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.

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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 Output
	Accuracy: Static	±0.5°	
*	Accuracy: Dynamic	±2%	
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:	0.01°/sec	Binary mode (14 bit)
	Analog Scale Factor:	10°/sec/V	±10V Output
	Scale Factor Accuracy:	2%	
	Bias: Roll, Pitch, Yaw	< ±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: X, Y, Z	< ±5mg	
	Non-Linearity:	< 1%	Full scale range
	Bandwidth:	20 Hz	
Magnetic			
	Range: X, Y, Z	±1000 mGauss	
	Resolution:	0.1 mGauss	Binary mode (14 bit)
	Scale Factor Accuracy:	1%	
	Bias: X, Y, Z	< ±5mGauss	
	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 30VDC	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 (cm)
	Weight:	22oz (1.4lb)	620g (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. Please consult the factory.

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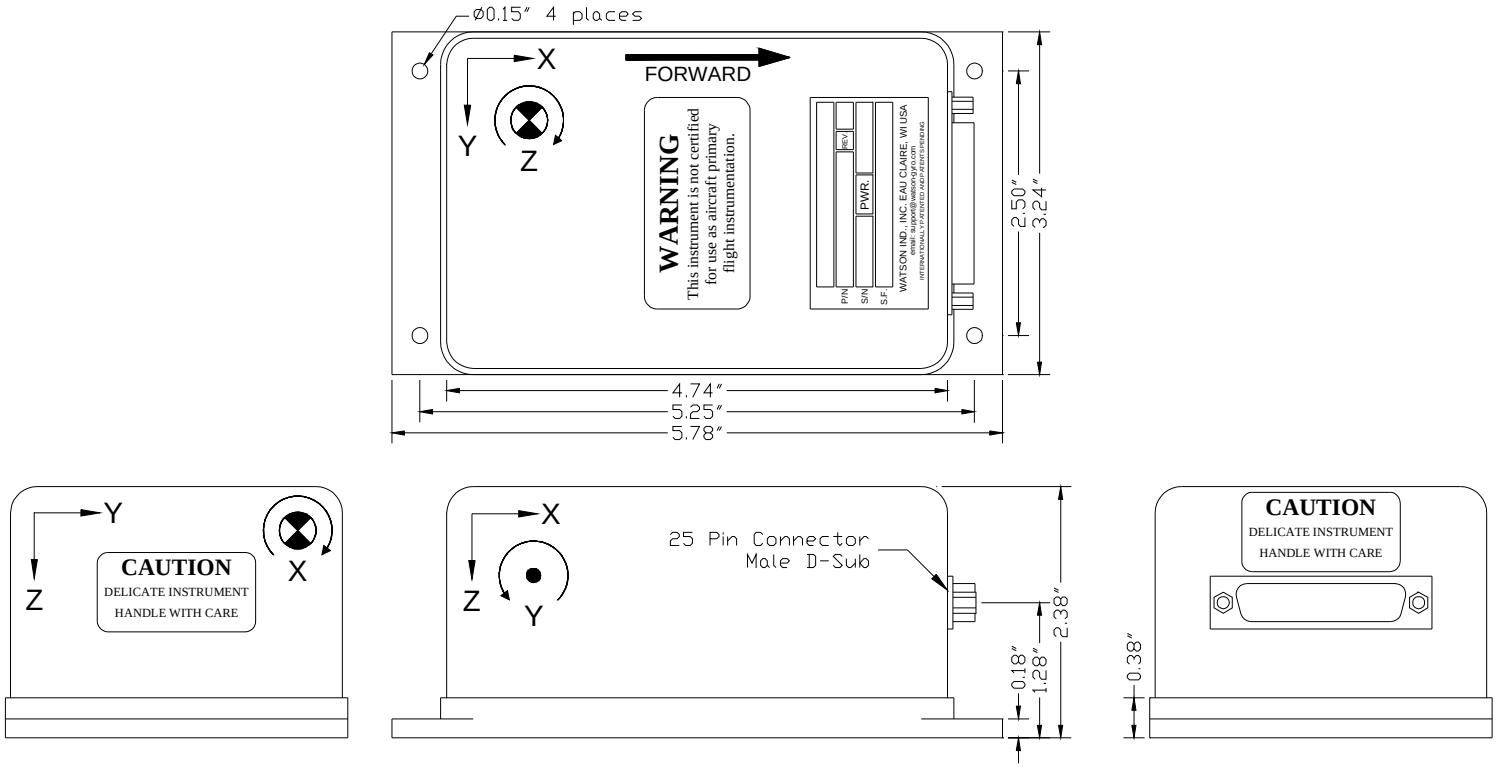
Dimensions:



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