

Radiosonde
DFM-17



High accuracy GNSS radiosonde with PTU measurements



Main benefits

- High accuracy GNSS radiosonde with PTU measurements
- Optional XDATA and NFC interfaces
- Easy-to-use design with informative LEDs and seamless ground check
- Powerful and highly stable transmitter with continuous frequency selection
- Optional barometric pressure sensor, XDATA interface, wireless ground check

Key specifications

Measurements	Temperature, humidity, wind, altitude and pressure (derived from GNSS)
Windfinding technology	Multi-GNSS (L1; GPS, GLONASS and Beidou)
Transmitter	Synthesized 100 mW between 400,15-406 MHz, ETSI EN 302 054 compliant
Ground check	Via cable dongle (optional via wireless ground check interface) and connected grawMet software

Product description

DFM-17 is one of the most advanced and accurate radiosondes on the market, delivering daily weather data for millions of people worldwide. The industry leading performance of our sensors, including the new continuously heated humidity sensor, paired with our robust Multi-GNSS windfinding technology and the accompanying grawMet software makes this one of the most advanced systems available.

This makes our sounding systems trusted by meteorological agencies, researchers and special users alike. The eco-friendly design reduces the amount of resources used for the electronics as well as the primary plastics content.

Features

Superior sensor design

The TU sensor boom is the most important element of any radiosonde. We have conducted extensive tests and brought together decades of experience to develop a state-of-the-art solution. The thermal mass of the temperature sensor has been reduced, and a hydrophobic coating has been added to prevent icing during cloud passages. The highly reflective coating was especially selected due to its optical properties. At the same time, the temperature sensor is heated to prevent icing and significantly reduces the time-lag. Our highly sophisticated software processing accounts for all known sources of error and results in data of highest quality.

Windfinding performance

Wind, altitude and pressure are derived from the position and velocity measurements of the multi-GNSS receiver. The DFM-17 uses the L1 signals of multiple GNSS constellations (GPS, GLONASS, Beidou) which are fully user selectable and significantly increase immunity to GPS jamming and spoofing. The data products are calculated in our advanced grawMet software for use in various reports.

Eco-friendly where it matters most

The biggest environmental impact of radiosoundings comes from the manufacturing process and end-of-life. An additional factor is the consumption of lifting gas if helium is used. We designed the DFM-17 to use as few electronics as possible, which reduces the carbon footprint as well as the usage of metal and rare-earth elements. This also leads to a reduced environmental end-of-life impact. In addition, we partner with sondehub to help recover used radiosondes and have introduced a completely plastic-free unwinder. And of course, we have minimized the use of primary plastics, too.

Flight preparation

The DFM-17 features an easy and effortless flight preparation. The intuitive design includes a button with distinctive LED colours to assist the operator during preparation. Our grawMet software guides the user through each step and makes the completion of all necessary steps a breeze. During the preparation, DFM-17 is connected to the sounding workstation via an optional wireless ground check interface which allows the operator to switch on the radiosonde remotely.

Data transmission

Thanks to a powerful transmitter and state-of-the-art data transmission schemes, our radiosondes feature industry-leading ranges in excess of 350 km. Data integrity is ensured using advanced error detection- and correction schemes. Thanks to the design protocol, a large part of a data frame can still be used even in the event of transmission errors. The transmission frequency is freely selectable, and the narrow bandwidth allows for optimal spectral usage.

Add-on sensors and pressure sensor

The DFM-17 can be equipped with an XDATA interface to support external payloads, for example ozone sondes or research payloads. The maximum data bandwidth is 24 bytes/s and all data can be processed directly in grawMet or can be exported for further analysis. Furthermore, DFM-17 is available with a barometric pressure sensor which can enhance pressure accuracy in the lower portions of the atmosphere.

Technical Data

Temperature	
Type	Resistive
Measurement Range	-100 bis +60 °C
Resolution	0.01 °C (internal)
Uncertainty	< 0.25 °C
Repeatability in calibration	< 0.05 °C
Reproducibility in sounding	< 0.2 °C
Response time (63.2%, 5 m/s, 1000 hPa)	< 0.6 s
Stability (0.5 years)	< 0.03 °C

Humidity	
Type	Heated capacitive thin-film polymer sensor
Measurement Range	0 to 100 %rH
Resolution	0.1 %rH
Uncertainty	< 3 %rH
Reproducibility in sounding	< 2 %rH
Repeatability in calibration	< 1 %rH
Response time (6 m/s, 1000 hPa, +20 °C)	0.2 s
Response time (6 m/s, 1000 hPa, -60 °C)	10 s (time lag corrected)

Pressure	
Type	Calculated by GPS (optional barometric)
Measurement Range	1100 to 1 hPa
Resolution	0.01 hPa (internal)
Uncertainty > 100hPa	< 1 hPa
Uncertainty 100 - 10hPa	< 0.2 hPa
Uncertainty < 10hPa	< 0.04 hPa

Geopotential height	
Measurement Range	-500 gpm to 40,000 gpm
Resolution	0.1 gpm
Uncertainty	< 8 gpm
Reproducibility in sounding	< 5 gpm

Wind speed	
Method	Calculated by GPS
Measurement Range	0 to 200 m/s
Resolution	0.01 m/s (internal)
Uncertainty	< 0.1 m/s

Wind direction	
Method	Calculated by GPS
Measurement Range	0 to 360°
Resolution	0.01° (internal)
Uncertainty	< 1°

Telemetry	
Transmitter type	Synthesized
Tuning Range	400 - 405.99 MHz
Bandwidth	< 12 kHz
Max. range	< 350 km
Frequency stability	< 1 kHz (frequency drift < 1 kHz)
Emission bandwidth	Acc. to EN 302 054
Output power	< 100 mW
Sideband radiation	Acc. to EN 302 054
Modulation	GFSK
Data downlink	1250 bit/s
Data loss	< 1%
Sampling rate	1 Hz
Frequency channels	300 (tuneable in 20 KHz steps)
National standards	ETSI (Europe), NTIA (USA)

GNSS receiver	
Type	GPS/GLONASS/BEIDOU
Number of channels	72
Cold start acquisition time	26 s
Reacquisition time	1 s
Technology	DGPS (SBAS)
Horizontal position accuracy	< 2.5 m
Horizontal position error	< 5 m (CEP90)
Vertical position error	< 10 m (CEP90)
Velocity accuracy	< 0.05 m/s
Heading accuracy	< 0.3°
Maximum altitude	unlimited

Interface to external sensors	
Protocol	Xdata
Transfer rate	24 bytes/s

Miscellaneous	
Battery type	2 x Lithium CR123A, replaceable
Battery capacity	2 x 1500 mAh
Battery operating time	> 240 min
Battery voltage	3 - 6 V
Battery saving feature	Radiosonde powered by groundstation during preparation
Dimensions (body)	90 x 67 x 44 mm
Weight	63 g
Antenna	Steel wire strand
Documentation	Complete user documentation set is available

Unwinder	
Material of string	Polypropylene (optional cotton)
Tenacity	< 120 N
Length of string	30 m
Unwinding Speed	0.3 m/s
Weight	25 g

Packing / Labelling	
Packing type	Robust carton with individual protective placeholders
Moisture protection	Optional sealed packing with an appropriate desiccant package
Quantity per carton	Standard (1, 5, 20) or customer-specific
Labelling	Standard or customer-specific with durable and legible marking
Serial numbers	Standard or customer-specific
Shipping documentation	Standard or customer-specific packing lists, commercial invoices, customs documents, etc.

Notes: Uncertainties are expressed with 2-sigma confidence level ($k=2$); Reproducibility calculated by twin soundings.

Impressum/Disclaimer

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