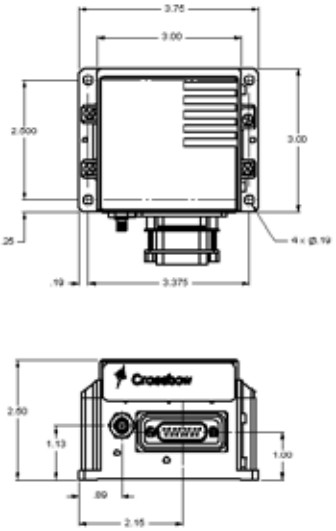
VGS440

MEMS-BASED VERTICAL GYRO SYSTEMS

- Roll, Pitch, and GPS-aided Heading Angles with 3-Axis Acceleration and Angular Rate Outputs
- GPS Position, Track and Velocity Outputs
- Built-In GPS Receiver With RTCM and WAAS Compatibility
- High Stability MEMS Sensors
- Enhanced Performance Kalman Filter Algorithm
- EMI & Vibration Resistant
- Environmentally Sealed

Applications

- Unmanned Vehicle Control
- Land Vehicle Guidance
- Avionics Systems
- Platform Stabilization



Package Dimensions

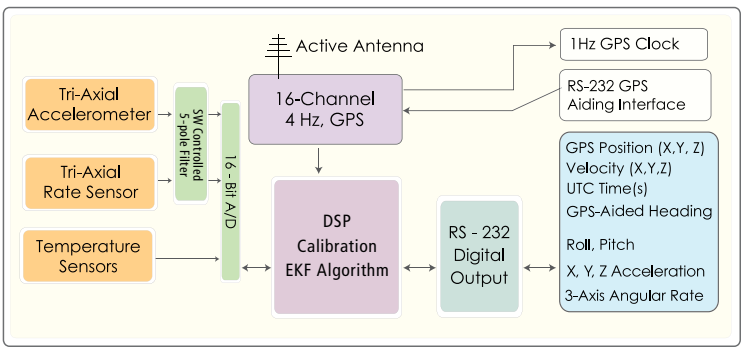
VGS440CA

The Crossbow VGS440 is a GPS-Aided MEMS-Based Vertical Gyro System that provides an unmatched value in terms of both price and performance. Developed in response to over a decade of extensive application experience in a wide variety of airborne, marine, and land applications. The VGS440 incorporates many new and enhanced design features including:

- Built-in GPS/Inertial Sensor integration for position, velocity and heading measurements
- GPS clock data synchronization (1 PPS)
- Configurable high-performance Extended Kalman Filter (EKF) algorithms tunable to a wide range of applications
- Water resistant, vibration resistant, lightweight design
- EMI protection for trouble-free operation
- Continuous Built-in-Test

The VGS440 operates as a standalone vertical gyro with attitude performance that is enhanced by the internal GPS receiver. In addition to enhanced attitude measurements, the VGS440 also provides velocity and heading data at up to 100 Hz. The inertial systems are aided by both GPS velocity and GPS track to improve stability and reduce the latency associated with standalone GPS measurements.

Each VGS440 system comes with a User's Manual and Crossbow's NAV-VIEW 2.0 software to assist users with system development, evaluation, and basic data acquisition. A High-Gain Aircraft Quality GPS Antenna option is also available.



VGS440 Block Diagram

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Specifications	VGS440CA-200	Remarks
Performance		
Update Rate[1] (Hz)	2-100	Programmable
Start-up Time Valid Data (sec)	< 1	
Fully Stabilized Data (sec)	< 60	Under static conditions
Position/Velocity		
Position Accuracy[2] (m CEP)	2.5	Internal GPS
X,Y Velocity Accuracy (m/s rms)	< 0.4	With GPS aiding
Z Velocity Accuracy (m/s rms)	< 0.5	With GPS aiding
1 PPS Accuracy (ns)	± 50	Internal GPS
Heading[3]		
Range (°)	± 180	
Accuracy (° rms)	< 2.0	With GPS aiding
Resolution (° rms)	< 0.1	
Attitude		
Range: Roll, Pitch (°)	± 180, ± 90	
Accuracy[4] (° rms)	< 0.5	With GPS aiding
Accuracy[4] (° rms)	< 1.5	Without GPS aiding
Resolution (°)	< 0.1	
Angular Rate		
Range: Roll, Pitch, Yaw (°/sec)	± 200	
Bias: Roll, Pitch, Yaw (°/sec)	< ± 0.1	Kalman filter stabilized
Scale Factor Accuracy (%)	< 1	
Non-Linearity (% FS)	< 0.5	
Resolution (°/sec)	< 0.06	
Bandwidth (Hz)	25	-3 dB point nominal
Random Walk (°/hr$^{1/2}$)	< 4.5	
Acceleration		
Input Range: X/Y/Z (g)	± 4	
Bias: X/Y/Z (mg)	< ±15	Full temperature range
Scale Factor Accuracy (%)	< 1	
Non-Linearity (% FS)	< 1	
Resolution (mg)	< 0.6	
Bandwidth (Hz)	25	-3 dB point nominal
Random Walk (m/s/hr$^{1/2}$)	< 1.0	
Environment		
Operating Temperature (°C)	-40 to +71	
Non-Operating Temperature (°C)	-55 to +85	
Enclosure[5]	IP66 Compliant	
Electrical		
Input Voltage (VDC)	9 to 42	
Input Current (mA)	< 350	At 12 VDC nominal
Power Consumption (W)	< 5	
Digital Output Format	RS-232	
Physical		
Size (in)	3 x 3.75 x 2.50	With mounting flanges
(cm)	7.62 x 9.53 x 6.43	With mounting flanges
Weight (lbs)	< 1.3	
(kg)	< 0.58	
Connector	15 pin "D" male	
GPS Antenna Connector	SMA Jack	

Specifications subject to change without notice.

Notes:

[1] See User's Manual for additional information.

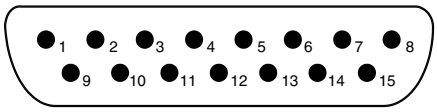
[2] Internal GPS accuracy can be further improved with Radio Technical Commission for Maritime (RTCM) or Satellite Based Augmentation System (SBAS) messages such as the Wide Area Augmentation System (WAAS).

[3] Accurate heading data only available when GPS is available and vehicle is in motion. The VGS440 assumes vehicle heading equals GPS track. See User's Manual for additional information.

[4] Dynamic conditions, aggressive Crossbow flight profile.

[5] IP66 Compliant without EMI fiter attached.

15 Pin "D" Connector Male Pinout



Pin	Signal
1	RS-232 Transmit Data
2	RS-232 Receive Data
3	Positive Power Input (+Vcc)
4	Power Ground
5	Chassis Ground
6	NC - Factory use only
7	RS-232 GPS Tx[1]
8	RS-232 GPS Rx[1]
9	Signal Ground
10	1PPS OUT
11	NC – Factory use only
12	NC – Factory use only
13	BIT OUT
14	NC – Factory use only
15	NC – Factory use only

Notes: 1 See User's Manual for additional information.

VGS440 Pin Diagram

Ordering Information

Model	Description	Gyro (°/sec)	Accel (g)
VGS440CA-200-1	GPS-Aided MEMS-Based Vertical Gyro System - includes: CD ROM, User's Manual, Quick Start Guide, standard GPS Antenna and cable	± 200	± 4
VGS440CA-200-2	GPS-Aided MEMS-Based Vertical Gyro System - includes: CD ROM, User's Manual, Quick Start Guide, High-Gain GPS Antenna and cable	± 200	± 4

CALL FACTORY FOR OTHER CONFIGURATIONS

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