

SDI170

MEMS Quartz Tactical Inertial Measurement Unit

Suitable for Wide Variety of High-Precision Commercial, Industrial, Marine and Defense 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**
 - **20 Year Lifetime Without Calibration**
 - **Greater Than 100,000 hr MTBF**
- **Designed as a Form, Fit & Functional Performance Alternative to Legacy RLG-based IMU**



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.

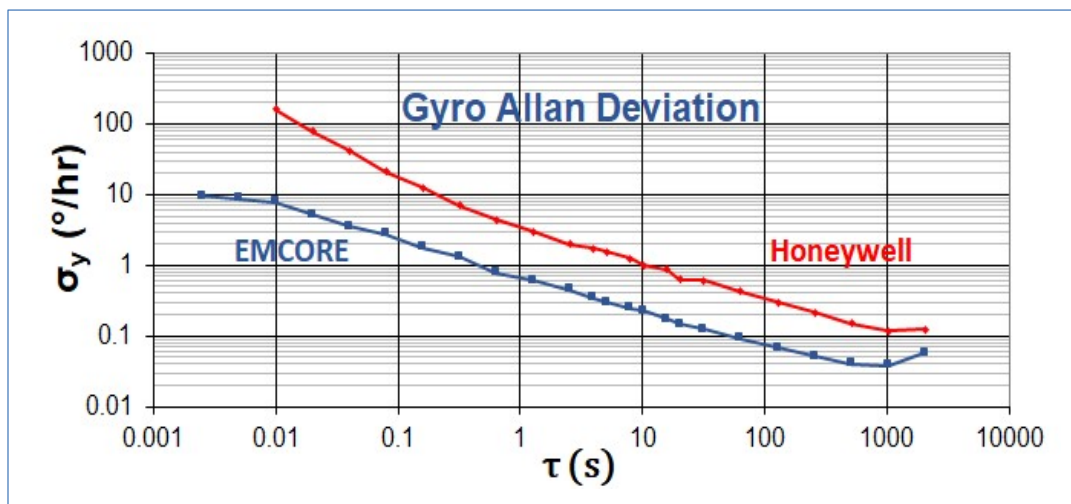
The SDI170 IMU is constructed with EMCORE's latest generation quartz gyros, quartz accelerometers, and high-speed signal processing to achieve outstanding precision performance. The SDI170 IMU is designed for demanding, mission-critical, rugged environments. It is ideal for continuous use applications 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.

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

	Units	Measure	SDI170-AA00	SDI170-BA00	SDI170-CA00
System Performance					
Start Up Time for Valid Data	secs	max		1.0	
Bandwidth, Phase (-90° Phase Shift) *	Hz	min		75	
Gyro Channels					
Bias (over temperature)	deg/hr	1 σ	1.0	2.0	3.0
Bias In-Run Stability	deg/hr	1 σ	1.0	1.0	1.5
Scale Factor Error	ppm	1 σ	200	200	200
Angle Random Walk	deg/ $\sqrt{\text{hr}}$	max	0.02	0.02	0.02
Angular Rate – Dynamic Range	deg/sec	min	± 1074	± 1074	± 1074
Accelerometer Channels					
Bias (over temperature)	milli-g	1 σ	1.0	1.0	2.0
Bias In-Run Stability	μg	1 σ	100	200	200
Scale Factor Error	ppm	1 σ	200	200	200
Velocity Random Walk	$\mu\text{g}/\sqrt{\text{Hz}}$	1 σ	100	100	120
Acceleration - Calibrated Range	g	min	± 50 (± 70 optional)	± 50 (± 70 optional)	± 50 (± 70 optional)
System Physical & Environmental					
Input Voltage	Vdc			+15 and +5	
Power	watts			<5.0	
I/O				RS422, SDLC	
Data Rate	Hz		100 Hz (Guidance) and 600 Hz (Control) – Other rates available		
Dimensions (height x diameter)	in		2.9 x 3.5		
Volume	cu in		<33		
Weight	lbs		<1.95		
Temperature	°C		-55 to +85		
Vibration (Operating)	g, rms		19		
Shock	g, ms		150, 11		
Operating Life	yrs		20		
Reliability @ 35°C (MTBF)	hrs		100,000 ground benign: 15,000 air inhabited cargo		
Dormancy	yrs		20		

Note: * @ 600 Hz Flight Control Data Rate



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Transforming Navigation

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