Product Specification

Product Name: MEMS Inertial Measurement Unit

Product model: IMU313C

Catalogue

1. Product Introduction

IMU313C is a three-axis MEMS inertial measurement unit with small volume, high precision, high reliability and low cost, which can measure the three-dimensional angular velocity and acceleration information of a moving carrier. The zero position, scale factor, non-orthogonal error and acceleration-related items of all temperature parameters are compensated inside the product, which can maintain high measurement accuracy for a long time.

This manual is an explanatory document when IMU313C is used, and it is the basis for operators to use it correctly and operate it reasonably.

Figure 1 Product Physical Drawing

2. Product Specifications

2.1 Function

Measure the angular velocity and linear acceleration of the carrier in three directions along the coordinate axis during the movement.

2.2 Main Performance

Table 1 Main Performance Indicators

No.	performance parameter		Index	Remarks
1	Top	Measuring Range	-450°/s~+450°/s	
2		Full Temperature Zero Bias	≤150°/h	
3		Angular Random Walk	≤0.25°/$\sqrt{h}$	
4		Zero Bias Instability(Allan)	≤2.5°/h	
5		Full Temperature Zero Bias Stability(1σ)	≤10°/h	
6		Full Temperature Zero Bias Repeatability(1σ)	≤10°/h	
7		Scale Factor Nonlinearity	≤50ppm	
8		Bandwidth (Adjustable from 10 Hz to 250 Hz)	150Hz	
9	Accelerometer	Measuring Range	-10g~+10g	
10		Full Temperature Zero Bias	≤5mg	
11		Rate Random Walk	≤0.025m/s/$\sqrt{h}$	
12		Zero Bias Instability(Allan)	≤0.025mg	
13		Full Temperature Zero Bias Stability(1σ)	≤0.2mg	
14		Full Temperature Zero Bias Repeatability(1σ)	≤0.2mg	
15		Scale Factor Nonlinearity(±1g)	≤200ppm	
16		Bandwidth (Adjustable from 10 Hz to 250 Hz)	150Hz	
17	Supply Electricity		5V±0.3V	
18	Working Temperature		-40℃ ~ +85℃	
19	Resist The Impact		≥2000g	
20	Vibrate		≥20grms	
21	Outline Dimension		22.4mm×22.4mm×9mm	
22	Weight		≤20g	
23	Data Update Rate (Adjustable)		400Hz	
24	Interface Type		UART TTL	
25	Connector		Molex 5015680607	

2.3 Overall dimensions and mechanical interface

Product dimensions: (22.4±0.2) mm×(22.4±0.2) mm×(9.0±0.2) mm;

Mechanical interface: 3 2.5 mm screw holes;

As shown in figure 2.

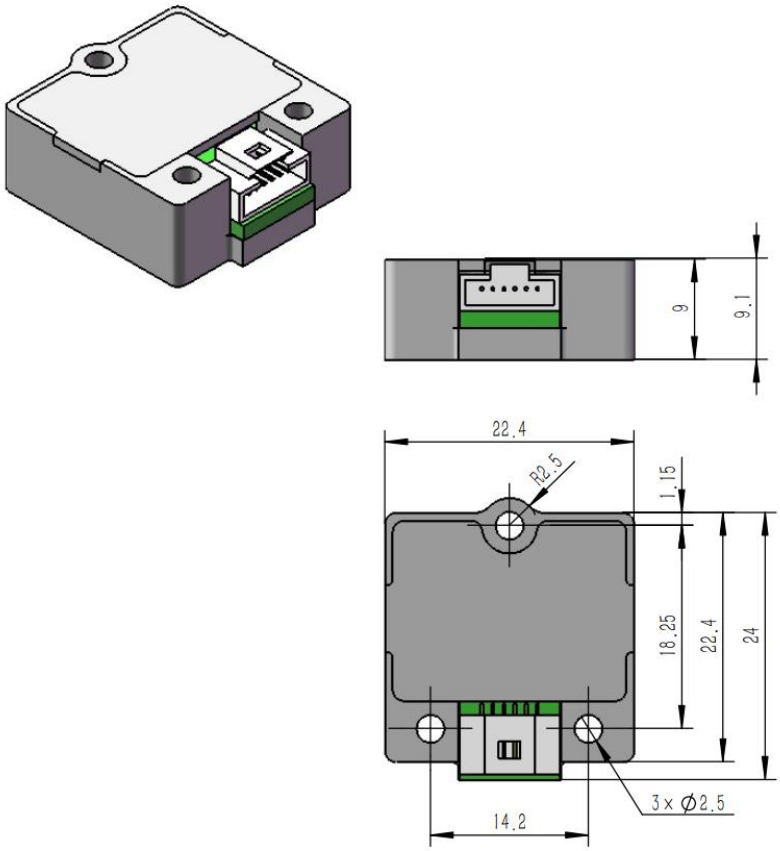

Figure 2 Product outline dimension drawing (unit: mm)

2.4 Electrical Interface

The product interface is Molex connector.

The product connector model: 5015680607, and its definition is shown in Figure 3 and Table 2.

Counter plug connector model: 5013300600

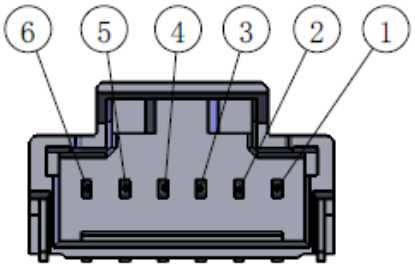

Figure 2 Product Output Interface Pin Definition Diagram

Table 2 Definition of Electrical Interface

Dit	Definition	Remarks
1	VCC(+5V)	Power supply positive
2	GND	Power supply ground
3	TXD	TTL transmission
4	RXD	TTL reception
5	PPS	Synchronize
6	—	—

Note: TXD and RXD output by UART are based on products.

2.5 Communication Protocol

TTL level communication is adopted, with baud rate of 921600bps, 1 start bit, 8 data bits, 1 stop bit, no check, low byte in front and high byte in the back. The refresh rate is 400Hz, and the communication protocol is shown in Table 3.

Table 3 Communication Protocols

Byte	Value	Value Type	Describe
0	0xBD	/	Fixed
1	0xDB		
2	0x0A		
3~6	LSB MID1 MID2 MSB	Float	Gx Factor 1 Unit deg/s
7~10	LSB MID1 MID2 MSB	Float	Gy Factor 1 Unit deg/s
11~14	LSB MID1 MID2 MSB	Float	Gz Factor 1 Unit deg/s
15~18	LSB MID1 MID2 MSB	Float	Ax Factor 1 Unit m/s^2
19~22	LSB MID1 MID2 MSB	Float	Ay Factor 1 Unit m/s^2
23~26	LSB MID1 MID2 MSB	Float	Az Factor 1 Unit m/s^2
27	LSB	Signed	Temperature Factor 0.006 Minimum -60 Maximum +125 Unit ℃
28	MSB		
29	BIT	Unsigned	Built-in Test Self-checking error (tentative 00)
30	Reserved	Reserved	Reserved (Arrange for the time being 00)
31	LSB	Unsigned	Counter Factor 1 Minimum 0 Maximum 65535 Unit ms
32	MSB		

Byte	Value	Value Type	Describe
33	Check	Byte	XOR check, including 0~32 bytes

2.6 Coordinate

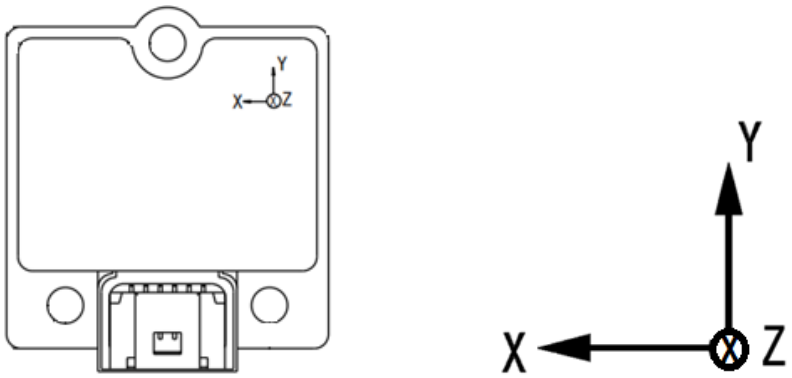

Figure 3 Product Coordinate System

3. Installation Connection

3.1 Product installation

When installing the product, install it in the designated installation position with 3 M2 or M2.5 screws. The installation requirements for products are as follows:

1) Install with M2 or M2.5 screws. See Figure 2 for the installation dimensions;
2) Clean the installation space to facilitate product installation;
3) Clean the adhered impurities on the product and the installation surface;
4) Place the product carefully to avoid bumping;
5) After the product is placed, there should be no "leg sticking" phenomenon, otherwise, check whether the installation plane meets the requirements;
6) Tighten the screws in turn.

3.2 Electrical Connection

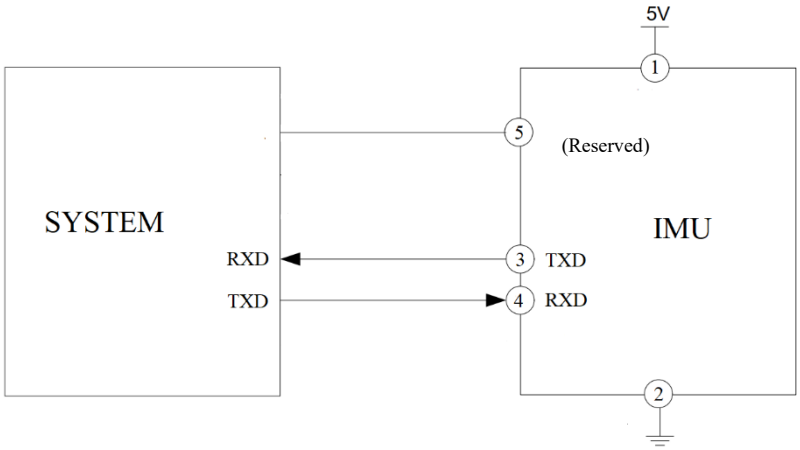

Fig. 4 Electrical Connection Diagram

4. Precautions

During the use of the product, it should be noted that the positive and negative connection of the power cord and each signal wire should not be wrong. It is forbidden to plug and plug the power cord and signal wire with electricity during the power-on process of the product. It is strictly forbidden to disassemble the product without authorization. If the product is abnormal during use, you should contact the manufacturing unit or return to the factory for maintenance.