

VN-100 IMU/AHRS

Inertial Measurement Unit /
Attitude Heading Reference System

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INTRODUCTION

The VN-100 is a miniature, light weight, low power, high-performance Inertial Measurement Unit (IMU) and Attitude and Heading Reference System (AHRS) available in a surface mount package or aluminum encased Rugged module.

The VN-100 computes and outputs a real-time, drift-free attitude solution (i.e. 3D orientation) that is continuous over a complete range of 360° motion.

PRODUCT HIGHLIGHTS

2.0° Magnetic Heading Accuracy	5-7°/hr (typ.) Gyro In-Run Bias Stability	400 Hz Onboard Extended Kalman Filter Update Rate	Rugged 36 x 33 x 9 mm; 15 grams; 220 mW
0.5° Pitch/Roll Accuracy	< 0.04 mg Accel In-Run Bias Stability	800 Hz IMU Data	Surface Mount (SMD) 24 x 22 x 3 mm; 3.5 grams; 185 mW



VN-100 SMD

VN-100 Rugged

INDUSTRY LEADING ALGORITHMS - VPE

The VN-100 features a robust Kalman Filter (EKF) along with a proprietary suite of high performance algorithms that run completely onboard the sensors. VectorNav's industry leading Vector Processing Engine (VPE) algorithms provide real-time magnetic and acceleration disturbance rejection, adaptive signal filtering, dynamic filter tuning and onboard Hard & Soft Iron compensation.

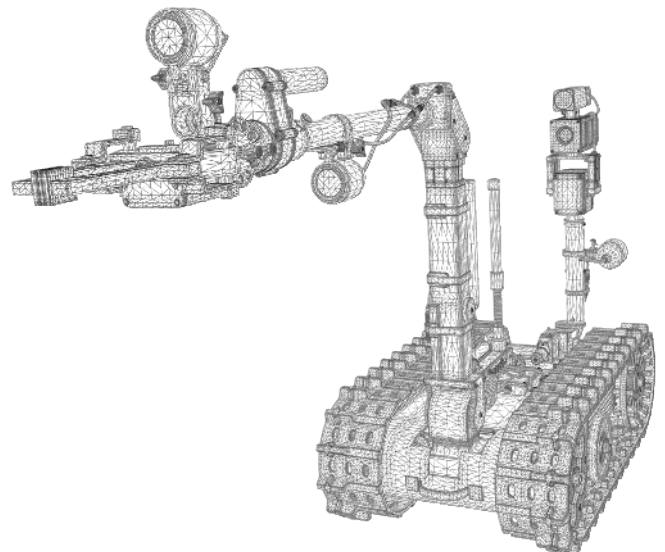
DEVELOPMENT KIT OPTIONS



VN-100 Rugged



VN-100 Surface Mount



Kit Contents

Complete hardware Development Kits include VectorNav sensor, applicable cabling, documentation, hardware tools and rugged carrying case.

Sensor Summary

- ▶ VectorNav proprietary AHRS delivers a continuous attitude solution over the complete 360° range of operation
- ▶ VectorNav Processing Engine (VPE) for disturbance rejection, adaptive filtering, dynamic filter tuning
- ▶ Real-time gyro bias tracking and compensation
- ▶ Hard/Soft Iron Compensation (Real-time and Manual 2D & 3D)
- ▶ Individually calibrated for bias, scale factor, misalignment, and temperature over full operating range (-40°C to +85°C)
- ▶ Available with standard (@ 25° C) or full temperature compensation (-40° C to +85° C)
- ▶ Real-time and delayed heave estimation
- ▶ Coning and sculling integrals (ΔV 's, $\Delta \theta$'s)
- ▶ Data output format: ASCII (VectorNav), Binary (VectorNav)
- ▶ World Magnetic & Gravity Reference Models
- ▶ VectorNav Control Center GUI (available for free download at www.vectornav.com) provides a practical tool for easy sensor setup, configuration and data viewing/logging
- ▶ ITAR-Free

Performance Specifications

ATTITUDE / HEAVE

Range (Heading/Yaw, Roll).....	± 180°
Range (Pitch).....	± 90°
Heading (Magnetic) ¹	2.0° RMS
Pitch/Roll (Static).....	0.5° RMS
Pitch/Roll (Dynamic) ²	1.0° RMS
Heave Accuracy.....	5 % or 5 cm
Delayed Heave Accuracy.....	2 % or 2 cm
Angular Resolution.....	0.001°

IMU Specifications

	ACCELEROMETER	GYROSCOPE	MAGNETOMETER	BAROMETER
Range	±16 g	±2,000°/s	±2.5 Gauss	10 to 1200 mbar
In-Run Bias Stability (Allan Variance)	< 0.04 mg	< 10°/hr (5-7°/hr typ.)	-	-
Noise Density	0.14 mg/√Hz	0.0035 °/s /√Hz	140 μGauss/√Hz	-
Bandwidth	260 Hz	256 Hz	200 Hz	200 Hz
Cross-Axis Sensitivity	±0.05 °	< 0.05 °	±0.05 °	-

Mechanical

	SIZE	WEIGHT	INTERFACE
Rugged	36 x 33 x 9 mm	15 g	10-pin Harwin
SMD	24 x 22 x 3 mm	3.5 g	30-pin LGA

Electrical

	INPUT VOLTAGE	CURRENT DRAW	POWER
Rugged	4.5 to 5.5 V	40 mA @ 5 V	220 mW
SMD	3.2 to 5.5 V	45 mA @ 3.3 V	185 mW

¹. With proper magnetic declination, suitable magnetic environment and valid hard/soft iron calibration.

². Typical; Velocity Aiding required for applications with sustained linear accelerations.

³. Contact VectorNav for higher IMU data output rates.

