

VG

## SOLID-STATE VERTICAL GYRO

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

## Applications

- ▼ UAV Control
- ▼ Platform Stabilization
- ▼ Avionics



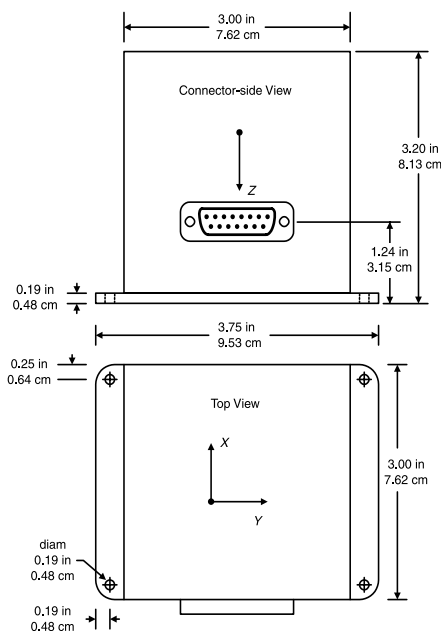
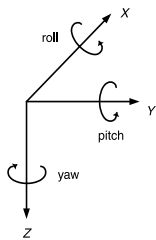
## VG400CC

The VG400CC is a high performance, solid-state vertical gyro intended for airborne applications such as UAV control, Avionics, and Platform Stabilization. This high reliability, strap-down inertial system provides attitude measurement with static and dynamic accuracy that exceeds traditional spinning mass vertical gyros.

This VG400CC series product builds on the performance of the VG400CB series. It features higher performance sensors, including new silicon MEMS gyroscopes with wider bandwidth and improved bias stability. New design features in the VG400CC Series reduce sensitivity to vibration and EMI.

The VG400CC 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.

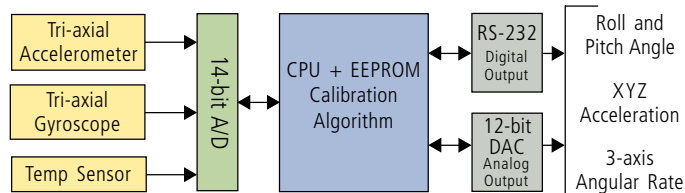


| Specifications                       | VG400CC-100                   | VG400CC-200        | Remarks                   |
|--------------------------------------|-------------------------------|--------------------|---------------------------|
| <b>Performance</b>                   |                               |                    |                           |
| Update Rate (Hz)                     | > 75                          | > 75               | Continuous Update Mode    |
| Start-up Time Valid Data (sec)       | < 1                           | < 1                |                           |
| Fully Stabilized Data (sec)          | < 60                          | < 60               | Under static conditions   |
| <b>Attitude</b>                      |                               |                    |                           |
| Range: Roll, Pitch (°)               | ± 180, ± 90                   | ± 180, ± 90        |                           |
| Static Accuracy (°)                  | ± 0.5                         | ± 1.0              |                           |
| Dynamic Accuracy (° rms)             | 2.0                           | 2.5                |                           |
| Resolution (°)                       | < 0.1                         | < 0.1              |                           |
| <b>Angular Rate</b>                  |                               |                    |                           |
| 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 <sup>1/2</sup> )   | < 2.25                        | < 4.5              | Typical                   |
| <b>Acceleration</b>                  |                               |                    |                           |
| Input 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 <sup>1/2</sup> ) | < 0.1                         | < 0.5              |                           |
| <b>Environment</b>                   |                               |                    |                           |
| 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       |
| <b>Electrical</b>                    |                               |                    |                           |
| 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             | See "Digital Data Format" |
| Analog <sup>1</sup> 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              |
| <b>Physical</b>                      |                               |                    |                           |
| Size (in)                            | 3.0 x 3.75 x 3.2              | 3.0 x 3.75 x 3.2   | Includ. mounting flanges  |
| (cm)                                 | 7.62 x 9.53 x 8.13            | 7.62 x 9.53 x 8.13 | Includ. mounting flanges  |
| Weight (lbs)                         | < 1.4                         | < 1.4              |                           |
| (kg)                                 | < 0.64                        | < 0.64             |                           |
| Connector                            | 15 pin sub-miniature "D" male |                    |                           |

## Notes

<sup>1</sup>All DAC analog outputs are fully buffered and are designed to interface directly to data acquisition equipment.

Specifications subject to change without notice



Vertical Gyro Block Diagram

## Ordering Information

| Model       | Description               | Gyro (°/sec) | Accel (g) |
|-------------|---------------------------|--------------|-----------|
| VG400CC-100 | Solid State Vertical Gyro | ±100         | ± 2       |
| VG400CC-200 | Solid State Vertical Gyro | ± 200        | ± 10      |

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