

GI-CVG-F21XXD Tactical Grade Miniature Gyroscope



General Description

The GI-CVG-F21XXD is a high-performance, miniature, robust, and high-reliability Coriolis Gyroscope providing inertial angular rate measurement of rotations performed about 1-axis. The core technology used in the GI-CVG-F21XXD is InnaLabs® patented and proven Vibratory Gyros technology (CVG) which is inherently stable, impervious to ageing effects, naturally immune to vibrations, shocks, and low power consumption.

It exhibits an unprecedented size ($\leq 100 \text{ cm}^3$) to Angular Random Walk ($\leq 0.015 \text{ }^\circ/\sqrt{\text{hr}}$) ratio, so long awaited by customers operating in the stabilization market. The GI-CVG-F21XXD outperforms its FOG, DTG and Coriolis MEMS competitors in stabilisation applications.



Principle of Operations

Solid-state Coriolis Vibrating Gyros are based on the control of standing waves in a physical body, called a resonator (shown below, right) which is housed within a protective case (shown below, left). The protective case which contains the resonator is called a Sensitive Element (SE), and there is one such SE per axis in all InnaLabs® CVG gyroscopes.



Sensitive Element



Resonator

The oscillations in the resonator are generated and detected by piezoelectric actuators, which are attached to the base of the resonator. A closed-loop electronic system is used to control the standing wave oscillation in the resonator, and to null the effects of Coriolis forces induced by the rotation of the resonator, providing as output a signal which is proportional to the gyroscope angular rate. This electromechanical system is key to the very low output noise, and facilitates the large dynamic range required in several demanding applications.

Features

- 1-axis rate angular measurement
- Resolution $\leq 0.5 \text{ }^\circ/\sqrt{\text{hr}}$ (1σ)
- Reliability 500,000 hrs (MTBF)
- Housekeeping data
- RS422 Data Interface
- Power Interface ($\pm 5 \text{ VDC } \pm 5\%$)

Applications

- Platform stabilisation of optical systems and payloads, or other sensitive systems on airborne, land-based or marine platforms
- Stabilisation of pointing and directional systems
- Rail-tilt compensation systems
- Industrial control systems
- Platform leveling
- Structural health & maintenance
- Seismic sensing



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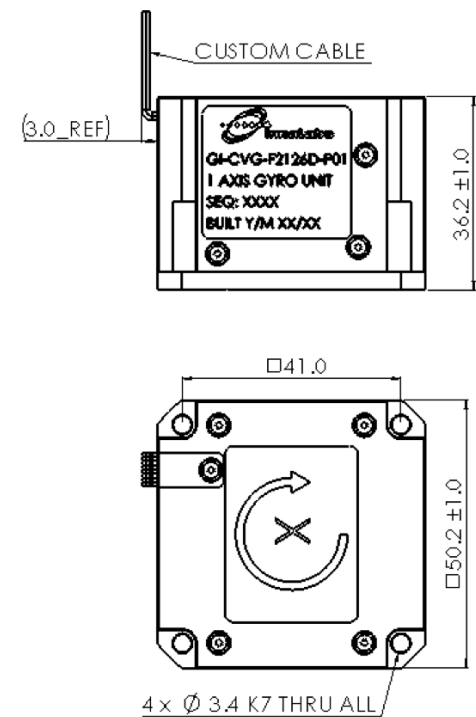
Specification

Variant	Unit	GI-CVG-F21XXD
Output format		Digital
Number of Axes		One
Measurement Range	°/s	≤ ±300
In-run Bias Stability	°/hr	≤ 0.5 °/hr (1 σ) (typical 0.2)
Bias stability, full temperature range	°/hr	≤ 10 (1σ)
Bias repeatability, turn-on to turn-on, 1σ	°/hr	≤ 0.3 °/hr (1 σ)
Scale factor error, full	ppm	≤ 3,500
Scale factor linearity	ppm	≤ 1,500
Angular Random Walk	°/√hr	0.015
Electrical		
Quiescent noise (1-100 Hz), RMS	°/s	≤ 0.01
Input Signal	VDC	+5 VDC to +5%
Bandwidth	Hz	≥ 300 Hz (-3db)
Start-up Time	sec	3 sec (typical 1 s)
Output Interface		RS422 Data Interface
Output Signal Rate	Hz	4,000
Environment		
Operating Temperature	degC	-40°C to +85°C
Random Vibration	g rms	3.63 g rms [5Hz-2kHz]
Sine Vibrations	g, ms	100g pk, ½sine, 11ms
MTBF	hrs	500,000
Physical		
Volume	cm ³	≤100
Weight	kg	≤200
Power Consumption	Watt	<2.5
Input Signal	VDC	+12 VDC to +36 VDC
Built-in self test		Yes

How to Order

The product is available under the following part number; GI-CVG-F21XXD. InnaLabs® offers a selection of accessories such as cables for use with gyroscopes, which help bench and field-testing of these gyroscopes.

Dimensions



IN-GEN-A-00-DAT-0024

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