



FORSENSE Tactical single axis MEMS Gyroscope sensor

原极科技

FSS-G200 Product Manual

Characteristic

Tactical MEMS gyroscope

- 3.0°/h bias stability
- Better than 0.1°/s bias repeatability
- 0.08/s ultra low output noise

High reliability

- Shock resistance: 2000g (0.5ms, half sine, 3-axis)
- Shock vibration: 10g(10~2KHz, 3-axis)
- Stable operation at full temperature: -40 °C~85°C
- 100% magnetic shielding
- IP67 Waterproof
- Special bending resistant cable

Flexible digital interface, small size

- Configurable output sampling rate up to 400Hz
- Support RS232, CAN mainstream agricultural machinery controller interface
- Size of 45 * 45* 22.8mm and weighs only 50g



Product description

FSS-G200 is a single degree of freedom MEMS gyroscope module, which was originally designed for measuring the front wheel angle of automatic driving of agricultural machinery.

The module has the characteristics of high repeatability, good stability, good vibration and shock resistance. Large wheel angle can be measured under vibration environment, so that each module can play stably under various limit conditions, and ensure the high consistency of all product performance.

Application area

- Vehicle
- Automatic driving of agricultural machinery
- Engineering vehicle
- Underwater vehicle

On the basis of standard performance and output parameters, Forsence also provides customized software and logo services for your special needs.

1. Performance Parameter

1.1 Key specification of Gyroscope

Table 1 Key specification of Gyroscope

Parameter	Test Conditions /Remarks	Min	Typ	Max	Units
Measuring range			±500		°/s
Bias stability ¹	@25°C, 1σ		3.0		°/hr
Bias repeatability	@25°C, 1σ		0.1		°/s
G value sensitive error			0.05		°/s/g
Internal low pass cutoff frequency	Software adjustable	1.0	15	47	Hz
ODR ²		1	100	400	Hz
Measurement delay				5.0	ms
Random walk	Allan variance@25°C, 1σ		0.3		°/√hr
Output noise ³	rms@30Hz cf		0.08		°/s
Scale factor error			±0.6‰		
Scale factor nonlinearity			0.05%		

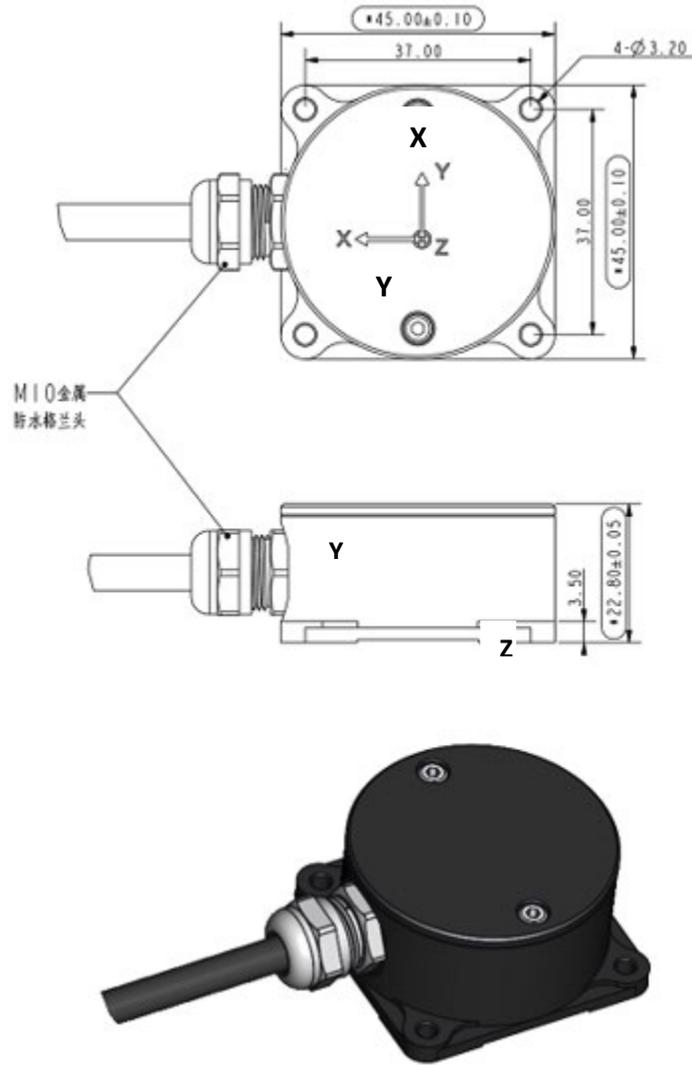
¹According to IEEE standard, Allan variance curve is given under static 25 °C

²The maximum output update rate is not greater than 200Hz@115200bps

³RMS index under static 25 °C environment and cut-off frequency of 15Hz

2. Configuration

Figure 1 Outline structure and dimensions (Unit: mm)



3. Electrical Characteristics

Table 2 Electrical characteristics

Parameter	Symbol	Interface Type	Min	Max	Units
Power input	VCC		4.5	5.5	V
Power ground	GND				
Electric current	I		60	80	mA
Temperature	T		-40	85	°C

Remarks: Standard RS232 and CAN bus interface

Table 3 Pin definition

Parameter	Line Color	Remarks
Power input	Red	5V DC Input
Power ground	Black	
RS232_TX	Yellow	RS232 Level
RS232_RX	White	
CAN_L	Brown	
CAN_H	Green	

Remarks: The baud rate of CAN communication is 1MHz, and the built-in matching resistance is 120 Ω

4. CAN Communication Protocol

Sample CAN host read driver based on STM32:

https://github.com/forsense/IMU61x_SPI_I2C_CAN_Drivers

4.1 Communication Parameters

- Interface Form: CAN, Standard Frame
- CAN Rate: 500Kbps

4.2 Standard Frame Format

Table 4 CAN Standard Frame Format 101

Standard Frame ID	1	2	3	4	5	6	7	8
101	ROLL				PITCH			

Table 5 CAN Standard Frame Format 102

Standard Frame ID	1	2	3	4	5	6	7	8
102	YAW				Gx			

Table 6 CAN Standard Frame Format 103

Standard Frame ID	1	2	3	4	5	6	7	8
103	Gy				Gz			

Table 7 CAN Standard Frame Format 104

Standard Frame ID	1	2	3	4	5	6	7	8
104	Ax				Ay			

Table 8 CAN Standard Frame Format 105

Standard Frame ID	1	2	3	4	5	6	7	8
105	Az				TEMP		INDEX	

Note 1 Posture angle,gyro,accelerometer data are represented as float, temperature,count data are represented as int16.

Note 2 TEMP unit is 100*C,gyroscope output unit is g,accelerometer output unit is degree.