



PRELIMINARY DATASHEET | OCTOBER 2023

A New Era in Navigation



Applications

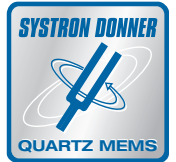
- Precision Aircraft Attitude Heading Reference Systems
- GPS-Aided Navigation Systems
- Autonomous Vehicles
- Remotely Operated Vehicles
- Tactical Weapons & Torpedoes
- Aerial and Marine Geomapping / Surveying
- Targeting & Pointing Systems
- Robotics

Key Performance Features

- 1°/hr Gyro & 1mg Accel Bias Over Wide Temperature Range
- 0.02°/√hr Angle Random Walk - 5X Better Than RLG-based IMU
- <1.0 Seconds Valid Data Start Up
- Industry Standard RS-422 Serial Interface
- <33 in.³ Rugged Size
- Stable Performance, Superior Quality & Reliability
 - Greater Than 100,000 hr MTBF
- Designed as a Form, Fit & Functional Performance Alternative to Legacy RLG-based IMU

Suitable for Wide Variety of High-Precision Commercial, Industrial, Marine and Defense Applications

The SDI170 IMU is designed as a performance-compatible inertial system that is form, fit, and functional with a legacy RLG-based IMU product. The MEMS-based Inertial Measurement Unit (IMU) delivers 1°/hr gyro bias and 1 mg accelerometer bias stability and very low 0.02°/√hr angle random walk over wide -55 °C to +85 °C temperatures and rugged vibration environments. The tactical performance of the SDI170 IMU is based on EMCORE's proven, dependable, accurate quartz MEMS inertial sensor technology. EMCORE's quartz technology enables repeatable high-volume production of precisely machined sensor structures combined with the inherent large signal output and thermal stability of quartz materials.



The SDI170 IMU is constructed with EMCORE's latest generation quartz gyros, quartz accelerometers, and high-speed signal processing to achieve outstanding precision performance. The SDI170 IMU is designed for demanding, mission-critical, rugged environments. It is ideal for continuous use applications with no wear-out components, highly linear accelerometer performance and longer life compared to competing alternatives. The solid-state quartz sensors and hermetically sealed IMU construction provide reliable 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 compatibility make the SDI170 IMU easy to use in a wide range of higher-order integrated commercial and defense system applications.

Performance Highlights

Parameter	SDI170-AA00	SDI170-BA00	SDI170-CA00
Gyro Performance			
Bias (over temperature) 1σ	1.0°/hr	2.0°/hr	3.0°/hr
Bias In-Run Stability 1σ	1.0°/hr	1.0°/hr	1.5°/hr
Angle Random Walk (max)	0.02°/√hr	0.02°/√hr	0.02°/√hr
Bandwidth, Phase Shift (-90° Phase) * (min)	90 Hz	90 Hz	90 Hz
Accelerometer Performance			
Bias (over temperature) 1σ	1.0 milli-g	1.0 milli-g	2.0 milli-g
Bias In-Run Stability 1σ	100 μg	200 μg	200 μg
Velocity Random Walk 1σ	100 μg/√Hz		

* @ 600 Hz Flight Control Data Rate



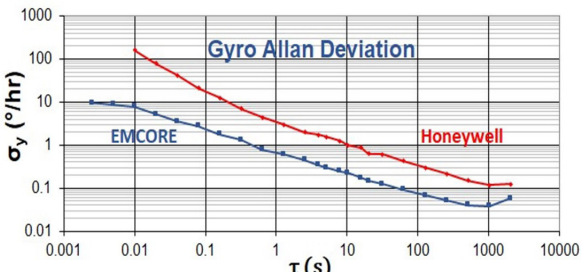
Performance Specifications

Specifications are based on 100 Hz Inertial Data ($\Delta V/\Delta \theta$)

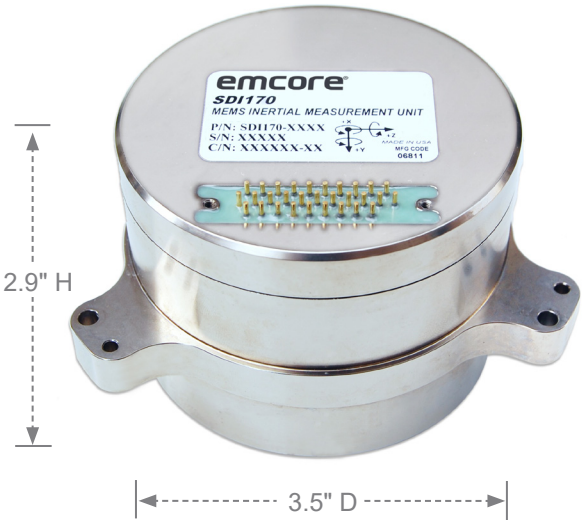
Parameter	SDI170-AA00	SDI170-BA00	SDI170-CA00
System Performance			
Start-Up Time for Valid Data Output (max)	<1.0 secs		
Bandwidth, Phase (-90° Phase Shift) * (min)	90 Hz		
Gyro Channels			
Bias (over temperature) 1σ	1.0°/hr	2.0°/hr	3.0°/hr
Bias In-Run Stability 1σ	1.0°/hr	1.0°/hr	1.5°/hr
Scale Factor Error 1σ	200 ppm	200 ppm	200 ppm
Angle Random Walk (max)	0.02°/√hr	0.02°/√hr	0.02°/√hr
Angular Rate – Dynamic Range (min)	±1074°/sec	±1074°/sec	±1074°/sec
Accelerometer Channels			
Bias (over temperature) 1σ	1.0 milli-g	1.0 milli-g	2.0 milli-g
Bias In-Run Stability 1σ	100 μg	200 μg	200 μg
Scale Factor Error 1σ	200 ppm	200 ppm	200 ppm
Velocity Random Walk 1σ	100 μg/√Hz	100 μg/√Hz	120 μg/√Hz
Acceleration - Calibrated Range (min)	±50g (±70 optional)		
System Physical & Environmental			
Input Voltage	+15 and +5 Vdc		
Power	<5.0 watts		
I/O	RS422, SDLC		
Data Rate	100 Hz (Guidance) and 600 Hz (Control) – Other rates available		
Dimensions (height x diameter)	2.9" x 3.5"		
Volume	<33 cu in		
Weight	<1.95 lbs		
Temperature	-55 to +85 °C		
Vibration (Operating)	10 g, rms		
Shock	150, 11 g, ms		
Operating Life	20 yrs		
Reliability @ 35°C (MTBF)	100,000 hrs ground benign: 15,000 hrs air inhabited cargo		
Dormancy	20 yrs		

Note

* @ 600 Hz Flight Control Data Rate



Dimensions/Scale



For More Information

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