VG2000

High Performance Vertical Gyro

Main Features

- Output: Pitch, Roll, Yaw, Acceleration, Angular Speed
- Attitude Accuracy: Static < ±0.1°, Dynamic< ±0.3°
- Range: Gyro ±500°/s, Acc ±10g, (ODM supported)
- Wide Input Power Range: 5~24VDC
- Military Level Casing, High Survivability
- Compact and Lightweight: 50 x 45 x 21mm, 70grams
- Wide Working Temperature: -40°C~+85°C

VG2000 high performance vertical gyro is a standalone compact, high accuracy vertical gyro system that utilizes the MEMS-based inertial sensors which have passed temperature calibration and nonorthogonal error compensation, so VG2000 can output precisely three attitude angles (pitch, roll, yaw) and other auxiliary sensing signals (acceleration and angular velocity) of the carrier that the VG2000 is installed.

VG2000 vertical gyro 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 UAV Flight Control, Unmanned Vehicle Control, Platform Stabilization, Robotics Control, Antenna Stabilization, etc.

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

Typical Applications


AGV


Antenna Pointing


Industrial Control


UAV Flight Control

Super Reliability & Performance

www.SkyMEMS.com Mobile: +86 133 7203 8516
Skype: skymems

Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

VG2000

High Performance Vertical Gyro

Technical Specifications

Technical Specs		
Parameter	**Value**	**Comments**
Attitude		
Range: Roll, Pitch	±180°, ±90°	
Accuracy	< 0.1°(1σ)	
Dynamic Accuracy	< 0.3°(RMS)	
Resolution	0.01°	
Gyro		
Range: Roll, Pitch, yaw	±500°/s	default setting
	±75°/s, ±150°/s, ±900°/s	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	

VG2000

High Performance Vertical Gyro

Technical Specifications

Technical Specs		
Parameter	**Value**	**Comments**
Accelerometer		
Range: X, Y, Z	±10g	default
	±20g, ±40g	ODM supported
Noise	< 5mg (RMS) (Max)	
Zero Error	< 5mg (max)	including calibration error, working drift
Bias Full Temperature Error	0.5% mg/°C	-40~+125°C
Scale Factor Error	±0.1% FSR	
Sacle Factor Full Temperature Drift	±0.01% mg/°C	-40~+125°C
Resolution	Range/32768/LSB	16bit
Bandwidth	1~1500Hz	50% attenuation
Environment Condition		
Working Temperature	-40~+85°C	
Protection Level	IP67	
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	5~24VDC	
Current	25mA@12VDC	
Communication Protocol		
Default Interface	RS232	
Baud rate	115200	
Data Update Rate	200Hz	settable
Physical Parameter		
Dimension	50mm*45mm*21mm	
Weight	around 70 grams	
Connector	5 pin mini aviation connector	
Location Hole	4 holes	

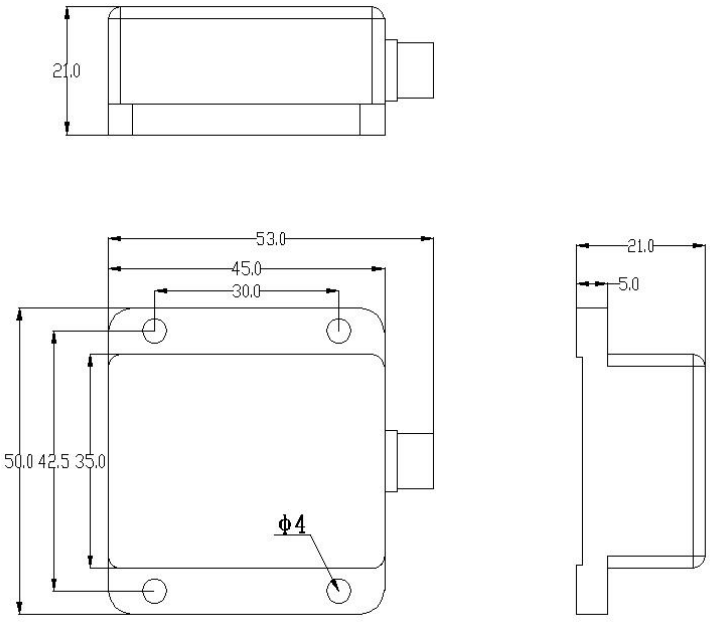
VG2000

High Performance Vertical Gyro

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)

three-view drawing with 5 pin mini aviation connector

VG2000

High Performance Vertical Gyro

Communication Protocol

the electronic parameters of RS232 communicaiton protocol are as follows:

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

VG mode:

the data string is sent out every 5ms, and each data string includes 32 bytes, the detailed description see as follows:

Data String Definition		
Name	**Byte Length**	**Description**
Initial Code	4	0x4E 0x4A 0x1B 0x91
X axis of acceleromter	2	With symbol 16 bit shaping complement form output,high byte in front, scale factor: (accelerometer range/32768)g/LSB
Y axis of acceleromter	2	With symbol 16 bit shaping complement form output,high byte in front, scale factor: (accelerometer range/32768)g/LSB
Z axis of acceleromter	2	With symbol 16 bit shaping complement form output,high byte in front, scale factor: (accelerometer range/32768)g/LSB
X axis of gyro	2	With symbol 16 bit shaping complement form output,high byte in front, scale factor: (gyro range/32768)degree/s/LSB
Y axis of gyro	2	With symbol 16 bit shaping complement form output,high byte in front, scale factor: (gyro range/32768)degree/s/LSB
Z axis of gyro	2	With symbol 16 bit shaping complement form output,high byte in front, scale factor: (gyro range/32768)degree/s/LSB
X axis of magnetic sensor	2	0
Y axis of magnetic sensor	2	0
Z axis of magnetic sensor	2	0
Temperature	2	With symbol 16 bit shaping complement form output,high byte in front, scale factor: (1/100)°C/LSB
Yaw Angle	2	With symbol 16 bit shaping complement form output,high byte in front, scale factor: (180/3276)deg/LSB
Roll Angle	2	With symbol 16 bit shaping complement form output,high byte in front, scale factor: (180/3276)deg/LSB

VG2000

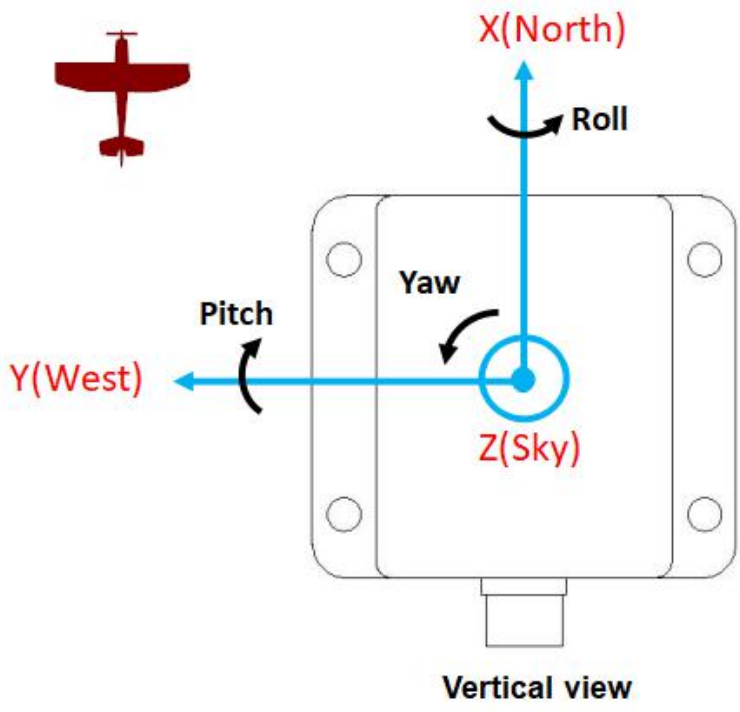
High Performance Vertical Gyro

Communication Protocol

Data String Definition		
Name	**Byte Length**	**Description**
Pitch Angle	2	With symbol 16 bit shaping complement form output,high byte in front, scale factor: (90/3276)deg/LSB
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

Axis & Angle Definition



The arrows of attitude angles indicate positive direction, it means that:

Positive direction of pitch angle: rotation around +Y axis

Positive direction of roll angle: rotation around +X axis

Positive direction of roll angle: rotation around +Z axis

VG2000

High Performance Vertical Gyro

Order Information

VG2000: model name

XXX: Gyro Measurement Range:
500 = ±500°/sec (Default)
075 = ±75°/sec
150 = ±150°/sec
900 = ±900°/sec

XX: Accelerometer Measurement Range: 10= ±10g (Default)
20= ±20g
40= ±40g

For example, VG2000-900-10 means that the VG2000 with gyro range: ±900°/sec, accelerometer range: ±10g.