Multiparametric sensor (7 measures)

Description

The Compact Weather Sensor is an all in one device for measuring of air temperature, relative humidity, air pressure, wind direction, wind speed, global radiation and precipitation (intensity, type and quantità).

Relative humidity is measured by means of a capacitive sensor element; a precision NTC measuring element is used to measure air temperature. Ultrasonic sensor technology is used to take wind measurements. Measurement output can be accessed by the following protocolls: Binary, ASCII, SDI-12, MODBUS. One external temperature or rain sensor is connectable.

Temperature is measured by way of a highly accurate NTC-resistor while humidity is measured using a capacitive humidity sensor. In order to keep the effects of external influences (e.g. solar radiation) as low as possible, these sensors are located in a ventilated housing with radiation protection. In contrast to conventional non-ventilated sensors, this allows significantly more accurate measurement during high radiation conditions. Additional variables such as dewpoint, absolute humidity and mixing ratio are calculated from air temperature and relative humidity, taking account of air pressure.

Absolute air pressure is measured by way of a built-in sensor (MEMS). The relative air pressure referenced to sea level is calculated using the barometric formula with the aid of the local altitude, which is user-configurable on the equipment.

The wind meter uses 4 ultrasonic sensors which take cyclical measurements in all directions. The resulting wind speed and direction are calculated from the measured run-time sound differential. The sensor delivers a quality output signal indicating how many good readings were taken during the measurement interval. In accordance with the specified sampling rate, the value of the last measurement is transmitted when the current measurement value is requested. Each measurement is stored in a circular buffer for the subsequent calculation of minimum, maximum and average values.

Precipitation is measured by a 24 GHz Doppler radar, which measures the drop speed of an individual drop of rain/snow. Precipitation quantity and intensity are calculated from the correlation between drop size and speed. The difference in drop speed determines the type of precipitation (rain/snow).

When requesting the minimum and maximum values, the corresponding value is calculated - via the circular buffer at the interval (1 – 10 minutes) specified in the configuration - and transmitted. When requesting the average value, this is calculated - via the circular buffer at the interval (1 – 10 minutes) specified in the configuration - and transmitted. In this way moving averages can also be calculated. For some values the standard deviation is calculated for the same interval. The calculation of standard deviation will only be activated after the related UMB channel has been requested for the first time.

The global radiation is measured by a pyranometer mounted in the top cover of the sensor.

In the specific case of wind monitoring, measurements are calculated vectorially. To this end, the average values of the vectors are generated internally. Hence the value (wind speed) and angle (wind direction) of the vector are calculated.

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Technical specifications may be varied without prior notice

Technical specifications

Power supply	24Vdc ±10% 12Vdc (with operating restrictions)
Consumption heating system	20VA @ 24Vdc
Dimentions (indicative)	150 mm x 290 mm - 1,5 kg
Installation	Brackets for pipe Ø 60 - 76mm in stainless steel
Protection	IP66
Operating Conditions	-50°C ... +60°C ; 0 ... 100% RH
Interface	RS485 (2-wire, half-duplex)
Housing	Plastic
AIR TEMPERATURE	
Measurement process	NTC
Measuring range	-50°C ... +60°C
Resolution	0.1°C (-20°C...+50°C), 0.2°C on the remaining range
Sensor accuracy	±0.2°C (-20°C .. +50°C); ±0.5°C on the remaining range
Sampling rate	1 minute
Generation of average value	1 ... 10 minutes
Units	°C; °F
HUMIDITY	
Measurement process	Capacitive
Measuring range	0 ... 100% RH
Resolution	0.1% RH
Sensor accuracy	±2% RH
Sampling rate	1 minute
Generation of average value	1 ... 10 minutes
Units	% RH; g/m³; g/kg
DEWPOINT TEMPERATURE	
Measurement process	Passive, calculated from temperature and humidity
Measuring range	-50°C ... +60°C
Resolution	0.1°C
Sensor accuracy	Calculated ±0.7°C
Units	°C; °F
AIR PRESSURE	
Measurement process	MEMS sensor - capacitive
Measuring range	300 ... 1200hPa

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Technical specifications

Resolution	0.1hPa
Accuracy	±0.5hPa (0 ... +40°C)
Sampling rate	1 minute
Generation of average value	1 ... 10 minutes
Units	hPa
WIND SPEED	
Measurement process	Ultrasonic
Measuring range	0 ... 75m/s
Resolution	0.1m/s
Accuracy	±0.3 m/s or ±3% (0...35 m/s) ±5% (>35m/s) RMS
Response threshold	0.3 m/s
Sampling rate	10 seconds / 1 second with resctrictions
Units	m/s; km/h; mph; kts
WIND DIRECTION	
Measurement process	Ultrasonic
Measuring range	0 ... 359.9°
Resolution	0.1°
Accuracy	< 3° (> 1m/s) RMSE
Response threshold	0.3 m/s
Sampling rate	10 seconds / 1 second with restrictions
PRECIPITATION	
Measurement process	Radar sensor
Measuring range (drop size)	0.3 mm ... 5.0 mm
Liquid precipitation resolution	0.01 mm
Precipitation types	Rain - snow
Repeatability	> 90%
Response threshold	0.01 mm
Sampling rate	Event-dependent on reaching response threshold
GLOBAL RADIATION	
Measurement process	Silicon photodiode
Measuring range	0.0 ... 2000.0 W/m²
Resolution	< 1W/m²
Sampling Rate	10 seconds
Response time (95%)	<1s
Spectral range (50% points)	300 ... 1100nm

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Ordering codes

Multiparametric sensor (temperature, humidity, atmospheric pressure, wind speed and direction)	**PCTMP000**
Multiparametric sensor (temperature, humidity, atmospheric pressure, precipitation type and quantity, wind speed and direction)	**PCTMP001**
Multiparametric sensor (temperature, humidity, atmospheric pressure, solar radiation, wind speed and direction)	**PCTMP005**
Multiparametric sensor for temperature, humidity and pressure	**PCTMP004**
Multiparametric sensor (temperature, humidity, atmospheric pressure, precipitation type and quantity)	**PCTMP022**
Multiparametric sensor for only wind speed and wind direction	**PCTAN012**

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