

AHR500

Supersonic Air Data Attitude Heading Reference System



Comprised of two components, Archangel's AHR500-1 ISU and the AHR150A-2 MSU, the AHR500 ADAHRS (Air Data Attitude Heading Reference System) is designed for the extremes of supersonic flight while setting a new precedent for price, performance, and safety.

KEY FEATURES

Qualified for Mission Critical applications including IFR, SAR, and primary flight systems

Angle rate limit of $\pm 420^\circ/\text{second}$ (roll and pitch) and $\pm 220^\circ/\text{second}$ (yaw)

Air data limit of 55,000 feet altitude and 800 knots indicated air speed

Directional Gyro meets TSO C5f requirements

Mil Spec 38999 filtered connectors

CERTIFICATIONS

Developed per DO-178B Level A software procedures

DO-160E environmental certifications including EMI, EMC, and HIRF

MIL-STD-810F Fluids, Vibration, Shock, Gunfire, Temperature (short duration at 83°C)

MIL-STD-704A Voltage Spikes

AHR500 Details

What does the AHR500 do?

The AHR500 is a MEMS-based Air Data Attitude Heading Reference System installed into supersonic aircraft to provide attitude, heading, and air data in an industry standard digital format. Additionally, the AHR500 is designed for the environmental and flight-envelope extremes where supersonic aircraft operate.

The AHR500 ADAHRS consists of the AHR500-1, the Inertial Sensing Unit (ISU) and the AHR150A-2, the Magnetic Sensing Unit (MSU). Unlike most supersonic systems which separate the air data and attitude functions into separate products, the AHR500A-1 contains both. This approach greatly reduces total size, weight, and power.

What are the advantages of the AHR500?

The AHR500 provides plenty of advantages. For example, the AHR500 is one of the only MEMS-based ADAHRS designed to provide reliable data at supersonic airspeeds. Furthermore, by using MEMS-based sensors, the AHR500 is just as reliable as fiber optic gyro (FOG) alternatives, but more affordable.

Who should use the AHR500?

By focusing on the extremes of supersonic flight at a low cost, the AHR500 is ideally suited for upgrade programs operating on constrained budgets.

What are the performance limits?

The AHR500 is guaranteed to perform at up to 55,000 feet of pressure altitude, and it can measure at rates of $\pm 420^\circ/\text{second}$ in pitch and roll and $\pm 220^\circ/\text{second}$ in yaw. Additionally, the AHR500 reliably performs at indicated airspeeds up to 800 KIAS. Note that 800 KIAS corresponds to Mach 1.2 at sea level and Mach 2.0 at 28,000 feet.

Is the AHR500 certified?

With its military focus, the AHR500 does carry FAA TSO approvals. However, Archangel still ensures the quality of each AHR500 product throughout the design process, applying the same rigorous testing procedures to the AHR500 as it does to its other FAA approved catalog items. Additionally, to ensure environmental survivability in supersonic defense aircraft, the AHR500 has been tested to additional MIL-STD requirements including: aggressive voltage spikes, gunfire, and short-term elevated temperature ambient.

Can the AHR500 be exported?

Because of the military-oriented focus of this product, the Department of State suggests that a Technical Assistance Agreement and an end-user statement may need to be completed. Archangel staff has experience in handling these matters and can assist you as necessary.

AHR500 Specifications

AHR500-1 ISU Dimensions/Weight

Size	4.375" x 4.375" x 6.25" (H x W x D)
Weight	3.1 lbs

AHR500-2 MSU Dimensions/Weight

Size	1.0" x 3.75" (height x diameter)
Weight	0.6 lbs

Environment/Power

Temperature	-40°C to +70°C operating, -55°C to +125°C non-operating 83°C operation survivability
Altitude	-1,500 to 55,000 ft pressure altitude
Power	16–36 VDC, 0.7 A @ 28 V nominal

Inputs/Outputs

ARINC 429	4 high-speed transmit, 1 receive, ARINC 705-5 and 706-4 words 4 low-speed transmit, 1 receive, ARINC 706-4 words
Discrete Outputs	Master fault
Discrete Inputs	Unit ID, Orientation, CW/CCW slewing, DG/Mag mode select, and SSEC/PSEC select

Limits (Normal Operations)

Rates	±420°/second in pitch and roll ±220°/second in yaw
Accelerations	±10 g

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% of non-linearity

Certifications/MTBF

Commercial Categories	DO-160E [D2]XABB[UK1]EWFDFSZZXAZZ [Y(QKL)]L[B4K44]XAAX
MIL-STD Categories	MIL-STD-704A Voltage Spikes MIL-STD-810F Fluids and Gunfire
Software Categories	DO-178B Level A (developed per FAA approved processes)

The AHR500 system consists of both the AHR500-1 ISU and the AHR150A-2 MSU.

For more information or inquiries about sales, contact Bill Dillard at bill@archangel.com or by phone at 334.826.8008x14.