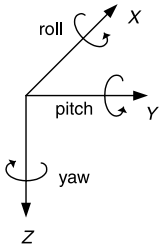
IMU

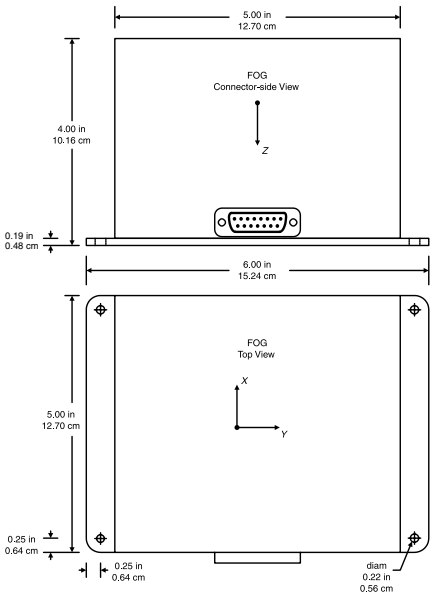
FIBER OPTIC GYRO BASED IMU

- High Bandwidth Angular Rate and Linear Acceleration Measurement
- Fiber Optic Gyro Stability < 20°/hr
- Analog and Digital Outputs
- No Calibration Required

Applications

- Navigation and Control
- Avionics





IMU700CA

The IMU700CA is a six-degree-of-freedom (6DOF) Inertial Measurement Unit that provides accurate monitoring of linear acceleration and angular rate. The IMU700CA 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. Example applications include GPS/INS navigation, dynamic positioning and avionics.

The IMU700CA offers wide bandwidth measurement of acceleration and rotation rate about three orthogonal axes. The IMU700CA employs on-board digital signal processing to sample data, compensate for deterministic errors, and format digital and analog outputs in engineering units.

The IMU700CA sensing elements are solid-state devices that have no moving parts. The three fiber optic rate gyros employ the Sagnac effect to measure angular rate independently of acceleration. The three accelerometers are silicon MEMS devices that use differential capacitance to sense acceleration. The IMU700CA has three output options (one analog and two digital modes) to allow for easy integration into measurement and control systems.

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.

Document Part Number: 6020-0037-01

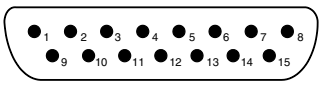
Specifications		IMU700CA-200	IMU700CA-201	Remarks
Performance				
Update Rate (Hz)		> 125	>125	Continuous Update Mode
Start-up Time Valid Data (sec)		< 1	< 1	
Angular Rate				
Range Roll, Pitch, Yaw (°/sec)		± 200	± 200	
Bias: Roll, Pitch, Yaw (°/hr)		< ± 20	<± 20	Constant temp.
Bias: Roll, Pitch, Yaw (°/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)		> 75	> 75	-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	@ 15V
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 6.0 x 4.0	
	(cm)	12.70x15.24x10.16	12.70x15.24x10.16	
Weight	(lbs)	< 3.5	< 3.5	
	(kg)	< 1.6	< 1.6	
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



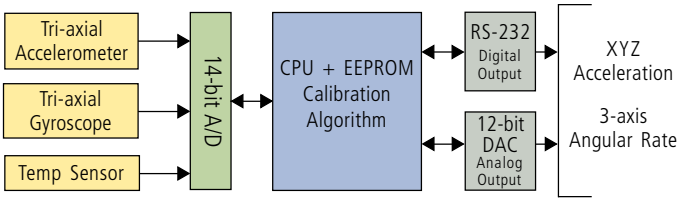
Pin	Function
1	RS-232 Transmit Data
2	RS-232 Receive Data
3	Input Power
4	Ground
5	X-axis accel voltage[1]
6	Y-axis accel voltage[1]
7	Z-axis accel voltage[1]
8	Roll-axis angular rate[2]
9	Pitch-axis angular rate[2]
10	Yaw-axis angular rate[2]
11	NC – Factory use only
12	X-axis acceleration
13	Y-axis acceleration
14	Z-axis acceleration
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.

Pin Diagram



IMU Block Diagram

inertial systems

Ordering Information

Model	Description	Gyro (°/sec)	Accel (g)
IMU700CA-200	Fiber Optic IMU	± 200	± 2
IMU700CA-201	Fiber Optic IMU	± 200	± 10

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