

SDG1400

Quartz MEMS Angular Rate Sensor

emcore®



DATASHEET | MAY 2022

Transforming Navigation



Ideal for High Performance Commercial & Industrial Applications

The SDG1400 is a single-axis angular rate sensor that provides exceptional performance with EMCORE's proven Quartz MEMS sensing element and fully self-contained electronics.



By applying design techniques found only in more expensive rate sensors, excellent Bias Stability, Temperature Performance, Noise, and Vibration performance levels have been achieved. The availability of the internal temperature sensors enable bias modeling.

Applications

- Platform Stabilization
- Optical Camera Stabilization
- Antenna Stabilization & Pointing
- High Speed Ride & Tilt Control
- Robotic Control
- Instrumentation

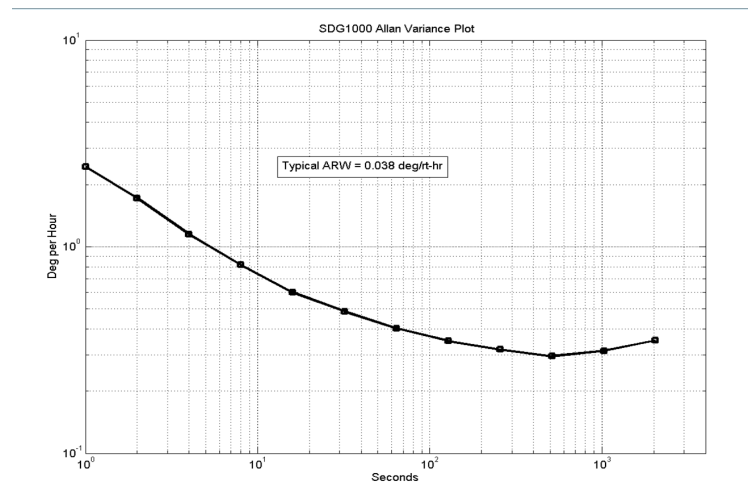
Performance Highlights

Parameter	SDG1400-200-200
Standard Range Full Scale	$\pm 200^\circ/\text{sec}$.
Full Scale Output (Nominal)	$\pm 5.0 \text{ Vdc}$
Scale Factor (at 25°C)	$0.025 \pm 0.004 \text{ Vdc}/^\circ/\text{sec}$
Scale Factor Over Temperature (Dev. from 25°C)	$\leq 0.06\%/^\circ\text{C}$
Bias Calibration (at 25°C)	$\leq 1 \text{ deg}/\text{sec}$.
Bias Variation over Temperature (Dev. from 25°C)	$\leq 1 \text{ deg}/\text{sec}$.
Bias Stability (In-Run at Constant Temp., Std. Dev.)	$< 6^\circ/\text{hr}$. typical
Bandwidth (-90°, incl. temp. effect)	$50 \pm 10 \text{ Hz}$

Key Performance Features

- Exceptional Bias Stability
- Low Gyro Noise
- Improved Vibration Performance
- DC Voltage Input/High-Level Analog DC Voltage Output
- Rugged Construction in a Very Small Form Factor
- High Reliability & Long Life
- RoHS Compliant

SDG1400 Allen Variance Plot



SDG1400

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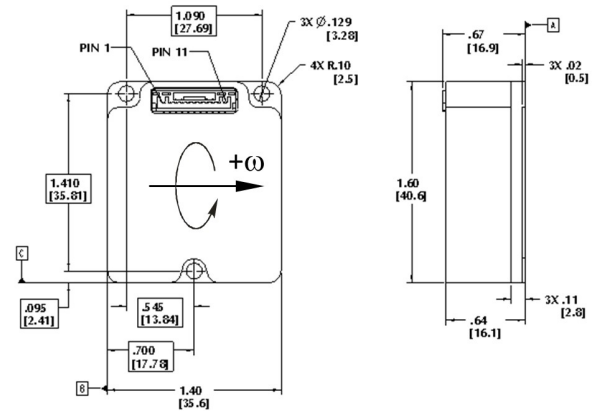
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Performance Specifications

Parameter	SDG1400-200-200
Power Requirements	
Input Voltage	+ and - 10 to 16 Vdc
Input Current	< 15 mA (each supply, typical)
Performance	
Standard Range Full Scale	$\pm 200^\circ/\text{sec.}$
Full Scale Output (Nominal)	± 5.0 Vdc
Scale Factor (at 25°C)	0.025 ± 0.004 Vdc/ $^\circ/\text{sec}$
Scale Factor Over Temperature (Dev. from 25°C)	$\leq 0.06\%/^\circ\text{C}$
Bias Calibration (at 25°C)	≤ 1 deg/sec.
Bias Variation over Temperature (Dev. from 25°C)	≤ 1 deg/sec.
Bias Stability (In-Run at Constant Temp., Std. Dev.)	< 6 $^\circ/\text{hr.}$ typical
G Sensitivity	< 36 $^\circ/\text{hr/g}$
Start-Up Time	≤ 1.0 sec
Bandwidth (-90 $^\circ$, incl. temp. effect)	50 \pm 10 Hz
Damping Ratio	0.7 \pm 0.2
Non-Linearity, (% Full Range)	$\leq 0.03\%$
Output Noise (DC to 100 Hz)	$\leq 0.1^\circ/\sqrt{\text{hr}}$ (< 0.0017 $^\circ/\text{sec}/\sqrt{\text{Hz}}$)
Environments	
Operating Temperature	-55 $^\circ\text{C}$ to +85 $^\circ\text{C}$
Storage Temperature	-55 $^\circ\text{C}$ to +95 $^\circ\text{C}$
Vibration Operating* (20 – 2000 Hz, Flat Profile)	5 g _{rms}
Vibration Rectification*	< 3.6 $^\circ/\text{hr/g}_{\text{rms}}$
Vibration Survival*	20 g _{rms}
Shock Survival	200 g, 2 ms, 1/2 sine pulse
Weight	< 60 grams

* Please see user's guide for more information regarding vibration tolerance and sensitivity.

Dimensions/Scale



SDG1400 PIN ASSIGNMENT

1	-	-	Power Ground	7	-	-	Built-In Test
2	-	-	+Vdc Input	8	-	-	Temp 2 Output
3	-	-	-Vdc Input	9	-	-	No Connection
4	-	-	Temp 1 Output	10	-	-	Leave Open
5	-	-	Signal Return	11	-	-	Case Ground
6	-	-	Rate Output				

For More Information

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

EMCORE Corporation

2015 Chestnut Street
Alhambra, CA 91803 USA

P +1 626.293.3700

F +1 626.293.3429

emcore®

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MADE IN
USA

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