



Attitude and Heading Reference System

AHRS-S305

Description:

The AHRS-S305 is Watson Industries' newest Attitude and Heading Reference System. Standard for an attitude gyro system, the AHRS-S305 has a sensor package that consists of three solid state angular rate gyros, three accelerometers, and a triaxial fluxgate magnetometer used as a heading reference. This AHRS differs from our other inertial gyro packages because this sensor uses smaller MEMS gyros. This makes the AHRS-S305 more economical and half the size of the AHRS-E304 which uses VSG gyros for enhanced accuracy and signal stability.



The signals from three solid state angular rate gyros are coordinate transformed and then integrated to produce attitude and heading outputs that reflect normal attitude coordinates. These attitude and heading signals are compared to the accelerometers and the fluxgate magnetometer to derive gyro drift error. These errors are filtered over a long time constant and are used to adjust system biases so that the long-term convergence of the system is to the vertical references and the magnetic heading. A velocity input can be used to improve the overall stability and accuracy of the system by calculating centrifugal forces and velocity changes on the vertical reference and compensating for them.

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 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
- Small Size
- Low Cost, Low Power
- Rugged, High Reliability
- Analog and RS-232 Serial Outputs
- PC Heading Calibration
- One Year Limited Warranty
- Engineering Support

Applications:

The AHRS-S305 is useful for land and sea applications. Some examples include control and stabilization of remote piloted subs or antennas, robotics research, and road surface measurement.



Watson Industries, Inc.

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AHRS-S305 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	±0.5°	
* Accuracy: Dynamic	2%	

Magnetic Heading

Range:	0° - 360°	
Resolution:	0.02°	Binary mode (14 bit)
Analog Scale Factor:	18°/V	±10V Output
† Accuracy: Static	±1°	
* Accuracy: Dynamic	2%	

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:	2%	
Bias:	< 0.3°/sec	
Non-Linearity:	< 0.05%	Full scale range
Bandwidth:	20 Hz	

Acceleration

Range: X, Y, Z	±10g	
Resolution:	4mg	
Scale Factor Accuracy:	1%	
Bias:	< 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:	< 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	2.5g 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	2.8W
Input Current:	215mA @ 12VDC	115mA @ 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:	< 0.25°	
Size: Including Mounting Flanges	3.24"W x 5.78"L x 2.38"H	8.2 x 14.7 x 6.0 (cm)
Weight:	21 oz (1.31lb)	595 grams (0.6Kg)
Connection:	25 pin male "D" subminiature	

* 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.

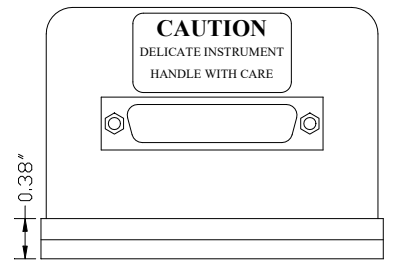
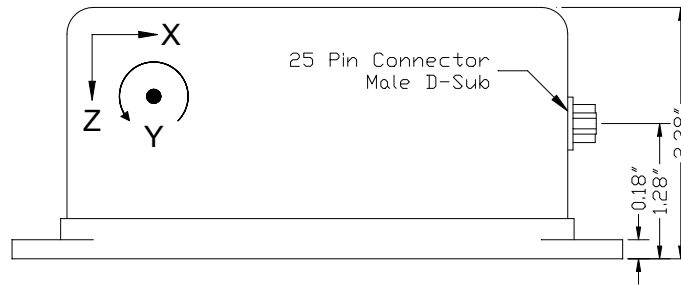
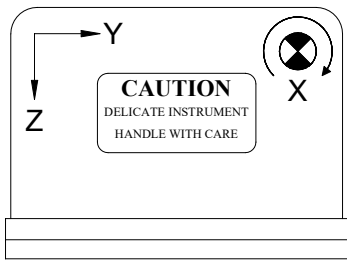
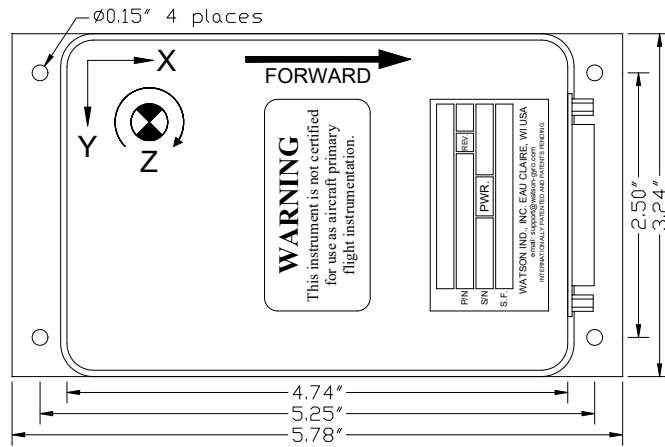
- Specifications are subject to change without notice.
- This product may be subject to export restrictions. Export Classification ECCN 7A994.



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Dimensions:



02/20 DAO



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