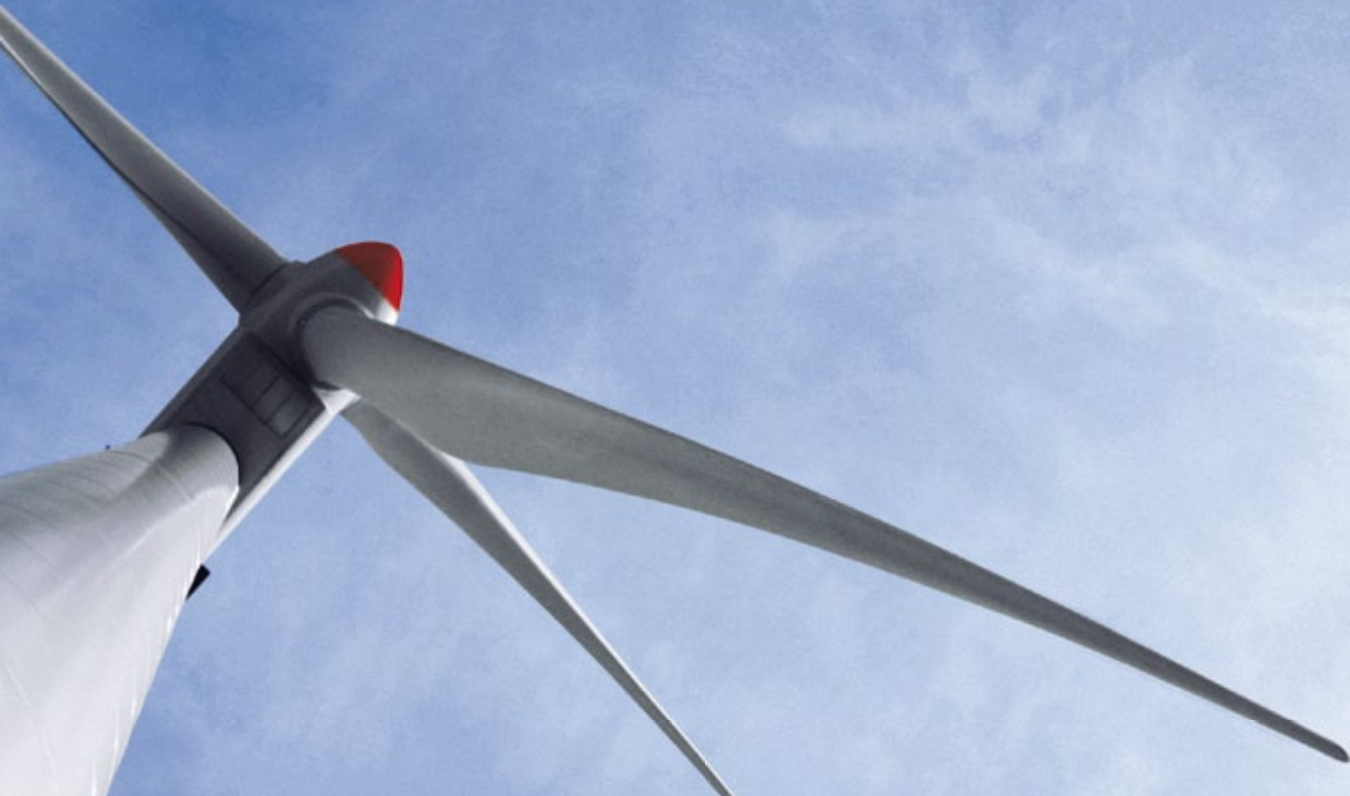


Wind and Weather

A Passion for Precision



por la precisión · passione per la precisione · a passion for precision · passion pour la précision · pasión por



www.lufft.com





Smart
**Weather
Sensors**



Wind & Weather

The UMB (Universal Measurement Bus) system is a new technology for recording environmental data. But why?

Hydrology, meteorology, weather conditions on the roads, agricultural meteorology, energy applications, renewable energy, high speed trains, air quality measurements – These various **applications** all have the same demands at their core:

- **high precision**
- **durability**
- **maintenance-free**
- **innovative**

However, the technical **requirements** can be very different:

- **solar operation**
- **connected to mains**
- **operation in all imaginable conditions** – including extreme conditions

Last but not least, the **transducers** needed by our clients are very different:

- **compact build**
- **stand alone sensors**
- **a combination** of stand-alone with built in transducers
- **ability to connect own transducer**

In order to fulfil these many different needs and desires, Lufft has committed itself to UMB technology.

The catalogue of UMB sensors includes different series of intelligent weather probes for temperature, relative air humidity, precipitation, air pressure, wind, solar radiation and



further data.

Our **titan range** was developed for use in the most extreme conditions. Various series meet professional meteorological requirements, starting with **our professional series** which meets all WMO criteria, whereas the weather sensors in our **gold and platinum series** are ideal for even higher levels of precision.











All UMB sensors use a standard electric connector system, meaning that installation and service tasks are made as simple as possible. Sensors not belonging to the series or existing analogue sensors can also be connected to the UMB system via an ANACON UMB module. Furthermore, a four channel UMB transformer module is currently being worked on, which would enable up to four analogue sensors to be used with the UMB system.

All UMB sensors use a standardized data interface for data retrieval. Currently, there are various options for this including SDI12, ASCII, Modbus und UMB. If the data retrieval unit is integrated in the Luft Smart Sensor WSxx, the other WSxx probes can be added with basic parametrization.








The probes' channel based data retrieval provides a multitude of calculable values in metric and US customary units. This means that a converter function is not necessary in the interface. With the aid of free configuration software (UMB-Config-Tool), sensors can be configured, systems tested and firmware updated.

Furthermore, Lufft offers a range of software packages for data retrieval from weather stations (COLLECTOR) all the way up to packages for web visualisation (SmartView3).

Lufft UMB Sensor Overview

	Wind	Temperature Rel. humidity Air pressure	Temperature Rel. humidity Air pressure Precipitation	Temperature Rel. humidity Air pressure Radiance (solar radiation)
Titan				
	Ventus			WS303
Platinum				
				WS301
Gold				
	V200A	WS300	WS400	WS304
Professional				
	WS200		WS401	WS302



Temperature Rel. humidity Air pressure Wind speed Wind direction	Temperature Rel. humidity Air pressure Wind speed Wind direction Radiance (solar radiation)	Temperature Rel. humidity Air pressure Wind speed Wind direction Precipitation	2 Channel EXPANDER	Protocols
			ANACON	UMB MODBUS ASCII SDI12
	WS503			
			ANACON	UMB MODBUS ASCII SDI12
	WS501			
			ANACON	UMB MODBUS ASCII SDI12
WS500	WS504	WS600		
			ANACON	UMB MODBUS ASCII SDI12
	WS502	WS601		





Lufft's high-quality networks for measuring emissions consist of gas measurements, dust particle measurements, as well as meteorological measurements.

Precision with UMB

The WS500-UMB and WS600-UMB deliver all meteorological measured data for Lufft's high-quality measuring networks. By means of the digital interface, they can be perfectly integrated into the measured data architecture of the entire system. When it comes to road traffic meteorology ("Green ITS"), quality is playing a more and more important role: In the future, traffic guidance and air pollution will depend on each other. This can only be realized with precise measured data, especially in large cities.



Lufft WS601-UMB – Temperature, Relative Humidity, Precipitation, Air Pressure, Wind, Electronic Compass

From the WS product family of professional intelligent measurement transducers with digital interface for environmental applications.

Integrated design with ventilated radiation protection for measuring:

- Air temperature
- Relative humidity
- Precipitation
- Air pressure
- Wind direction
- Wind speed

Relative humidity is measured by means of a capacitive sensor element; a precision NTC measuring element is used to measure air temperature.

Precipitation is measured by a tipping spoon and tipping bucket processes. The flexible tipping bucket allows a 0.2mm or a 0.5mm resolution of the rainfall.

Optionally, the WS601-UMB can be equipped with a leaf wetness sensor in addition.

Ultrasonic sensor technology is used to take wind measurements.

Measurement output can be accessed by the following protocols:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS

One external temperature sensor is connectable.

Lufft WS601-UMB Smart Weather Sensor			Order No.
WS601-UMB			8376.U01
Technical Data	Dimensions	Ø approx. 164 mm, height approx. 445 mm	
	Weight	approx. 1.7 kg	
Temperature	Principle	NTC	
	Measuring range	-50 ... 60 °C	
	Accuracy	±0.2 °C (-20 °C ... +50 °C), otherwise ±0.5 °C (>-30 °C)	
Relative humidity	Principle	Capacitive	
	Measuring range	0 ... 100 % RH	
	Accuracy	±2 % RH	
Precipitation	Resolution	0.2mm / 0.5mm	
	Accuracy	±2 %	
Air pressure	Principle	MEMS capacitive	
	Measuring range	300 ... 1200 hPa	
	Accuracy	+/- 0.5 hPa (0...+40°C)	
Wind direction	Principle	Ultrasonic	
	Measuring range	0 ... 359.9 °	
	Accuracy	< 3 ° RMSE >1.0 m/s	
Wind speed	Principle	Ultrasonic	
	Measuring range	0 ... 30 m/s	
	Accuracy	±0.3 m/s or 3 % RMS	
General Information	Heating	20VA at 24 VDC	
	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Op. power consumption	4...32 VDC	
	Operating humidity range	0 ... 100 %	
	Op. temperature range	-50 ... 60 °C	
Accessories	Surge protection		8379.USP
	Power supply 24V/4A		8366.USV1
	UMB Interface converter ISOCON-UMB		8160.UISO
	Digital-analog-converter DACON8-UMB		8160.UDAC
	Leaf wetness sensor WLW100		8358.10
	Temperature Sensor WT1		8160.WT1
	Road Surface Temperature Sensor WST1		8160.WST1
	Connection cable, 20m		8370.UKAB20



All in One

Aspirated temperature/humidity measurement

Open communication protocol:

- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS
- Analogue outputs in combination with 8160.UDAC



Luffts family of digital weather sensors for all environmental applications: best precision, solar- or mains-powered, all-in-one and stand-alone versions, open interfaces, long life cycle

Smart Sensors

WS Family



Lufft WS600-UMB – Temperature, Relative Humidity, Precipitation, Air Pressure, Wind, Electronic Compass

From the WS product family of professional intelligent measurement transducers with digital interface for environmental applications.

Integrated design with ventilated radiation protection for measuring:

- Air temperature
- Relative humidity
- Precipitation intensity
- Precipitation type
- Precipitation quantity
- Air pressure
- Wind direction
- Wind speed

Relative humidity is measured by means of a capacitive sensor element; a precision NTC measuring element is used to measure air temperature.

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).

Maintenance-free measurement offers a major advantage over the common tipping spoon and tipping bucket processes.

Ultrasonic sensor technology is used to take wind measurements.

Measurement output can be accessed by the following protocols:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS

One external temperature sensor is connectable.

All in One

Aspirated temperature/humidity measurement

Maintenance-free operation

Open communication protocol:

- UMB-ASCII

- UMB-Binary

- SDI-12

- MODBUS

- Analogue outputs in combination with 8160.UDAC

Lufft WS600-UMB Smart Weather Sensor			Order No.
WS600-UMB EU, USA, Canada			8370.U01
WS600-UMB UK			8370.U02
Technical Data	Dimensions	Ø approx. 150mm, height approx. 343mm	
	Weight	approx. 1.5kg	
Temperature	Principle	NTC	
	Measuring range	-50 ... 60 °C	
	Accuracy	±0.2 °C (-20 °C ... +50 °C), otherwise ±0.5 °C (> -30 °C)	
Relative humidity	Principle	Capacitive	
	Measuring range	0 ... 100 % RH	
	Accuracy	±2 % RH	
Precipitation quantity	Resolution	0.01 mm	
	Measuring range	Drop size 0.3 ... 5mm	
	Reproducibility	typ. >90 %	
Precipitation type	Rain/snow		
Air pressure	Principle	MEMS capacitive	
	Measuring range	300 ... 1200 hPa	
	Accuracy	+/- 0.5 hPa (0...+40°C)	
Wind direction	Principle	Ultrasonic	
	Measuring range	0 ... 359.9°	
	Accuracy	< 3° RMSE >1.0m/s	
Wind speed	Principle	Ultrasonic	
	Measuring range	0 ... 75 m/s	
	Accuracy	±0.3 m/s or 3 % (0 ... 35 m/s) RMS of reading, whichever is greater ±5 % (> 35 m/s) RMS	
General Information	Heating	40 VA at 24 VDC	
	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Op. power consumption	4...32 VDC	
	Operating humidity range	0 ... 100 %	
	Op. temperature range	-50 ... 60 °C	
Accessories	Surge protection		8379.USP
	Power supply 24V/4A		8366.USV1
	UMB Interface converter ISOCON-UMB		8160.UISO
	Digital-analog-converter DACON8-UMB		8160.UDAC
	Temperature Sensor WT1		8160.WT1
	Road Surface Temperature Sensor WST1		8160.WST1
	Connection cable, 20m		8370.UKAB20



Lufft WS504-UMB – Tilttable Pyranometer, Wind, Temperature, Air Pressure, Relative Humidity, Electronic Compass

From the WS product family of professional intelligent measurement transducers with digital interface for environmental applications.

Integrated design with ventilated radiation protection for measuring:

- Air temperature
- Relative humidity
- Air pressure
- Wind direction
- Wind speed
- Solar Radiation

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 protocols:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS .

One external temperature or rain sensor is connectable.

Lufft WS504-UMB Smart Weather Sensor			Order No.
WS504-UMB			8375.U12
Technical Data	Dimensions	Ø approx. 150mm, height 377 mm	
	Weight	approx. 1.5 kg	
Temperature	Principle	NTC	
	Measuring range	-50 ... 60 °C	
	Accuracy	±0.2 °C (-20 °C ... +50 °C), otherwise ±0.5 °C (> -30 °C)	
Relative humidity	Principle	Capacitive	
	Measuring range	0 ... 100 % RH	
	Accuracy	±2 % RH	
Radiation	Response time (95%)	< 1s	
	Spectral range	300 to 1100 nm	
	Measuring range	1400 W/m ²	
Air pressure	Principle	MEMS capacitive	
	Measuring range	300 ... 1200 hPa	
	Accuracy	±0.5 hPa (0 ... +40 °C)	
Wind direction	Principle	Ultrasonic	
	Measuring range	0 ... 359.9 °	
	Accuracy	< 3 ° RMSE >1.0 m/s	
Wind speed	Principle	Ultrasonic	
	Measuring range	0 ... 75 m/s	
	Accuracy	±0.3 m/s or 3 % (0 ... 35 m/s) RMS of reading, whichever is greater ±5 % (> 35 m/s) RMS	
General Information	Heating	20 VA at 24 VDC	
	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Operating power consumption	4 ... 32 VDC	
	Operating humidity range	0 ... 100 %	
Accessories	Operating temperature range	-50 ... 60 °C	
	Surge protection		8379.USP
	Power supply 24V/4A		8366.USV1
	UMB Interface converter ISOCON-UMB		8160.UISO
	Digital-analog-converter DACON8-UMB		8160.UDAC
	Temperature Sensor WT1		8160.WT1
	Road Surface Temperature Sensor WST1		8160.WST1
	Rain Sensor WTB100		8353.10
Connection cable, 20m		8370.UKAB20	



All in One

Aspirated temperature/humidity measurement

Open communication protocol:

- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS

- Analogue outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1 mm, 0.2 mm, 0.5 mm, 1mm heated and unheated.



Lufft WS503-UMB – Tilttable Pyranometer, Wind, Temperature, Air Pressure, Relative Humidity, Electronic Compass

From the WS product family of professional intelligent measurement transducers with digital interface for environmental applications.

Integrated design with ventilated radiation protection for measuring:

- Air temperature
- Relative humidity
- Air pressure
- Wind direction
- Wind speed
- Solar Radiation

Relative humidity is measured by means of a capacitive sensor element; a precision NTC measuring element is used to measure air temperature.

The world renowned technology of Kipp+Zonen CMP3 is integrated.

Ultrasonic sensor technology is used to take wind measurements.

Measurement output can be accessed by the following protocols:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS.

One external temperature or rain sensor is connectable.

Lufft WS503-UMB Smart Weather Sensor			Order No.
WS503-UMB			8375.U11
Technical Data	Dimensions	Ø approx. 150 mm, height 392mm	
	Weight	approx. 1.5 kg	
Temperature	Principle	NTC	
	Measuring range	-50 ... 60 °C	
	Accuracy	±0.2 °C (-20 °C ... +50 °C), otherwise ±0.5 °C (>-30 °C)	
Relative humidity	Principle	Capacitive	
	Measuring range	0 ... 100 % RH	
	Accuracy	±2 % RH	
Radiation	Response time (95%)	< 18s	
	Non-stability (change/year)	< 1%	
	Non-linearity (0 to 1,000 W/m²)	< 1%	
	Directional error (at 80° with 1,000 W/m²)	< 20 W/m²	
	Temperature dependence of sensitivity	< 5% (-10 bis +40 °C)	
	Tilt error (at 1000 W/m²)	< 1%	
	Spectral range (50% points)	300 to 2,800 nm	
	Measuring range	1400 W/m²	
Air pressure	Altitude	0...60°	
	Azimuth	-10° ... +10°	
	Principle	MEMS capacitive	
Wind direction	Measuring range	300 ... 1200 hPa	
	Accuracy	±0.5 hPa (0 ... +40°C)	
	Principle	Ultrasonic	
Wind speed	Measuring range	0 ... 359.9°	
	Accuracy	< 3° RMSE >1.0 m/s	
	Principle	Ultrasonic	
General Information	Measuring range	0 ... 75 m/s	
	Accuracy	±0.3 m/s or 3% (0...35 m/s) RMS of reading, whichever is greater ±5% (>35 m/s) RMS	
	Heating	20 VA at 24 VDC	
	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Operating power consumption	4...32 VDC	
Accessories	Operating humidity range	0 ... 100 %	
	Operating temperature range	-50 ... 60 °C	
	Surge protection		8379.USP
	Power supply 24V/4A		8366.USV1
	UMB Interface converter ISOCON-UMB		8160.UISO
	Digital-analog-converter DAICON8-UMB		8160.UDAC
	Temperature Sensor WT1		8160.WT1
	Road Surface Temperature Sensor WST1		8160.WST1
	Connection cable, 20m		8370.UKAB20
	Rain Sensor WTB100		8353.10



Tilttable Pyranometer

Ultrasonic wind sensor

Aspirated temperature/humidity measurement

Open communication protocol:

- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS
- Analogue outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1 mm, 0.2 mm, 0.5 mm, 1mm heated and unheated.



Lufft WS502-UMB – Temperature, Relative Humidity, Radiation, Air Pressure, Wind, Electronic Compass

From the WS product family of professional intelligent measurement transducers with digital interface for environmental applications.

Integrated design with ventilated radiation protection for measuring:

- Air temperature
- Relative humidity
- Air pressure
- Wind direction
- Wind speed
- Solar Radiation

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 protocols:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS

One external temperature or rain sensor is connectable.

Lufft WS502-UMB Smart Weather Sensor			Order No.
WS502-UMB			8375.U10
Technical Data	Dimensions	Ø approx. 150mm, height 317 mm	
	Weight	approx. 1.5 kg	
Temperature	Principle	NTC	
	Measuring range	-50 ... 60 °C	
	Accuracy	±0.2 °C (-20 °C ... +50 °C), otherwise ±0.5 °C (> -30 °C)	
Relative humidity	Principle	Capacitive	
	Measuring range	0 ... 100 % RH	
	Accuracy	±2 % RH	
Radiation	Response time (95%)	< 1s	
	Spectral range	300 to 1100 nm	
	Measuring range	1400 W/m ²	
Air pressure	Principle	MEMS capacitive	
	Measuring range	300 ... 1200 hPa	
	Accuracy	+/- 0.5 hPa (0...+40°C)	
Wind direction	Principle	Ultrasonic	
	Measuring range	0 ... 359.9°	
	Accuracy	< 3° RMSE >1.0 m/s	
Wind speed	Principle	Ultrasonic	
	Measuring range	0 ... 75 m/s	
	Accuracy	±0.3 m/s or 3% (0...35 m/s) RMS of reading, whichever is greater ±5% (>35 m/s) RMS	
General Information	Heating	20VA at 24 VDC	
	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Operating power consumption	4...32 VDC	
	Operating humidity range	0 ... 100 %	
Accessories	Operating temperature range	-50 ... 60 °C	
	Surge protection		8379.USP
	Power supply 24V/4A		8366.USV1
	UMB Interface converter ISOCON-UMB		8160.UISO
	Digital-analog-converter DACON8-UMB		8160.UDAC
	Temperature Sensor WT1		8160.WT1
	Road Surface Temperature Sensor WST1		8160.WST1
	Rain Sensor WTB100		8353.10
Connection cable, 20m		8370.UKAB20	

All in One

Aspirated temperature/humidity measurement

Open communication protocol:

- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS

- Analogue outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1 mm, 0.2 mm, 0.5 mm, 1mm heated and unheated.



Lufft WS501-UMB – Temperature, Relative Humidity, Radiation, Air Pressure, Wind, Electronic Compass

From the WS product family of professional intelligent measurement transducers with digital interface for environmental applications.

Integrated design with ventilated radiation protection for measuring:

- Air temperature
- Relative humidity
- Air pressure
- Wind direction
- Wind speed
- Solar Radiation

Relative humidity is measured by means of a capacitive sensor element; a precision NTC measuring element is used to measure air temperature.

The world renowned technology of Kipp+Zonen CMP3 is integrated.

Ultrasonic sensor technology is used to take wind measurements.

Measurement output can be accessed by the following protocols:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS

One external temperature or rain sensor is connectable.

Lufft WS501-UMB Smart Weather Sensor			Order No.
WS501-UMB			8375.U01
Technical Data	Dimensions	Ø approx. 150 mm, height 332 mm	
	Weight	approx. 1.5 kg	
Temperature	Principle	NTC	
	Measuring range	-50 ... 60 °C	
	Accuracy	±0.2 °C (-20 °C ... +50 °C), otherwise ±0.5 °C (>-30 °C)	
Relative humidity	Principle	Capacitive	
	Measuring range	0 ... 100 % RH	
	Accuracy	±2 % RH	
Radiation	Response time (95%)	< 18s	
	Non-stability (change/year)	< 1%	
	Non-linearity (0 to 1,000 W/m²)	< 1%	
	Directional error (at 80° with 1,000 W/m²)	< 20W/m²	
	Temperature dependence of sensitivity	< 5 % (-10 to +40 °C)	
	Tilt error (at 1000 W/m²)	< 1%	
	Spectral range (50% points)	300 to 2,800 nm	
	Measuring range	1400 W/m²	
Air pressure	Principle	MEMS capacitive	
	Measuring range	300 ... 1200 hPa	
	Accuracy	+/- 0.5 hPa (0...+40°C)	
Wind direction	Principle	Ultrasonic	
	Measuring range	0 ... 359.9°	
	Accuracy	< 3° RMSE >1.0 m/s	
Wind speed	Principle	Ultrasonic	
	Measuring range	0 ... 75 m/s	
General Information	Accuracy	±0.3 m/s or 3% (0...35 m/s) RMS of reading, whichever is greater ±5% (>35 m/s) RMS	
	Heating	20 VA at 24 VDC	
	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Operating power consumption	4...32 VDC	
	Operating humidity range	0 ... 100%	
Accessories	Operating temperature range	-50 ... 60 °C	
	Surge protection		8379.USP
	Power supply 24V/4A		8366.USV1
	UMB Interface converter ISOCON-UMB		8160.UISO
	Digital-analog-converter DACON8-UMB		8160.UDAC
	Temperature Sensor WT1		8160.WT1
	Road Surface Temperature Sensor WST1		8160.WST1
	Connection cable, 20m		8370.UKAB20
	Rain Sensor WTB100		8353.10



All in One

Aspirated temperature/humidity measurement

Open communication protocol:

- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS
- Analogue outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1 mm, 0.2 mm, 0.5 mm, 1mm heated and unheated.



Lufft WS500-UMB – Temperature, Air Pressure, Relative Humidity, Wind, Electronic Compass

From the WS product family of professional intelligent measurement transducers with digital interface for environmental applications.

Integrated design with ventilated radiation protection for measuring:

- Air temperature
- Relative humidity
- Air pressure
- Wind direction
- Wind speed

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 protocols:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS

One external temperature or rain sensor is connectable.

Lufft WS500-UMB Smart Weather Sensor			Order No.
WS500-UMB			8373.U01
Technical Data	Dimensions	Ø approx. 150mm, height approx 287mm	
	Weight	approx. 1.2kg	
Temperature	Principle	NTC	
	Measuring range	-50 ... 60 °C	
	Accuracy	±0.2 °C (-20 °C ... +50 °C), otherwise ±0.5 °C (> -30 °C)	
Relative humidity	Principle	Capacitive	
	Measuring range	0 ... 100 % RH	
	Accuracy	±2 % RH	
Air pressure	Principle	MEMS Capacitive	
	Measuring range	300 ... 1200 hPa	
	Accuracy	+/- 0.5 hPa (0...+40°C)	
Wind direction	Principle	Ultrasonic	
	Measuring range	0 ... 359.9°	
	Accuracy	< 3° RMSE >1.0 m/s	
Wind speed	Principle	Ultrasonic	
	Measuring range	0 ... 75 m/s	
	Accuracy	±0.3 m/s or 3 % (0 ... 35 m/s) RMS of reading, whichever is greater ±5 % (>35 m/s) RMS	
General Information	Heating	20 VA at 24 VDC	
	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Op. power consumption	4...32 VDC	
	Operating humidity range	0 ... 100 %	
	Op. temperature range	-50 ... 60 °C	
Accessories	Surge protection		8379.USP
	Power supply 24V/4A		8366.USV1
	UMB Interface converter ISOCON-UMB		8160.UISO
	Traverse for R2S-UMB + WS500-UMB		8367.TRAV
	Digital-analog-converter DACON8-UMB		8160.UDAC
	Temperature Sensor WT1		8160.WT1
	Road Surface Temperature Sensor WST1		8160.WST1
	Rain Sensor WTB100		8353.10
	Connection cable, 20m		8370.UKAB20

Ultrasonic wind sensor

Aspirated temperature/humidity measurement

Open communication protocol:

- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS
- Analogue outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1 mm, 0.2 mm, 0.5 mm, 1mm heated and unheated.



Lufft WS401-UMB – Temperature, Relative Humidity, Precipitation, Air Pressure

From the WS product family of professional intelligent measurement transducers with digital interface for environmental applications.

Integrated design with ventilated radiation protection for measuring:

- Air temperature
- Relative humidity
- Precipitation
- Air pressure

Relative humidity is measured by means of a capacitive sensor element; a precision NTC measuring element is used to measure air temperature.

Optionally, the WS401-UMB can be equipped with a leaf wetness sensor in addition.

Precipitation is measured by tipping spoon and tipping bucket processes. The flexible tipping bucket allows a 0.2mm or a 0.5mm resolution of the rainfall.

Measurement output can be accessed by the following protocols:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS

One external temperature sensor is connectable.

Lufft WS401-UMB Smart Weather Sensor			Order No.
WS401-UMB			8377.U01
Technical Data	Dimensions	Ø approx. 150mm, height approx. 380mm	
	Weight	approx. 1.5kg	
Temperature	Principle	NTC	
	Measuring range	-50 ... 60 °C	
	Accuracy	±0.2 °C (-20 °C ... +50 °C), otherwise ±0.5 °C (> -30 °C)	
Relative humidity	Principle	Capacitive	
	Measuring range	0 ... 100 % RH	
	Accuracy	±2 % RH	
Precipitation	Resolution	0.2 mm / 0.5mm	
	Accuracy	±2 %	
Air pressure	Principle	MEMS Capacitive	
	Measuring range	300 ... 1200hPa	
	Accuracy	+/- 0.5 hPa (0...+40°C)	
General Information	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Op. power consumption	4...32 VDC	
	Operating humidity range	0 ... 100 %	
	Op. temperature range	-50 ... 60 °C	
Accessories	Surge protection		8379.USP
	Power supply 24V/4A		8366.USV1
	UMB Interface converter ISOCON-UMB		8160.UISO
	Digital-analog-converter DACON8-UMB		8160.UDAC
	Leaf wetness sensor WLW100		8358.10
	Temperature Sensor WT1		8160.WT1
	Road Surface Temperature Sensor WST1		8160.WST1
	Connection cable, 20m		8370.UKAB20

Aspirated temperature/humidity measurement

Open communication protocol:

- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS
- Analogue outputs in combination with 8160.UDAC



Lufft WS400-UMB – Temperature, Relative Humidity, Precipitation, Air Pressure

From the WS product family of professional intelligent measurement transducers with digital interface for environmental applications.

Integrated design with ventilated radiation protection for measuring:

- Air temperature
- Relative humidity
- Precipitation intensity
- Precipitation type
- Precipitation quantity
- Air pressure

Relative humidity is measured by means of a capacitive sensor element; a precision NTC measuring element is used to measure air temperature.

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). Maintenance-free measurement offers a major advantage over the common tipping spoon and tipping bucket processes.

Measurement output can be accessed by the following protocols:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS

One external temperature sensor is connectable.

Lufft WS400-UMB Smart Weather Sensor			Order No.
WS400-UMB EU, USA, Canada			8369.U01
WS400-UMB UK			8369.U02
Technical Data	Dimensions	Ø approx. 150mm, height approx. 280mm	
	Weight	approx. 1.3kg	
Temperature	Principle	NTC	
	Measuring range	-50...60°C	
	Accuracy	±0.2°C (-20°C...+50°C), otherwise ±0.5°C (>-30°C)	
Relative humidity	Principle	Capacitive	
	Measuring range	0...100% RH	
	Accuracy	±2% RH	
Precipitation quantity	Resolution	0.01mm	
	Measuring range	Measuring range drop size 0.3...5mm	
	Reproducibility	typ. >90%	
Precipitation type	Rain/snow		
Air pressure	Principle	MEMS Capacitive	
	Measuring range	300...1200hPa	
	Accuracy	+/- 0.5 hPa (0...+40°C)	
	Heating	20VA at 24VDC	
General Information	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Op. power consumption	4...32 VDC	
	Operating humidity range	0...100%	
	Op. temperature range	-50...60°C	
	Accessories	Surge protection	
	Power supply 24V/4A		8366.USV1
	UMB Interface converter ISOCON-UMB		8160.UISO
	Digital-analog-converter DACON8-UMB		8160.UDAC
	Temperature Sensor WT1		8160.WT1
	Road Surface Temperature Sensor WST1		8160.WST1
	Connection cable, 20m		8370.UKAB20



Aspirated temperature/humidity measurement

Maintenance-free operation

Open communication protocol:

- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS
- Analogue outputs in combination with 8160.UDAC

Lufft WS304-UMB – Tilttable Pyranometer, Temperature, Air Pressure, Relative Humidity

From the WS product family of professional intelligent measurement transducers with digital interface for environmental applications.

Integrated design with ventilated radiation protection for measuring:

- Air temperature
- Relative humidity
- Air pressure
- Solar Radiation

Relative humidity is measured by means of a capacitive sensor element; a precision NTC measuring element is used to measure air temperature.

Measurement output can be accessed by the following protocols:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS .

One external temperature or rain sensor is connectable.

Lufft WS304-UMB Smart Weather Sensor			Order No.
WS304-UMB			8374.U12
Technical Data	Dimensions	Ø approx. 150mm, height 377 mm	
	Weight	approx. 1.5 kg	
Temperature	Principle	NTC	
	Measuring range	-50 ... 60 °C	
	Accuracy	±0.2 °C (-20 °C ... +50 °C), otherwise ±0.5 °C (> -30 °C)	
Relative humidity	Principle	Capacitive	
	Measuring range	0 ... 100 % RH	
	Accuracy	±2 % RH	
Radiation	Response time (95%)	< 1s	
	Spectral range	300 to 1100 nm	
	Measuring range	1400 W/m ²	
Air pressure	Principle	MEMS capacitive	
	Measuring range	300 ... 1200 hPa	
	Accuracy	±0.5 hPa (0 ... +40 °C)	
General Information	Heating	20 VA at 24 VDC	
	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Operating power consumption	4...32 VDC	
	Operating humidity range	0 ... 100 %	
Accessories	Operating temperature range	-50 ... 60 °C	
	Surge protection		8379.USP
	Power supply 24V/4A		8366.USV1
	UMB Interface converter ISOCON-UMB		8160.UISO
	Digital-analog-converter DACON8-UMB		8160.UDAC
	Temperature Sensor WT1		8160.WT1
	Road Surface Temperature Sensor WST1		8160.WST1
	Rain Sensor WTB100		8353.10
	Connection cable, 20m		8370.UKAB20



All in One

Aspirated temperature/humidity measurement

Open communication protocol:

- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS

- Analogue outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1 mm, 0.2 mm, 0.5 mm, 1mm heated and unheated.



Lufft WS303-UMB – Tilttable Pyranometer, Temperature, Air Pressure, Relative Humidity

From the WS product family of professional intelligent measurement transducers with digital interface for environmental applications.

Integrated design with ventilated radiation protection for measuring:

- Air temperature
- Relative humidity
- Air pressure
- Solar Radiation

Relative humidity is measured by means of a capacitive sensor element; a precision NTC measuring element is used to measure air temperature.

The world renowned technology of Kipp+Zonen CMP3 is integrated.

Measurement output can be accessed by the following protocols:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS.

One external temperature or rain sensor is connectable.



Tilttable Pyranometer

Ultrasonic wind sensor

Aspirated temperature/humidity measurement

Open communication protocol:

- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS
- Analogue outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1 mm, 0.2 mm, 0.5 mm, 1mm heated and unheated.

Lufft WS303-UMB Smart Weather Sensor			Order No.
WS303-UMB			8374.U11
Technical Data	Dimensions	Ø approx. 150 mm, height 392mm	
	Weight	approx. 1.5 kg	
Temperature	Principle	NTC	
	Measuring range	-50 ... 60 °C	
	Accuracy	±0.2 °C (-20 °C ... +50 °C), otherwise ±0.5 °C (> -30 °C)	
Relative humidity	Principle	Capacitive	
	Measuring range	0 ... 100 % RH	
	Accuracy	±2 % RH	
Radiation	Response time (95%)	< 18s	
	Non-stability (change/year)	< 1%	
	Non-linearity (0 to 1,000 W/m²)	< 1%	
	Directional error (at 80° with 1,000 W/m²)	< 20 W/m²	
	Temperature dependence of sensitivity	< 5% (-10 bis +40 °C)	
	Tilt error (at 1000 W/m²)	< 1%	
	Spectral range (50% points)	300 to 2,800 nm	
	Measuring range	1400 W/m²	
	Altitude	0...60°	
Air pressure	Azimuth	-10° ... +10°	
	Principle	MEMS capacitive	
Air pressure	Measuring range	300 ... 1200 hPa	
	Accuracy	±0.5 hPa (0 ... +40°C)	
General Information	Heating	20 VA at 24 VDC	
	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Operating power consumption	4...32 VDC	
	Operating humidity range	0 ... 100 %	
	Operating temperature range	-50 ... 60 °C	
Accessories	Surge protection		8379.USP
	Power supply 24V/4A		8366.USV1
	UMB Interface converter ISOCON-UMB		8160.UI50
	Digital-analog-converter DACON8-UMB		8160.UDAC
	Temperature Sensor WT1		8160.WT1
	Road Surface Temperature Sensor WST1		8160.WST1
	Rain Sensor WTB100		8353.10
	Connection cable, 20m		8370.UKAB20



Lufft WS302-UMB – Temperature, Relative Humidity, Radiation, Air Pressure

From the WS product family of professional intelligent measurement transducers with digital interface for environmental applications.

Integrated design with ventilated radiation protection for measuring:

- Air temperature
- Relative humidity
- Solar radiation
- Air pressure

Relative humidity is measured by means of a capacitive sensor element; a precision NTC measuring element is used to measure air temperature.

Measurement output can be accessed by the following protocols:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS

One external temperature or rain sensor is connectable.

Lufft WS302-UMB Smart Weather Sensor			Order No.
WS302-UMB			8374.U10
Technical Data	Dimensions	Ø approx. 150 mm, height 253 mm	
	Weight	approx. 1.3 kg	
Temperature	Principle	NTC	
	Measuring range	-50 ... 60 °C	
	Accuracy	±0.2 °C (-20 °C ... +50 °C), otherwise ±0.5 °C (> -30 °C)	
Relative humidity	Principle	Capacitive	
	Measuring range	0 ... 100 % RH	
	Accuracy	±2 % RH	
Radiation	Response time (95%)	< 1 s	
	Spectral range	300 to 1100 nm	
	Measuring range	1400 W/ m ²	
Air pressure	Principle	MEMS Capacitive	
	Measuring range	300 ... 1200 hPa	
	Accuracy	+/- 0.5 hPa (0...+40°C)	
General Information	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Op. power consumption	4...32 VDC	
	Operating humidity range	0 ... 100 %	
	Op. temperature range	-50 ... 60 °C	
Accessories	Surge protection		8379.USP
	Power supply 24V/4A		8366.USV1
	UMB Interface converter ISOCON-UMB		8160.UISO
	Digital-analog-converter DACON8-UMB		8160.UDAC
	Temperature Sensor WT1		8160.WT1
	Road Surface Temperature Sensor WST1		8160.WST1
	Rain Sensor WTB100		8353.10
	Connection cable, 20m		8370.UKAB20



Aspirated temperature/humidity measurement

Open communication protocol:

- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS

- Analogue outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1 mm, 0.2 mm, 0.5 mm, 1mm heated and unheated.

Lufft WS301-UMB – Temperature, Relative Humidity, Radiation, Air Pressure

From the WS product family of professional intelligent measurement transducers with digital interface for environmental applications.

Integrated design with ventilated radiation protection for measuring:

- Air temperature
- Relative humidity
- Solar radiation
- Air pressure

Relative humidity is measured by means of a capacitive sensor element; a precision NTC measuring element is used to measure air temperature.

The world renowned technology of Kipp+Zonen CMP3 is integrated.

Measurement output can be accessed by the following protocols:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS

One external temperature or rain sensor is connectable.

Lufft WS301-UMB Smart Weather Sensor			Order No.
WS301-UMB			8374.U01
Technical Data	Dimensions	Ø approx. 150mm, height 268mm	
	Weight	approx. 1.3kg	
Temperature	Principle	NTC	
	Measuring range	-50...60 °C	
	Accuracy	±0.2 °C (-20 °C...+50 °C), otherwise ±0.5 °C (>-30 °C)	
Relative humidity	Principle	Capacitive	
	Measuring range	0...100 % RH	
	Accuracy	±2 % RH	
Radiation	Response time (95%)	< 18s	
	Non-stability (change/year)	< 1%	
	Non-linearity (0 to 1,000 W/m²)	< 1%	
	Directional error (at 80° with 1,000W/m²)	< 20W/m²	
	Temperature dependent of sensitivity	< 5% (-10 bis +40 °C)	
	Tilt error (at 1000W/m²)	< 1%	
	Spectral range (50% points)	300 to 2,800nm	
Air pressure	Measuring range	2000W/m²	
	Principle	MEMS Capacitive	
	Measuring range	300...1200hPa	
General Information	Accuracy	±0.5 hPa (0...+40°C)	
	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Op. power consumption	4...32 VDC	
	Operating humidity range	0...100 %	
Accessories	Op. temperature range	-50...60 °C	
	Surge protection		8379.USP
	Power supply 24V/4A		8366.USV1
	UMB Interface converter ISOCON-UMB		8160.UISO
	Digital-analog-converter DAICON8-UMB		8160.UDAC
	Temperature Sensor WT1		8160.WT1
	Road Surface Temperature Sensor WST1		8160.WST1
	Rain Sensor WTB100		8353.10
	Connection cable, 20m		8370.UKAB20



Aspirated temperature/humidity measurement

Open communication protocol:

- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS

- Analogue outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1 mm, 0.2 mm, 0.5 mm, 1mm heated and unheated.



Lufft WS300-UMB – Temperature, Air Pressure, Relative Humidity

From the WS product family of professional intelligent measurement transducers with digital interface for environmental applications.

Integrated design with ventilated radiation protection for measuring:

- Air temperature
- Relative humidity
- Air pressure

Relative humidity is measured by means of a capacitive sensor element; a precision NTC measuring element is used to measure air temperature.

Measurement output can be accessed by the following protocols:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS

One external temperature or rain sensor is connectable.

Lufft WS300-UMB Smart Weather Sensor			Order No.
WS300-UMB			8372.U01
Technical Data	Dimensions	Ø approx. 150 mm, height approx. 223 mm	
	Weight	approx. 1.0 kg	
Temperature	Principle	NTC	
	Measuring range	-50 ... 60 °C	
	Accuracy	±0.2 °C (-20 °C ... +50 °C), otherwise ±0.5 °C (> -30 °C)	
Relative humidity	Principle	Capacitive	
	Measuring range	0 ... 100 % RH	
	Accuracy	±2 % RH	
Air pressure	Principle	MEMS Capacitive	
	Measuring range	300 ... 1200 hPa	
	Accuracy	±0.5 hPa (0 ... +40°C)	
General Information	Interface	RS485, 2-wire, half-duplex	
	Protection type housing	IP66	
	Op. power consumption	4...32 VDC	
	Operating humidity range	0 ... 100 %	
	Op. temperature range	-50 ... 60 °C	
Accessories	Surge protection		8379.USP
	Power supply 24V/4A		8366.USV1
	UMB Interface converter ISOCON-UMB		8160.UISO
	Digital-analog-converter DACON8-UMB		8160.UDAC
	Temperature Sensor WT1		8160.WT1
	Road Surface Temperature Sensor WST1		8160.WST1
	Rain Sensor WTB100		8353.10
	Connection cable, 20m		8370.UKAB20

Aspirated temperature/humidity measurement

Open communication protocol:

- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS
- Analogue outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1 mm, 0.2 mm, 0.5 mm, 1mm heated and unheated.



Lufft WS200-UMB – Ultrasonic Wind Sensor, Electronic Compass

From the WS product family of professional intelligent measurement transducers with digital interface for environmental applications.

Integrated design for measuring:

- Wind direction
- Wind speed

Ultrasonic sensor technology is used to take wind measurements.

Measurement output can be accessed by the following protocols:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS

One external temperature or rain sensor is connectable.

Lufft WS200-UMB Smart Weather Sensor			Order No.
WS200-UMB			8371.U01
Technical Data	Dimensions	Ø approx. 150mm, height approx. 194mm	
	Weight	approx. 0.8 kg	
Wind direction	Principle	Ultrasonic	
	Measuring range	0 ... 359.9°	
	Accuracy	< 3° RMSE >1.0m/s	
Wind speed	Principle	Ultrasonic	
	Measuring range	0 ... 75 m/s	
	Accuracy	±0.3 m/s or 3% (0 ... 35 m/s) RMS of reading, whichever is greater ±5% (>35 m/s) RMS	
General Information	Heating	20VA at 24VDC	
	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Op. power consumption	4...32 VDC	
	Operating humidity range	0 ... 100 %	
	Op. temperature range	-50 ... 60° C	
Accessories	Surge protection		8379.USP
	Power supply 24V/4A		8366.USV1
	UMB Interface converter ISOCON-UMB		8160.UISO
	Digital-analog-converter DACON8-UMB		8160.UDAC
	Temperature Sensor WT1		8160.WT1
	Road Surface Temperature Sensor WST1		8160.WST1
	Rain Sensor WTB100		8353.10
	Connection cable, 20m		8370.UKAB20



Ultrasonic wind measurement

Open communication protocol:

- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS

- Analogue outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1 mm, 0.2 mm, 0.5 mm, 1mm heated and unheated.

Calibration Certificate for all UMB-Sensors

Inspection certificate DIN EN 10204/3.1

ZERTIFIZIERT
DIN ISO 9001
NR 70100 222
CERTIFIED



Smart Weather Sensor

Model Type	WS600-UMB	
Serial Number	006 0911 0813 025	

This is to certify, that this Lufft product has been tested according to the TQM of the G. LUFFT Mess- und Regeltechnik GmbH manual in accordance with DIN EN ISO 9001. Ordering specifications are complied with. Execution of instruments / systems as well as testing of accuracy was carried out following LUFFT quality assurance procedures. Quality inspection was successfully passed.

Measurements

	Reference Value	Actual Value	Status
Relative Humidity	54,5%	54,3%	✓
Temperature	5,99 °C	5,75 °C	✓
Air Pressure	979,6 hPa	981,0 hPa	✓

Precipitation

	Reference Value	Actual Value	Status
Drop Size Small	0,115 mm	0,116 mm	✓
Drop Size Medium	0,670 mm	0,674 mm	✓
Drop Size Large	2,730 mm	2,716 mm	✓


Wind Direction and Speed

Angular Deviation

	2,0 m/s	5,0 m/s	10,0 m/s	20,0 m/s	50,0 m/s	Status
RMSE	1,3°	1,0°	0,9°	0,8°	0,7°	✓

Wind Speed

	2,0 m/s	5,0 m/s	10,0 m/s	20,0 m/s	50,0 m/s	Status
RMS	2,0 m/s	5,0 m/s	10,0 m/s	20,1 m/s	50,3 m/s	✓

Date	Inspector	Quality Management
18042011	 i. A. Martin Wyrambik	i. A. Helmut Hager

G. LUFFT Mess- und Regeltechnik GmbH
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E-Mail: info@lufft.de

Managing Director
Dipl.-Wirtsch.-Ing. Klaus Hirzel
Dipl.-Ing. Axel Schmitz-Hübisch

PRECIPITATION SENSOR “DGN”

DGN measures double accurate!

Latest weighing technology combined with a self-emptying monolithic manufactured precision tipping bucket allows the DGN a high resolution and high precision at a very small construction volume. The DGN is ideal to setup new measurement network as well as addition to an existing measurement network with tipping bucket or weighing precipitation sensors.

- outstanding cost-benefit ratio
- high resolution and accuracy
- compact and robust construction (weight only 2.5 kg)
- all-metal housing, weatherproof and durable
- comparability of the measured data to data of the sensors with tipping bucket and weighing technology

Lufft Precipitation Sensor		Order No.
Double gravimetric precipitation sensor unheated		8353.14DGN
Double gravimetric precipitation sensor heated (+2 °C funnel surface temperature)		8353.14HDGN
Technical Data	Measuring principle	double gravimetric, weighing + precision tipping bucket
	Operating temperature	0...70 °C (unheated) -40...70 °C (heated) ⁽¹⁾
	Collecting area	200 cm ²
	Amount measuring range	without limitation (0.05...∞ mm)
	Amount resolution	0.001 mm
	Amount accuracy	1 % at 1 mm/min
	Intensity range	0...20 mm/min resp. 0...1200 mm/h
	Intensity resolution	0.001 mm/min resp. 0.001 mm/h
	Intensity accuracy	± 0.1 mm/min resp. ± 6 mm/h
	Standards	WMO-No. 8 / VDI 3786 Bl. 7 / EN 61000-2, -4 / EN 61000-4-2, -3, -4, -5, -6, -11 / NAMUR NE-21
	Prot. class weighing cell	IP67
	Current consumption	≤ 50 mA at 24 V DC
	Supply voltage	9.8...32 V DC / sensor 24 V DC 140 W / heating
	Heating power	80 W (funnel)/60 W (outlet/tipping buck.)
Signal outputs	<ul style="list-style-type: none"> • UMB-protocol • SDI-12 / RS-485 (SDI-12 protocol, ASCII protocol, TALKER protocol) • 2 Pulse-Outputs for linearised, bounce-free output signal • Status-Output (configurable, e.g. rain yes/no or heating on/off) • Analogue output 	
Accessories	Cable 10 m	8353.KAB

⁽¹⁾ no icing, no snowdrift



classical meteorology and hydrology

- measuring networks of water suppliers
- lysimeter systems
- sewage plants
- Weather services
- airports
- traffic meteorology

Lufft WTB100 External Rain Gauge

Lufft WTB100 Rain Gauge		Order No.
Rain gauge 0.2 mm unheated		8353.10
Rain Gauge with bounce-free reed contact (normally closed)		
Technical Data	Dimensions	Ø165 mm, height 285 mm
	Connection type	Open cable ends
	Collecting area	200 cm ²
	Resolution	0.2 mm and 0.5 mm (tipping bucket), adjustment by reduction ring
	Weight	930 g
	Mounting type	On mast, Ø 60-76 mm
	Accuracy	± 2%



Lufft Rain Gauge		Order No.
Rain gauge 0.1 mm unheated		8353.13
Rain gauge 0.1 mm heated		8353.13H
Technical Data	Dimensions	Ø 190 mm, Height 292 mm
	Connection type	Open cable ends
	Collecting area	200 cm ²
	Resolution	0.1 mm (tipping bucket)
	Weight	approx. 4 kg
	Mounting type	On mast, Ø 60 mm
	Operating temp. range, rain gauge unheated	0 ... 70 °C
	Operating temp. range, rain gauge heated	-30 ... 70 °C
Heating	42 V/AC, 170 VA	
Accessories	Power supply for heated probe 8353.13H	8353.SV1
	Stand, height 1 m for 8353.13	8353.FUS2
	Stand, height 1 m for 8353.13H	8353.FUS3



Lufft Rain Gauge		Order No.
Rain gauge 0.1 mm unheated		8353.12
Rain gauge 0.1 mm heated		8353.12H
Technical Data	Dimensions	Ø 190 mm, height 292 mm
	Connection type	Open cable ends
	Collecting area	200 cm ²
	Resolution	0.1 mm (tipping bucket)
	Weight	approx. 3 kg
	Mounting type	On mast, Ø 60 mm
	Operating temp. range, rain gauge unheated	0 ... 70 °C
	Operating temp. range, rain gauge heated	-20 ... 70 °C
Heating	24 VDC 150 W	
Accessories	Power supply for heated probe 8353.12H	8366.USV2
	Stand, height 1 m for 8353.12	8353.FUS2
	Stand, height 1 m for 8353.12H	8353.FUS3





A Passion for Precision VENTUS

VENTUS ultrasonic cold weather anemometer was tested under MIL standard-810F method 521.2 proving success in ice free operation. Ventus is corrosion tested for seawater and vibration resistance. It gives the best accuracy with maintenance-free operation.

HALT test

Vibration test According to IEC 60945

*Corrosion test According to MIL-STD-810
Method 509.3*

*Ice-free test According to MIL-STD-810F
Method 521.2*

*Now UL-certified
Underwriters Laboratories Inc.*



Lufft VENTUS-UMB– Ultrasonic Wind Sensor

Metal Housing, 240W-Heater



Extremely precise and maintenance-free measurement of wind velocity and wind direction, as well as calculation of acoustic virtual temperature.

Belongs to Lufft's WS family of professional intelligent sensors with digital and analog interfaces.

The ultrasonic wind sensor is designed without mechanical parts – traditionally known as "cups and vane".

The digital or analog output delivers instantaneous, average, min or max value with flexible measuring rate. The VENTUS is heated in case of critical ambient conditions. Made for cold climates!

Recommended for:

- Wind turbines
- Marine/ships
- Meteorology
- Building automation

The following outputs/protocols are available:

- NMEA
- UMB-ASCII
- UMB-Binary
- MODBUS (ASCII, RTU)
- SDI-12
- 4 ... 20mA, 0...10V, 0...20 mA, 2...10V frequency (analog)

Lufft VENTUS-UMB Wind Sensor		Order No.
VENTUS-UMB for wind energy applications		8371.UMT
Technical Data	Dimensions	Ø approx. 150mm, height approx. 170mm
	Weight	approx. 1.62kg
Wind direction	Principle	Ultrasonic
	Measuring range	0 ... 359.9°
	Resolution	0.1°
	Accuracy	<2° RMSE >1.0m/s
	Start-up threshold	0.1m/s
	Measuring rate	60 partial measurements/ 15 measurements per second
	Measurement output rate	1-10 seconds adjustable – default 10s
Wind speed	Principle	Ultrasonic
	Measuring range	0 ... 75m/s
	Resolution	0.1m/s
	Accuracy	±0.2m/s or ± 2 % RMS of reading, whichever is greater
	Start-up threshold	0.1m/s
	Measuring rate	60 partial measurements/ 15 measurements per second
	Measurement output rate	1-10 seconds adjustable – default 10s
Virtual temperature	Unit	m/s; km/h; mph; kts
	Principle	Ultrasonic
	Measuring range	-50 ... +70 °C
	Resolution	0.1 °C
	Accuracy	± 2.0 °C (without heater and without sun exposure or wind > 4m/s)
Air pressure	Measuring rate	60 partial measurements/ 15 measurements per second
	Measurement output rate	1-10 seconds adjustable – default 10s
	Principle	MEMS Capacitive
Data output digital	Measuring range	300 ... 1200hPa
	Accuracy	±1.5hPa
	Interface	RS485 semi-/full duplex, isolated
Data output analog	Baudrate	1200-57600
	Meas. rate instant. value	1-10s
	Measuring rate Avg (arithmetic, vector)	1-10min
	Status	Heating, sensor failure
	Only semi-duplex mode	
General Information	Output signal	0 ... 20 mA, 4 ... 20 mA, 0 ... 10V, 2 ... 10V, 2 ... 2,000 Hz only output 1 (instantaneous, avg, min, max)
	Load	max. 500 Ohm
	Resolution	16 Bit
	Operating temperature	-40 ... +60 °C (with heating) -20 ... +60 °C (without heating)
	max. operating height	3500m
Accessories	Bus operation	Up to 32 devices
	Operating voltage electronics	24VDC ±10 % or 24VDC/1.2VA without heating 12 VDC
	with heating	24VDC, max. 240 VA (140W + 100W)
	Connection	8-pole plug
	Housing material	Aluminum, seawater-proof
	Protection	IP66
	Pole diameter	50mm/2"
	Factory certificate	yes
	Surge protection	8379.USP-V
	Power supply 24V/10A	8366.USV2
UMB Interface converter ISOCON-UMB	8160.UIISO	
Connection cable, 15m incl. connector	8371.UK015	
Connection cable, 50m incl. connector	8371.UK050	
Connector	8371.UST1	



Maintenance-free
ivemeasuring



Lufft V200A-UMB – Ultrasonic Wind Sensor

Plastic Housing, 20 W-Heater



Extremely precise and maintenance-free measurement of wind velocity and wind direction as well as calculation of acoustic virtual temperature.

Belongs to Lufft's WS family of professional intelligent sensors with digital and analog interfaces.

The ultrasonic wind sensor is designed without mechanical parts – traditionally known as "cups and vane".

The digital or analog output delivers instantaneous, average, min or max value with flexible measuring rate. The V200A is heated to remove frost and ice formation from the sensor.

Recommended for:

- Meteorology
- Building automation

The following outputs/protocols are available:

- NMEA
- UMB-ASCII
- UMB-Binary
- MODBUS (ASCII, RTU)
- SDI-12
- 4 ... 20 mA, 0...10V, 0...20mA, 2...10V frequency (analog)

Lufft V200A-UMB Ultrasonic Wind Sensor			Order No.
V200A-UMB			8371.UA01
Technical Data	Dimensions	Ø approx. 150 mm, height approx. 170 mm	
	Weight	approx. 0.8 kg	
Wind direction	Principle	Ultrasonic	
	Measuring range	0 ... 359.9°	
	Resolution	0.1° (standard)	
	Accuracy	< 3° RMSE > 1.0 m/s	
	Start-up Threshold	0.3 m/s	
	Measuring rate	60 partial measurements/ 15 measurements per second	
	Measurement output rate	1-10 seconds adjustable – default 10 s	
Wind speed	Principle	Ultrasonic	
	Measuring range	0 ... 75 m/s	
	Resolution	0.1 m/s	
	Accuracy	±0.3 m/s or 3% (0 ... 35 m/s) RMS of reading, whichever is greater ±5% (> 35 m/s) RMS	
	Start-up threshold	0.3 m/s	
	Measuring rate	60 partial measurements/ 15 measurements per second	
	Measurement output rate	1-10 seconds adjustable – default 10 s	
Virtual temperature	Principle	Ultrasonic	
	Measuring range	-50° C ... +70° C	
	Resolution	0.1° K	
	Accuracy	± 2.0 K (without heater and without sun exposure or wind > 4 m/s)	
Air pressure	Principle	MEMS Capacitive	
	Measuring range	300 ... 1200 hPa	
	Accuracy	+/- 0.5 h Pa (0 ... +40° C)	
	Measurement output rate	1-10 seconds adjustable – default 10 s	
Data output digital	Interface	RS485 semi-/full duplex, isolated	
	Baudrate	1200-57600	
	Meas. rate instant. value	1-10 s	
	Measuring rate Avg (arithmetic, vector), Min, Max	1-10 min	
	Status	Heating, sensor failure	
Data output analog	Only semi-duplex mode		
	Output signal	0 ... 20 mA, 4 ... 20 mA, 0 ... 10V, 2 ... 10V, 2 ... 2,000 Hz only output 1 (instantaneous, avg, min, max)	
	Load	max. 500 Ohm	
	Resolution	16 Bit	
General Information	Operating temperature	-40 ... +60° C (with heating)	
	max. operating height	3500m	
	Bus operation	Up to 32 devices	
	Operating voltage electronics	24 VDC ±10% or 24 VDC/1,2 VA without heating: 12 VDC	
	with heating	24 VDC, max. 20 VA	
	Connection	8-pole plug	
	Housing material	Plastic	
	Protection	IP66	
	Pole diameter	50 mm/2"	
	Factory certificate	yes	
Accessories	Surge protection		8379.USP-V
	Power supply 24V/4A		8366.USV1
	UMB Interface converter ISOCON-UMB		8160.UISO
	Connection cable, 15 m incl. connector		8371.UK015
	Connection cable, 50 m incl. connector		8371.UK050
	Connector		8371.UST1

Wind Sensor BASIC



The Wind Sensors without heating offer:

- wearfree data acquisition
- robust housing
- dimensionally stable blade wind vane
- fail-safe cup
- double precision bearing

Wind Sensor BASIC		Order Nr.	
<p><i>The slender, flow-optimized external geometry ensures certain and precise measurement. For highest stability under load and safe long-term use we rely on robust materials, such as the anodised aluminium housing. The compact sensors with their simple mounting principles additionally provide a high degree of flexibility. Without heating.</i></p>			
Technical data	Wind Sensor BASIC		
Wind direction	Dimensions	Blade wind fane L 232 mm / H 260 mm	8368.100
	Weight	approx. 0.95 kg	
	Principle	magnetic	
	Measuring range	0...360°	
	Resolution	3°	
	Accuracy	+/-5°	
	Starting value	0.7 m/s	
	Outputs	0...5 V	
	Supply voltage	24 VDC (6...28 VDC)	
	current consumption	15 mA at 12 V / 18 mA at 28 V	
Wind speed	Dimensions	3-armed cup-Ø 95 mm / H 180 mm	8368.110
	Weight	approx. 0.9 kg	
	Principle	magnetic	
	Measuring range	0.7...50 m/s	
	Resolution	0.26 m/s	
	Accuracy	+/- 2% FS	
	Starting value	0.7 m/s	
	Outputs	0...192 Hz	
	Supply voltage	24 VDC (4.7...28 VDC)	
current consumption	max. 8 mA <4 mA at 5 V		
Temperature-measuring range	-30... +70 °C under non-icing environmental conditions		
Housing	sea water resistant aluminium, anodized, IP53 for boreswith Ø 30 mm at max. 10 mm material thickness incl. 5 m fixed cable		
Accessories	Mast adapter Ø 50 mm		8368.Z100
	Traverse		8368.Z101

Wind Sensors BASIC are recommended for use in:

- building services
- environmental measurements
- wind power plants
- stadiums
- industrial meteorology
- solar plants
- controlling of жалousies

Further information about our products can be found on our website www.lufft.de

Wind Sensor INDUSTRY



Wind Sensor INDUSTRY		Order No.	
The wind sensors impress with high accuracy, simplest mounting methods and ultimately robust, seawater-proof materials.			
Technical Data		Wind Sensor INDUSTRY	
Wind direction	Dimensions	Blade wind fane, L 232 mm, H 307 mm dimensionally stable, plastic	
	Weight	approx. 0.35 kg	
	Measuring range	0...360°	
	Resolution	2°	
	Accuracy	+/-2°	
	Starting value	< 0.7 m/s	
	Outputs	0(4)...20 mA / max. load 600 Ohm	
Wind speed	Dimensions	3-armed cup-Ø 95 mm / H 230 mm	
	Weight	approx. 0.25 kg	
	Measuring range	0.7...50 m/s	
	Resolution	< 0.02 m/s	
	Accuracy	+/-2 % FS	
	Starting value	< 0.7 m/s	
	Outputs	0(4)...20 mA = 0...50 m/s, max. load 600 Ohm	
General Information	Measuring principle	Hall Sensor Array	
	Range of application	temperatures -30...+70 °C heated, wind speed 0...60 m/s	
	Supply voltage	24 (20...28) VDC, max. 800 mA electr. controlled heating, 18 W	
	Housing	Aluminium, anodized, IP53, Ø 32 mm	
	Bore	Ø 30 mm for mounting at traverse	
Included in delivery	cable with plug 12 m, ready-made		
Varieties	(Sensors with fixed cable or without heating on request)		
	Wind direction	0...20 mA – output	8368.200
	Wind speed	0...20 mA – output	8368.210
	Wind direction	4...20 mA – output	8368.220
	Wind speed	4...20 mA – output	8368.230
	Wind direction	0...10 VDC output = 0...360 °C	8368.240
	Wind speed	0...10 VDC output = 0...50 m/s	8368.250

The optimal heating of the sensor head and minimum powerdemand of the system are made possible by thermal decoupling of the housing shaft.

- precision, tradition and future reliability
- large operative measuring and temperature range
- simplest mast mounting
- very good starting values through magnetic, contactless measuring principle
- optimal heating concept

Further information about our products can be found on our website www.lufft.de

Wind Sensors INDUSTRY are recommended for use in:

- wind power plants
- building services
- wind warning devices on cranes
- industrial applications
- in all climatic zones
- environmental measurements

Wind Sensor PROFESSIONAL



The titan in the category „professional wind sensors“ meets the challenge of highest reliability over a very large measuring range.

- Precision, tradition and future reliability
- Large measuring range of 75 m/s!
- Very low starting value of 0.3 m/s through magnetic, contactless measuring principle
- Optimal heating concept at the 4...20 mA version

Wind Sensor PROFESSIONAL		Order No.	
<p><i>Two optimized versions are available with regard to power supply and signal output. The design is not only aerodynamically optimized but also effectuates extremely good deep-seaworthiness through the special surface treatment.</i></p>			
Technical Data		Wind Sensor PROFESSIONAL	
Wind direction	Dimensions	Blade wind vane, L 240 mm, H 310 mm	8368.300
	Weight	approx. 0.4 kg	
	Principle	Magnetical Positioning Encor System	
	Measuring range	0...360°	
	Resolution	< 1°	
	Accuracy	± 1°	
	Outputs	4...20 mA analogue	
	Starting value	≤ 0.3 m/s	
	Measuring element	Blade wind vane, dimensionally stable, aluminium	
Wind speed	Dimensions	3-armed cup CB, Ø 215 mm	8368.310
	Weight	approx. 0.35 kg	
	Principle	Magnetical Positioning Encor System	
	Measuring range	0.3...75 m/s	
	Resolution	< 0.1 m/s	
	Accuracy	± 0.3 m/s ≤ 10 m/s ± 1 % FS...50 m/s	
	Outputs	4...20 mA analogue	
	Starting value	< 0.3 m/s	
	Measuring element	3-armed cup, dimensionally stable, aluminium	
Range of application	Temperatures -40...+70 °C, heated, max. gusts of 100 m/s		
Supply voltage	24 VDC (20...28 VDC), max 800 mA, electr. controlled heated		
Housing	Seawater resistant aluminium, surface (special anodised oxidised Al, black, IP 65)		
Measuring element	in upright position, Ø 32 mm, bore Ø 30 mm for mounting at mast or traverses		
Included in delivery	Cable 12 m, plug connection, 4 pin, polarity protection ready-made		
Accessories	Mast adapter Ø 50 mm		8368.Z100
	Traverse, for mast Ø 30-80 mm length 825 mm		8368.Z101
	Traverse, for mast top 50 mm, length 600 mm		8368.Z102
	Lightning rod		8368.Z103

Wind Sensors PROFESSIONAL are recommended for use in:

Offshore
wind power plants
meteorology
wind warning systems
power plants
airports
military and civil ships

Further information about our products can be found on our website www.lufft.de

Wind Sensor PROFESSIONAL-IX



Dual bearings, coupled with the use of a special alloy, allow a large range of measurements to be taken in a wide variety of temperatures. The frictionless measuring technique delivers precise and reliable measurements without wear and tear. Simple mounting allows the device to be used with a high degree of flexibility.

- able to take a wide range of measurements in a wide variety of temperatures, all year round
- excellent start up speeds due to frictionless measuring technique
- internal heating system offers optimal protection against extreme conditions
- high resilience and durability

Wind Sensor PROFESSIONAL-IX		Order No.	
Robust sensor for reliable measurement of wind direction and wind speed at extremely low temperatures			
Technical Data		Wind Sensor PROFESSIONAL-IX	
Wind direction	Dimensions	Blade wind vane L 195 mm, H 295 mm	
	Weight	approx. 0.8 kg	
	Principle	Hall Sensor Array contact-free	
	Measuring range	0...360°	
	Resolution	< 1°	
	Accuracy	± 1°	
	Outputs	0/4...20 mA	
	Starting value	< 0.4 m/s	
Wind speed	Dimensions	3-armed cup Ø 218 mm H 241 mm	
	Weight	approx. 0.8 kg	
	Principle	Hall Sensor Array contact-free	
	Measuring range	0.4...50 m/s	
	Resolution	< 0.1 m/s	
	Accuracy	± 2% FS at 50 m/s	
	Outputs	0...500 Hz, 0/4...20 mA	
	Starting value	< 0.4 m/s	
Varieties	Wind direction	4...20 mA	8368.400
		0...20 mA	8368.410
	Wind speed	4...20 mA	8368.450
		0...20 mA	8368.460

NON-ICING wind sensor with 125 W Heating
Cold Climate Standard
polar stations
wind power plants
ascents supports
environmental applications
winter sports grounds
wind warning systems for cranes

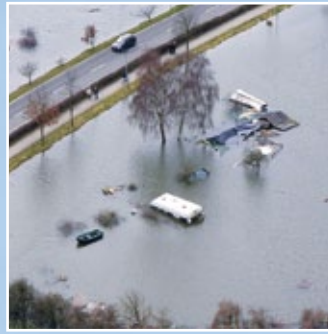
Further information about our products can be found on our website www.lufft.de



WS600-UMB



WS400-UMB



Sensors

of the Highest Quality

It is difficult to believe that rain density can be measured, that a sensor can record the speed of precipitation and the size of the rain drops. In such cases, high-tech sensors can be extremely precise and meticulous in detail. When it is a matter of traffic safety, then Lufft Measuring Technology knows no excuses!

Lufft R2S-UMB – Precipitation Sensor (Present Weather Detector)

The drop speed is captured with a 24-GHz-Doppler radar.

The precipitation quantity and intensity is calculated from the correlation between drop size and speed.

The type of precipitation (rain, snow, sleet, freezing rain, hail) is detected from the difference in drop speed.

The measurement data is available for further processing in the form of a standard protocol (Lufft UMB protocol).

Lufft R2S-UMB Precipitation Sensor		Order No.
R2S-UMB EU, USA, Canada		8367.U01
R2S-UMB UK		8367.U02
Technical Data	Resolution liquid precipitation	0.01 ... 0.1 ... 1.0 mm/m ²
	Power supply	20 ... 28 VDC
	Power consumption without heating	2 VA
	Heating power	30 VA
	Op. temperature range	-40 ... +60 °C
	Op. humidity range	0 ... 100 %
	Protection	IP66
	Interface	RS485 semiduplex wire, UMB protocol, pulse and frequency interface
	Cable length	10 m
	Measuring range hail	5.1 ... approx. 30 mm
Type of precipitation	Rain, snow, sleet, freezing rain, hail	
Precipitation	Principle	Doppler-Radar
	Reproducibility	typ. > 90 %
	Measuring range drop size	0.3 ... 5 mm
Accessories	UMB Interface converter ISOCON-UMB	8160.UISO
	Power supply 24 V/4 A	8366.USV1
	Protection shield for R2S-UMB	8367.SCHIRM
	Traverse for R2S-UMB + WS500-UMB	8367.TRAV1
	Surge protection	8379.USP
	Digital-analog-converter DACON8-UMB	8160.UDAC
	Connection cable, 20m	8370.UKAB20

Maintenance-free
Fast response time
Present weather detector
Resolution 0.01 mm





An Optoelectronic

Laser Sensor

An optoelectronic laser sensor for determining snow depths. Compact, reliable and cost-efficient: The snow depth sensor reliably determines snow depths within a measuring range of up to 10 meter within seconds and with millimeter precision.



Lufft SHM 30 Snow Depth Sensor

Made in Germany by Jenoptik

Compact, reliable and cost-efficient

The SHM 30 snow depth sensor reliably determines snow depths up to 10 meter within seconds and with millimeter precision.

Based on an opto-electronic distance sensor emitting visible eye-safe laser light, the SHM 30 allows probing distances up to 30 meter to detect the surface level. Unlike snow depth sensors using ultrasonic methods, the laser distance measuring technique is independent

of temperature changes.

Even if the measuring process is impaired by precipitation, the SHM 30 reliably finds the snow surface due to its mode of operation. Further evaluation of the transmitted signal strength allows discrimination between snow and grass.

Benefits

- Determination of snow depth over long distances using opto-electronic measuring technique
- MTBF (meantime between failure) >40.000h (duty cycle 30% 3 measurements/min)
The build in heater does mainly keep the build in laser diode in specs to ensure a long lifetime
- Very compact and weatherproof housing
- Efficient background light suppression
- Allows discrimination between snow and grass

Applications

- Weather service
- Traffic and aviation safety, road surveillance
- Winter sport areas
- Water & energy related applications

Lufft SHM 30 Snow Depth Sensor		Order No.
A compact laser sensor with RS232, 10 m cable		8365.10
With RS232 and ext. heat off, 10 m cable		8365.11
With RS422, 10 m cable		8365.20
With RS422, 5 m cable		8365.50
Technical data	Dimensions (LxBxH)	302 mm x 130 mm x 234 mm
	Weight	approx. 3.3 kg
Operating parameters	Temperature range	-40°C ... +50°C
	Relative humidity	0% ... 100%
	Heating activity	< 0 °C (programmable)
Measuring parameter	Snow depth	0 ... 10 m
	Distance to hard targets ^(1,2)	0.1 ... 30 m
	Precision / reproducibility ⁽²⁾	≤ 0.5 mm
	Measuring accuracy ^(2,3,4)	± 1 mm
	Measuring accuracy snow ⁽⁴⁾	± 5 mm
	Programmable measuring interval	1 s ... 600 s
	Time to measure	≤ 10 s
Interfaces	Data interfaces	RS232, analog output
	Interface modes RS 232 analog	2,4 ... 38,4 kBaud, format 8N1 3 mA und 4 ... 20 mA
	Operating modes	Polling, automatic telegram
	Client software	Any terminal program
Electrical parameters	Power consumption	0,5...1W (without heating) <12W (with heating) ⁽⁵⁾ ... 24W
	Power supply	10...30VDC (without heating) 15...24VDC (with heating)
Safety parameters	Laser classification	Laser Class 2 (IEC825-1/EN 60825)
	Environmental conditions	ISO 10109-11
	Protection class	IP65
	EMV	EN 61326-1
Accessories	Mounting clamp, steel, up to 80 mm Ø	8365.608-11X
	Mounting clamp, steel, up to 300 mm Ø	8365.609-11
	Mounting clamp, steel, up to 72 mm Ø	8365.610-11
	connecting cable 10m	8365.610-14
	connecting cable 20m	8365.611-14
	connecting cable 5m	8365.612-14

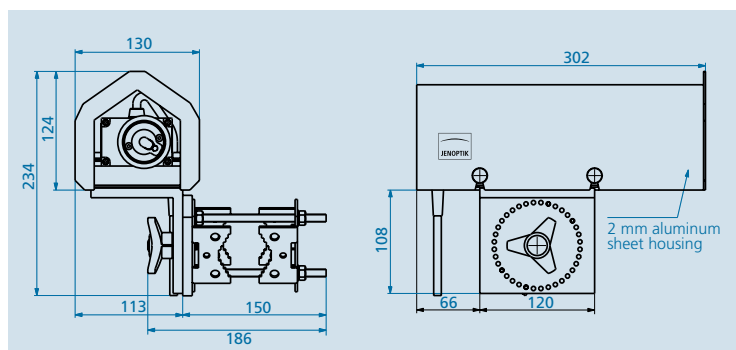
⁽¹⁾ without far field stray light protection

⁽⁴⁾ 95% statistical spread

⁽²⁾ on natural diffuse reflecting surfaces

⁽⁵⁾ heating cycle 0 ... -30 °C, at 24 VDC

⁽³⁾ offset corrected sensor





*Ceilometer CHM 15k „NIMBUS“
Measuring clouds, aerosol height
profiles and visibility*

Jenoptik Laser Technology inside **cloud height**

The “NIMBUS” series is the second generation of proven CHM 15k ceilometers measuring aerosol height profiles using the LIDAR technique. They determine cloud base heights, penetration depths, mixing layer height and vertical visibility. Within their operating range of up to 15 kilometers (50 000 feet), they reliably detect multiple cloud layers and cirrus clouds. The “NIMBUS” series is equipped with an integrated controller offering improved range resolution and a comfortable web interface.

1300m

1500m

Ceilometer CHM 15k „NIMBUS“

Measuring clouds, aerosol height profiles and visibility

High optical sensitivity for exact results

Accurate results in day- and nighttime are obtained by

- a solid state laser source with long life-time
- small bandwidth filters
- a highly sensitive photo receiver

Reliable operation in any climate

The CHM 15k series is prepared to work throughout the year and in any climate. Due to their double case structure combined with a window blower and an automatic heating system, the ceilometers are not interfered with fogging, precipitation, freezing or overheating.

The data telegrams in detail

1 - Standard data telegram

Output interval, date, time, detected cloud layers, penetration depths, vertical visibility, max. detection range, local altitude, unit (m/ft), system status, precipitation index, checksum

2 - Extended data telegram

Standard telegram combined with additional status messages and device specific parameters

3 - Raw data telegram

Extended telegram with measured raw data (in NetCDF format)

4 - CHM 15k data telegram

Output interval, date, time, unit, sky condition index, total cloud cover, cloud layers, cloud penetration depths, VOR, max. detection range, quality index aerosol layer, aerosol layer heights, status, checksum

5 - CHM 15k raw data telegram

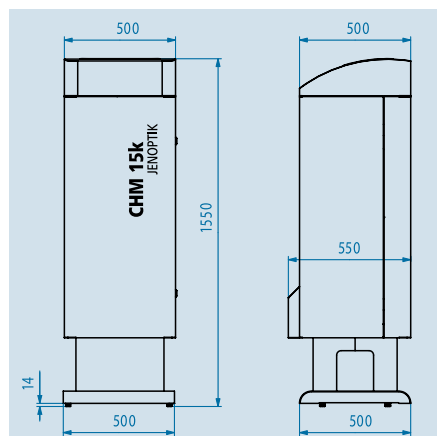
CHM 15k data telegram with raw data
Exemplary data telegram (standard)...;
29.05.06; 05:25; 00330; 01913; 07725;
0150; 0112; 0772; 01968; 08498; +060;
m; 11111111; ...

Jenoptik Ceilometer CHM 15k“Nimbus“			Order No.
Ceilometer			8350.00
Technical Data	Dimensions (LxWxH)	500 mm x 500 mm x 1550 mm	
	Weight	70 kg (130 kg incl. packaging)	
Operating conditions	Temperature	-40°C ... 55°C	
	Relative humidity	0% ... 100%	
	Wind	55 ms ⁻¹	
Measuring parameters	Measuring principle	Optical (LIDAR)	
	Measuring range (CBH) ¹	5 m ... 15,000 m (16 ft ... 50,000 ft)	
	Accuracy ²	± 5m (± 16 ft)	
	Range resolution	5 m (16 ft)	
	Sampling rate	100 MHz	
	NetCDF raw data resolution	15 m (full range, compact file sizes) 5 m (5 m to 150 m range)	
	Time to measure	2 s ... 600 s (programmable)	
	Targets	Aerosols, clouds	
	Quantities to be measured	- CBH1, preset: 3 layers; maximum 9 layers - Cloud penetration depth - Cloud amount and sky condition index - Vertical visibility (VOR) - Height of aerosol layer - Aerosol backscatter profiles	
	Light source	Nd:YAG solid-state laser, wavelength 1064 nm	
Interfaces and software for data output and device configuration	Standard interface	RS485, LAN	
	Optional interfaces	RS232 or Modem V.21, V.22, V.22bis	
	Communication	LAN Port: Web-Interface Serial Port: JO-DataClient Software or standard terminal programs	
	Optional software	Viewer-Software for convenient visualizing measured results	
Electrical parameters	Power supply	Standard: 230 VAC, ±10% Optional: 110 VAC, ± 10%	
	Power consumption	250 W (Standard) 800 W (in maximum heating mode)	
	UPS functionality (opt.)	Internal backup battery for electronics, > 1 hrs	
Operating safety	Environmental requirements	ISO 10109-11	
	Laser protection class	1M according to IEC 60825-1:2007	
	Internal protection class	IP65	
	EMC	Class B, DIN EN 61326-1	
	Electrical safety	DIN EN 61010-1	
	Certifications	CE	

¹CBH - Cloud Base Height ² measured on hard target in 10 km distance

Benefits

- Great measuring range up to 15 km (50 000 ft)
- Enhanced multiple cloud layer detection
- Simple and eye-safe routine operation
- Service-friendly modular device setup
- Various data telegrams, including raw data
- GUI software for device control and display of measured backscatter data in NetCDF format





Added

Value

Smart Sensors from Lufft offer an additional input to connect external sensors. The WSxx master sensor serves as the “UMB converter” of these external measurements.

Whether you need an additional temperature measurement, a tipping bucket or a leaf wetness sensor: “all-in-one sensor solutions” for agrometeorological and meteorological applications or for PV monitoring.

Lufft WT1 – Temperature Sensor



Lufft WT1 - Temperature Sensor			Bestell-Nr.
WT1 - Temperature Sensor			8160.WT1
Technical Data	Dimensions	Ø 30mm, Höhe 8mm	
	Weight (incl. cable)	approx. 300 g	
	Measuring range	-40 ... +80 °C	
	Resolution	0,25°C	
	Accuracy	±1 °C	
	Protection type	IP68	
	Op. temperature range	-40 ... +80 °C	
	Cable length	10m	

Each sensor of the WS family has an extra input channel to connect a remote temperature sensor.

The temperature sensor measures the surface temperature, eg. the surface temperature of a solar module.

This remote temperature sensor can be combined with any sensor of the WS family.

A typical application is to combination with WS301-UMB or WS501-UMB as a reference sensor how efficient a solar system works.

Lufft WLW100 - Leaf Wetness Sensor



Lufft WLW100 - Leaf Wetness Sensor			Bestell-Nr.
WLW100 - Leaf Wetness Sensor			8358.10
Technical Data	Dimensions	112mm x 58mm x 1mm	
	Weight (incl. cable)	approx. 150 g	
	Measuring range	0...1500mV	
	Principle	Capacitive	
	Op. temperature range	-20 ... +50 °C	
	Cable length	5m	

The leaf wetness sensor measures, whether a leaf is dry or wet.

This remote sensor can be combined with the WS601-UMB and WS401-UMB. The WS601-UMB and WS401-UMB with external leaf wetness sensor has all sensor informations for professional agricultural weather applications.

The WS601-UMB and WS401-UMB has an extra input channel to connect a remote leaf wetness sensor.

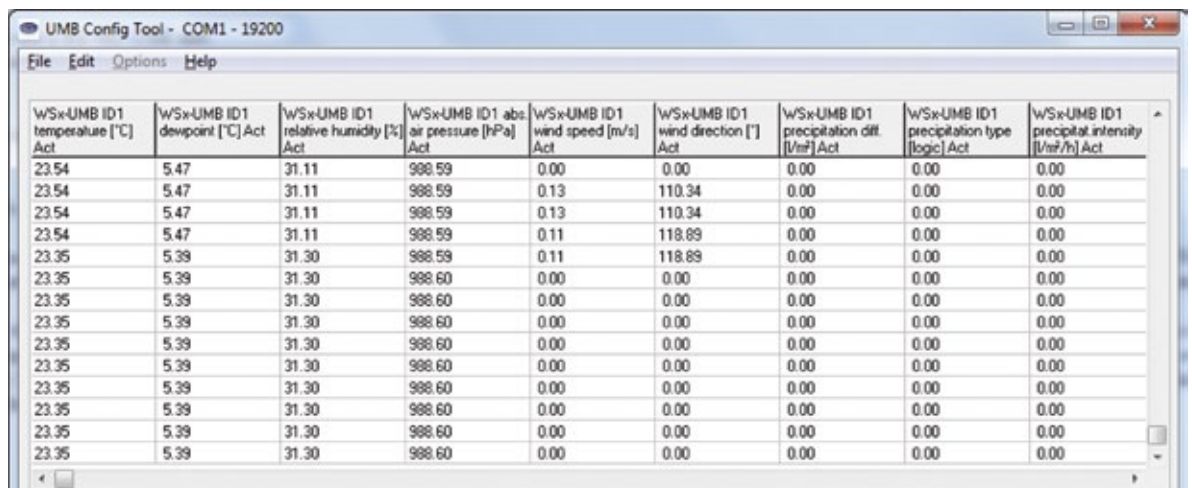
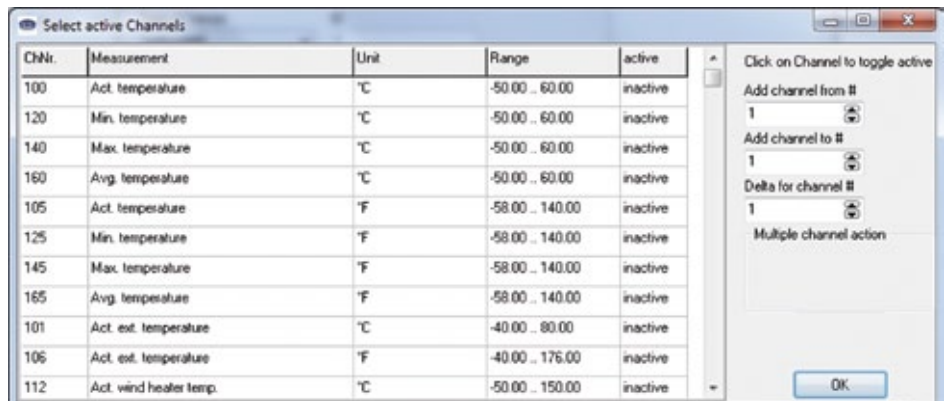
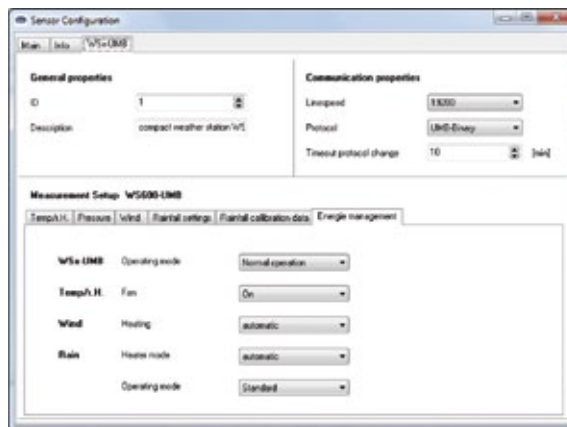
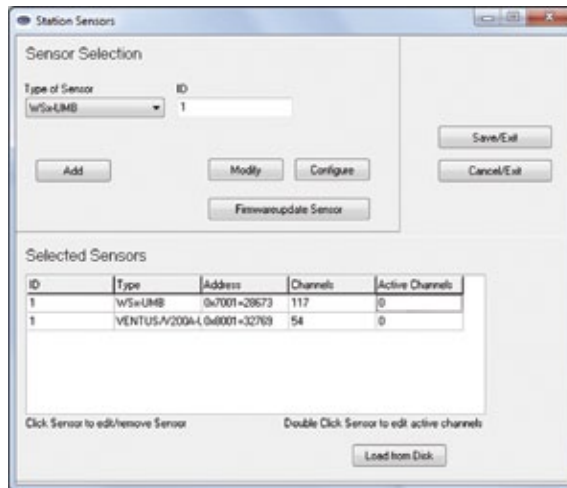
Lufft UMB Configuration Software

A Lufft intelligent weather sensor gives you a choice of various settings. The config tool allows you to choose the correct ones, such as:

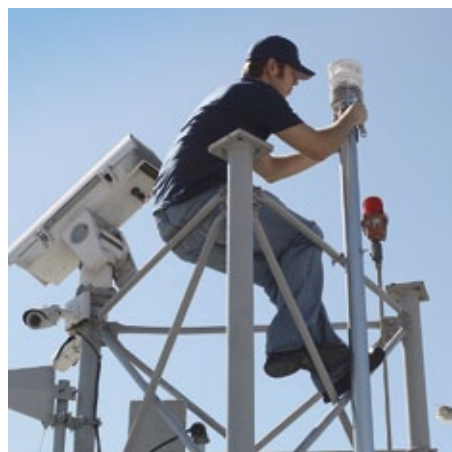
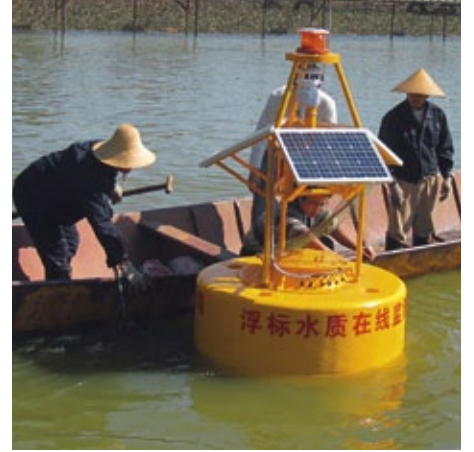
Choosing the data channels needed for your purpose. As well as raw data, these could include calculated values such as the dew point. The data can be shown in either metric or US customary units.

Recording the data in a text document during test runs. This form of protocol and archiving with date stamp can also be useful for field testing

Loading the most recent firmware in the intelligent probe. Continual improvements and function enhancements can therefore simply be installed during maintenance. Should you prefer not to alter the setting yourself, a local Lufft Partner is available to aid in the correct configuration of your intelligent measuring device.



Intelligent Weather Sensor Applications Worldwide



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Subject to technical modifications - Wind 10_2014