

# CRS39

Analogue Angular Rate Sensor  
High Performance MEMS Gyroscope

## CRS39-03



CRS39-03 provides the optimum solution for applications where bias instability, angle random walk and low noise are of critical importance.

At the heart of the CRS39-03 is Silicon Sensing's VSG3Q<sup>MAX</sup> vibrating ring MEMS sensor which is at the pinnacle of 15 years of design evolution and the latest off a line which has produced over 30 million high integrity MEMS inertial sensors. The VSG3Q<sup>MAX</sup> gyro sensor is combined with precision discrete electronics to achieve high stability and low noise, making the CRS39 a viable alternative to Fibre-Optic Gyro (FOG) and Dynamically Tuned Gyro (DTG).

CRS39 has been designed for mounting within a 25mm inside diameter cylinder.

Three on board temperature sensors and the resonant frequency of the MEMS enable additional external conditioning to be applied to the CRS39 by the host, enhancing the performance even further.

Typical applications include downhole surveying, precision platform stabilization, ship stabilization, ship guidance and control, autonomous vehicles and high-end AHRS.

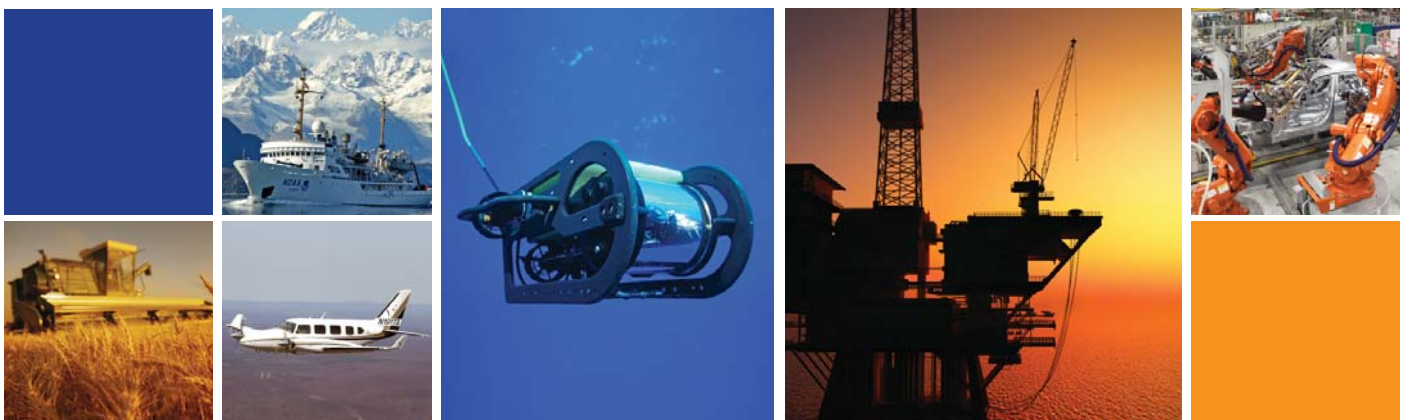
CRS39-03 supersedes CRS39-01. It is a higher specification, 'drop-in' replacement.

### Key features

- Proven and Robust silicon MEMS vibrating ring structure
- FOG-like performance
- DTG-like size and performance
- Low Bias Instability (0.1°/h)
- Excellent Angle Random Walk (0.015°/√h)
- Ultra-low noise (<0.006°/s rms, 10Hz)
- Optimised for low rate range environments (e.g. North Finding)
- Precision analogue output
- Temperature range from -10°C to +110°C
- High shock and vibration rejection
- Three temperature sensors and MEMS frequency output for precision thermal compensation
- RoHS Compliant

### Applications

- Platform Stabilization
- Precision, Downhole Surveying, North Finding
- Maritime Guidance and Control
- Gyro-compassing and Heading Control
- Autonomous Vehicles and ROVs
- Rail Track monitoring
- Robotics



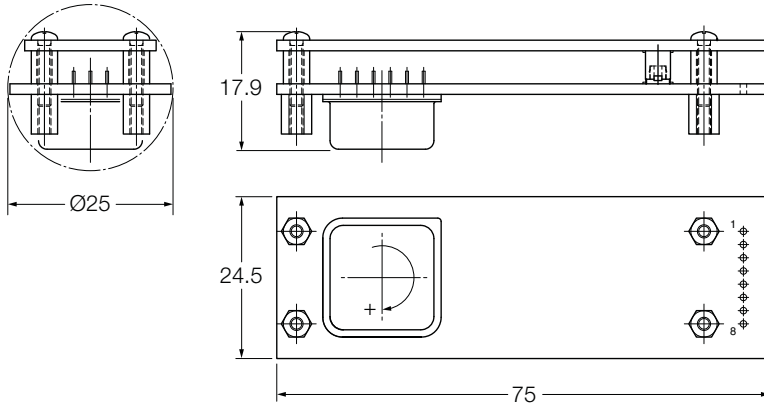
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For full technical datasheets please go to our website where the documents can be downloaded

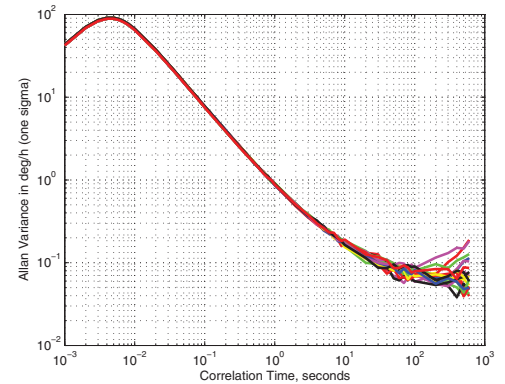


### CRS39-03



All dimensions in millimetres

### Allan Variance



### Typical Data

<b>Angular Rate Range</b>	$\pm 25^\circ/\text{s}$
<b>Output</b>	Analogue (non-ratiometric)
<b>Scale Factor</b>	
Nominal	$80\text{mV}/^\circ/\text{s}$
Setting tolerance (+45°C)	$\pm 0.08\%$
Variation over temperature	$\pm 0.2\%$
Non-linearity	$\pm 0.006\%$ of full scale

### Bias

Setting error (+45°C)	$\pm 0.03\text{V}$
Variation over temperature	$\pm 60^\circ/\text{h}$
Angular Random Walk	$0.015^\circ/\sqrt{\text{h}}$
Bias instability	$0.10^\circ/\text{h}$
<b>Bandwidth (normal)</b>	$25\text{Hz} \pm 10\text{Hz}$
<b>Noise to 10Hz</b>	$0.006^\circ/\text{s rms}$
<b>Wideband Noise</b>	$0.03^\circ/\text{s rms}$

### Environment

Temperature	$-10^\circ\text{C}$ to $+110^\circ\text{C}$
Operational shock	$250\text{g}$ , $1.7\text{ms}$
Survival shock	$1,000\text{g}$ , $1\text{ms}$
<b>RoHS Compliant</b>	Yes

### Pin Connections

<b>1</b> +5V (4.9 to 5.25)	<b>5</b> TMP1
<b>2</b> GND	<b>6</b> TMP2
<b>3</b> Rate Output	<b>7</b> TMP3
<b>4</b> Reference	<b>8</b> FREQ

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