Nucleus1000

NORTEK

A sensor hub that makes vehicle control and navigation possible.

The Fusion DVL1000 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.

Highlights

- ✓ Small size
- ✓ Complete sensor suite
- ✓ Proven performance

Applications

- ✓ Small ROV
- ✓ Micro AUV
- ✓ Coastal USV

Technical specifications

→ Bottom tracking

Maximum altitude	50 m
Minimum altitude	10 cm
Long-term accuracy	>1% (license-free), <0.3% (export-controlled)
Velocity resolution	0.01 mm/s
Single ping standard deviation	0.5 cm/s
Maximum ping rate	8 Hz [1]

[1] Maximum ping rate is range dependent

→ Water tracking

Minimum accurary	0.5% of measured value / +-0.5 cm/s
Minimum range	2.0 m

→ Current profiling

Minimum accuracy	0.5% of measured value / +-0.5 cm/s
Velocity resolution	0.1 cm/s
Interval	User specified N^{th} ping
Maximum range	30 m
Blanking	0.1 m
Cell size	0.2-2.0 m
Max # cells	150

→ Altimeter

Range	50 m
Accuracy	1% of measured value
Resolution	1 cm

→ INS

Position accuracy of distance travelled	2%[2]
Output rate	Configurable

[2] Nominal position error, given as % of Distance Travelled. Value given is a reflection of a given set of operational conditions. Note that deviations from this specification can be expected in line with varying environmental conditions and integration parameters. INS functionality currently only available as export controlled

→ AHRS

Pitch and roll accuracy	0.35 deg
Heading accuracy*	0.5 deg
Output rate	Configurable

- Heading accuracy for nominal conditions. Vehicles or environments which disturb the magnetic field will degrade performance

→ Pressure sensor

Pressure accuracy	0.3% FS (precision better than 0.003% of full scale per sample)
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	135e-6 m/sec²
Scale factor stability	0.10 %
Sampling rate	100 Hz

→ Gyroscopes

Range	2000 deg/sec
Bias - repeatability	1.4 deg/sec
Angular random walk	0.3 deg/√hr
Bias instability	8 deg/h
Linear acceleration effect	1.02×10^{-3} (deg/sec)/(m/sec²)
Vibration rectification error	5.6×10^{-6} (deg/sec)/(m/sec²)²
Sampling rate	100 Hz

→ Environmental

Operating temperature	-4 to +40 °C
Storage temperature	-20 to +60 °C

→ Mechanical design (shallow/deep)

Depth rating	300 m
Height	42 mm
Diameter	90 mm
Weight in air	535 g
Weight in water	295 g

→ Power

Voltage range	10-28 Volts
Average power	< 4 W
Maximum peak power	35 W

→ Communication

Serial	RS-422 / RS-232

→ 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 deg