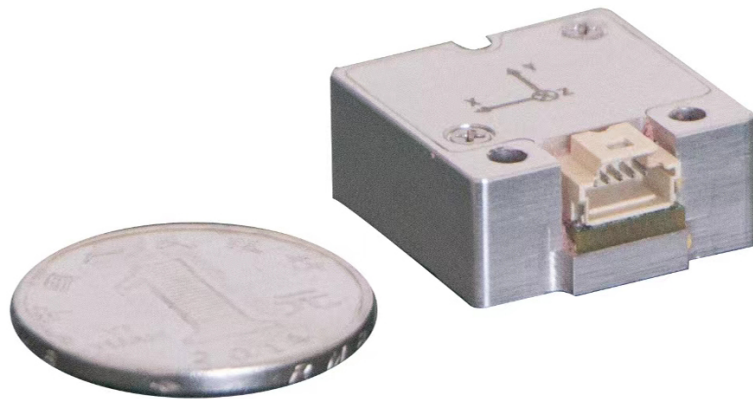






MEMS Inertial Measurement Unit V 1.01.

BS-IC202-M-D6EC



Product characteristics

-  Gyroscope measuring range: 500 ~ 2000 °/s optional
-  2 °/H gyroscope bias stability (Allan variance)
-  Acceleration range: 16 ~ 200 G optional
-  Zero bias stability (Allan variance) for acceleration of 0.1 mg

Field of application

UAV Navigation Robot Navigation AUV Navigation

Various air carriers flight navigation land vehicle navigation ROV navigation



1. Product overview

The BS-IC202-M-D6EC is an inertial measurement unit (IMU) based on micromachining technology (MEMS) with built-in high-performance MEMS gyroscope and MEMS accelerometer, which outputs 3 angular velocities and 3 accelerations. The utility model has the advantages of high reliability and strong environmental adaptability. By matching different software, the product can be widely used in tactical and industrial UAV, smart ammunition, seeker and other fields.

2. Product features

1) Three-axis digital gyroscope:

- A) $\pm 500^\circ/\text{s}$ (Max: $\pm 2000^\circ/\text{s}$) dynamic measurement range;
- B) Zero bias stability: $10^\circ/\text{H}$ (GJB, 10s), $2.0^\circ/\text{H}$ (ALLAN);

2) Triaxial digital accelerometer:

- A) $\pm 16\text{ G}$ (Max: $\pm 200\text{ G}$) dynamic measuring range;
 - B) Zero-bias stability: 0.5 mg (GJB, 10s), 0.1 mg (ALLAN);
- 3) High reliability: MTBF > 20000h;
 - 4) Guaranteed accuracy within the full temperature range ($-40^\circ\text{C} \sim 80^\circ\text{C}$): built-in high-performance temperature calibration and compensation algorithm;
 - 5) Suitable for working under strong vibration conditions
 - 6) Interface 1-way UART

3. Product indicators

Parameter		Test conditions	Typical value	Unit	
Angular velocity	Range	Turntable	500, 1000, 2000	$^\circ/\text{s}$	
	Zero bias	Stability	10 s average, + 70 $^\circ\text{C}$, + 20 $^\circ\text{C}$, -40 $^\circ\text{C}$	10	$^\circ/\text{h}$
			Allan variance, + 20 $^\circ\text{C}$	2	$^\circ/\text{h}$
		Zero-bias total temperature variation	-40 $^\circ\text{C} \sim +70^\circ\text{C}$, 1 $^\circ\text{C}/\text{min}$, 10 s average, 1σ	± 0.05	$^\circ/\text{s}$
	Zero bias	Zero bias range	± 0.1	$^\circ/\text{s}$	
	Scale factor	Non-linearity	+20 $^\circ\text{C}$	0.01	%FS
Scale factor accuracy		Life-cycle change, accelerated	0.2	%FS	

Parameter		Test conditions	Typical value	Unit	
		testing			
	Acceleration sensitive term		8	°/h/g	
	Bandwidth		3dB	200	Hz
	Data delay		Excluding transmission time	< 5	ms
Accelerat ion	Range		16, 200	g	
	Zero bias	Stability	10 s average, +70 °C, + 20 °C, -40 °C	0.5	mg
			Allan variance, +20 °C	0.1	mg
		Zero-bias total temperature variation	-40 °C ~ + 70 °C, 1 °C/min variation	1	mg
		Zero bias	Zero bias range	5	mg
	Scale factor	Repeatability of successive starts	+70°C +20°C -40°C	100	ppm
		Non-linearity	+20°C	0.02	%FS
		Scale factor accuracy	Life-cycle change, accelerated test instead	0.3	%FS
	Bandwidth		3dB	200	Hz
	Start time		Time from power-on to output valid data	500	ms
3 gyro axes and 3 acceleration axes The degree of nonorthogonality between any two ax		+70°C +20°C -40°C	0.05	°	
Overall dimensions			22.4×24×9	mm	
Weight			10	g	
Power supply			5±0.1	V	
Power consumption			0.8	W	
Use environment		Operating temperature-	-40~+80	°C	
		Storage	-45~+85	°C	

Parameter	Test conditions	Typical value	Unit
	temperature		
	Impact	1000g, 0.5ms	
	Vibration	20~2000Hz , 6.06g	
Communication update rate	1-way UART	500 (default) 1000 (Max)	Hz
Communication baud rate	1-way UART	460.8 (default) 921.6 (Max.)	kbps

4. Electrical interface

The model of the interface is A1008WR-S-6P, and the recommended mating terminal is A1008H-6P + A1008-T/G or 5013300600 (6p) + 5013340000.

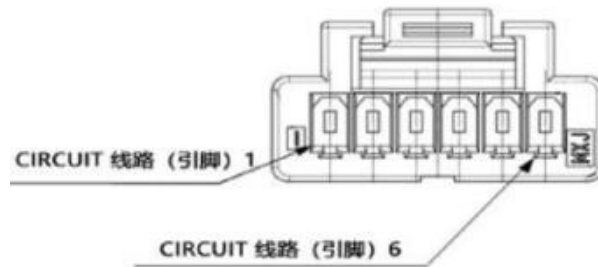


Figure 1 Schematic diagram of electrical interface

Seri	Name	Type	Description
1	5V	Powe	Power input + 5V ± 0.5 V, peak current ≤ 100mA
2	GND	Powe	
3	UART-TX	Outp	LVTTL-3.3v
4	UART-RX	Input	LVTTL-3.3v
5	SYNC	Outp	1 PPS synchronous signal input rising edge effective
6	MCLR	Outp	Reset signal input, active low, duration ≥ 20 ms,

Table 1 Electrical Definition Table

5. Fabric interface

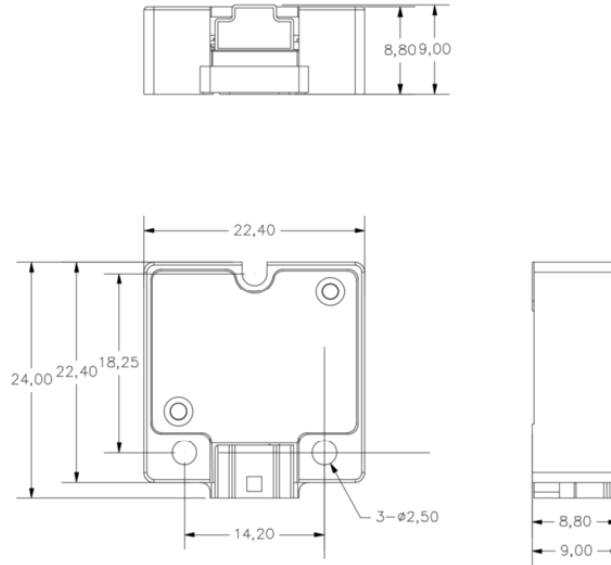


Fig. 2 Schematic Diagram of Structure Appearance

6. Instructions for use

6.1 UART read-write data

6.1.1 interface

Default configuration: 460800bps, 8 data bits, 1stop bit, no parity;

6.1.2 configuration commands

- 1) \$GPENB
Enable UART power-on automatic output
- 2) \$GPDIS
Close UART power-on automatic output
- 3) \$GP SER
View the serial number
- 4) \$GPINF
View configuration information

6.1.3 protocol format

A protocol head, a protocol body and a protocol tail; 500Hz; The coordinate axis is defined as front right down.

Agreeme	Byte	Data	Unit	Data	Remark
Protocol	0	0x5a			

header	1	0x5a			
Protocol body	2~5	X-axis	°/s	float	
	6~9	Y-axis	°/s	float	
	10~13	Z-axis	°/s	float	
	14~17	X-axis	g	float	
	18~21	Y-axis	g	float	
	22~25	Z-axis	g	float	
	26~29	Spare			
	30~33	Spare			
	34~37	Spare			
	38~41	Spare			
	42~45	Spare			
	46~49	Temperat	°C	float	
	50~53	Spare			
	54~57	Spare			
End of	58	Checksum			Accumulate and sum 2