



DATASHEET | DECEMBER 2023

A New Era in Navigation



Applications

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

Key Performance 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
- Algorithms and Software:
 - Calibration parameters
 - Unit calibration and modeling
- The EN-300 is a Commercial Product that can be Licensed Under U.S. Department of Commerce for International Use

For Applications Where GPS is Unavailable or Denied

EMCORE has developed the Commercial Off-The-Shelf (COTS) EN-300 Precision Fiber Optic Inertial Measurement Unit (IMU) 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 ten-times better performance than competing systems. The internal signal processing provides full stand-alone 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 and is able to statically find North to less than one degree through gyro-compassing. The EN-300's digital interface is fully programmable within EMCORE's factory allowing it to directly replace lower performing competing units. It has the same style connector, pinouts and signals as a commonly used FOG IMU from a leading competitor.

The EN-300 contains:

- Three precision FOGs
- Three precision MEMS accelerometers
- Electronics performing:
 - Embodying calibration parameters
 - System modeling



Performance Highlights

Parameter	EN-300-1	EN-300-3	EN-300-5
Gyro Performance (1σ)			
Bias (Over Temperature)	0.1°/hr	0.2°/hr	0.4°/hr
Bias In-Run Stability	0.02°/hr	0.04°/hr	0.08°/hr
ARW (Angle Random Walk)	0.008°/√hr	0.015°/√hr	0.03°/√hr
Bandwidth	<1000 Hz		
Accelerometer Performance (1σ)			
Bias (Over Temperature)	300 μg	500 μg	500 μg
VRW (Velocity Random Walk)	0.026 m/s/√hr	0.026 m/s/√hr	0.026 m/s/√hr

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

EN-300

Precision Fiber Optic Inertial Measurement Unit (IMU)

A New Era in Navigation

Performance Specifications

Parameter	EN-300-1	EN-300-3	EN-300-5
Gyro Performance (1σ)			
Bias (Over Temperature)	0.1°/hr	0.2°/hr	0.4°/hr
Bias In-Run Stability	0.02°/hr	0.04°/hr	0.08°/hr
ARW (Angle Random Walk)	0.008°/√hr	0.015°/√hr	0.03°/√hr
Scale Factor Accuracy	100 ppm	100 ppm	100 ppm
Rate Range	1,500°/sec (max)	1,500°/sec (max)	1,500°/sec (max)
Bandwidth	<1000 Hz	<1000 Hz	<1000 Hz
Accelerometer Performance (1σ)			
Bias (Over Temperature)	300 μ g	500 μ g	500 μ g
VRW (Velocity Random Walk)	0.026 m/s/√hr	0.026 m/s/√hr	0.026 m/s/√hr
Scale Factor Accuracy	200 ppm	200 ppm	200 ppm
Acceleration Range (special request)	30 g	30 g	30 g
Electrical/Mechanical			
Weight	1.8 lb	1.8 lb	1.8 lb
Size	3.5" D x 3.35" L (excluding connector)	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	5V (or 5V, +/- 15V*) 10W nominal 18W @ temp extremes
Data Message Rate	3,600 Hz 400 Hz Optional	3,600 Hz 400 Hz Optional	3,600 Hz 400 Hz Optional
Environmental			
Temperature: Operating	-40 °C to +71 °C	-40 °C to +71 °C	-40 °C to +71 °C
Shock: Operating	45 g, 10 msec	45 g, 10 msec	45 g, 10 msec
Vibration: Performance	9 g rms, 20-2000 Hz	9 g rms, 20-2000 Hz	9 g rms, 20-2000 Hz
General			
Input/Output	RS 485 serial (SDLC available)	RS 485 serial (SDLC available)	RS 485 serial (SDLC available)
Reliability @ 30°C (MTBF – AUF)	>20,000 hrs	>20,000 hrs	>20,000 hrs
Temperature: Storage	-55 °C to +85 °C	-55 °C to +85 °C	-55 °C to +85 °C

* For compatibility with legacy IMU

Notes

Not procurement specifications. Subject to change

Dimensions/Scale



For More Information

+1 866.234.4976 | navigation-sales@emcore.com | emcore.com

EMCORE Corporation

2015 Chestnut Street
Alhambra, CA 91803 USA

P +1 626.293.3400

F +1 626.293.3429

emcore[®]

ISO9001
CERTIFIED



© 2023 EMCORE Corporation. All rights reserved.

Information contained herein is deemed to be reliable and accurate as of issue date. EMCORE reserves the right to change the design or specifications of our products at any time without notice. EMCORE and Systron Donner Inertial are registered trademarks of EMCORE Corporation in the U.S. and other countries.

**MADE IN
USA**

Released 12.12.2023