

Seatex Seapath 200 RTK High Grade Heading, Attitude and Positioning Sensor

The Seatex Seapath 200 RTK (Real Time Kinematic) sensor uses state-of-the-art GPS technology and processing to provide the measurement accuracy that all surveyors have been asking for:

- Centimetre-level position accuracy at several reference points on the vessel
- Real-time tide measurements
- Combined RTK and vertical acceleration heave measurements
- Precise heading, attitude and velocity measurements.

The Seapath 200 RTK is delivered complete with a Seatex Searef 200 GPS RTK reference station and a UHF radio data link. The package is complete and all you need for RTK measurement surveying!

Integrated RTK/inertial sensor solution

The Seapath 200 RTK provides high accuracy, real-time position, heading and attitude information by blending the best characteristics of inertial navigation and GPS RTK technologies. High-rate motion data obtained from the system's IMU (Inertial Measurement Unit) and precise position data from two, fixed baseline GPS carrier-phase receivers are integrated in a Kalman Filter within the Seapath Processing Unit. The Seapath 200 RTK model includes one dual frequency RTK receiver in addition to one L1 GPS receiver in order to provide heading and centimetre level, real-time 3D position accuracy. The system contains sophisticated algorithms that determine the integer ambiguity dynamically OTF (On The Fly) using both GPS frequencies (L1 and L2).

This tight integration of the RTK GPS data with the inertial sensor data from the IMU gives the Seapath 200 RTK product unique advantages compared to stand alone RTK products. The Seapath 200 RTK's highly accurate roll, pitch and heading measurements allow the RTK antenna position to be referenced to a number of points on the vessel where accurate position and velocity data are required. All the data from Seapath 200 RTK have the same time stamp and the output is in real-time. The high update rate of the IMU data yields output measurements at 100 Hz, including the position data.

This Seapath model is capable of determining the heave measurement without phase errors by a unique combination of vertical acceleration and RTK position measurements. This combination makes it possible to measure wave slopes and the tide in real time with high precision.

Versatile output variables and protocols

The Seapath 200 RTK includes output protocols for all commonly used survey equipment. The output variables are available on two RS-232 and two RS-422 individually configurable output serial lines and on an Ethernet output.



High performance RTK reference station

The Seapath 200 RTK system is delivered complete with a UHF data link and the portable Seatex Searef 200 GPS reference station. This reference station is designed specifically for RTK marine surveying and features a 12-channel, dual-frequency, all-in-view GPS receiver for optimum accuracy and multipath mitigation. The integrated UHF radio distributes DGPS RTK corrections to the mobile Seapath 200 RTK system in real time.

The Searef 200 is designed to withstand weather conditions ranging from the extreme cold of polar icecaps to the heat and humidity of tropical jungles. The robust, all-weather housing contains all the required station components. Antennas for GPS and UHF transmission are included with the package.

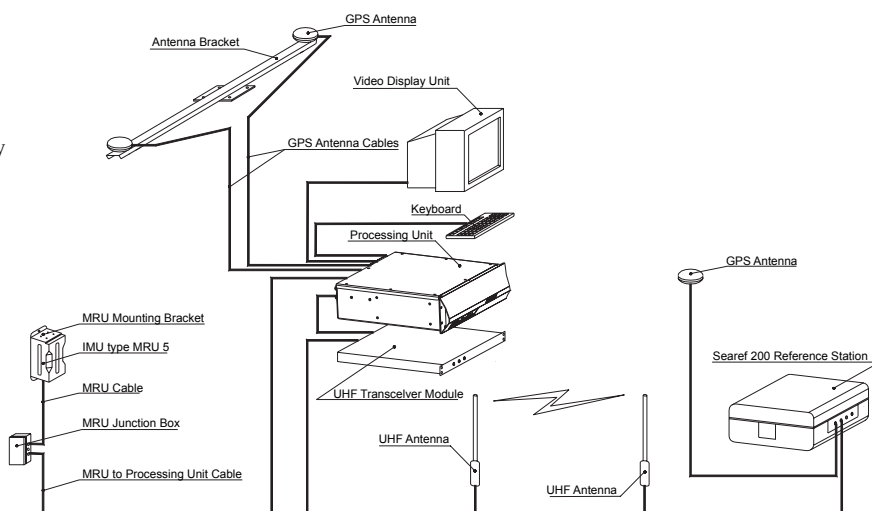
As an option, the Seapath 200 RTK system can be delivered with a stationary reference station called the Seatex Searef 300 instead of the portable Searef 200. The Searef 300 has all the functionality of the Searef 200 but adds a data logging function for post-processing.

Applications

This complete package is a unique solution for hydrographic surveying and dredging work demanding the most comprehensive, most accurate surveying data available.

Features

- 3D position measurements with centimetre accuracy
- Accurate referencing of the RTK antenna position to four user defined points
- Wave slopes and tide measured with high precision
- 0.03° in documented roll and pitch dynamic accuracy
- No accuracy degradation in roll, pitch and heave measurements during turns
- Robust against GPS dropouts with IMU sensor-based backup
- All output data available in real time
- 100 Hz update rate, including position
- Outputs on RS-232, RS-422 and Ethernet
- No export license required
- Tide sensor requirement eliminated
- Simple and error free installation ensured by using the graphical configuration software



Technical specifications

Performance

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|---|---|
| Heading accuracy | 0.05° RMS (4 m baseline) 0.075° RMS (2.5 m baseline) |
| Roll and pitch accuracy | 0.03° RMS for ±5° amplitude |
| Scale factor error in roll, pitch and heading | 0.2% RMS |
| Heave accuracy | 5 cm or 5% whichever is highest |
| Heave motion periods | 1 to 40 seconds |
| Position accuracy (x and y) | 1 cm + 1.6 ppm RMS (*) |
| Position accuracy (z) | 2 cm + 3.2 ppm RMS (*) |
| Velocity accuracy | 0.03 m/s RMS |
| Range to Searef 200 reference station (max) | 10 km |
| UHF radio frequencies | 450-470 MHz (optional 868-870 MHz) |

Data outputs

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|------------------------|--|
| Communication ports | 4 serial RS-232/RS-422 lines and Ethernet |
| Data output interval | Programmable in 0.01 sec. steps and 1PPS pulse |
| Output message formats | NMEA 0183 ZDA, GGA, GLL, VTG, HTD and proprietary messages, Seatex Binary, Simrad EM1000 and EM3000, Echo sounder format, ADCP proprietary NMEA format 'PRDID', Atlas Fansweep, Submetrix and Interface to Lehmkuhl gyro repeater. |
| Analog outputs | 3 user configurable channels |

Data inputs

| | |
|---------------------|-------------------------------------|
| Communication ports | 4 serial RS-232/RS-422 lines |
| Baud rate | 38.4k baud (max) |
| DGPS corrections | RTCM-104 version 2.2 |
| Gyrocompass | NMEA 0183 HDT, Robertson 4 byte BCD |

Dimension and weight

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|-------------------------|--|
| Seapath Processing Unit | 3U 19" rack unit, 430 mm (d) x 132 mm (h), weight 12 kg |
| UHF Transceiver Module | 1U 19" rack unit, 350 mm (d) x 44.5 mm (h), weight 3 kg |

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|-------------------------------|--|
| Video Display Unit (optional) | 362 mm (w) x 396 (d) x 370 mm (h), weight 13.5 kg |
| Motion sensor | Ø105 x 204 mm, weight 2.5 kg |
| Searef 200 Reference Station | 400 mm (w) x 410 (d) x 196 mm (h), weight 9.1 kg |
| Antenna beam | 2700 x 200 x 100 mm |

Operating temperature

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|-------------------------------|--------------|
| Seapath Processing Unit | 0 to +55°C |
| UHF Transceiver Module | 0 to +55°C |
| Video Display Unit (optional) | 0 to +40°C |
| Motion sensor | -5 to +55°C |
| Searef 200 Reference Station | -20 to +55°C |
| Antenna | -30 to +70°C |

Power

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|-------------------------------|----------------------------|
| Seapath Processing Unit | 85 to 265V AC, 100 W (max) |
| Video Display Unit (optional) | 95 to 264V AC, 75 W (max) |
| Searef 200 Reference Station | 10 to 36V DC, 25 W (max) |

Humidity

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|-------------------------------|--------------------------------|
| Seapath Processing Unit | 10-95% relative non condensing |
| UHF Transceiver Module | 10-95% relative non condensing |
| Video Display Unit (optional) | 10-80% relative non condensing |
| Motion sensor | Hermetically sealed |
| Searef 200 Reference Station | Hermetically sealed |
| Antenna | Hermetically sealed. |

(* Accuracy is dependent on GPS satellite geometry, environment, ionospheric conditions and distance to the reference station)

Specification subject to change without further notice



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