

EN-150 Precision Fiber Optic Inertial Measurement/Navigation Unit

emcore®

PRELIMINARY DATASHEET | SEPTEMBER 2018

NAVIGATION SYSTEMS



Applications

- Inertial Navigation System for UAVs
- Dismounted Soldier Applications/Weaponry
- Stabilization Platforms
- Mobile Mapping
- Applications Where GPS Unavailable

Features

- Three-Axis, Precision Closed-Loop FOG:
Using EMCORE's proprietary FOG transceiver that enhances performance, increases reliability and lowers cost
- 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 as an IMU with Options for Navigation
- 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)

For Applications Where GPS is Unavailable or Denied

EMCORE's EN-150 Precision Fiber Optic Inertial Measurement/Navigation Unit is the smallest, most affordable Fiber Optic Gyro-based Inertial Measurement Unit (IMU) available today. The EN-150 is designed as a higher accuracy inertial system that in form, fit and function is compatible with a legacy RLG-based IMU product, but with better performance needed for:

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

The EMCORE EN-150 is a state-of-the-art design incorporating EMCORE's proprietary integrated optics devices to enhance performance, providing up to two-times better performance than competing IMU systems. The internal signal processing provides standard IMU output and options for full stand-alone or aided navigation. The EN-150 provides lower noise and greater stability than competing IMUs, and with the option of full navigation capability, includes coning and sculling compensation and sophisticated Kalman filtering.

Functionality

The EN-150 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-150 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.

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

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Performance Specifications

Parameter	EN-150-1	EN-150-3	EN-150-5
Gyro Performance (1σ)			
Bias (Over Temperature)	0.5 deg/hr	1.0 deg/hr	2.0 deg/hr
Bias In-Run Stability (25 °C)	0.06 deg/hr	0.1 deg/hr	0.2 deg/hr
ARW (Angle Random Walk)	0.02 deg/rt-hr	0.08 deg/rt-hr	0.10 deg/rt-hr
Scale Factor (25°C), 1s	≤50 ppm	≤75 ppm	≤100 ppm
Scale Factor vs. Temp. (≤ 1 °C/min)	≤100 ppm	≤150 ppm	≤150 ppm
Rate Range	+/- 1500 deg/sec	+/- 1500 deg/sec	+/- 1500 deg/sec
Misalignment	5 mrad (max)	5 mrad (max)	5 mrad (max)

Parameter	EN-150-1	EN-150-3 & EN-150-5
Accelerometer Performance (1σ)		
Bias (Over Temperature)	3000 μg	3000 μg
Bias In-Run Stability	<0.5 mg	<1 mg
Scale Factor	<300 ppm	<375 ppm
Acceleration Range (special request)	40 g (70 g)	40 g (70 g)
Electrical/Mechanical		
Weight	<0.5 lb Typical	<0.5 lb Typical
Size	2.37" L x 2.37" W x 2.4" H (excluding connector)	2.37" L x 2.37" W x 2.4" H (excluding connector)
Power	5V (or 5V, +/- 15V**) <8W nominal <15W @ temp extremes	5V (or 5V, +/- 15V**) <8W nominal <15W @ temp extremes
Dissipation	Conduction cooling Air Cooled over limited environment	Conduction cooling Air Cooled over limited environment
Environmental		
Temperature: Operating	-40 °C to +71 °C	-40 °C to +71 °C
Extended	-54 °C to +85 °C	-54 °C to +85 °C
Shock: Operating	500 g, 1 msec	500 g, 1 msec
Vibration: Operating	18 g rms, 20-2000 Hz	18 g rms, 20-2000 Hz
Vibration: With Isolator Mount	25 g rms, 20-2000 Hz	25 g rms, 20-2000 Hz
General		
Input/Output	RS 422 serial (SDLC available)	RS 422 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

MADE IN USA