Navigation sensor package

Nucleus1000

A sensor hub that makes vehicle control and navigation possible.

The Nucleus1000 is a sensor package that has all the necessary sensors and data products to aid in subsea navigation and vehicle control. This includes estimates of distance from the surface and bottom, attitude, heading and velocity. To learn more about the Nucleus1000's capabilities, click here.

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Highlights

- Compact size optimal for small ROVs and AUVs
- Integrated AHRS for pre-calibrated attitude and heading information
- Dedicated vertical beam for altimeter information

Applications

- Small ROV
- Micro AUV
- Coastal USV

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Technical specifications

⟶ Bottom tracking	
Maximum altitude	50 m
Minimum altitude	10 cm
Long-term accuracy	>1.01% (license-free), <0.3% (export-controlled)
Velocity resolution	0.01 mm/s
Single ping standard	0.5 cm/s
Maximum ping rate	2 Hz
⟶ Altimeter	
Range	50 m
Accuracy	1% of measured value
Resolution	0.1 cm
⟶ Environmental	
Operating temperature	-4 to +40 °C
Storage temperature	-20 to +60 °C
⟶ Mechanical design	
Depth rating	300 m
Height	42 mm
Diameter	90 mm
Weight in air	535 g
Weight in water	295 g
⟶ Power	
Voltage range	10-32 V
Average power	< 4 W
Maximum peak power	35 W
⟶ Communication	
Serial	RS-422

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⟶ Communication	
Ethernet	10/100 Mbits Auto MDI-X.TCP/IP, UDP/IP. Fixed IP / mDNS/DHCP client /Auto IP address assignment. (Multiple simultaneous data format transmission possible.) Data formats Nortek proprietary.
⟶ Hardware	
Frequency of operation	1 MHz
Beam width	3.4°
Vertical beam angle	20°
⟶ AHRS	
Pitch and roll accuracy	0.35°
Heading accuracy	0.5°
Output rate	25 Hz
⟶ Pressure sensor	
Pressure accuracy	0.1% FS /precision better than 0.002% of full scale
Temperature	-4° to +40 °C ± 0.1 °C
⟶ Magnetometer	
Range	800 µT
Repeatability over ±200µT	20 nT
Noise	50 nT
Sampling	75 Hz
⟶ Accelerometers	
Range	40 g
Bias - repeatability	6 mg
Velocity random walk	0.039 m/sec/√hr
Bias instability	135x10-6 m/sec2
Scale factor stability	0.10 %
Sampling rate	100 Hz
⟶ Gyroscopes	
Range	2000°/s
Bias - repeatability	1.4°/s
Angular random walk	0.3°/√hr

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⟶ Gyroscopes	
Bias instability	8°/h
Linear acceleration effect	1.02x10-3 (°/s)/(m/s2)
Vibration rectification error	5.6x10-6 (°/s)/(m/s2)2
Sampling rate	100 Hz