Air Data Attitude Heading Reference System (AHR150A)

Archangel Systems originally developed an Air Data Attitude Heading Reference System (ADAHRS) to support its experimental EFIS, because there were no reasonably priced, solid state ADAHRS available on the market. The ADAHRS is also the enabling technology for Primary Flight Displays, flight control, Fly-by-Wire and smaller (3 ATI standard) single purpose retrofit instruments, as well as for reversionary and decision aiding use in civil, commercial, commuter and business aircraft.

AHR150A-1 ISU

From inception, Archangel Systems has focused on the use of high-reliability solid-state MEMS gyros, which conventional wisdom maintained could not be used, because of excessive drift and other characteristics. Through four generations of development, Archangel has refined its AHR150A ADAHRS to the point where it is now not only certified, but provides accuracy and usability beyond the demands of the relevant FAA TSO standards including C5f (non-magnetically stabilized heading). In fact, it was developed for use in Fly-by-wire systems and is finding wide applications in rotocraft throughout the world as well as other civil aircraft applications including business jets.

The AHR150A system consists of two boxes. The AHR150A-1 Inertial Sensing Unit (ISU shown above) is the rate, acceleration and air data sensing component while the AHR150A-2 Magnetic Sensing Unit (MSU shown below) is a remote 3 axis magnetic field sensing device. Together these two units provide a powerful and cost effective alternative to Fiber Optic Gyro systems.

AHR150A-2 MSU

Integral compass calibration routines are provided with the system, which requires only a laptop computer with serial port.

Features Include:

- All solid state ISU
  - MEMS Gyros
  - MEMS Accelerometers
  - Silicon Pressure Sensors
- Low power
  - 16-36 V dc Operation
  - 0.6 A nominal @28V dc
- Low System Weight: 3.6 Lbs
- Redundant Power Inputs with Failure Warning
- Multiple Redundant Dissimilar Processors in ISU
  - ISU Level A Software
- FAA/JAA Harmonized HIRF Testing
- 8 ARINC 429 outputs
  - 4 ARINC 705-5 word (Hi Speed)
  - 4 ARINC 704-6 word (Lo Speed)
- RS232 Maintenance Port
- Discrete Outputs
  - Master Fault
- Discrete Inputs
  - Pitot-Static Source Error Correction (4)
  - Unit ID (2)
  - Orientation (4)
  - Parity (2)
  - DG Mode
  - CW/CCW Compass Adjust
- Analog Inputs
  - OAT (2 wire)
  - Angle of Attack (3 wire)
- 11 bit ICAO Encoder Interface
- All Solid State MSU
  - Powered from ISU
  - 9 to 12 Volt Operation
  - MSU Level A Software
  - Calibration Routines Included
- All Mil Spec Connectors
- Application Notes
  - One AHR150A may be required per display for redundancy
  - Static and ram pressure ports MUST be vented to atmosphere during pressurization testing

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Mechanical	Size (-1)	5.25” x 4.25” x 4.25” (D x W x H)
	Weight (-1)	3.1 lbs.
	Size (-2)	0.75” x 3.0” round
	Weight (-2)	0.5 lbs.
	Shock	6 g, sine wave half cycle, 20 g crash survivability
	Vibration	DO-160E Category U
	Temperature	-40 °C to +70 °C operating, -55 °C to +125 °C non-operating
	Humidity	Severe Environment
	Altitude	-1000 to 52,000 ft. pressure altitude
	Airspeed	20 to 425 NM/hr. indicated

Electrical	Power	16-36 V DC, 0.6 A @ 28 V nominal
	Ride Through	200 ms
	Emissions	DO-160E, level Z (conducted and radiated)
	Interference	Harmonized FAA/JAA

Inputs/Outputs	ARINC 429	4 hi speed Transmit, 1 receive, ARINC 705-5 words 4 lo speed Transmit, 1 receive, ARINC 706-4 words
	Transponder	11 bit ICAO Encoder Interface (isolated)
	Discrete Outputs	Master Fault
	Discrete Inputs	SSEC, PSEC, DG/CW/CCW, Unit ID, Orientation

Data Resolution	Inertial Angles	Magnetic heading < 0.02°, pitch, roll and slip < 0.02°
	Inertial Rates	Pitch, roll, yaw and turn rate < 0.03°/second
	Body Rates	Pitch, roll and yaw < 0.03°/second
	Air Data	Altitude - 1 ft, Altitude Rate - 16 ft/min, Air Speed < 0.01 Kts
	Accelerations	X, Y, and Z– 1.0 mg

Data Accuracy (Static)	Pitch, Roll	±0.3°, 3 σ
	Heading	±1.0°, 3 σ
	Body Accelerations	0.008 g, 3 σ
	Heading frame Accelerations	0.008 g, 3 σ
Data Accuracy (Dynamic - Normal Flight)	Pitch, Roll	±1.0°, 3 σ
	Heading	±2.0°, 3 σ
	Body Rates	0.2% of input rate, 0.1% non linearity
	Airspeed, 6 σ (Kts)	20 – 60: 5; 61 – 90: 3; 91 – 240: 2; 241 – 275: 2.4 276 – 325: 2.8; 326 – 375: 3.2; 376 – 425: 3.6
	Altitude, 6 σ (1000 ft)	-1 - 5: 25; 6 - 8: 30; 9 -13: 35; 14- 16: 40; 17- 19: 45; 20- 29: 50; 30-39: 75; 40 – 49: 100; 50 – 52: 125
	OAT	±1.5°C, 6 σ

Limits (Normal Operations)	Rates	±128°/second
	Accelerations	±10 g

Certification Categories	TSO	C4c, C5f, C6e, C88b, C106

Environmental Categories	DO160E	[D2]XABB[UK1]EWFDFSZZXAZZ[Y(QKL)]L[B4K44]XAAX
Software Categories	DO178B	AHR150A-1, Level A AHR150A-2, Level A

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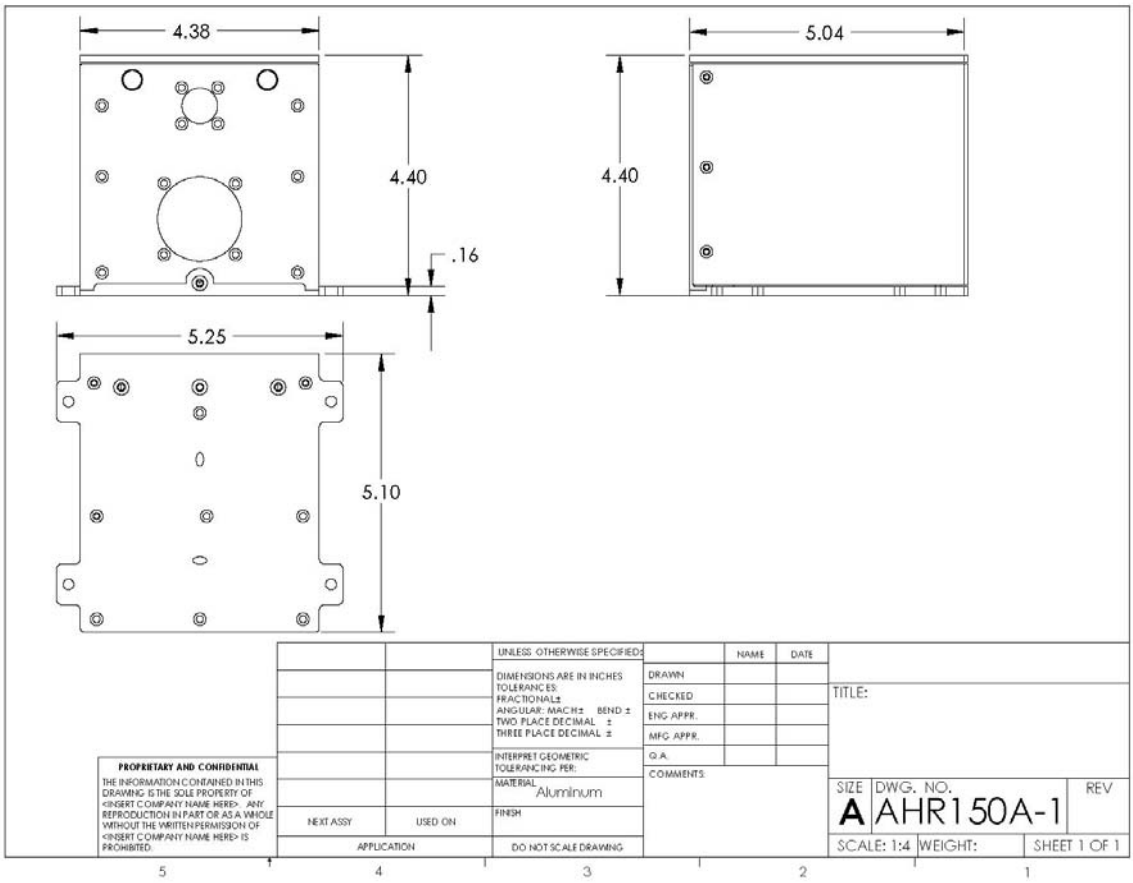

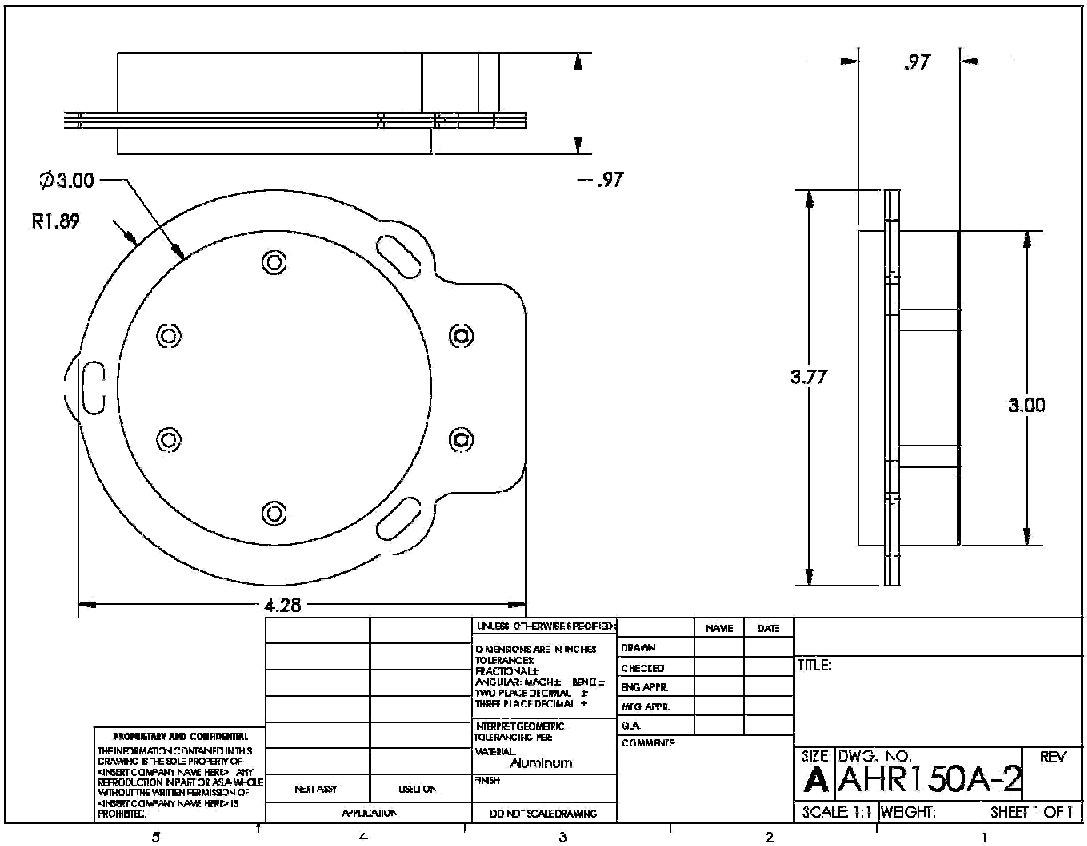

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