

SpectraSensors WVSS-II Datasheet

Water vapor sensing system

The Water Vapor Sensing System (WVSS-II) meets the demanding needs of Upper Air meteorological data collection from commercial aircraft, providing accurate atmospheric water vapor data with extremely low cost of operations leading to sustainable support to weather forecast and aviation operations.

Application WVSS-II uses TDLAS technology and internationally accepted standards to enable meteorological data collection from commercial aircraft, in support of the global WMO AMDAR program, enhancing meteorological operations and aviation weather support. For research applications in the atmospheric and aviation sciences, WVSS-II also provides simplified installation and data acquisition interfaces.

Methodology Tunable Diode Laser Absorption Spectroscopy.

Output data

- Water Vapor Concentration
- System Status Data
- Internal Pressure
- Internal Temperature
- Engineering Data

Key Features

- Fully automated operation
- High accuracy of measurement
- High reliability of operation
- High stability for long term performance
- No drag, through aerodynamic design
- No icing risk, thus no external heating
- Low size and weight
- Low power
- Very low maintenance
- Meets international standards
- Certified for multiple aircraft types
- Independently validated performance
- Wide use in meteorological operations
- Used in meteorological research
- Used in aviation research
- Low cost of operations



1. System Electronics Box (SEB)
2. Air Sampler
3. Hoses
4. Standard Aircraft Power/Data Connector

Specifications	
Performance	
Internal sample rate	~ 4 times/seconds
Data output rate	~ every 2.3 seconds
ACARS downlink rate	Downlink rate determined by user implementation
Range of coverage	Surface to approximately 45,000 ft (13.7 km)
Minimum detectable signal	<50 ppmv (0.0311 g/kg)[1]
Maximum detectable signal	>40,000 ppmv (24.88 g/kg)[2]
Accuracy	±50 ppmv or ±5% of reading (% of signal), whichever is greater
Minimum absorbance	~2 ppmv (1 x 10 ⁻³ g/kg) output resolution
Analyzer optical path length	22.7 cm (8.938 in)
Data Output Standards - SEB	
Standard operating mode	ARINC-429
Research and test modes	RS-232 Tx only output direct to PC applications
Environmental Range - SEB	
Outside air operating temperature range	-65 °C to +50 °C
SEB inside operating temperature range	-5 °C to +30 °C
SEB storage temperature range	-40 °C to +85 °C
Air Sample pressure range	Surface (~1016 mb) to <150 mb
Power Requirements	
Input voltage	28 VDC standard aircraft power
Current	5 amp maximum @ 28 VDC
Minimum operating voltage	17 VDC (any temperature)
Drop out voltage	15.8 VDC (any temperature)
Maximum operating voltage	33 VDC (any temperature)
Physical Specifications - Internal SEB	
Size	254.00mm long x 138.18mm wide x 92.08mm high (10.00 x 5.44 x 3.625 in)
Weight	3.46 kg (7.63 lb)
Mounting	6 x 10-32 screws (thermal isolation from the airframe required)
Physical Specifications - External Air Sampler[3]	
Dimensions	136.35mm long x 80.89mm wide x 19.98mm high (5.37 x 3.185 x 0.787 in)
Weight	0.33 kg (0.73 lb)
Service Interface Module and Alternate Research Data Output	
Test connector	High Density DB-26 Connector (Female)
Outputs	RS-232 Output (Tx only)
Service interface module	Option – Display data and status for local test and evaluation without removal from aircraft
Certifications	
U.S. FAA Supplemental Type Certifications (STC)	B757-200PF; B737-300; B737-700; B737-800
EASA STC (Customer held)	A319; A320; A321
General	Compliant to environmental conditions specified by FAA Doc. No. RTCA/DO-160E Easily configured for Experimental Aircraft certifications.
SpectraSensors, Inc. Manufacturing and Engineering Facilities	U.S. FAA PMA and Certified WVSS-II Repair Station, ISO 9001: 2008

- 1 Conversion of minimum detectable signal from ppmv to g/kg is computed for 200 mb and -57 °C, a representative condition at ~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.
- 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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