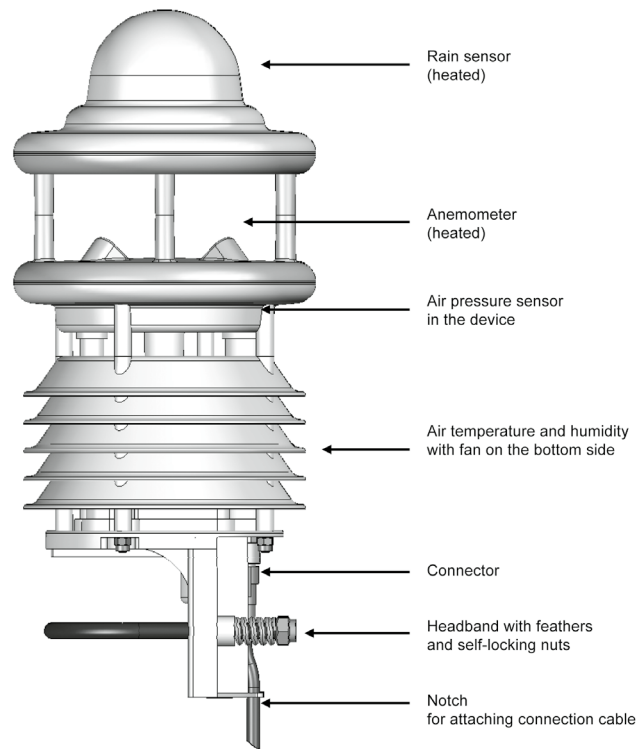


# 12 Meteorology

## Compact meteorological transducer for professional use - FMD760

Digital sensors for measuring wind, precipitation, air temperature, atmospheric humidity, atmospheric pressure. Maintenance-free measuring procedures for wind and precipitation  
Forced-ventilated radiation-protected housing

ALMEMO® D7



### Technical data and functions

#### Digital meteorological transducer for operating with ALMEMO® V7 devices

This digital meteorological transducer, with its integrated signal processor or A/D converter, can acquire all important weather variables in one device (over 20 different measurable variables). Up to 10 measuring channels can be evaluated simultaneously via the ALMEMO® D7 plug.

On leaving our factory the following variables are programmed: wind velocity (m/s), wind direction (°), precipitation quantity (mm), precipitation intensity (mm/h), air temperature (°C), relative atmospheric humidity (% RH), barometric atmospheric pressure (hPa).

The meteorological transducer operates with current ALMEMO® V7 devices, including precision measuring instrument ALMEMO® 710 and professional measuring instrument ALMEMO® 202-S.

#### For professional applications

The meteorological transducer complies in essence with all specifications laid down by the WMO (world meteorological organization) and is used in a wide variety of areas, e.g. weather services, water management, transport technology (roads, rail), agriculture, renewable energy technology, and the monitoring of air quality and atmospheric emissions.

The transducer can be fitted quickly and easily, e.g. on a mast or pole, using the supplied bracket.

The connection cable can be plugged onto the transducer. In the small connection box the signal cables are clamped and the mains unit 24V for the heating system supply are plugged. In mobile use (without mains unit 24V) heating and fan (see below) are deactivated, and the rainfall radar (see below) can be operated in Energy Saver mode. 1

#### Wind

Wind is measured by means of four ultrasonic sensors (the four main compass points). From the runtime differences the wind velocity is calculated in m/s and the wind direction in °.

This measuring procedure is maintenance-free (no moving parts). For operation in winter the ultrasonic sensors can if so required be heated.

#### Precipitation, rainfall

Precipitation is acquired using tried and tested radar technology. A Doppler radar measures the velocity of individual drops of rain / snow. Precipitation quantity (in mm) and precipitation intensity (in mm/h) can be calculated on the basis of the correlation of drop size and drop velocity. The type of precipitation (rain / snow) is determined on the basis of the different velocity of descent.

This measuring procedure is maintenance-free (no moving parts). For operation in winter the precipitation sensor can if so required be heated.

#### Air temperature and atmospheric humidity

Air temperature is measured (in °C) by means of a high-precision NTC resistance sensor; relative atmospheric humidity is measured (in % RH) by means of a capacitive humidity sensor. These sensors are enclosed in a forced-ventilated radiation-protected housing in order to minimize external influences (e.g. solar radiation, etc.). This ensures that in spite of high solar radiation accurate measuring results can still be achieved. The forced ventilation, similarly, improves responsiveness in the event of condensation.

#### Atmospheric pressure

Absolute atmospheric pressure is measured (in hPa) by means of an integrated sensor.

#### Measured values

The sensors in the meteorological transducer measure the current measured values continuously and at their internal sampling rate. In the ALMEMO® D7 plug the minimum / maximum / average values and quantities are calculated (at the output cycle of the ALMEMO® V7 device); this is for the purpose of various measurable variables.

## Technical data

### Wind velocity

Measuring method	Ultrasonic
Measuring range	0 to 75 m/s
Resolution	0.1 m/s
Accuracy	±0.3 m/s or ±3 % (0 to 35 m/s) ±5 % (>35 m/s) RMS
Response threshold	0.3 m/s
Sampling rate	10 seconds
ALMEMO® D7 quantities	Average value, minimum value, maximum value (at output cycle)

### Wind direction

Measuring method	Ultrasonic
Measuring range	0 to 359.9 °
Resolution	0.1 degrees
Accuracy	<3 ° (>1 m/s)
Response threshold	0.3 m/s
Sampling rate	10 seconds
ALMEMO® D7 quantities	Average value, minimum value, maximum value, average value as text (at output cycle)

### Precipitation, rainfall

Measuring method	Radar sensor
Measuring range	Drop size 0.3 to 5.0 mm
Resolution	Precipitation, liquid 0.01 mm
Precipitation types	rain, snow
Reproducibility	typical >90 %
Response threshold	0.002 mm
Sampling rate	On reaching the response threshold, event-dependent
Rainfall intensity	0 to 200 mm/h; Sampling rate 1 minute
ALMEMO® D7 quantities	Rainfall quantity or snow quantity (at the output cycle) Rainfall intensity or snow intensity, current momentary value

### Air temperature

Measuring method	NTC
Measuring range	-50 to +60 °C
Resolution	0.1 K (-20 to +50 °C), otherwise 0.2 K
Accuracy sensor	±0.2 K (-20 to +50 °C), otherwise ±0.5 K (>-30 °C)
Sampling rate	1 minute
ALMEMO® D7 quantities	Current momentary value, average value, minimum value, maximum value (at output cycle)

### Atmospheric humidity

Measuring method	capacitive
Measuring range	0 to 100 % RH
Resolution	0.1 % RH
Accuracy sensor	±2 % RH
Sampling rate	1 minute
ALMEMO® D7 quantities	Current momentary value

### Atmospheric pressure

Measuring method	MEMS sensor, capacitive
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Measuring range	300 to 1200 hPa
Resolution	0.1 hPa
Accuracy sensor	±0.5 hPa (0 to +40 °C)
Sampling rate	1 minute
ALMEMO® D7 quantities	Current momentary value

### Operating conditions

Temperature	-50 to +60 °C (with heating)
Relative humidity	0 to 100 % RH

### Dimensions (including fixture)

Height	343 mm
Diameter	150 mm
Weight	approx. 1.5 kg (including fixture, excluding connection cables)

### Housing

Fixture	Plastic Protective class IP66
	Mast fixture, stainless steel, for Ø 60 to 76 mm

### Sensor connector

Sensor connector	Built-in plug
Sensor connection cable	fitted in connection box Length (see variants, accessories)

### Connection box

	Clamp fitting the sensor connection cable and the ALMEMO® connection cable
	Plug fitting the mains unit cable for the heating system supply
	Dimensions 80 x 82 x 55 mm 3 cable glands

### Heating

Supply voltage	24 VDC
Current consumption	1.7 A (40 W) via external mains unit ZB1024NA2 (in delivery), 100 to 240 V AC / 24 V DC, with hollow connector, fitted in the connection box

ALMEMO® connection cable	fitted in connection box Length = 2 meters
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### ALMEMO® D7 plug

Refresh rate	2 seconds for all current momentary values Average value, maximum value, minimum value and quantities - at the output cycle (minimum 2 sec. up to 24 hours) of the ALMEMO® V7 device
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### Supply with mains unit 24V (default):

	All functions available.
	24 V from the mains unit, max. 1,8 A.
	12 V from ALMEMO® device, typ. 9 mA.

### Supply without mains unit 24V (mobile operation):

	Fan and heating deactivated.
	12 V from ALMEMO® device, typ. 130 mA with rainfall radar in continuous operation.
	Operating in Energy Saver mode 1: typ. 25 mA, no rain test / no rain, typ. 130 mA for 2 s / Min in the rain test, typ. 130 mA continuously, in the rain

## Accessories

Sensor connection cable, free ends	Length = 20 meters
Overvoltage arrester (for stationary operation)	

## Order no.

ZB9760AK20
ZB9760USP

## Variants

Digital meteorological transducer for measuring wind, precipitation, air temperature, atmospheric humidity, atmospheric pressure. Forced-ventilated radiation-protected housing, integrated heating, bracket for mast fitting. Sensor with built-in plug, including sensor connection cable Length = 10 meters fitted in connection box, external mains unit ZB1024NA2, fitted in the connection box, ALMEMO® connection cable fitted in connection box Length = 2 meters with ALMEMO® D7 plug

## Order no.

FMD760

**Other versions:**

**Digital meteorological transmitter FMD7 70**

**Compact transmitter for professional use**

**Digital sensors for global radiation and further measured variables**

**such as wind, precipitation, air temperature, humidity, atmospheric pressure.**



**Technology and function**

**Global radiation**

The global radiation is measured with the pyranometer mounted in the cap of the transmitter.

For further measured quantities and general functions see FMD7 60.

**Technical data**

**Global radiation**

Measuring method	thermopile pyranometer
Spectral range	300 ... 1100 nm
Measuring range	0 ... 2000 W/m <sup>2</sup>
Resolution	< 1 W/m <sup>2</sup>
Measuring rate	10 seconds
ALMEMO® D7 range:	Actual value

For technical data on the other measured variables and general functions, see FMD7 60

**Features**

Digital meteorological sensor for wind, precipitation, air temperature, humidity, atmospheric pressure and global radiation. Ventilated radiation protection, built-in heater, mounting bracket for mast mounting. Sensor with built-in plug, including sensor connection cable, length = 10 m, mounted in the connection box. Power supply unit 24 V ZB1024NA2, mounted in the connection box, ALMEMO® connection cable, mounted in the connection box, length = 2 m with ALMEMO® D7 connector

**Order no.**

**FMD770**

**Digital meteorological transmitter FMD7 20**

**Compact transmitter for professional use**

**Digital sensors for wind. Maintenance-free measuring method.**



**Technology and function**

**Wind**

Technology for wind measurement and general functions see FMD7 60

**Technical data**

For technical data on wind and general functions see FMD7 60

**Features**

Digital meteorological transmitter for wind. Built-in heater, mounting bracket for mast mounting. Sensor with built-in plug, including sensor connection cable, length = 10 m, mounted in the connection box. Power supply unit 24 V ZB1024NA2, mounted in the connection box, ALMEMO® connection cable, mounted in the connection box, length = 2 m with ALMEMO® D7 connector

**Order no.**

**FMD720**