Product User Manual

Product Name: Three-Axis MEMS Gyroscope

Product Model: TAMG210

Table of Contents

1. Product Overview

The TAMG210 is a high-precision, highly reliable, and cost-effective three-axis MEMS gyroscope that can be widely used in measurement and control applications. It integrates a high-performance MEMS gyroscope within a standalone structure; the selected gyroscope represents state-of-the-art in MEMS-based inertial devices.

The three-axis MEMS gyroscope measures the angular rate of the carrier. The product internally compensates for zero-point, scale factor, non-orthogonal errors, and acceleration-related terms across the full temperature range, enabling it to maintain high measurement accuracy over extended periods.

This manual serves as an instructional document for the use of the TAMG210 and provides the basis for operators to use the device correctly and appropriately.

Figure 1: Product Photo

2. Product Description

2.1 Function

Measures the angular velocity of the carrier along the three directions of the coordinate axes during motion.

2.2 Key Performance Characteristics

Table 1: Key Performance Specifications

No.	Performance Parameters	Specification	Remarks
1	Start-up Time	≤1 s	
2	Measuring Range	-400°/s to +400°/s	
3	Zero Drift	< 0.3°/h	Allan variance @25°C
4	Zero-Drift Stability	≤3°/h	(1σ, full temperature range)
5	Zero-offset repeatability	≤3°/h	(1σ, full temperature range)
6	Angular random walk	≤0.05°/√h	
7	Noise	0.05°/s (3σ)	
8	Orthogonal error	≤0.05%	
9	Bandwidth	≥250 Hz	
10	Scale factor nonlinearity	≤200 ppm	(1σ, room temperature)
11	Data Update Rate	2000 Hz	
12	Power Supply	5 V ± 0.2 V	
13	Power Consumption	≤1 W	
14	Operating Temperature	-40°C to +85°C	
15	Electrical Interface	RS422	
16	Dimensions	44.8 mm × 38.6 mm × 14.5 mm	
17	Weight	<45 g	
18	Color	Metallic Gold	

2.3 Dimensions and Mechanical Interfaces

Product Dimensions: (44.8 ± 0.2) mm × (38.6 ± 0.2) mm × (14.5) mm; Mechanical Interfaces: 3 × 4.4 mm screw holes;

As shown in Figure 2.

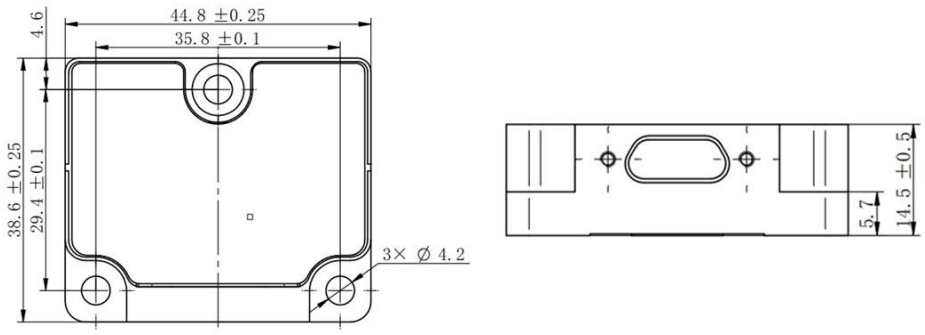

Figure 2: Product Dimensions (Unit: mm)

2.4 Electrical Interfaces

The product's external connector is J30J-15ZKP; see Table 2 for the interface definitions.

Table 2 Electrical Interface Definitions

Pin Number	Definition	Remarks
8	VSUP	5V Power Supply
15	GND	
10	RS422 RxD+	RS422 Interface
2	RS422 RxD-	
9	RS422 TxD+	
1	RS422 TxD-	
12, 13	GND	Ground
Remaining	/	Reserved by the manufacturer; please

2.5 Communication Protocol

Uses an RS422 communication interface with a 2000 Hz output, a baud rate of 460,800 bps, 8 data bits, 1 stop bit, and no parity. The communication protocol is shown in Table 3.

Table 3 Communication Protocol

No.	Number of Bytes	Data Type	Description
1	1	unsigned char	CCH Header
2	1	char	Gyro X High Bit
3	1	unsigned char	Gyro X second-most significant bit
4	1	unsigned char	Gyro X least significant bit
5	1	char	Gyro Y High Bits
6	1	unsigned char	Gyro Y second-most significant bit
7	1	unsigned char	Gyro Y high-order bit
8	1	char	Gyro Z High Bit
9	1	unsigned char	Gyro Z second-most significant bit
10	1	unsigned char	Gyro Z high-order bit
11	1	unsigned char	XOR of bytes 2–10

Gyroscope angular velocity output equations:

X-axis output data: $$out[^\circ/s] = \frac{(GXH) \times 2^{16} + (GXM) \times 2^{8} + (GXL)}{2^{14}}$$

Y-axis output data: $$out[^\circ/s] = \frac{(GYH) \times 2^{16} + (GYM) \times 2^{8} + (GYL)}{2^{14}}$$

Z-axis output data: $$out[^\circ/s] = \frac{(GZH) \times 2^{16} + (GZM) \times 2^{8} + (GZL)}{2^{14}}$$

2.6 Coordinate System

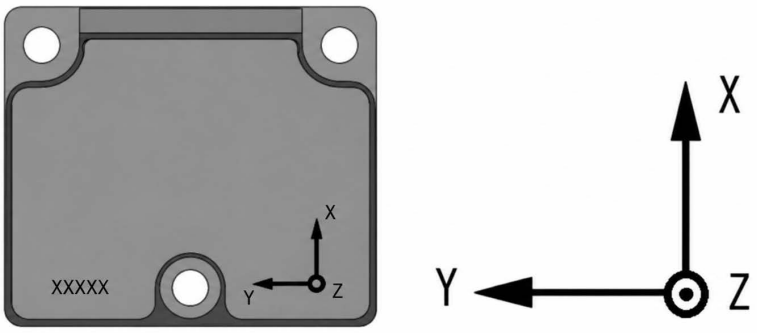

Figure 3 Product Coordinate System

3. Precautions

When using this product, ensure that the positive and negative terminals of the power cord and all signal cables are connected correctly. Under no circumstances should the power cord or signal cables be plugged in or unplugged while the product is powered on. Do not disassemble the product without authorization. If any abnormalities occur during use, contact the manufacturer or return the product to the factory for repair.