



INTELLISONDE™

Digital Radiosonde

IS-5A Series

Digital Accuracy: The IS-5A Series Intellisonde measures temperature, humidity, pressure and battery voltage with digital precision. Sensor output is converted to digital words in the radiosonde. PTU data and sensor references are then formatted into a digital message transmitted at a 1024 baud rate. Error detection codes ensure that error-free data is received by the ground station. Contamination of the PTU data by telemetry noise cannot occur undetected.

Each Intellisonde is factory calibrated in a computer-controlled environmental chamber. Test derived calibration coefficients of pressure, temperature and relative humidity are stored in ROM memory in each Intellisonde and are automatically transmitted to the receiver on power-up. Paper tape, bar code readers, and manual data entry are not needed. Calibration baseline is automatic and error free.

Superior Performance: The Intellisonde measures pressure, temperature, humidity, battery voltage and a spare resistance channel. The measurement of resistance and capacitance is exceptionally precise. PTU accuracy is limited only by sensor stability and exposure to the atmosphere.

Pressure is measured from 1050 to 5 hPa by an AIR, Inc. patented capacitance type pressure sensor. The sensor is not affected by thermal transients or mechanical stress. An internal temperature sensor located near the pressure sensor provides accurate temperature compensation.

Temperature is measured by a precision thermistor, which is protected by a reflective coating to minimize radiation errors at high altitude. The small mass of these sensors yields fast temperature response.

Relative humidity is measured by a patented capacitive sensor which is protected from severe rain by a protective shield. Exposure to 100% RH has little effect on accuracy. This sensor is a thin polymer which is exposed to the air flow on both surfaces, providing fast response.

Transmitters: Intellisondes are available in both 403 MHz and 1680 MHz models. The 1680 MHz transmitter is tunable and receivable by commercially available radiosonde receivers. The 403 MHz transmitter is crystal controlled. AIR, Inc. Intellisondes typically transmit 200 milliwatts of power for more than two hours of operation and perform effectively to 35 km altitude and distances greater than 160 km.

Features

- ❑ **Precision Sensors:**
 - Thermistor ($\pm 0.3^{\circ}\text{C}$)**
 - Capacitive Polymer ($\pm 3\%$ RH)**
 - Aneroid Pressure Cell (± 1 hPa)**
- ❑ **High resolution data (.01%)**
- ❑ **High vertical resolution – data from all sensors transmitted every 5 to 10 meters**
- ❑ **Individually pre-calibrated – no baseline required**
- ❑ **Transmitter frequency bands: 403 MHz, 1680 MHz**
- ❑ **Reliable – each unit tested under simulated flight conditions**
- ❑ **Operational simplicity**
- ❑ **Economical – low cost, lightweight, small balloon, minimal lift gas**
- ❑ **For soundings up to 35 km (5 hPa)**

Applications

- ❑ **Operational forecasting**
- ❑ **Meteorological research**
- ❑ **Air pollution studies, EPA Impact Statements**
- ❑ **Mountain valley and sea breeze studies**
- ❑ **Atmospheric wave studies**
- ❑ **Radio propagation and refractive index studies**
- ❑ **Agricultural and forestry research**
- ❑ **Sound propagation studies**
- ❑ **Ballistic density calculations**

GENERAL DESCRIPTION

Construction: Body molded of expanded polystyrene
 Power: Three sealed 9V alkaline transistor batteries.
 Operating Time: 2 - 4 hours
 Battery Shelf Life: 5 years @ 20°C
 (Expected)
 Size: 11cm x 9.5cm x 16cm (4.5in x 4.0in x 6.5in)
 Weight: 260 grams with batteries

INTELLISONDE™ MODELS IS-5A-403, IS-5A-1680 SPECIFICATIONS

The following performance specifications are for the sondes when used with an AIR ground station in a field environment. They include all sources of error and are for digital, automatically acquired data.

<u>SENSOR</u>	<u>TRANSMITTER MODELS</u>	<u>403 MHz IS-5A-403</u>	<u>1680 MHz IS-5A-1680</u>
Temperature (Fast Response Bead Thermistor)	Carrier Frequency:	403 MHz	1680 MHz
Range: +50°C to -90°C	Modulation Type:	FM Narrowband	FM wideband
Accuracy: ±0.3°C	Modulation:	Manchester Digital	Manchester Digital
Resolution: 0.01°C	Transmitter Type:	Crystal controlled	Colpitts Oscillator
Humidity (Fast Response Capacitance Polymer)	Stability:	±10 kHz	±1 MHz Typical
Range: 0% to 100% RH	Deviation:	±5 kHz	±100 kHz
Accuracy: ±3% RH	Tuning:	Single frequency	±20 MHz Minimum
Resolution: 0.01% RH	Transmitter Power:	200 mW Typical	250 mW Typical
Pressure (Capacitance Aneroid)	Telemetry Range:	>160 km	>160 km
Range: 1050 to 5 hPa	Antenna Type:	¼ wave vert. Monopole	¼ wave vert. Monopole
Accuracy: ±1 hPa (with reference Offset)	RF Polarization:	linear, vertical	linear, vertical
Resolution: 0.01 hPa			
Temperature Compensation: Automatic			



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