

BEI GYROCHIP™ II

Micromachined Angular Rate Sensor



Applications

- Platform Stabilization
- Short Term Navigation
- GPS Augmentation
- Camera Stabilization
- Instrumentation
- Robotics
- Autonomous Vehicle Control

Description

The BEI GyroChip II is a compact, rugged, solid-state inertial sensor used to measure angular rotation rates. It features a monolithic quartz sensing element, internal power regulation and DC input/high-level DC output operation. Two versions are available. The +12 Vdc version features a high-level 0 to +5 Vdc output, integral POWER-SAVE mode, and operation from standard battery power. The ± 15 Vdc version provides a high-level bipolar output of ± 5 Vdc, and is designed for use with conventional double-sided power supplies.

Features

- Solid-State
- Compact, Lightweight Design
- Wide Temperature Range
- High Reliability
- DC Input/High-Level DC Output
- Internal Power Regulation
- POWER SAVE Mode (+12 Vdc Version)

Operation

The BEI GyroChip™ II utilizes a one piece, micromachined, vibrating quartz tuning fork sensing element. Applying the Coriolis effect, a rotational motion about the sensor's input axis produces a DC voltage proportional to the rate of rotation. Use of piezoelectric quartz material simplifies the active element, resulting in exceptional stability over temperature and product life.

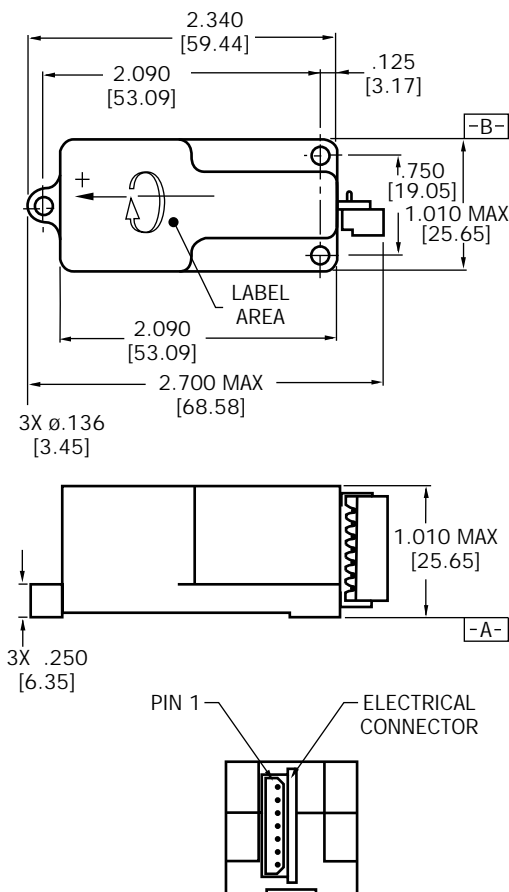


BEI SYSTRON DONNER INERTIAL DIVISION
BEI TECHNOLOGIES, INC.

For applications assistance or more information on any of
Systron Donner Inertial Division's micromachined inertial sensors,
Call 1-800-227-1625.

BEI GYROCHIP™ II

Micromachined Angular Rate Sensor



NOTES:

1. GYROCHIP™ II IS SUPPLIED WITH A MATING CONNECTOR (MOLEX P/N 5264-7 OR EQUIV.).
2. ANGULAR RATE APPLIED AS SHOWN WILL PRODUCE A MORE POSITIVE OUTPUT.
3. UNIT OF MEASURE IN INCHES/[MM].
4. POWER IS DISCONNECTED FROM INTERNAL CIRCUITS APPLYING 5 Vdc ± 1 V TO POWER SAVE INPUT.
5. BUILT-IN-TEST ACTIVATED BY GROUNDING PIN 7 CAUSES AN INCREASE IN RATE OUTPUT (PIN 5) OF 0.5 Vdc NOMINAL.
6. BUILT-IN-TEST ACTIVATED BY GROUNDING PIN 7 CAUSES AN INCREASE IN RATE OUTPUT (PIN 5) OF 1.0 Vdc NOMINAL.

QRS14-00XXX-102	
Connector Pin	Assignment
1	Power and Signal Ground
2	+Vdc Input
3	POWER SAVE ⁴
4	No Connection, Leave Open
5	Rate Output
6	No Connection, Leave Open
7	Built-in-Test ⁵

QRS14-00XXX-103	
Connector Pin	Assignment
1	-Vdc Input
2	+Vdc Input
3	Power Ground
4	Signal Ground
5	Rate Output
6	No Connection, Leave Open
7	Built-in Test ⁵

PARAMETER

SUMMARY SPECIFICATIONS

Part Number	QRS14-0XXXX-102**	QRS14-0XXXX-103**
Power Requirements		
Input Voltage	+9 to +18 Vdc	± 9 to ± 18 Vdc
Input Current	<20 mA	<40 mA (each supply)
Performance		
Standard Ranges	$\pm 50, 100, 200, 500, 1000^\circ/\text{sec}$	
Full Range Output (Nominal)	0 to +5 Vdc	± 5 Vdc
Scale Factor Calibration (at 22°C)	$\pm 2\%$ of value	
Scale Factor over Temperature (Dev. from 22°C)	$\leq 0.06\%/^\circ\text{C}$	
Bias Calibration (at 22°C)	$+2.5 \pm 0.045$ Vdc	0.0 ± 0.075 Vdc*
Bias Variation over Temperature (Dev. from 22°C)	$< 3.0^\circ/\text{sec}^*$	
Short Term Bias Stability (100 sec at const. temp)	$\leq 0.05^\circ/\text{sec}$	
Long Term Bias Stability (1 year)	$\leq 1.0^\circ/\text{sec}$	
G Sensitivity	$\leq 0.06^\circ/\text{sec/g}$	
Start-Up Time	< 1.0 sec	
Bandwidth (-90°)	> 50 Hz	
Non-Linearity	$\leq 0.05\%$ of F.R.	
Threshold/Resolution	$\leq 0.004^\circ/\text{sec}^*$	
Output Noise (DC to 100Hz)	$\leq 0.05^\circ/\text{sec}/\sqrt{\text{Hz}}^*$	$\leq 0.02^\circ/\text{sec}/\sqrt{\text{Hz}}^*$
Operating Life	10 years, typical	
Environments		
Operating Temperature	-40°C to $+85^\circ\text{C}$	
Storage Temperature	-55°C to $+100^\circ\text{C}$	
Vibration Operating	4 g_{rms} 20 Hz to 2 kHz random	
Vibration Survival	10 g_{rms} 20 Hz to 2 kHz random	
Shock	200 g	
Weight	≤ 50 grams	

*Values indicated for $\pm 100^\circ/\text{sec}$ range.

**"XXXX" designates \pm range.



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