

# SEAPATH® 320-R SERIES



KONGSBERG



Foto: Magne Olsen, Havforskningsinstituttet



## PRECISE HEADING, ATTITUDE AND POSITIONING SENSOR

The Seapath 320-R series is developed specifically for the hydrographic and other high precision applications where heading, position, roll, pitch, heave and timing are critical measurements. The product series combines inertial technology together with GPS and GLONASS satellite signals. The MGC part of the Seapath 320-R series functions both as IMU in the Seapath and as a stand-alone IMO type approved gyrocompass.

### Integrated inertial/GNSS product

The Seapath 320-R offers the best possible combination of GNSS signals and inertial measurements for demanding operations in challenging environments. This Seapath product includes the MGC inertial navigation sensor, providing up to 0.01° RMS roll, pitch and heading accuracy. This accuracy is achieved by the use of accurate linear accelerometers and unique ring laser gyros.

The combination of GNSS signals and inertial data enables a much better performance than each of the signals alone with a high output data rate (up to 200 Hz), zero delay on output data, data available in up to eight different monitoring points and a total of sixteen configurable serial lines and Ethernet ports, together with three analog channels.

### Accuracy and reliability

The redundancy of the Seapath measurements is improved by using the two built-in GNSS receivers for position and velocity determination. In case of missing data from one GNSS receiver, then the other (remaining) receiver provides position and velocity, and the inertial sensor provides heading from its internal rate sensors. Improved heading and position availability when passing bridges and close to high buildings is made possible due to the combined GPS/GLONASS solution. The Seapath 320-R is robust against GNSS dropouts by using the inertial sensor part of the product to provide position, velocity and heading measurements when GNSS signals are not available. No user actions are required.

### Product range

The Seapath 320-R series is delivered in the following product range:

	Roll/Pitch [RMS]	Heading [RMS]	
		2.5m baseline	4m baseline
Seapath 320-R2	0.02°	0.03°	0.02°
Seapath 320-R3	0.01°	0.02°	0.01°

### System configuration

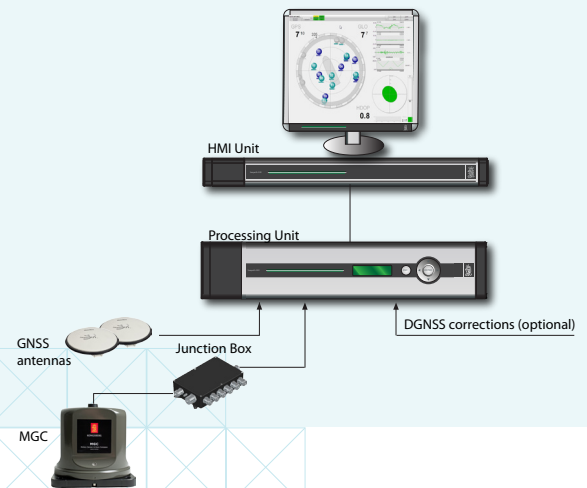
This Seapath product is a two-module solution with a Processing and an HMI Unit connected via Ethernet. The Processing Unit runs all critical computations independent from user interface on the HMI Unit to ensure continuous and reliable operation. Multiple HMI Units can be connected to the same Processing Unit in a networked architecture. The HMI Units present the vessel motion in a clear and easy-to-understand format. The Seapath is operated through the operator software installed on one or several HMI Units. This software is used for performance monitoring, configuration and troubleshooting of the system.

### Applications

This integrated navigation product is a unique solution for applications within hydrographic surveying, dredging, oceanographic research, seismic work and offshore construction where accurate compensation of multibeam echo sounders, hydro acoustic positioning systems and ADCPs or vessel motion monitoring are required.

# FEATURES

- 0.01° to 0.02° roll, pitch and heading accuracy dependent on MGC model
- IMO type approved gyrocompass part of the product
- 2 cm heave accuracy by use of the PFreeHeave® algorithms
- Meets IHO special order requirements
- Robust against GNSS dropouts due to the inertial sensor part of the product
- Multiple satellite constellation support (GPS and GLONASS)
- Multiple differential correction support including SBAS
- All data have the same time stamp and to an accuracy of 0.001 s to the actual measurement time
- Outputs on RS-232, RS-422, Ethernet and analog channels
- Up to 200 Hz data output rate



# TECHNICAL SPECIFICATIONS

## SEAPATH 320-R SERIES

### PERFORMANCE

Heave accuracy (real-time)	5 cm or 5 % whichever is highest
Heave accuracy (delayed signal)	2 cm or 2 % whichever is highest
Heave periods (real-time)	1 to 25 seconds
Heave periods (delayed signal)	1 to 50 seconds

Position accuracy (DGPS/DGLONASS)	1 m (95 % CEP)
Position accuracy (SBAS)	1 m (95 % CEP)
Position accuracy (RTK corrections)	0.20 m (95 % CEP)

Velocity accuracy	0.07 m/s (95 % CEP)
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### DATA OUTPUTS

Communication ports	8 serial RS-232/RS-422 lines and 16 Ethernet UPD/IP ports
Data output interval	Programmable in 0.005-sec. steps and 1PPS pulse
Data update rate	Up to 200 Hz
Analog output	3 user configurable channels, +/- 10 Volt
1PPS signal accuracy	220 nsec

### POWER SPECIFICATIONS

Processing Unit	100 to 240 V AC, 75 W (max)
HMI Unit	100 to 240 V AC, 40 W (max)
Monitor	100 to 240 V AC, 23 W (max)
IMU	24 V DC from Processing Unit
GNSS antenna	5 V DC from Processing Unit

### WEIGHTS AND DIMENSIONS

Processing Unit	5.4 kg, 89 x 485 x 357 mm
HMI Unit	3.8 kg, 44 x 485 x 330 mm
Monitor	3.8 kg, 383 x 380 x 170 mm
IMU	8.1 kg, 188 x 189 x 189 mm
GNSS antenna	0.5 kg, 69 x 185 mm

### ENVIRONMENTAL SPECIFICATIONS

#### Operational temperature range

Processing and HMI Unit	-15 to +55 °C
Monitor	+5 to +40 °C
IMU	-15 to +55 °C
GNSS antenna	-40 to +85 °C

#### Storage temperature range

Processing and HMI Unit	-20 to +70 °C
Monitor	-20 to +60 °C
IMU	-25 to +70 °C
GNSS antenna	-40 to +85 °C

#### Enclosure protection

Processing and HMI Unit	IP 21 (rear)
Monitor	IP 21 (rear)
IMU	IP 66
GNSS antenna	IP 66
Cables	IP 67
Connectors	IP 67

#### Mechanical

Vibration	IEC 60945/EN 60945
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#### Electromagnetic compatibility

Compliance to EMC, immunity/emission	IEC 60945/EN 60945
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#### PRODUCT SAFETY

Compliance to LVD, standard used	IEC 60950-1/EN 60950-1
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Specifications are valid without multipath, without shadowing of antennas and with vessel in motion.

Specifications subject to change without any further notice.

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