MGA103 Single Axis MEMS Gyro with Triaxial Accelerometer

- Cost Effective Z Axis MEMS Gyro with 3 Accelerometers
- Heading: diverging 0.1°/hour
- Range: acc ±2g, gyro ±300° /s, (ODM supported)
- Wide Input Power Range: 6~14VDC
- Compact and Lightweight - 50 x 45 x 21 (mm), 70g
- Wide Working Temperature: -40° C～+85° C

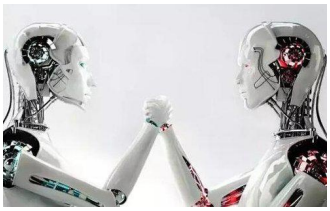
Product Description

MGA103 Single Axis MEMS Gyro with Triaxial Accelerometer is composed of one Z axis MEMS gyro and 3 accelerometers, which provides accurate heading direction and accelerations, MGA103 is a miniature factory-calibrated module to provide consistent performance through the extreme operating environments.

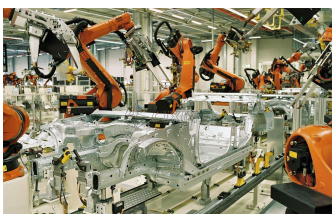
MGA103 offers a highly-effective solution for cost-sensitive demanding applications. It adopts advanced MEMS components, which reduces the cost deeply. The system enjoys small size and light weight, it is widely applied in Robotics Control, Platform Stabilization, Antenna Stabilization & Pointing, etc.

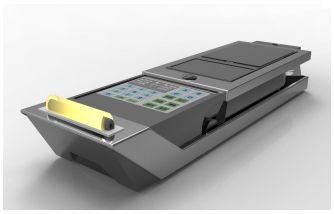
- ✓ **12-Step Quality Control, Higher Reliability, More Functions**
- ✓ **Adopting Original Big Brand Component, High-class Glue Encapsulation**
- ✓ **Real Actual Precise after Calibration, Perfect Performance**
- ✓ **Successful Applications in Tens of Fields, More than 1000 Customers are Using**

Typical Applications


Robot Control


Antenna Stabilization


Industrial Control


AGV

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Skype: skymems

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Technical Specs

Technical Specs		
Parameter	**Value**	**Comments**
Heading		
Range	±180°	
Accuracy	0.1°/hour	it is diverging with time, diverging speed is 0.1°/hour
Gyro		
Range: Heading	±300°/s ±75°/s, ±150°/s, ±900°/s	default setting optional
Noise	< 0.3°/s(RMS)	
Zero Error (25° C)	< 0.2°/s	
Bias Instability	24°/h (75°/s range) 40°/h (900°/s range)	typical value, Allen Variance
Bias Temperature Error	±3°/s	
Zero Drift Repeatability	0.14°/s(RMS)	
Scale Factor Non-linearity	0.2%	
Bias Acceleration Sensitivity	0.077°/s/g (typical) 0.17°/s/g (max)	
Rate Noise Density	0.025°/s/sqrHz	
Angle Random Walk Coefficient	0.28°/h	Allen Variance
Bias Vibration Sensitivity	0.001°/s/g2rms (typical) 0.003°/s/g2rms (max)	12g (RMS), 10Hz ~5kHz, random
Bandwidth	5~160Hz	

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Technical Specs

Technical Specs		
Parameter	**Value**	**Comments**
Accelerometer		
Range: X, Y, Z	±2g, ±6g	
Noise	< 5mg (RMS) (Max)	
Zero Error	±16mg (typical)	including calibration error, working drift
Bias Full Temperature Stability	±70mg (max)	including calibration error, working drift, power jitter and full temperature error
Bias Full Temperature Error	±30mg (max)	-40~+125°C
Scale Factor Error	±0.5% range (max)	
Sacle Factor Temperature Drift	±0.8% range (max)	-40~+125°C
Resolution	0.5%	12bit
Bandwidth	30~55Hz	-3dB
Environment Condition		
Working Temperature	-40~+85°C	
Protection Level	IP66	
Electromagnetic compatibility	Compatible with EN61000 and GBT17626	
MTBF	≥5000hours	
Vibration Resistance	10grms, 10~1000Hz	
Shock Resistance	100g@11ms, 3 axes, (half sine wave)	
Power Supply		
Input Voltage	6~14VDC	
Current	60mA@9VDC	
Communication Protocol		
Default Interface	RS232	
Baud rate	115200	
Data Update Rate	100Hz	
Physical Parameter		
Dimension	50mm*45mm*21mm	
Weight	around 70 grams	
Connector	5 pin mini aviation connector	
Location Hole	4 holes	

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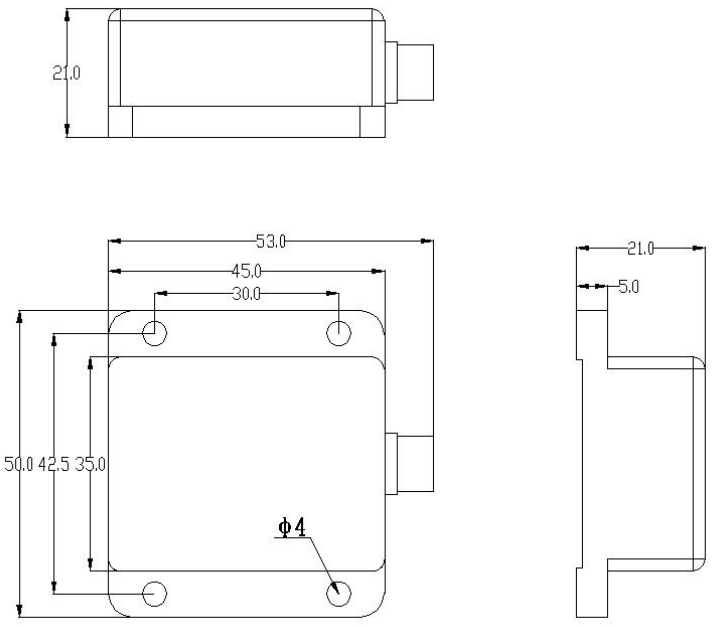
Pins Definition

Pins Definition

Pins No.	5 pin mini aviation connector Line Color	Name	Description
1	Brown	Vcc	power positive pole
2	Black	GND	power gound
3	White	RS232_TX	RS232 data transmitting
4	Blue	RS232_RX	RS232 data receiving
5	Gray	RS232_GND	RS232 signal ground (short circuit with power ground inside the sensor)

Dimension & Package



(Unit: mm)

MGA103 three-view drawing

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Com Protocol

the electronic parameters of RS232 communicaiton protocol are as follows:

- Baud rate: 115200
- Data bit: 8
- Stop bit: 1
- Check bit: none

the data string is sent out every 10ms, and each data string includes 58 bytes, the detailed description see as follows:

Data String Definition		
Name	**Byte Length**	**Description**
Initial Code	4	0x4E 0x4A 0x35 0x94
X axis of acceleromter	4	float mode floating number, 4 bytes, high byte in front, unit: g
Y axis of acceleromter	4	float mode floating number, 4 bytes, high byte in front, unit: g
Z axis of acceleromter	4	float mode floating number, 4 bytes, high byte in front, unit: g
X axis of gyro	4	0
Y axis of gyro	4	0
Z axis of gyro	4	float mode floating number, 4 bytes, high byte in front, unit:deg/s
X axis of magnetic sensor	4	0
Y axis of magnetic sensor	4	0
Z axis of magnetic sensor	4	0
Temperature	4	float mode floating number, 4 bytes, high byte in front, unit: °C
Heading Angle (divergence)	4	float mode floating number, 4 bytes, high byte in front, unit:deg
Roll Angle	4	0
Pitch Angle	4	0
Sum Check	2	high byte in front, low byte in behind, the sum of all the front data

Remarks: during turning on the sensor, please keep the sensor in static status, and after turning on the sensor, please keep the sensor in statis status more than 5 seconds

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Order Information

MGA103 | **XXX** | **XX**

XX: Accelerometer Measurement Range: 02= ±2g (Default)
06= ±6g

XXX: Gyro Measurement Range:
300 = ±300°/sec (Default)
075 = ±75°/sec
150 = ±150°/sec
900 = ±900°/sec

MGA103: model name

For example, MGA103-900-02 means that the MGA103 with 1 axis gyro range: ±900°/sec, accelerometer range: ±2g.