

NAVS-1000

Underwater Integrated Navigation System

IMU/DVL/DEPTH



Overview

The NAVS-1000 is a new-generation all-in-one integrated navigation system, integrating a pressure sensor, Doppler Velocity Log (DVL), and high-performance inertial measurement unit (IMU). Designed specifically for compact Autonomous Underwater Vehicles (AUVs) and Remotely Operated Vehicles (ROVs), it is factory-calibrated and ready-to-use, eliminating the need for on-site calibration or secondary integration. The system directly outputs attitude, position, velocity, and depth data for immediate deployment.

To ensure reliable operation in ferromagnetic environments, the device does not incorporate magnetic sensors. Instead, it achieves self-alignment through north-seeking using the Earth's rotational angular velocity, maintaining long-term heading stability. It comes standard with a 1000m-rated titanium alloy pressure housing. The INS/DVL system is pre-calibrated via shipboard testing, requiring no additional in-field calibration. The integrated pressure sensor delivers depth accuracy of 0.1 m and resolution of 0.5 mm, matching the performance of high-end standalone pressure gauges. Supporting integration with GPS and Ultra-Short Baseline (USBL) systems, the unit requires no waterproof modification and can be directly deployed for underwater navigation on AUVs/ROVs. It has been field-proven in multiple deep-sea operations with AUVs in the South China Sea and Eastern Pacific Ocean.

The NAVS-1000 employs an enhanced IMU design and advanced data fusion algorithms, significantly improving attitude and heading accuracy. Despite its compact dimensions of $\Phi 101\text{mm} \times 148\text{mm}$, it delivers performance comparable to large-format fiber-optic gyroscope systems. When coupled with the DVL, the straight-line navigation accuracy reaches 0.5% of the distance traveled.

Technical Specifications

SPECIFICATIONS	NAVS-1000
Dimensions	Φ101×148 mm
Weight (in air/in water)	2.52 kg/1.38kg
Max. operating depth	1000 m (pressure tested to 1250 m)
Housing Material	Titanium Alloy
Max. operating depth	1000 m (pressure tested to 1250 m)
External sensor support	GPS , USBL
Depth Sensor Performance	Accuracy: 0.1 m Resolution: 5 mm
Attitude Accuracy	Pitch/Roll Accuracy: 0.05° Heading Accuracy: 0.25° × sec(latitude)
Straight-Line Navigation Accuracy	0.5% of distance traveled (after sound velocity correction)
Survey Line Accuracy	0.1% of distance traveled
DVL Bottom-Track Altitude Range	0.05 m – 45 m
Power Supply	24V (±1V)
Average Total Power Consumption	15W (INS + DVL)

Performance Parameters

Key Features:

(1) Compact cylindrical dimension Φ101×148 mm, magnetic-sensor free, autonomous north-seeking for ferromagnetic environment adaption.

Straight-line navigation accuracy: ≤0.5% of distance traveled.

(3) Integrated high-precision depth pressure sensor, 0.1 m depth accuracy and 0.5 mm resolution.

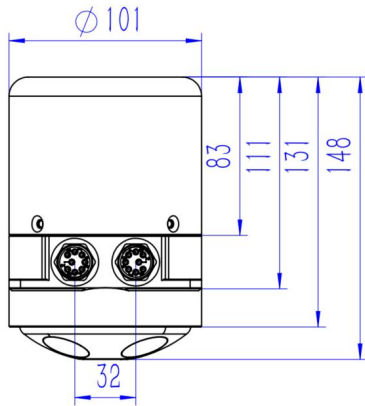
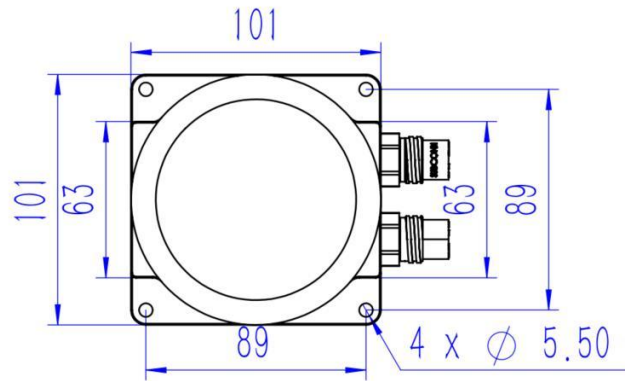
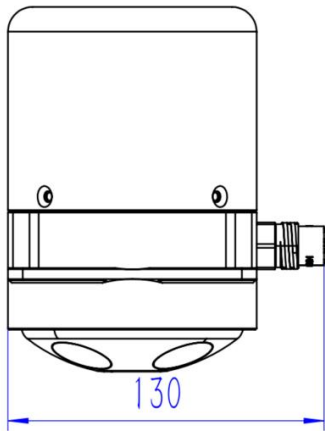
(4) All-in-one integrated INS/DVL system, factory pre-calibrated without additional ship calibration and secondary integration.

(5) Adopts improved IMU scheme and data fusion method, delivering optical gyro comparable accuracy in miniature size.

(6) Equipped with standard 1000 m titanium alloy pressure housing, directly deployable on AUV/ROV without waterproof modification.

(7) Supports GPS and USBL integrated navigation, field proven in deep-water operations of South China Sea and Eastern Pacific Ocean.

Dimensions&Connector



Depth Pressure Sensor

