VG

FIBER OPTIC VERTICAL GYRO

- Fiber Optic Gyro Stability < 20°/hr
- Stabilized Roll and Pitch Angle Outputs
- Fully Compensated Angular Rate and Linear Acceleration Outputs

Applications

- UAV Flight Control
- Platform Stabilization
- Avionics

VG700CA

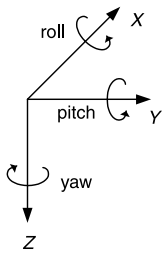
The VG700CA is an intelligent vertical gyro for measuring roll and pitch angles in dynamic environments. The VG700CA uses Crossbow's second generation Fiber Optic Rate Gyro technology resulting in superior performance, reliability, and stability over time. The new second generation FOG sensor provides excellent in-run bias stability of <20°/hr (constant temp.) and low noise.

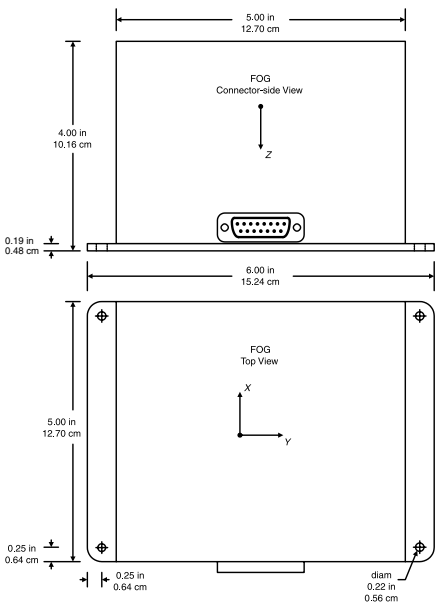
The VG700CA calculates stabilized roll and pitch angles by integrating the angular rate sensor outputs. The adaptive vertical erection algorithm is used to compensate for gyro bias-induced errors based on a long term gravity reference provided by the accelerometers. The "authority" of the drift correction can be set via the serial command 'T' (refer to the User Manual). The high stability fiber optic gyros allow a low 'T' setting which minimizes the effect of "false" gravity references during extreme maneuvers and therefore provides better overall accuracy in dynamic environments.

Example applications include flight control, avionics, and platform stabilization.

The VG700CA measures acceleration and rotation rate about three orthogonal axes. The VG700CA employs on-board digital processing to provide a factory calibrated unit with internal compensation for deterministic error sources.

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.





inertial systems

Document Part Number: 6020-0038-01

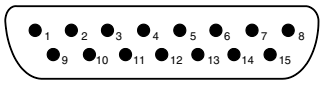
Specifications		VG700CA-200	VG700CA-201	Remarks
Performance				
Update Rate (Hz)		> 100	> 100	Continuous Update Mode
Start-up Time Valid Data (sec)		< 1	< 1	
Attitude				
Range: Roll, Pitch (°)		± 180, ± 90	± 180, ± 90	
Static Accuracy (°)		<± 0.5	<± 0.75	
Dynamic Accuracy (° rms)		2.0	2.0	
Resolution (°)		< 0.1	< 0.1	
Angular Rate				
Range: Roll, Pitch, Yaw (°/sec)		± 200	± 200	
Bias: Roll, Pitch, Yaw (°/hr)		<± 20	<± 20	Constant temp.
Bias: Roll, Pitch, Yaw (°/sec)		<± 0.03	<± 0.03	Over temp. (typical)
Scale Factor Accuracy (%)		< 2	< 2	Over temp. (typical)
Non-Linearity (% FS)		< 1	< 1	< 100 °/sec
Resolution (°/sec)		< 0.025	< 0.025	
Bandwidth (Hz)		> 100	> 100	-3 dB point
Random Walk (°/hr$^{1/2}$)		< 0.4	< 0.4	
Acceleration				
Range: X/Y/Z (g)		± 2	± 10	
Bias: X/Y/Z (mg)		<± 8.5	<± 12	
Scale Factor Accuracy (%)		<± 1	<± 1	
Non-Linearity (% FS)		<± 1	<± 1	
Resolution (mg)		< 0.25	< 1.25	
Bandwidth (Hz)		> 10	> 10	-3 dB point
Random Walk (m/s/hr$^{1/2}$)		< 0.1	< 0.5	
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)		10 to 30	10 to 30	
Input Current (A)		< 0.75	< 0.75	
Power Consumption (W)		< 8	< 8	At 15V DC
Digital Output Format		RS-232	RS-232	"See Digital Data Format"
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)	5.0 x 6.0 x 4.0	5.0 x 60 x 4.0	Including mounting flanges
	(cm)	12.70x15.24x10.16	12.70x15.24x10.16	Including mounting flanges
Weight	(lbs)	< 3.5	< 3.5	
	(kg)	< 1.6	< 1.6	
Connector		15 pin sub-miniature "D", male		

Notes

[1]All DAC analog output 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	Function
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

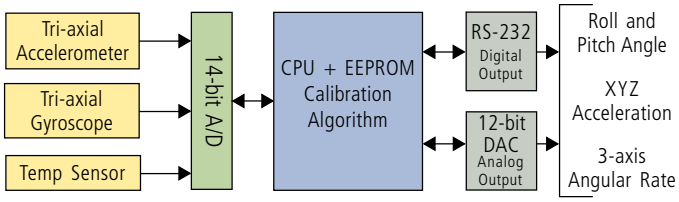
Notes

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



Vertical Gyro Block Diagram

Ordering Information

Model	Description	Gyro (°/sec)	Accel (g)
VG700CA-200	Fiber Optic Vertical Gyro	± 200	± 2
VG700CA-201	Fiber Optic Vertical Gyro	± 200	± 10

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