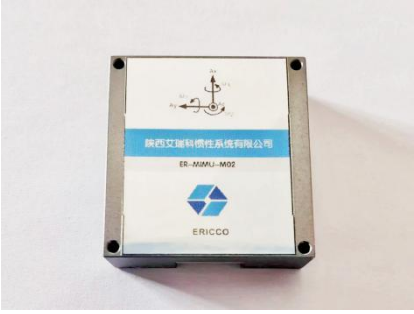
ER-MIMU-M02 High Precision MEMS IMU



Introduction

The ER-MIMU-M02 is an inertial measurement unit (IMU) based on micro-mechanical technology (MEMS) , including a built-in MEMS gyroscope with 2°/h (Allan) bias stability and a MEMS accelerometer with 100 μg (Allan) bias stability, which outputs three-axis angular velocity and three-axis acceleration, three-axis magnetometer and barometer.

The product has high reliability and strong environmental adaptability. That is, it can be widely used in fields such as drones, smart bombs, seekers, rocket shells and stable platforms.

Features

Three-axis digital gyroscope:

Dynamic measurement range of ±450º/s;

Bias stability: 2 º/h (Allan variance);

Random walk: 0.1º/√h;

Three-axis digital accelerometer:

Dynamic measurement range: 18g

Bias stability: 0.1mg (Allan variance);

Random walk: 0.02m/s√h;

High reliability: mean time between failures>20000h;

Ensure the accuracy within the full temperature range (-40℃~75℃): Built-in high-performance temperature calibration and compensation algorithm;

Support stable platform application: full parameter measurement and measurement bandwidth>100Hz;

Interface includes 1-channel SPI and 1-channel UART.

Specifications

Parameter	Test condition	Min value	Typical value	Max value	Unit
Gyroscope					
Dynamic measurement range	/	±400	±450		º/s
Bias stability	Allan variance	/	2	/	º/h
Random walk	/	/	0.1		º/√h
Bias repeatability	Full temperature	/	±0.1	0.2	º/s
Scale factor repeatability	Full temperature	/	0.5	1	%
Scale factor non-linearity	FS=450 º/s	/	0.1	0.2	%FS
Bandwidth	/	/	/	400	Hz
Accelerometer					
Dynamic measurement range	/	/	18	/	g
Bias stability	Allan variance	/	0.1	/	mg
Random walk	/	/	0.02	0.02	m/s/√h
Bias repeatability	Full temperature	/	10	32	mg
Scale factor repeatability	Full temperature	/	±0.5	±1	%
Scale factor non-linearity	FS=16g	/	0.2	/	%FS
Bandwidth	/	/	/	200	Hz
Magnetometer					
Dynamic measurement range	/	/	±2	/	gauss
Sensitivity	/	/	0.1	/	mgauss/LSB
Initial sensitivity error	/	/	2	/	%
Sensitivity temperature coefficient	/	/	250	/	ppm/℃
Non-linearity degree	/	/	/	1	% of FS
Initial bias error	/	/	400	/	mgauss
Partial temperature coefficient	/	/	0.7	/	mgauss/℃
Output noise	/	/	4	/	mgauss
Noise density	/	/	1	/	mgauss/√Hz
Bandwidth	/	/	50	200	Hz
Barometer					
Pressure range	extension	450	/	1100	mbar

		50	/	1200	mbar
Overall error	/	/	6.0	/	/
Long-term stability	/	/	1	/	mbar/year
Communication interface					
1 way SPI	Baud rate	/	/	15	MHz
1 way UART	Baud rate	9.6	230.4	921.6	Kbps
Electrical specification					
Voltage	/	3	3.3	3.6	V
Power dissipation	/	/	/	1.5	W
Ripple wave	P-P	/	/	10	mV
Structural characteristics					
Dimension	47×44×15mm				
Weight	/	41	42	47	g
Operating environment					
Operating temperature	/	-40		75	℃
Storage temperature	/	-45		80	℃
Vibration	/	/	3g, 10~2000Hz	/	/
Impact	/	/	30g, 11ms	/	/
Mean time between failures	/	/	20000	/	h
Reliability					
Continuous working hours	/	/	120	/	h