Atmospheric WVSS-II
Water Vapor Sensing System - II

Technical Specifications

Objective

The SpectraSensors WVSS-II is designed to meet the demanding need for accurate observations of atmospheric water vapor from commercial aircraft, in support of the global AMDAR program and related efforts. WVSS-II is also suitable for atmospheric research applications, using alternative installation and communications interfaces.

Performance

Methodology	Tunable Diode Laser Absorption Spectroscopy
Response time/data output	Internal Sample Rate: 4 Times/sec Real-time Output Rate: Every 2 sec - Water Vapor Concentration - Pressure - Temperature - Engineering data - System Status Data Downlink rate determined by ACARS (ARINC 429)
Range of coverage	Surface to approx 45,000 ft (13.7 km)
Minimum detectable signal	50 ppmv (0.0311 g/kg)[1]
Maximum detectable signal	60,000 ppmv (37.32 g/kg)[2]
Accuracy (% of signal)	±50 ppmv or ±5% of reading, whichever is greater
Minimum absorbance detected (resolution)	1×10^{-4}
Analyzer Optical Path length	22.7 cm (8.938 in)
Model Number	01023

Environmental Range (SEB = System Electronics Box)	
Outside air temperature range for operation	-65˚C to +50˚C
SEB inside operating temperature range	-5˚C to +30˚C
SEB storage temperature range	-40˚C to +85˚C
Sample Gas Pressure Range	Surface (1016 mb) to 200 mb
SEB Operating pressure range	14.7 PSI ± 10 PSI

Power Requirements	
Input voltage	28 VDC standard aircraft power
Current	5 amp maximum @ 28 VDC
Minimum Operating Voltage (any temperature)	17 VDC
Drop out Voltage (any temperature)	15.8 VDC
Maximum Operating Voltage (any temperature)	33 VDC

[1] Conversion of Minimum detectable signal from ppmv to g/kg is computed for 200 mb and -57˚ C, a representative atmospheric condition at approximately 40,000 ft Flight Level

[2] Conversion of Maximum detectable signal from ppmv to g/kg is computed for 1016 mb and 36˚ C, a representative atmospheric condition at the Surface

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Physical Specifications; Internal System Electronics Box (SEB)	
Size	254.00mm (10.00") long x 138.18mm (5.44") wide x 92.08mm (3.625") high. (Ref. Figures 2 & 3)
Weight	3.43 kg (7.56 lb)
Outputs (Standard Operating Mode)	ARINC 429 via ACARS
Outputs (Research and Test Modes)	RS-232 output direct to PC applications
Mounting (Ref. Figure 2)	6 x 10-32 Screws Thermal Isolation from the airframe required.
Replacement interval	At the convenience of the air carrier

Physical Specifications; External Air Sampler[3]	
Replacement interval	None required unless visible evidence of damage (20 year life time)
Size	136.35mm (5.37") long x 80.89mm (3.185") wide x 19.98mm (0.787") high. (Ref. Figure 1)
Mounting	Flush-mounted on the outside skin of the aircraft
Replacement interval	None required unless visible evidence of damage (20 year life time)

Service Interface Module and Local Test Connector	
Test Connector	High Density DB-26 Connector (Female)
Outputs	Display/Keypad I/O RS-232 on test connector (tx only)
Service Interface Module (Ref. Figure 3)	Available Option Access to operating modes of the system and system status for local test and evaluation without removal from aircraft.

Certifications

WVSS-II Product
Compliant to all environmental conditions specified by FAA Document Number RTCA/DO-160E dated December 9, 2004
FAA Supplemental Type Certifications (STC) for: - B757-200PF - B737-300 (Models: 737-301, 737-317, 737-3A4, 737-3G7, 737-3H4, 737-3K2, 737-3L9, 737-3Q8, 737-3T0,737-3T5, 737-3Y0)
FAA Supplemental Type Certifications (STC) in Process: - B737-700 (Planned completion Oct 2010)

SpectraSensors, Inc. Manufacturing and Engineering Facilities
ISO 9001: 2000
U.S. FAA Certified WVSS-II Repair Stations

[3] The Aerial Sampler Patents, U.S. Patent No.s 6,809,648 and 6,997,050, were developed by the University Corporation for Atmospheric Research. The University Corporation for Atmospheric Research Foundation has licensed the Aerial Sampler Technology to SpectraSensors Inc.

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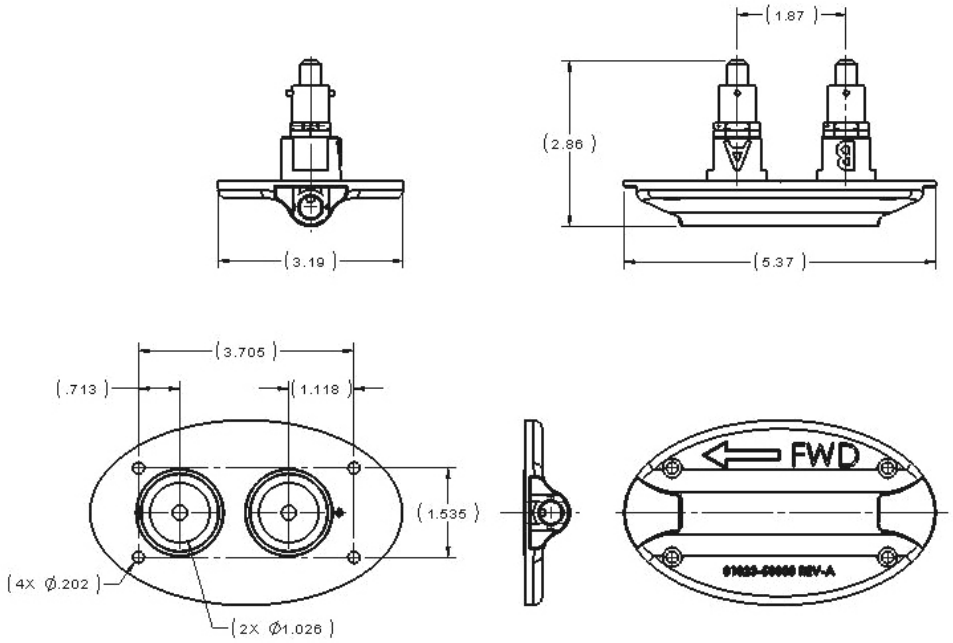

Figure 1: External Air Sampler

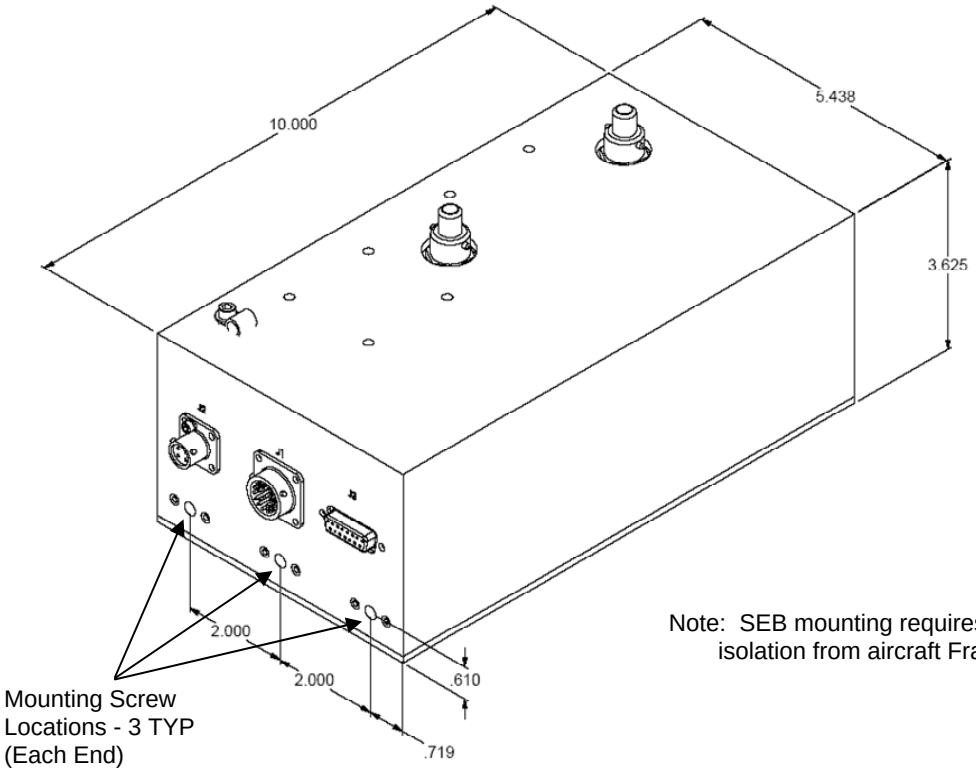

Figure 2: Internal System Electronics Box (Envelope)

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Figure 3: Service Interface Module for Local Test and Evaluation of the SEB