



Attitude and Heading Reference System

AHRS-E304

Description:

The signals from three solid state angular rate sensors are coordinate transformed and then integrated to produce attitude and heading outputs that reflect normal aircraft attitude coordinates. Attitude and heading signals are compared against a triaxial accelerometer and a triaxial fluxgate magnetometer to derive gyro drift error. These errors are filtered over a long time constant and are used to adjust biases in the system so that the long-term convergence of the system is to the vertical references and the magnetic heading. A velocity input is used to calculate compensations for centrifugal forces and velocity changes on the vertical reference to improve overall stability and accuracy.



This is a microprocessor-based system using a 16 bit A/D converter, a 12 bit D/A converter and an RS-232 interface. The microprocessor has stored parameters for all the sensor inputs to correct bias, scale factor, axis alignment, and others. The analog attitude and heading outputs are updated 71.11 times per second. The serial interface is highly configurable and provides access to almost all operational parameters.

- Solid State, Strapdown System
- Low Cost, Low Power
- Rugged, High Reliability
- Vibration Resistant
- Analog and RS-232 Serial Outputs
- PC Heading Calibration
- Two Year Limited Warranty
- Engineering Support

Applications:

The AHRS-E304 is useful for land, sea and airborne applications. It can be used to drive an attitude indicator flight display, for control and stabilization of remote piloted subs or aerial vehicles, and for robotics research and road surface measurement.



Watson Industries, Inc.

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AHRS-E304 Specifications

Attitude

Range: Bank	±180°	
Range: Elevation	±90°	
Resolution:	0.02°	Binary mode (14 bit)
Analog Scale Factor:	18°/V	±10V Bank ±5V Elevation
Accuracy: Static	±0.25°	
* Accuracy: Dynamic	0.5%	

Magnetic Heading

Range:	0° - 360°	
Resolution:	0.02°	Binary mode (14 bit)
Analog Scale Factor:	18°/V	±10V Output
† Accuracy: Static	±1°	
* Accuracy: Dynamic	0.5%	

Angular Rate

Range: Roll, Pitch, Yaw	±100°/sec	
Resolution:	0.025°/sec	Binary mode (14 bit)
Analog Scale Factor:	10°/sec/V	±10V Output
Scale Factor Accuracy:	0.5%	
Bias: Roll, Pitch, Yaw	< 0.2°/sec (Analog)	±0.02°/sec Binary mode (14 bit)
Non-Linearity:	< 0.1%	Full scale range
Bandwidth:	20 Hz	
Noise:	< 0.03°/sec rms	

Acceleration

Range: X, Y, Z	±10g	
Resolution:	4mg	
Scale Factor Accuracy:	1%	
Bias: X, Y, Z	< 10mg	
Non-Linearity:	0.1%	Full scale range
Bandwidth:	3 Hz	

Magnetic

Range: X, Y, Z	±1000 mGauss	
Resolution:	0.1 mGauss	Binary mode (14 bit)
Scale Factor Accuracy:	1%	
Bias: X, Y, Z	< 5 mGauss	
Non-Linearity:	< 0.01%	Full scale range
Bandwidth:	10 Hz	

Environmental

Temperature: Operating	-40°C to +85°C	
Temperature: Storage	-55°C to +85°C	
Vibration: Operating	5g rms	20 Hz to 2 KHz
Vibration: Survival	10g rms	20 Hz to 2 KHz
Shock: Survival	500g	10mS ½ sine wave

Electrical

Frame Rate:	71.1 Hz	Maximum
Startup Time: Data	5 sec	
Startup Time: Fully operational	10 sec	
Input Power:	10 to 35VDC	4.0W
Input Current:	310mA @ 12VDC	165mA @ 24VDC
Input Velocity: (Optional)	±10VDC	Full scale (±800kph)
Digital Output:	RS-232	
Analog Output:	±10VDC	
Analog Output Impedance:	300 Ohm	Per line

Physical

Axis Alignment:	< 0.1°	
Size: Including Mounting Flanges	3.24"W x 5.78"L x 4.68"H	8.2 x 14.7 x 11.9 (cm)
Weight:	35 oz (2.2lb)	992 grams (1Kg)
Connection: RS-232 / Analog Outputs	25 pin male "D" subminiature	
Connection: Power	4 pin male MS-3110-P8-4P	

* Assumes accurate velocity data.

Actual accuracy can be calculated as the listed percentage multiplied by the change in value over the entire dynamic maneuver.

† Static heading accuracy is dependent on the magnetic environment.

This sensor will meet or exceed this spec within the 48 contiguous United States.

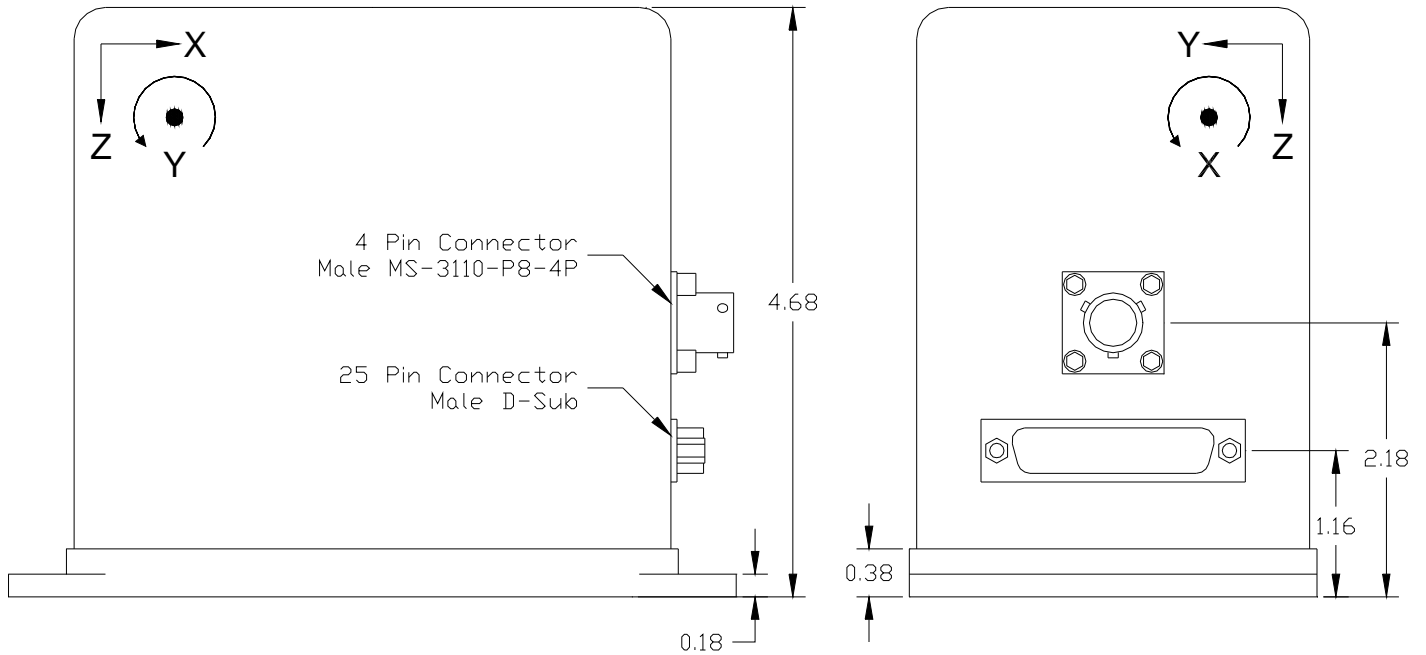
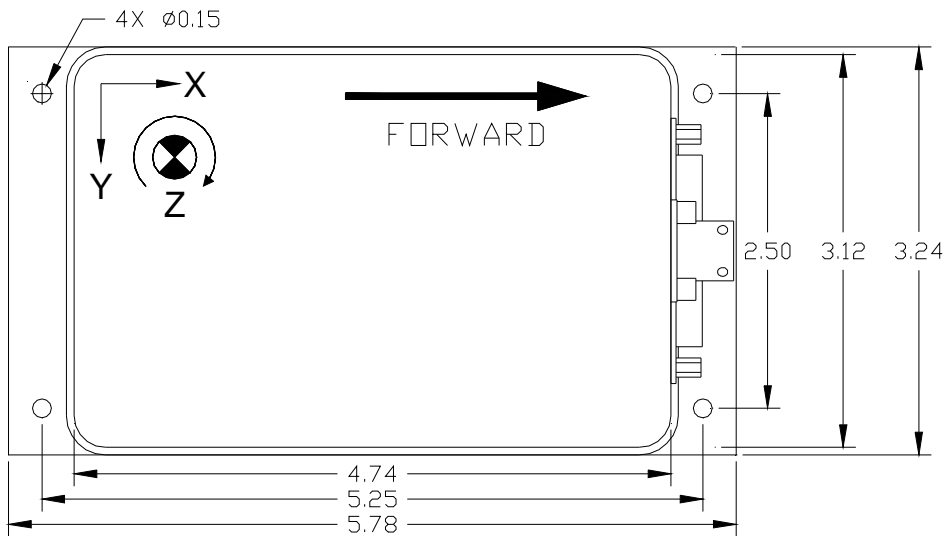
- Specifications are subject to change without notice.
- This product may be subject to export restrictions. Please consult the factory.



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Dimensions:



10/17 DAO



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