



**GRS-KD-0038-en**

**DFM-09**

**Data Sheet**

V01.13

## Issue

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# 1

## 1.1 Data Transmission

Data channels:	T, U, GPS (P optionally)
Free channels (optionally):	1 free channel, e. g. for an external sensor
Sampling rate:	T, U In total for all sensors for a TU radiosonde: 672 ms <ul style="list-style-type: none"> <li>&gt; Measurement and transmission time for one sensor: 224 ms</li> <li>&gt; Reference measurement: 224 ms</li> <li>&gt; Every additional sensor increases the sampling rate by 224 ms</li> </ul>
Coding:	Digital bi-phase Manchester
Transmission rate:	T, U <ul style="list-style-type: none"> <li>&gt; Transmission rate of TU data: 1250 baud in a timeslot of 57.6 ms</li> </ul> GPS <ul style="list-style-type: none"> <li>&gt; Transmission rate of GPS data in 4 timeslots of 166.4 ms (224 ms - 57.6 ms = 166.4 ms); The transmission of the GPS-data is done in the background during the TU-measurement. One complete set of GPS data is transmitted per second in addition to the TU-transmission.</li> </ul>
Error correction:	The microcontroller in the radiosonde expands 4 bits to 8 bits. By this operation it is possible to correct one error and detect two errors. Additionally, the radiosonde carries out an interleaving over 7 bytes.
Identification code:	Transmit of the identification code in the reference channel is possible (no change of the sampling rate of the sensors; sampling rate of about 2 s for the identification code) or instead of a sensor (the sampling rate of each sensor extends by 224 ms).

## 1.2 Transmitter

Type:	PLL Synthesizer based circuit
Tuning range:	400.01 MHz to 405.99 MHz
Channel spacing:	20 kHz
Frequency stability:	$\Delta f = \pm 3$ kHz
Modulation:	FSK
Frequency deviation:	$\Delta f = \pm 3$ kHz
Output power:	P = 100 mW ERP or 20 dBm
Harmonic suppression:	0 GHz to 1 GHz: P = -57 dBm From 1 GHz: P = -36 dBm
Antenna:	Quarter wave vertical monopole
RF polarisation:	Linear, vertical
Telemetry range:	250 km minimum

## 1.3 Power supply

Battery:	High Power Primary Lithium Battery with short circuit protection.
Source:	150 minutes minimum
Capacity:	1.4 Ah
International Transportation:	ICAO International Civil Aviation Organisation; IMO International Marine Organisation. Each battery cell contains less than 1 g of lithium or lithium alloy (less than 2.0 g for assembled batteries). Therefore the lithium batteries are considered as not dangerous and with short circuit protection air transport und sea transport is allowed.
Activating power supply:	Via slide switch

## 1.4 GPS

Receiving antenna type:	Patch
General:	Frequency L1 1575.42 MHz Code C.A. Code
Accuracy:	Position < 10 m 90 % Velocity < 0.1 m/s

## 1.5 Sensors

Installation of the sensors:	Temperature and humidity sensors are installed prior to launch.
Protection of sensors:	During the transport the temperature and the humidity sensors are protected inside the radiosonde housing.
Calibration:	Calibration coefficients are stored in an EEPROM on board of the radiosonde.
Transmission of calibration data:	Transmission of the calibration data to the groundstation before the launch via connection cable.
Recalibration before start:	Not required

### 1.5.1 Pressure sensor (optionally)

Type:	Piezo-resistive
Range:	10 - 1100 hPa
Accuracy:	$\Delta P = \pm 0.5$ hPa
Resolution:	$\Delta P = \pm 0.1$ hPa

## 1.5.2 Temperature sensor

Type:	Thermistor
Range:	-95 °C to +50 °C
Accuracy:	$\Delta T = \pm 0.2 \text{ °C}$
Resolution:	$\Delta T = \pm 0.01 \text{ °C}$

## 1.5.3 Humidity sensor

Type:	Capacitive polymer
Range:	0 to 100 % r. H.
Accuracy:	4 %
Resolution:	1 %

## 1.6 General data

Dimensions:	20 cm x 4 cm x 6 cm
Weight with batteries:	100 g
Housing:	Styrofoam
Operating temperature:	-95°C to +50°C
Storage conditions (open package):	Shelf life: 2 years Temperature: +5 to +40 °C rel. Humidity: 0 to 60 %
Storage conditions (vacuum package with dry powder):	Shelf life: 4 years Temperature: -40 to +40 °C rel. Humidity: 0 to 95 %