave measurements during turns
- Precise heave at long wave periods by use of the PFreeHeave® algorithms
- 550-channel multi-frequency GPS/GLONASS/Galileo/BeiDou/QZSS receiver
- Robust against GNSS dropouts due to inertial sensor part of product
- Multiple differential correction support including SBAS
- RTK correction on RTCM format supported
- Seastar®, OmniSTAR® and Marinestar™ corrections supported
- All data are provided with a time stamp with an accuracy of 0.001 s to the actual measurement time
- Outputs on RS-232, RS-422 and Ethernet
- Up to 100 Hz data output rate
- Precise Time Protocol (PTP) and NTP available for time critical applications over Etherne
- Multi-frequency GNSS ionospheric compensation
- Logging of raw satellite and IMU data possible
- Meets IHO exclusive order requirements



Technical specifications

Seapath® 130 series

Interfaces

Communication ports	3 serial RS-232/RS-422 lines and 8 Ethernet UDP/IP ports
Data output interval	Programmable in 0.01-second steps and 1PPS pulse
Data output rate	Up to 100 Hz

GNSS signal tracking

GPS	L1 C/A, L1C, L2C, L2P, L5
GLONASS	L1 C/A, L2 C/A, L2P, L3, L5
Galileo	E1, E5 AltBOC, E5a, E5b, E6
BeiDou	B1I, B1C, B2I, B2a, B2b, B3I
QZSS	L1 C/A, L1C, L1S, L2C, L5, L6

Power specifications

Sensor Unit	24 VDC, 10 W
IMU	24 VDC, 12 W

Weights and dimensions

Sensor Unit	7.7 kg, 1210 × 210 × 94 mm
MRU in light-weight bottle	3.7 kg, Ø 120 × 241 mm
miniMRU	0.5 kg, 100 × 80 × 48 mm
MGC	8.1 kg, 188 × 189 × 189 mm

Environmental specifications

Operating temperature range

Sensor Unit	-40 - 70 °C
MRU/miniMRU	-5 - 55 °C
MGC	-15 - 55 °C

Humidity

Sensor Unit	Hermetically sealed
IMU subsea housing	Hermetically sealed

Specifications are valid without multipath, without shadowing of antenna and for typical survey operations.

Specifications subject to change without any further notice.