



DATASHEET | DECEMBER 2023

A New Era in Navigation



Applications

- Position Sensor for Geo-Surveying
- Targeting & Positioning
- Precision Antenna Pointing
- UAVs & Other Unmanned Vehicles
- Targets & Drones
- Ground Vehicle Tracking
- Range Instrumentation

Key Performance Features

- Position 3.9 m SEP
- Attitude
 - Roll/Pitch (1σ) – 1.0 mrad
 - Heading in Dynamics (1σ) – 1.5 mrad
- 48 Channel GPS Tracking for Improved Coverage
 - Less than 35 second TTFF from cold
- Adaptable Modular 25 in.³ Compact Size for Packaging Flexibility
- Weighs <1.6 lbs.
- Customer Programmable Output Data Rates

Ideal for High-Precision Navigation & Guidance Applications

The SDN500 GPS/INS navigation system is a platform extension of EMCORE's proven tactical grade SDI500 IMU. The SDN500 GPS/INS combines latest generation quartz MEMS gyros and accelerometers, delivers industry leading bias in-run stability performance, provides enhanced 100Hz position data and faster GPS acquisition and start up time courtesy of a 48-channel Coarse/Acquisition (C/A) Code GPS receiver, creating a tightly coupled powerful Guidance and Navigation Control System. The modular compact 25 in³ size provides for maximum packaging flexibility in dense systems.



The solid state quartz sensors and sealed construction provide reliable 50,000+ hr. MTBF, and a 20 year operating and storage life. Continuous Built-in Test (BIT), configurable communications protocols, electromagnetic interference (EMI) protection, and flexible input power requirements make the SDN500 easy to use in a wide range of higher order integrated system applications.

Performance Highlights

Parameter	SDN500-AF00	SDN500-BF00	SDN500-CF00
System Performance			
Position (SEP) (max)	3.9 m		
Velocity (horizontal/vertical) 1σ	0.1/0.1 m/s		
Pitch/Roll 1σ	1.0 mrad		
Heading (in motion) 1σ	1.5 + d ¹ mrad		
Gyro Performance			
Bias In-Run Stability from Turn-on 1σ	1.0°/hr	1.5°/hr	2.0°/hr
Angle Random Walk 1σ	0.02°/√hr	0.02°/√hr	0.03°/√hr
Accelerometer Performance			
Bias In-Run Stability from Turn-on 1σ	100 μ g	200 μ g	200 μ g
Random Walk Noise 1σ	100 μ g/√Hz	100 μ g/√Hz	120 μ g/√Hz

¹ d represents a growth rate that depends on the time once all horizontal accelerations have stopped, drift will be 1 to 10 deg/hr 1σ



SDN500

Integrated MEMS GPS/INS Tactical System

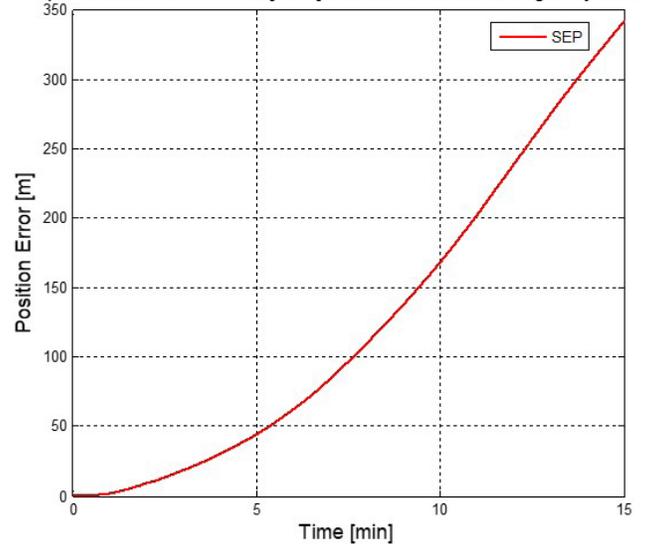
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Performance Specifications

Parameter	SDN500-AF00	SDN500-BF00	SDN500-CF00
System Performance			
Position (SEP) (max)	3.9 m		
Velocity (horizontal/vertical) 1 σ	0.1/0.1 m/s		
Pitch/Roll 1 σ	1.0 mrad		
Heading (in motion) 1 σ	1.5 + d' mrad		
Timemark Output 1pps (nom)	$\pm 1 \mu\text{s}$		
Gyro Channels			
Bias In-Run Stability from Turn-on 1 σ	1.0°/hr	1.5°/hr	2.0°/hr
Angle Random Walk 1 σ	0.02°/√hr	0.02°/√hr	0.03°/√hr
Angular Rate – Dynamic Range (min)	$\pm 1000 \text{ }^\circ/\text{sec}$		
Accelerometer Channels			
Bias In-Run Stability from Turn-on 1 σ	100 μg	200 μg	200 μg
Random Walk Noise 1 σ	100 $\mu\text{g}/\sqrt{\text{Hz}}$	100 $\mu\text{g}/\sqrt{\text{Hz}}$	120 $\mu\text{g}/\sqrt{\text{Hz}}$
Acceleration – Dynamic Range (min)	$\pm 50 \text{ g}$		
System Physical & Environmental			
Input Voltage	+12 to +42 Vdc		
Power	<7.5 watts		
I/O	RS232/422, SDLC IMU Output		
Volume	25 cu in		
Weight	<1.6 lbs		
Temperature Range (Operating)	-40 to +71°C		
Vibration (Operating)	12 gRMS		
Shock (Operating)	g, msec		
Altitude (INS/GPS)	60,000 ft		
Velocity (INS/GPS)	500 m/s		
Acceleration (INS/GPS)	4 g		
Reliability @ 35°C	50,000 hrs MTBF, ground; 6,000 hrs MTBF, air cargo		

1 d represents a growth rate that depends on the time once all horizontal accelerations have stopped, drift will be 1 to 10 deg/hr 1 σ

Spherical Error Probable [SEP] Position Error: UAV Flight Dynamics



Dimensions/Scale



EMCORE P/N 965898 Rev J1

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MADE IN USA

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