

## General description

The **Innalabs 2000 Family of Gyroscopes** is a  $<10^\circ/\text{hr}$  range of tactical gyroscopes. Coming in a variety of form factors, the U2x10 group of parts is supplied with a rugged and hermetic housing, able to withstand the harshest environmental conditions.

The GI-CVG-U2x10D digital output family is suitable for a range of applications. The tactical performance, very low noise and high MTBF, combined with the small size make this gyroscope family the ideal choice for platform stabilization as well as north finding applications.



## Features

- In run Bias stability (room temperature)  $0.05^\circ/\text{hr}$  typical
- Very low output noise ( $\leq 0.004^\circ/\text{s}$  RMS @ 100 Hz)
- Very High MTBF (500,000 hr)
- Moderate bandwidth ( $\geq 25$  Hz)
- Robust (800 g shock)
- RS 422 interface

## Applications

The GI-CVG-U2x10D is particularly suited to the following applications:

- **North Finding Applications**
- **Platform Stabilization** of optical systems and payloads, or other sensitive systems on Airborne, Land-based or Marine platforms
- Stabilization of Pointing and Directional systems
- Rail-tilt compensation systems
- Industrial control systems

## Principles of Operation

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.



The oscillations in the resonator are generated and detected by piezo-electric 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.

## How to order

The GI-CVG-U2x10D is available in 1-axis and 2-axis models, known as:

- GI-CVG-U2110D – 1 axis version
- GI-CVG-U2210D – 2 axis version

## Related Products

Innalabs also offers a selection of accessories such as cables for use with the GI-CVG-U2x10D gyroscopes, which help bench and field-testing of these gyroscopes.

See our list of accessories for further details.

## Specification

Parameter	Unit	Value	
		GI-CVG-U2110D	GI-CVG-U2210D
Number of axis		One U2110D: X axis U2111D: Y axis	Two (X and Y)
Output format		Digital	
Output interface		Asynchronous RS-422	
Output signal rate	Hz	7900	
<b>Output data rate</b>	Mbps	0.9375	
Measurement range	deg/sec	±20	
Bandwidth (-3dB)	Hz	≥ 25	
In run Bias stability (room temp.)	deg/hr	0.05 typical	
Bias stability, full temperature range, 1σ	deg/hr	≤ 10	
Bias repeatability, turn-on to turn-on, 1σ	deg/hr	1 typical	
Angular Random Walk (steady conditions)	deg/√hr	0.003 typical	
Quiescent noise (1 – 100 Hz), RMS	deg/sec	≤ 0.004	
Scale factor error, full temperature range, 1σ	ppm	≤ 3500	
Scale factor linearity	ppm	≤ 1500	
Start up time	sec	≤ 10	
Misalignment	mrاد	< 8	
Input signal (MIL STD 461 and 1275)	VDC	+12 VDC to +36 VDC	
Power consumption	Watt	< 2.5 @15V	
Operational temperature	degC	-40 to +85	
Storage temperature	degC	-55 to +90	
Vibration, operational		3.63 g rms (DEF STAN 00-35) and 12 g rms, 5Hz-2kHz	
Shock	g, ms	800g, 0.6ms half sine	
MTBF, (MIL-HDBK 217F)	hours	500,000	
Electromagnetic Environmental Effects		MIL-STD-461F	
Lifetime	years	> 17	
Weight	kg	1.1	
Dimensions	mm	H68 x L107 x W107	
Built-in-self-test		Yes	
Temperature compensation (Bias, SF)		Yes	

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