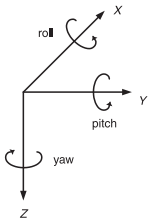
VG400

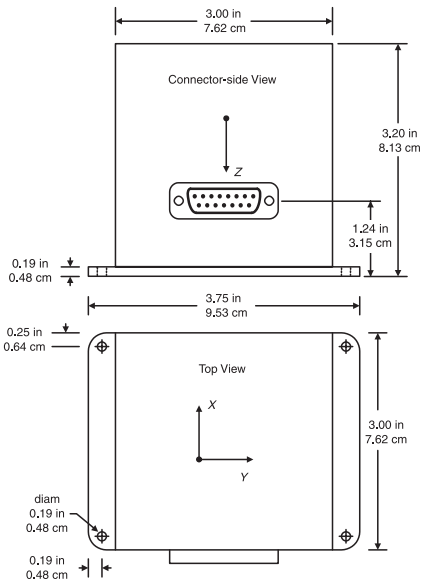
SOLID-STATE VERTICAL GYRO

- Roll and Pitch Angle Measurement in High Dynamic Environments
- High Stability MEMS Sensors
- Enhanced Performance Using Kalman Filter Algorithm
- EMI & Vibration Resistant

Applications

- UAV Control
- Platform Stabilization
- Avionics





VG400CD

The Crossbow VG400CD is a high performance, solid-state vertical gyro intended for airborne applications such as UAV control, avionics, and platform stabilization. This high reliability, strapdown inertial system provides attitude measurement with static and dynamic accuracy that exceeds traditional spinning mass vertical gyros.

The VG400CD offers enhanced stability and performance compared with previous 400-Series configurations by incorporating the latest advancements in MEMS accelerometers. These new MEMS accelerometers also provide significant improvement in vibration performance in a variety of different application environments.

The VG400CD achieves its excellent performance by employing proprietary Kalman Filter algorithms to determine stabilized roll and pitch angles in static and dynamic conditions. The Kalman Filter implementation results in a continuous on-line gyro bias calibration, and an adaptive attitude measurement that is stabilized by the long term gravity reference. Output data is provided in both analog and digital (RS-232) formats.

Each Inertial System comes with a User's Manual offering helpful hints on programming, installation, and product information. In addition, Crossbow's GYRO-VIEW software is included to assist you in system development and evaluation, and allows you to perform data acquisition.

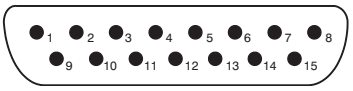
Specifications	VG400CD-100	VG400CD-200	Remarks
Performance			
Update Rate (Hz)	> 70	> 70	Continuous Update Mode
Start-up Time Valid Data (sec)	< 1	< 1	
Fully Stabilized Data (sec)	< 60	< 60	Under static conditions
Attitude			
Range: Roll, Pitch (°)	± 180, ± 90	± 180, ± 90	
Static Accuracy (°)	± 0.75	± 0.75	
Dynamic Accuracy (° rms)	± 2.0	± 2.5	
Resolution (°)	< 0.1	< 0.1	
Angular Rate			
Range: Roll, Pitch, Yaw (°/sec)	± 100	± 200	
Bias: Roll, Pitch, Yaw (°/sec)	<± 1.0	<± 1.0	Scaled sensor mode
Bias: Roll/Pitch (°/sec)	<± 0.05	<± 0.05	Angle mode
Scale Factor Accuracy (%)	< 1	< 1	
Non-Linearity (% FS)	< 0.3	< 0.3	
Resolution (°/sec)	< 0.025	< 0.05	
Bandwidth (Hz)	> 25	> 25	-3 dB point
Random Walk (°/hr$^{1/2}$)	< 2.25	< 4.5	Typical
Acceleration			
Input Range: X/Y/Z (g)	± 4	± 4	
Bias: X/Y/Z (mg)	<± 12	<± 12	
Scale Factor Accuracy (%)	< 1	< 1	
Non-Linearity (% FS)	< 1	< 1	
Resolution (mg)	< 0.6	< 0.6	
Bandwidth (Hz)	> 10	> 10	-3 dB point
Random Walk (m/s/hr$^{1/2}$)	< 1.0	< 1.0	
Environment			
Operating Temperature (°C)	-40 to +71	-40 to +71	
Non-Operating Temperature (°C)	-55 to +85	-55 to +85	
Non-Operating Vibration (g rms)	6	6	20 Hz - 2 KHz random
Non-Operating Shock (g)	1000	1000	1 ms half sine wave
Electrical			
Input Voltage (VDC)	9 to 30	9 to 30	
Input Current (mA)	< 250	< 250	
Power Consumption (W)	< 3	< 3	at 12 VDC
Digital Output Format	RS-232	RS-232	
Analog[1] Range (VDC)	± 4.096	± 4.096	Pins 8, 9, 10, 12, 13, 14
	0 to 5.0	0 to 5.0	Pins 5, 6, 7
Physical			
Size (in)	3.0 x 3.75 x 3.2	3.0 x 3.75 x 3.2	Incl. mounting flanges
(cm)	7.62 x 9.53 x 8.13	7.62 x 9.53 x 8.13	Incl. mounting flanges
Weight (lbs)	< 1.4	< 1.4	
(kg)	< 0.64	< 0.64	
Connector	15 pin sub-miniature "D" male		

Notes

[1]All DAC analog outputs are fully buffered and are designed to interface directly to data acquisition equipment.

Specifications subject to change without notice

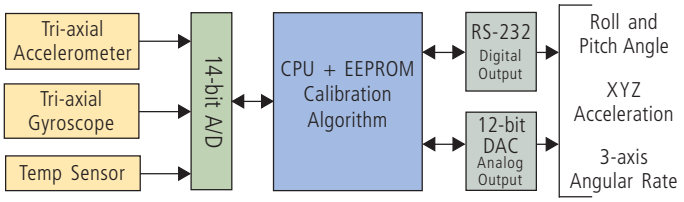
15 Pin "D" Connector Male Pinout



Pin	Signal
1	RS-232 Transmit Data
2	RS-232 Receive Data
3	Input Power
4	Ground
5	X-axis accel voltage[1]
6	Y-axis accel voltage[1]
7	Z-axis accel voltage[1]
8	Roll-axis angular rate[2]
9	Pitch-axis angular rate[2]
10	Yaw-axis angular rate[2]
11	NC – Factory use only
12	Roll angle/X-axis acceleration[3]
13	Pitch angle/Y-axis acceleration[3]
14	Not used/Z-axis acceleration[3]
15	NC – Factory use only

Notes
1 The accelerometer voltage outputs are taken directly from the accelerometers without compensation or scaling.
2 The angular rate analog outputs are scaled to represent degrees/second. Outputs are created by a D/A converter.
3 Actual output depends on VG measurement mode.

Pin Diagram



VG Block Diagram

Ordering Information

Model	Description	Gyro (°/sec)	Accel (g)
VG400CD-100	Solid State Vertical Gyro	±100	± 4
VG400CD-200	Solid State Vertical Gyro	± 200	± 4

CALL FACTORY FOR OTHER CONFIGURATIONS