



iMet-4 RSB

403 MHz GPS Research Radiosonde Technical Data Sheet

Overview

- Lightweight, compact design
- Compatible with iMetOS-II, SkySonde and En-Sci DAS-2 Software
- Status LED indicates transmit frequency selection and 3-D GPS solution
- Integrated Pressure, Temperature and Humidity sensors

The RSB supports auxiliary sensors using the XDATA format, including:

- En-Sci Ozonesondes (Model 2Z)
- En-Sci CFH and NOAA FPH
- ETH COBALD
- NOAA POPS
- MetOne OPC

Pressure and Height

As recommended by GRUAN³, the iMet-4 is equipped with a pressure sensor to calculate height at lower levels in the atmosphere. Once the radiosonde reaches the optimal height, pressure is derived using GPS altitude combined with temperature and humidity data.

The pressure sensor facilitates the use of the sonde in field campaigns where a calibrated barometer is not available to establish an accurate ground observation for GPS-derived pressure. For research use, the sensor may be bias adjusted at ground level with a reference.

Temperature and Humidity

The iMet-4 measures air temperature with a small glass bead thermistor. Its small size minimizes effects caused by long and short-wave radiation and ensures fast response times.

The humidity sensor is a thin-film capacitive polymer that responds directly to relative humidity. The sensor incorporates a temperature sensor to minimize errors caused by solar heating.

Winds

Data from the radiosonde's GPS receiver is used to calculate wind speed and direction.

Radiosonde Data Transmission

The iMet-4 radiosonde can transmit to an effective range of over 250 km*.

A 6 kHz peak-to-peak FM transmission maximizes efficiency and makes more channels available for operational use. Seven frequency selections are pre-programmed - with custom programming available.

Calibration

The iMet-4's temperature and humidity sensors are calibrated using NIST traceable references to yield the highest data quality.

* Subject to ground station, balloon size and atmospheric conditions

¹ All uncertainties expressed at a 95% confidence level

² Primary atmospheric pressure derived by GPS altitude

³ GECOS Reference Upper-Air Network

Specifications subject to change without notice, Rev 11 230116

MEASUREMENTS			
Measurement cycle	1 Hz	GEOPOTENTIAL HEIGHT	Pressure derived
		Measurement range	SFC to 40 km
		Resolution	0.1 m
TEMPERATURE SENSORS	Glass Bead	Combined Uncertainty/Reproducibility ¹	
Manufacturer	Shibaura	1080 - 400 hPa	15 m / 10 m
Measurement range	+60°C to -90°C	400 - 10 hPa	200 m / 150 m
Resolution	0.01°C		
Response time: still air/ 5 ms ⁻¹ (1000 hPa)	2 / < 1 sec		
Repeatability in Calibration	0.2 C	GEOPOTENTIAL HEIGHT	GPS derived
Combined Uncertainty/Reproducibility ¹		Measurement range	SFC to 40 km
> 100 hPa	0.5 C / 0.3 C	Resolution	0.1 m
< 100 hPa	1.0 C / 0.75 C	Combined Uncertainty/Reproducibility ¹	
Night flight	0.3 C / 0.3 C	1080 - 400 hPa	30 m / 15 m
Solar correction	≤ 1.2 C	400 - 3 hPa	60 m / 20 m
HUMIDITY SENSOR	Capacitive Polymer	WIND SPEED AND DIRECTION	
Manufacturer	IST	Resolution	0.1 m/s / 0.1 degree
Measurement range	0-100 % RH	Speed	
Resolution	0.1%	Combined Uncertainty/Reproducibility ¹	0.5 / 0.25 m/s
Response time		Direction	
@ 25C	0.6 seconds	Combined Uncertainty/Reproducibility ¹	1 degree
@ 5C	5.2 seconds	Wind Speed / Direction	Unlimited/360°
@ -10C	11 seconds		
@ -40C	61 seconds		
Repeatability in Calibration	5 %		
Uncertainty/Reproducibility ¹		TELEMETRY	
> 0 C	5% / 3%	Transmission type	Synthesized
-40 to 0 C	5% / 5%	Maximum Range	> 250 km
		Frequency stability	± 3 kHz
		Deviation, peak to peak	6 kHz
PRESSURE ²	Sensor	Output Power	~ 30 – 200 mW
Manufacturer	Measurement Specialties	Modulation	AFSK
Measurement range	1200 hPa - 10 hPa	Data Rate	1200 Baud
Resolution	0.01 hPa	Standard Frequencies	402, 402.5, 403, 403.5 404, 404.5, 405
Response time	0.5 milliseconds	Custom Frequencies	Available
Uncertainty/Reproducibility ¹			
Whole range	2.0 / 1.5 hPa	GPS RECEIVER	
1200 - 400 hPa	1.0 / 0.75 hPa	Manufacturer / Type	U-Blox CAM-M8
400 hPa - 10 hPa	2.0 / 1.5 hPa	Cold Start Time	< 60 seconds (typical)
PRESSURE	GPS derived		
Measurement range	SFC to 3 hPa	OPERATIONAL DATA	
Resolution	0.1 hPa	Battery	Lithium
Uncertainty/Reproducibility ¹		Operating time	> 135 minutes
1080 - 400 hPa	2.0 / 1.5 hPa	Weight	< 120 grams
400 hPa - 3 hPa	0.5 / 0.25 hPa	Dimensions (mm)	Body (LWH): 139x67x31 With boom (LWH): 235x67x31
		Calibration Stability	2 years
		Warranty	12 Months

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