

EN-300 Precision Fiber Optic Inertial Measurement/Navigation Unit



Applications

- Inertial Navigation System for Drones
- Dismounted Soldier Applications
- Applications Where GPS Unavailable
- Oil and Gas Exploration
- Aeronautics and Civil Aviation

Features

- Three-Axis, Precision Closed-Loop FOG:
 - Using EMCORE's proprietary FOG transceiver that enhances performance, increases reliability and lowers cost
 - More than double the fiber length of the legacy IMU
- Three Precision MEMS Accelerometers with Greater Pendulosity than Legacy Designs
- Next-Generation Field Programmable Gate Array (FPGA) Electronics
- Programmable (factory) I/O with Exceptional Flexibility with Options for IMU, Navigation or Combined Data
- Algorithms and Software:
 - Calibration parameters
 - Unit calibration and modeling
 - Coning and sculling compensation (option)
 - Full navigation (option)
 - Kalman filtering (option)
 - Provision for external aiding e.g. GPS (option)
- Structurally Rigid with the Lowest Vibration Mode >1,400 Hz to >1350 Hz Combined Data

U.S. Patent No. 7,746,476; 8,773,665; 8,798,405; 8,823,946

For Applications Where GPS is Unavailable or Denied

EMCORE has developed the EN-300 Precision Fiber Optic Inertial Measurement/Navigation Unit as a higher accuracy inertial system to be form, fit and function compatible with a legacy equivalent, but with better performance needed for:

- GPS denied navigation
- Precise targeting
- Line-of-sight stabilization

The EMCORE EN-300 is a state-of-the-art design incorporating EMCORE's proprietary integrated optics devices to enhance performance, providing up to five-times better performance than competing systems. The internal signal processing provides full stand-alone or aided navigation, and as an option can provide standard inertial measurement unit (IMU) delta velocity and delta theta.

Advantages

The EMCORE EN-300 provides lower noise and greater stability than competing IMUs. With the option of full navigation capability including coning and skulling compensation and sophisticated Kalman filtering, the unit is also able to statically find North to less than one degree through gyro-compassing.

Functionality

The EN-300 is designed to operate as an IMU or navigator. The unit's digital interface is fully programmable within EMCORE's factory allowing it to directly replace lower performing competing units. The EN-300 contains:

- Three precision FOGs
- Three precision MEMS accelerometers
- Electronics performing:
 - Embodying calibration parameters
 - System modeling
 - Coning and sculling compensation (option)
 - Full navigation (option)
 - Provision for external aiding e.g. GPS (option)

The unit may be ordered with the navigation functions inhibited as a form, fit and function higher performance replacement for other IMUs. It has the same style connector, pinouts and signals as a commonly used FOG IMU from a leading competitor.

Performance Specifications

Parameter	EN-300-1	EN-300-3	EN-300-5
Gyro Performance (1σ)			
Bias (Over Temperature)	0.05 deg/hr	0.1 deg/hr	0.40 deg/hr
Bias In-Run Stability	0.02 deg/hr	0.04 deg/hr	0.08 deg/hr
ARW (Angle Random Walk)	0.005 deg/rt-hr	0.007 deg/rt-hr	0.03 deg/rt-hr
Scale Factor	35 ppm	50 ppm	75 ppm
Rate Range	1,500 deg/sec (max)	1,500 deg/sec (max)	1,500 deg/sec (max)
Misalignment	0.1 mrad (max)	0.1 mrad (max)	0.1 mrad (max)

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DATASHEET | JULY 2018

NAVIGATION SYSTEMS

Performance Specifications (continued)

Parameter	EN-300-1	EN-300-3 & EN-300-5
Accelerometer Performance (1σ)		
Bias (Over Temperature)	150 μg	300 μg
Bias In-Run Stability	0.1 mg	0.1 mg
Vibration Rectification	20 μg/g ² rms 30 μg/g ² rms	20 μg/g ² rms (20-500 Hz) 30 μg/g ² rms (500-2000 Hz)
Scale Factor	100 ppm	100 ppm
Acceleration Range (special request)	30 g (70 g)	30 g (70 g)
Electrical/Mechanical		
Weight	<1.7 lb Typical	<1.7 lb Typical
Size	3.5" D x 3.35" L (excluding connector)	3.5" D x 3.35" L (excluding connector)
Power	5V (or 5V, +/- 15V**) 10W nominal 18W @ temp extremes	5V (or 5V, +/- 15V**) 10W nominal 18W @ temp extremes
Dissipation	Conduction cooling Air Cooled over limited environment	Conduction cooling Air Cooled over limited environment
Environmental		
Temperature: Operating	-40 °C to +75 °C	-40 °C to +75 °C
Shock: Operating	125 g, 10 msec	125 g, 10 msec
Vibration: Operating	16 g rms, 20-2000 Hz	16 g rms, 20-2000 Hz
General		
Input/Output	RS 485 serial (SDLC available)	RS 485 serial (SDLC available)
MTBF	>50,000 hrs	>50,000 hrs
Temperature: Storage	-55 °C to +85 °C	-55 °C to +85 °C

Scale Compared to U.S. Quarter



Notes

Not procurement specifications. Subject to change
 ** For compatibility with legacy IMU

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