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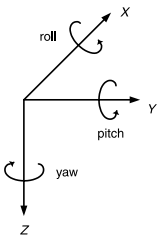
RGA

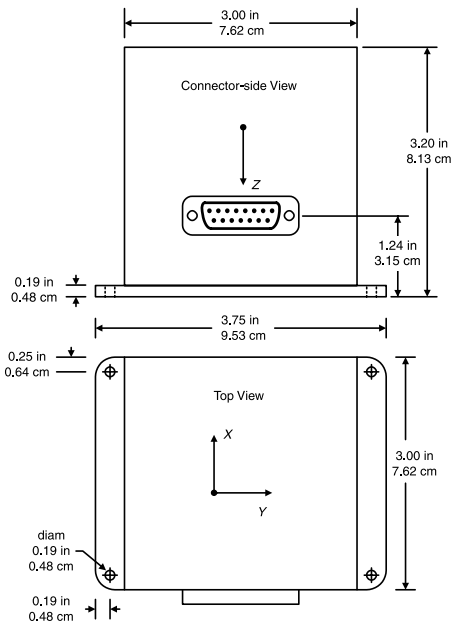
RATE GYRO & ACCELEROMETER PACKAGE

- Single Axis MEMS Yaw Rate Gyro
- 3-Axis Accelerometer
- Roll and Pitch in Static Conditions
- EMI & Vibration Resistant

Applications

- Land Vehicle Control
- GPS Augmentation
- Dead Reckoning
- Robotics





RGA300CA

The RGA300CA is a high-performance MEMS gyro and triaxial accelerometer subsystem. It is an ideal solution for land vehicles where the majority of the motion control occurs on the yaw rate axis. The unit is compensated for static errors using an on-board DSP processor. Outputs are available in both analog and digital (RS-232) formats. Data is available in a polled mode or continuously at a fixed rate of over 100Hz. No recalibration of the unit is required, and it is designed for a long service-free operating life.

The MEMS angular rate sensor is equiped with a Z-sensitive axis, also known as yaw rate. In addition to the rate sensor, a triaxial silicon MEMS accelerometer is included in the RGA300CA system. The triaxial accelerometer is a bulk-micromachined capacitive accelerometer. The accelerometer outputs can be used in one of two ways. In GPS augmentation applications, the accelerometers can be used to estimate X, and Y velocity by performing a single integration of the outputs. A second use for the acceleration signals is an inclinometer. The acceleration sensors have DC response and therefore can accurately measure the gravitational G-force. When the vehicle is static or quasi-static, the accelerometers will indicate the roll and pitch of the vehicle. The static roll and pitch data is calculated in the RGA300CA and output in analog and digital (RS-232) formats.

Typical applications for the system include land vehicle guidance and control. Example equipment includes construction vehicles and land robots. Tall buildings, trees, and other obstructions make reliable GPS coverage challenging. The yaw rate sensor of the RGA300CA, allows the system engineer to overcome GPS outages.

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.

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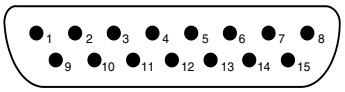
Specifications		RGA300CA	Remarks
Performance			
Update Rate (Hz)		> 100	Continuous Update Mode
Start-up Time Valid Data (sec)		< 1	
Fully Stabilized Data (sec)		< 1	Static conditions
Attitude			
Range: Roll, Pitch (°)		± 180, ± 90	
Static Accuracy (°)		± 1.5	
Resolution (°)		< 0.1	
Angular Rate			
Range: Yaw (°/sec)		± 100	
Bias: Yaw (°/sec)		<± 2.0	
Scale Factor Accuracy (%)		< 1	
Non-Linearity (% FS)		< 0.3	
Resolution (°/sec)		< 0.025	
Bandwidth (Hz)		> 25	-3 dB point
Random Walk (°/hr$^{1/2}$)		< 2.25	Typical
Acceleration			
Input Range: X/Y/Z (g)		± 2	
Bias: X/Y/Z (mg)		<± 30	
Scale Factor Accuracy (%)		< 1	
Non-Linearity (% FS)		< 1	
Resolution (mg)		< 1.0	
Bandwidth (Hz)		> 50	-3 dB point
Random Walk (m/s/hr$^{1/2}$)		< 0.15	
Environment			
Operating Temperature (°C)		-40 to +71	
Non-Operating Temperature (°C)		-55 to +85	
Non-Operating Vibration (g rms)		6	20 Hz - 2 KHz random
Non-Operating Shock (g)		1000	1 ms half sine wave
Electrical			
Input Voltage (VDC)		9 to 30	
Input Current (mA)		< 200	
Power Consumption (W)		< 3	at 12 VDC
Digital Output Format		RS-232	See "Digital Data Format"
Analog[1] Range (VDC)		± 4.096	Pins 8, 9, 10, 12, 13, 14
		0 to 5.0	Pins 5, 6, 7
Physical			
Size	(in)	3.0 x 3.75 x 3.20	Includ. mounting flanges
	(cm)	7.62 x 9.53 x 8.13	Includ. mounting flanges
Weight	(lbs)	< 1.3	
	(kg)	< 0.59	
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

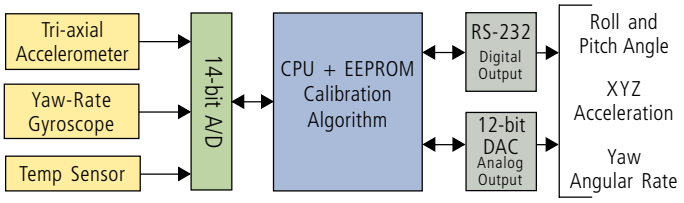


Pin	Signal
1	RS-232 Transmit Data
2	RS-232 Receive Data
3	Input Power
4	Ground
5	X-axis Accel Voltage[1]
6	Y-axis Accel Voltage[1]
7	Z-axis Accel Voltage[1]
8	X-axis Acceleration[2]
9	Y-axis Acceleration[2]
10	Z-axis Acceleration[2]
11	NC – Factory Use Only
12	Roll Angle[3]
13	Pitch Angle[3]
14	Yaw-axis Angular Rate[4]
15	NC – Factory Use Only

Notes

1 The accelerometer voltage outputs are taken directly from the accelerometers without compensation or scaling.
2 The compensated accelerometer analog outputs are scaled to represent G. Outputs are created by a D/A converter.
3 Roll and Pitch angle analog outputs are scaled to represent degrees. Outputs are created by a D/A converter.
4 The angular rate analog output is scaled to represent degrees/second. The Output is created by D/A converter.

Pin Diagram



RGA Block Diagram

Ordering Information

Model	Description	Gyro (°/sec)	Accel (g)
RGA300CA-100	Yaw Rate Gyro and Accelerometers	±100	± 2

CALL FACTORY FOR OTHER CONFIGURATIONS

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