

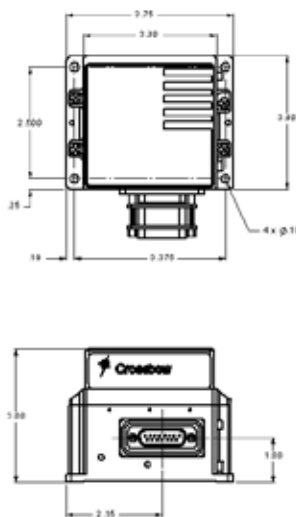
# AHRS440

## MEMS-BASED AHRS SYSTEM

- Roll, Pitch, Heading and 3-Axis Inertial Outputs
- GPS Position/Velocity Aiding Input
- Fully Compensated Over Wide Temperature Range
- High Stability MEMS Sensors
- 100 Hz Output Data Rate
- Enhanced Performance Kalman Filter Algorithm
- EMI & Vibration Resistant
- Environmentally Sealed

## Applications

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



Package Dimensions



## AHRS440CA

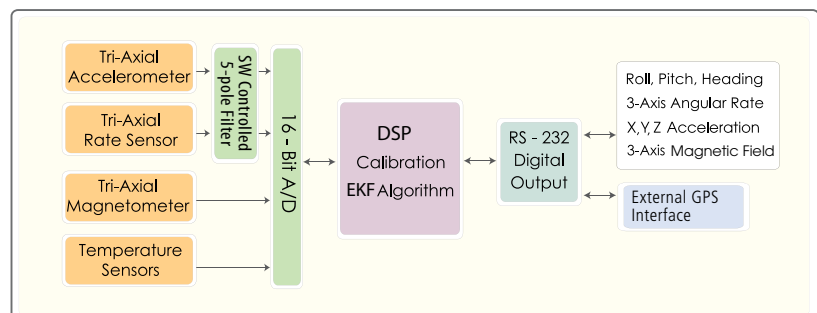
The Crossbow AHRS440 is an Attitude & Heading Reference System (AHRS) that utilizes MEMS-based inertial sensors to provide an unmatched value in terms of both price and performance. Developed in response to years of extensive application experience in a wide variety of airborne, marine and land applications, the AHRS440 also incorporates many new and enhanced design features including:

- Configurable high-performance Kalman Filter algorithms (EKF) tunable to a wide range of applications
- Water resistant, vibration resistant, lightweight design
- EMI protection for trouble-free operation
- Continuous Built-in-Test
- External GPS input for Position/velocity and aiding

The AHRS440 provides consistent performance over a wide temperature range in challenging EMI environments across a broad range of input power conditions. It finds uses 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.

Each AHRS440 system comes with a User's Manual and Crossbow's NAV-VIEW 2.0 software to assist users with system development, evaluation, and data acquisition.



AHRS440 Block Diagram

Specifications	AHRS440CA-200	Remarks
<b>Performance</b>		
Update Rate <sup>1</sup> (Hz)	2-100	Programmable
Start-up Time Valid Data (sec)	< 1	
Fully Stabilized Data (sec)	< 60	Under static conditions
<b>Heading</b>		
Range (°)	± 180	
Accuracy <sup>2</sup> (° rms)	< 2.0	With external GPS aiding
Accuracy <sup>2</sup> (° rms)	< 3.0	Without external GPS aiding
Resolution (° rms)	< 0.1	
<b>Attitude</b>		
Range: Roll, Pitch (°)	± 180, ± 90	
Accuracy <sup>2</sup> (° rms)	< 0.5	With external GPS aiding
Accuracy <sup>2</sup> (° rms)	< 1.5	Without external GPS aiding
Resolution (°)	< 0.1	
<b>Angular Rate</b>		
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 <sup>1/2</sup> )	< 4.5	
<b>Acceleration</b>		
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 <sup>1/2</sup> )	< 1.0	
<b>Environment</b>		
Operating Temperature (°C)	-40 to +71	
Non-Operating Temperature (°C)	-55 to +85	
Enclosure <sup>3</sup>	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 x 3.75 x 3	With mounting flanges
(cm)	7.62 x 9.53 x 7.62	With mounting flanges
Weight (lbs)	< 1.3	
(kg)	< 0.58	
Connector	15 pin "D" male	

Specifications subject to change without notice

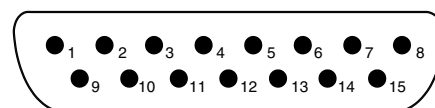
#### Notes

<sup>1</sup> See User's Manual for additional information

<sup>2</sup> Dynamic conditions, aggressive Crossbow flight profile

<sup>3</sup> IP66 Compliant without EMI filter 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 Aiding Tx
8	RS-232 GPS Aiding Rx
9	Signal Ground
10	1 PPS Out
11	1 PPS In
12	NC – Factory use only
13	BIT Out
14	NC – Factory use only
15	NC – Factory use only

AHRS440 Pin Diagram



## Ordering Information

Model	Description	Gyro (°/sec)	Accel (g)
AHRS440CA-200-1	MEMS Attitude & Heading Reference System - includes: CD ROM, User's Manual, Quick Start Guide, and cable	± 200	± 4

#### CALL FACTORY FOR OTHER CONFIGURATIONS

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