

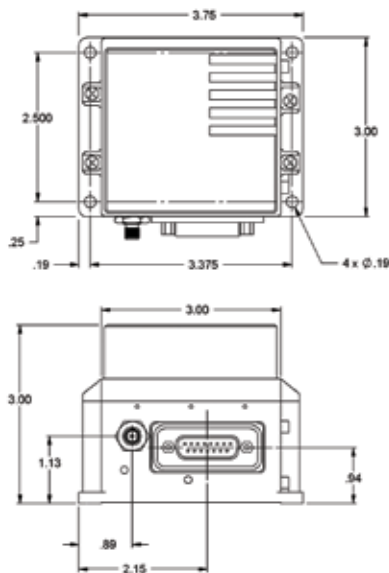
# NAV425EX

## GPS-AIDED MEMS INERTIAL SYSTEM

- Backward compatible with Output Data from FAA Certified AHRS500
- Real-Time GPS X, Y, Z Position and Velocity Outputs
- AHRS Pitch, Roll, and Heading Output at 25Hz
- Built-In GPS Receiver with RTCM and WAAS Compatibility
- High Stability MEMS Sensors
- Enhanced Performance Kalman Filter Algorithm
- EMI & Vibration Resistant
- Environmentally Sealed

## Applications

- Uncertified Avionics Systems
- Autopilot Systems
- Platform Stabilization



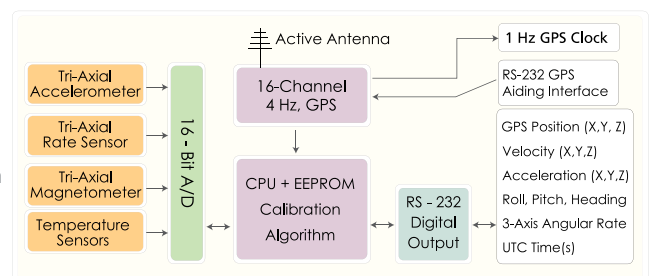
Package Dimensions

## NAV425EX

The Crossbow NAV425 is a combined GPS Navigation and GPS-Aided Attitude & Heading Reference system (AHRS) that utilizes both MEMS-based inertial sensors and GPS technology to provide an unmatched value in terms of both price and performance. Developed in response to years of extensive application experience in a wide variety of airborne, marine and land applications, the NAV425 also incorporates many new and enhanced design features including:

- Built-in GPS receiver for position and velocity measurement
- Easy installation procedure
- High performance Kalman Filter algorithms
- Water resistant, vibration resistant, light-weight design
- EMI protection for trouble-free operation
- Continuous Built-in-Test

NAV425 Block Diagram



The NAV425 provides consistent performance over a wide temperature range in challenging EMI environments across a broad range of input power conditions. It is designed for use in a number of different applications including unmanned vehicle control, land vehicle guidance, uncertified avionics and platform stabilization.

This high reliability, strapdown inertial system provides attitude and heading measurement with static and dynamic accuracies that exceed traditional spinning mass vertical and directional gyros. With GPS integration, the NAV425 system also provides GPS velocity data at 25Hz. Velocity data includes aiding from the inertial instruments to improve stability and reduce the latency associated with stand-alone GPS measurements. WAAS enabled GPS position data is provided at 4 Hz. Crossbow's NAV-VIEW software is also included to assist users with system development, evaluation, and data acquisition.

Specifications	NAV425EX-100	Remarks
<b>Performance</b>		
Update Rate (Hz)	25	
Start-up Time Valid Data (sec)	< 1	
Fully Stabilized Data (sec)	< 60	Under static conditions
<b>Position/Velocity</b>		
Position Accuracy <sup>1</sup> (m CEP)	3	Internal GPS, not augmented
X,Y Velocity Accuracy (m/s rms)	< 0.4	GPS available
Z Velocity Accuracy (m/s rms)	< 0.5	GPS available
1PPS Accuracy (ns)	± 50	GPS available
<b>Attitude</b>		
Range: Roll, Pitch (°)	± 180, ± 90	
Accuracy <sup>2</sup> (° rms)	< 0.75	GPS available
(° rms)	< 2.5	GPS unavailable
Resolution (°)	< 0.1	
<b>Heading</b>		
Range (°)	± 180	
Accuracy <sup>2</sup> (° rms)	< 3.0	
Resolution (°)	< 0.1	
<b>Angular Rate</b>		
Range: Roll, Pitch, Yaw (°/sec)	± 200	
Bias: Roll, Pitch, Yaw (°/sec)	< ± 0.1	Kalman filter stabilized
Bias: Roll, Pitch, Yaw (°/sec)	< ± 0.75	Kalman filter off
Scale Factor Accuracy (%)	< 1	
Non-Linearity (% FS)	< 0.5	
Resolution (°/sec)	< 0.06	
Bandwidth (Hz)	25	-3 dB point nominal
Random Walk (°/hr <sup>1/2</sup> )	< 4.5	
<b>Acceleration</b>		
Input Range: X/Y/Z (g)	± 4	
Bias: X/Y/Z (mg)	< ± 15	
Scale Factor Accuracy (%)	< 1	
Non-Linearity (% FS)	< 1	
Resolution (mg)	< 0.6	
Bandwidth (Hz)	25	-3 dB point nominal
Random Walk (m/s/hr <sup>1/2</sup> )	< 1.0	
<b>Environment</b>		
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)	200	1 ms half sine wave
Enclosure	IP66 compliant	
<b>Electrical</b>		
Input Voltage (VDC)	9 to 42	
Input Current (mA)	< 350	at 12 VDC nominal
Power Consumption (W)	< 5	
Digital Output Format	RS-232	
<b>Physical</b>		
Size (in)	3.0 x 3.75 x 3.0	including mounting flanges
(cm)	7.62 x 9.53 x 7.62	including mounting flanges
Weight (lbs)	< 1.3	
(kg)	< 0.58	
Connector	15 pin "D" male	
GPS Antenna Connector	SMA Jack	

Notes: <sup>1</sup> 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).

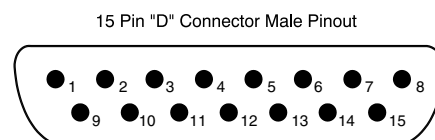
<sup>2</sup> Dynamic conditions, standard Crossbow flight profile  
Specifications subject to change without notice

## Ordering Information

Model	Description	Gyro (°/sec)	Accel (g)
NAV425EX-100	GPS-Aided MEMS Inertial System	± 200	± 4

CALL FACTORY FOR OTHER CONFIGURATIONS

This product has been developed by Crossbow exclusively for commercial applications. It has not been tested for, and Crossbow makes no representation or warranty as to conformance with, any military specifications or that the product is appropriate for any military application or end-use. Additionally, any use of this product for nuclear, chemical, biological weapons, or weapons research, or for any use in missiles, rockets, and/or UAV's of 300km or greater range, or any other activity prohibited by the Export Administration Regulations, is expressly prohibited without the written consent of Crossbow and without obtaining appropriate US export license(s) when required by US law. Diversion contrary to U.S. law is prohibited.



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 Transmit
8	RS-232 GPS Receive
9	Signal Ground
10	NC – Factory use only
11	NC – Factory use only
12	NC – Factory use only
13	Bit Status
14	NC – Factory use only
15	NC – Factory use only

NAV425EX Pin Diagram

