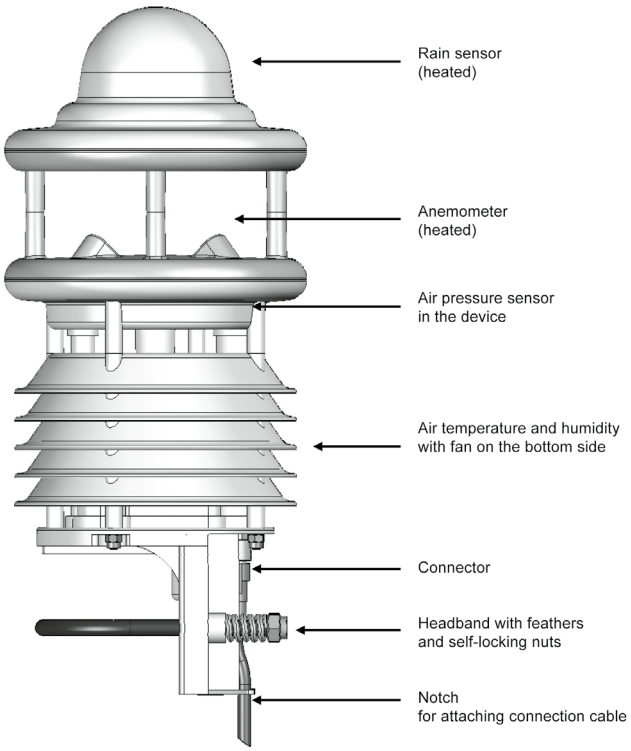
Compact meteorological transducer for professional use - FMD760
Digital sensors for measuring wind, precipitation, air temperature, atmospheric humidity, atmospheric pressure. Maintenance-free measuring procedures for wind and precipitation
Forced-ventilated radiation-protected housing

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, ALMEMO® 202-S, 204, 104, 710, 510, 809.

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 24 V for the heating system supply are plugged. In mobile use (without mains unit 24 V) 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.

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Technical data

Wind velocity	
Measuring method	Ultrasonic
Measuring range	0 to 75 m/s
Resolution	0.1 m/s
Accuracy	0 to 35 m/s: ±0.3 m/s RMS or ±3 % RMS >35 m/s: ±5 % 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
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	Plastic Protective class IP66
Fixture	Mast fixture, stainless steel, for Ø 60 to 76 mm
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

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

Supply with mains unit 24 V (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 24 V (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

	Order no.
Sensor connection cable, free ends Length = 20 meters	**ZB9760AK20**
Sensor connection cable, free ends Length = 50 meters	**ZB9760AK50**
Overvoltage arrester (for stationary operation)	**ZB9760USP**

Variants

	Order no.
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	**FMD760**

DAkkS accredited calibration or factory calibration for digital sensors, see chapter „Calibration certificates“.
The DAkkS accredited calibration meets the requirements of DIN EN ISO/IEC 17025 for test equipment.

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/m²
Resolution	< 1 W/m²
Measuring rate	10 seconds
ALMEMO® D7 range	Actual value

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

Features	Order no.
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	**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	Order no.
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	**FMD720**

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