

## ER-MINU-02 High Precision Navigation MEMS IMU

### 1. Product introduction

Inertial Measurement Unit, referred to as IMU, is a device to measure the attitude angle (or angular velocity) and acceleration of the three axis of the object. Gyroscope and accelerometer are the core devices of inertial navigation system (INS). With the built-in accelerometer sensor and gyroscope, the IMU can measure the linear acceleration and rotation angular velocity from three directions and can obtain the attitude, velocity and displacement information of the carrier through the resolving.

ER-MINU-02 uses MEMS accelerometer and gyroscope with high quality and reliability, RS422 and external communication, baud rate can be flexibly set between 9600~921600, through the communication protocol to set the user's required communication baud rate. With X, Y, Z three-axis precision gyro, X, Y, Z three-axis accelerometer with high resolution, can be output by RS422 X, Y, Z three axis of gyroscope and accelerometer's original hexadecimal complement data (including gyro hexadecimal complement the numerical temperature, Angle, the accelerometer hexadecimal temperature, the acceleration hexadecimal complement number); It can also output float dimensionless values of the gyroscope and accelerometer processed by the underlying calculation.

### 2. Application areas

Construction machinery dip Angle measurement, Angle control, pylon operation monitoring, medical equipment Angle control, satellite antenna star search, bridge, tall building, tower, dam monitoring and rock and soil monitoring, mining, attitude/heading reference system, integrated inertial navigation.

### 3. Product features

Volume: 38.6 mm×44.8 mm×21.8 mm;

5V power supply, low power consumption 1.0W;

Lightweight: 50g;

Products include X,Y,Z three-axis MEMS gyro and X,Y,Z three-axis MEMS accelerometer;

RS422 bus communication, baud rate from 9600~921600 can be set.

#### 4. Performance indicators

<b>Gyro</b>	Parameter	ER-MG2-300	ER-MG2-400	Unit	
	Range	±300	±400	deg/s	
	Resolution	24	24	bits	
	Data Rate	12K	12K	Hz	
	Group delay	<5	<3	ms	
	Bandwidth (-3dB)	50	100	Hz	
	Scale Factor at 25°C	28000	20000	lsb/deg/s	
	Scale Factor Repeatability (1σ)	<50	<20	ppm	
	Scale Factor VS Temperature (1σ)	300	100	ppm	
	Scale Factor Non-Linearity (1σ)	<300	100	ppm	
	Bias Instability	0.03	0.05	deg/hr	
	Bias stability	0.15	<0.5	deg/hr	
	Bias stability	0.5	<1.5	deg/hr	
	Angular Random Walk	<0.01	<0.025	°/√h	
	Bias error over temperature(1σ)	10	3	deg/Hr	
	Bias temperature variations, calibrated(1σ)	<1	<0.5	deg/Hr	
	Bias Run-Run(1σ)	<0.3	<0.3	deg/hr	
	Noise Peak to Peak	±0.010	±0.05	deg/s	
	G-Sensitivity	<1	<1	°/hr/g	
	VRE	<1	<1	°/hr/g (rms)	
	Startup Time	1	1	s	
	Sensor Resonant Frequency	11K—13K			
	Environment, Power and Physical				
	Shock (operating)	500g,1ms, half sine wave			
	Shock (survival)	10000g,1.0ms, half sine wave			
	Vibration (Operating)	12grms,20Hz to 2KHz Random Vibration			
Operating Temperature	-45°C—85°C				
Max storage (survival) Temperature	-55°C—125°C				
Supply voltage	5±0.25V				
Current consumption	40mA				
<b>Accelerometer</b>	Range	2-10	30-50	g	

Bandwidth	100.00	100	Hz
Bias Stability (Allan Curve)	<5	<10	ug
Bias Stability (1s Standard Deviation)(1 $\sigma$ )	<20	<50	ug
Bias Month Repeatability	100-300	300-500	ug
Bias Temp Coefficient	<10	<50	ug/°C
Bias Temp Hysteresis	<0.5	<1	mg
Factor Scale Non-linearity	<500	<1000 (2000@50g)	ppm
Factor Scale Month Repeatability	<300	<300	Ppm
Factor Scale Temp Coefficient	10	10	ppm/°C
ClassII Non-linearity Coefficient	<100	<100	ug/g <sup>2</sup>
Factor Scale	4000000-800000	200000-150000	Lsb/g
Resolution	5	10	ug
Start Time	<1	<1	s
Sampling Rate	1500	1500	Hz
Shock(charged)	10000	10000	g
Shock(uncharged)	10000	10000	g
Vibration Rectification Error (6grms)	/	<0.4	mg/grms
Operation Temp	-40--110		°C
Voltage	5±0.25	5±0.25	V
Current	<15	<15	mA