

# iNAV-RQH-1003

## Inertial Navigation System with Laser Gyros and Servo Accelerometers

iNAV-RQH is an INS product family for inertial navigation and dynamically motion analysis with laser gyros that covers applications which require highest accuracy, reliability and an open interface to the user.

- high end guidance and control
- random walk 0.002 deg/sqrt(hr)
- bias 0.003 deg/hr / 25 µg
- 300 Hz data rate
- RTK GPS/GLONASS and Strapdown processor on-board
- Internal flash disk (8 GByte)
- used on helicopters, fixed wing aircrafts, UAVs, AUVs, ships, speed boats, trucks and cars

accelerometers (Q-Flex) and a powerful strapdown processor.

As an option the modular designed system provides interfaces to (D)GPS, up to 3 odometers and external trigger I/O. Outputs are Ethernet, RS232/ 422, SDLC/HDLC, CAN or custom specific and internal data storage on flash drive as an option. Data processing (strapdown algorithms, global or local navigation, north-seeking or motion monitoring and control) inside of the iNAV-RQH-1003 is possible as well as data transmission of pure or corrected raw data.



iNAV-RQH consists of three highly integrated high precision ring laser gyroscopes (Dig-Gyro), three servo

### Technical Data:

### Gyroscopes

### Accelerometers

Range:	± 400 deg/s	± 20 g
Drift/Offset (OTR):	< 0.003 deg/h (1 sigma)	< 25 µg
Bias stability :	0.002 deg/h (const. temp.)	< 10 µg
Random Walk:	< 0.002 deg/√h	
Noise (0...300 Hz):		< 8 µg/√Hz rms plus rlg dithering
Resolution:	0.0003 deg (1,13")	< 5 µg (depends on data output rate)
Scale factor error:	< 5 ppm	< 100 ppm
Linearity error:	< 5 ppm	< 20 µg/g <sup>2</sup>
Bandwidth:	300 Hz	300 Hz
Data rate:	1...300 Hz	
True Heading:	< 0.04 deg / sec(lat) <sup>1</sup> [ $< 0.008 \text{ deg}^2$ ]	
Attitude accuracy:	< 0.01 deg [ $< 0.005 \text{ deg}^2$ ]	
Position accuracy:	< 15 m (with GPS, temporary GPS gaps allowed) approx. 2..30 cm with RTK GPS / RTK postproc < 0.1 % distance travelled (with odometer and GPS, application dependant) < 1 m /hr (free inertial with ZUPT all 1 minute, application dependant) < 0.1 % of distance travelled on autonomous underwater vehicles (AUV) including RDI DVL interface (position error at bottom track approx. 4 m / hr at 1 m/s) < 0.8 nm/hr free inertial after 15 minutes alignment	
Output:	RS232/422 (up to 115.2 kBd), Ethernet TCP/IP and UDP (100 MBit/s), CAN (up to 1 MBd) MIL-C-38999 III - connectors Internal flash disk for data storage (up to 8 GByte on request)	
Inputs:	(D or RTK)GPS (NMEA or binary data), up to 3 odometer inputs (A/B), DVL, APS, event trigger, synchronisation input/output internal L1/L2/GLONASS GPS engine; connection of external GPS engine possible Input for PPS (from internal GPS engine or from external source)	
GPS:		
Synchronization:	Input for PPS (from internal GPS engine or from external source)	
Power:	11...34 V DC; 40 W	
Temperature:	-40...+60 °C	
Rel. Humidity:	8...100 %, IP67	
Shock, Vibration:	60 g, 6 ms; 10...2000 Hz, 3 g rms	
MTBF:	25,000 hrs (surveying application)	
Weight, Size:	approx. 10.5 kg ; approx. 299 x 213 x 179 mm (without connectors)	
Software:	internal online Kalman filter; NavCommand software; INS/GPS post-proc	

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<sup>1</sup> real-time <sup>2</sup> post-proc, depends on environment