Wind and Weather

A Passion for Precision

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

Abbeon Instruments

Supplier of Lufft Products since 1946

Lufft

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
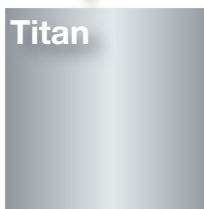
further data.

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.

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 Lufft 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).

Titan

Platin

Gold

Profi

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			WS310
Platinum				WS301/303
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	Temperature Rel. humidity Air pressure Wind speed Wind direction Precipitation Radiation	2 Channel EXPANDER	Protocols
	WS510			ANACON	UMB MODBUS ASCII SDI12
	WS501/503			ANACON	UMB MODBUS ASCII SDI12
WS500	WS504	WS600	WS700	ANACON	UMB MODBUS ASCII SDI12
	WS502	WS601	WS800	ANACON	UMB MODBUS ASCII SDI12

WS600-UMB
with precipitation sensor

WS502-UMB
with solar radiation sensor

Future Inside

Lightning
Detection

WS800 the first smart weather sensor from the Lufft WS product family, that comes with a combined measurement of precipitation, solar radiation and lightning detection.

Lufft WS800-UMB – Temperature, Relative Humidity, Precipitation, Solar 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
- Precipitation intensity
- Precipitation type
- Precipitation quantity
- Solar radiation
- Lightning detection
- Air pressure
- Wind direction
- Wind speed

One external temperature or rain sensor is connectable.

WS800-UMB includes lightning detection by an integrated sensor analysing the radio wave emission of lightnings. It delivers a count of recognized lightnings. The sensor analyses spectrum and wave form of the received signal to suppress the detection of man made electrical discharges.

Lufft WS800-UMB Smart Weather Sensor			Order No.
WS800-UMB			**8381.U01**
Technical Data	Dimensions	Ø approx. 150mm, height 317mm	
	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 intensity	Resolution	0.1mm/h	
Precipitation quantity	Resolution	0.01mm	
	Measuring range	Drop size 0.3…5mm	
	Reproducibility	Typ. >90%	
Precipitation type	Rain/snow		
Radiation	Response time (95%)	<1s	
	Spectral range	300 to 1100nm	
	Measuring range	1400 W/m²	
	Accuracy	5%	
Lightning detection	Number of lightning events		
Air pressure	Principle	MEMS capacitive	
	Measuring range	300…1200hPa	
	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…75m/s	
	Accuracy	±0.3m/s or ±3% (0...35m/s) ±5% (>35m/s) RMS	
General Information	Heating	40VA at 24VDC	
	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Operating voltage	4...32VDC	
	Operating humidity range	0…100%	
	Operating temperature range	–50…60 °C	

All in One

Aspirated temperature/humidity measurement

Open communication protocol:
- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS
- Analoge outputs in combination with 8160.UDAC

WS600-UMB
with precipitation sensor

WS502-UMB
with solar radiation sensor

All meteorological Sensors
Under One Roof

WS700 - the first smart weather sensor from the Lufft WS product family, that comes with a combined measurement of precipitation and solar radiation.

Lufft WS700-UMB – Temperature, Relative Humidity, Precipitation, Solar 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
- Precipitation intensity
- Precipitation type
- Precipitation quantity
- 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 protocolls:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS

One external temperature sensor is connectable.

Lufft WS700-UMB Smart Weather Sensor			Order No.
WS700-UMB			**8380.U01**
Technical Data	Dimensions	Ø approx. 150mm, height 317mm	
	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	
Precipitation intensity	Resolution	0.1mm/h	
Precipitation quantity	Resolution	0.01 mm	
	Measuring range	Drop size 0.3…5 mm	
	Reproducibility	typ. > 90 %	
Precipitation type	Rain/snow		
Radiation	Response time (95%)	<1s	
	Spectral range	300 to 1100 nm	
	Measuring range	1400 W/m²	
	Accuracy	5%	
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…90m/s	
	Accuracy	±0.2 m/s or ± 2% RMS of reading, whichever is greater (0...65m/s) else ±5%	
General Information	Heating	40VA at 24 VDC	
	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Operating voltage	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.UISO**
	Digital-analog-converter DACON8-UMB		**8160.UDAC**
	Temperature Sensor WT1		**8160.WT1**
	Connection cable, 20m		**8370.UKAB20**

All in One

Aspirated temperature/humidity measurement

Open communication protocol:
- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS
- Analoge outputs in combination with 8160.UDAC

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

One external temperature sensor is connectable.

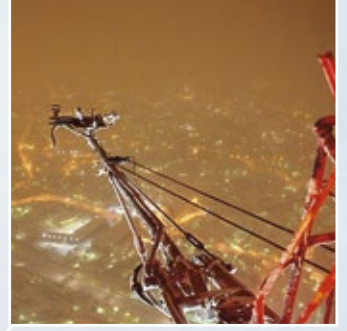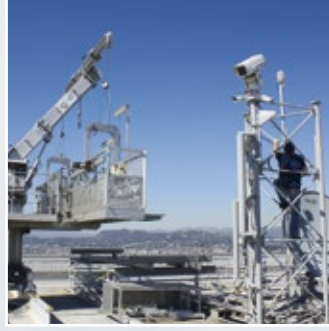| Lufft WS601-UMB Smart Weather Sensor			Order No.
WS601-UMB			**8376.U01**
Technical Data	Dimensions	Ø approx. 164 mm, height approx. 445 mm	
	Weight	Approx. 1.7 kg	
Temperature	Principle	NTC	
	Measuring range	–50 … 60 °C	
	Accuracy	± 0.2 °C (–20 °C … +50 °C), otherwise ± 0.5 °C (>–30 °C)	
Relative humidity	Principle	Capacitive	
	Measuring range	0…100 % RH	
	Accuracy	± 2 % RH	
Precipitation	Resolution	0.2mm	
	Accuracy	±2%	
	Max. intensity	144mm/h	
Precipitation (with reduction ring)	Resolution	0.5mm	
	Accuracy	±2%	
	Max. intensity	360mm/h	
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	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**
	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
- Analoge 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 Familiy

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 protocolls:
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
- Analoge 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. 150 mm, height approx. 343mm	
	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)	
Rel. humidity	Principle	Capacitive	
	Measuring range	0…100 % RH	
	Accuracy	±2% RH	
Precipitation intensity	Resolution	0.1mm/h	
Precipitation quantity	Resolution	0.01mm	
	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 >1.0 m/s	
Wind speed	Principle	Ultrasonic	
	Measuring range	0…90m/s	
	Accuracy	±0.2m/s or ±2% RMS of reading, whichever is greater (0...65m/s) else ±5%	
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**

An ISO 9060 Secondary Standard Pyranometer

CMP10
Integrated

Smart Weather Sensor with integrated Kipp & Zonen CMP10 pyranometer

Lufft WS510-UMB – Solar Radiation, 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:

- **Solar radiation**
- **Wind direction**
- **Wind speed**
- **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.

The world renowned technology of Kipp+Zonen CMP10 is integrated.

Ultrasonic sensor technology is used to take wind measurements.

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

One external temperature or rain sensor is connectable.

Lufft WS510-UMB Smart Weather Sensor			Order No.
WS510-UMB			**8375.U13**
WS310-UMB without wind sensor			**8374.U13**
Technical data	Dimensions	Ø approx. 150 mm, height 392mm	
	Weight	Approx. 1.5 kg	
Temperature	Principle	NTC	
	Measuring range	–40…80 °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	Spectral range	285 to 2,800 nm	
	Measuring range	4000 W/m²	
	Response time	< 5 s	
	Zero offset A	< 7 W/m²	
	Zero offset B	< 2 W/m²	
	Directional error (at 1000 W/m²)	< 0,2%	
	Temperature dependence of sensitivity	< 1% (-10 ºC...40 ºC)	
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…90m/s	
	Accuracy	±0.2 m/s or ± 2% RMS of reading, whichever is greater (0...65m/s) else ±5%	
General information	Heating	20 VA at 24 VDC	
	Protection type housing	IP66	
	Interface	RS485, 2-wire, half-duplex	
	Operating power consumption	12-24 VDC ± 10%	
	Operating humidity range	0…100 %	
	Operating temperature range	-50…60 °C	
Accessories	see WS family members		

WS310 Technical Data as WS510 without wind sensor

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Lufft WS504-UMB – Tiltable 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 protocolls:
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 377mm	
	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/m²	
	Accuracy	5%	
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…90m/s	
	Accuracy	±0.2 m/s or ± 2% RMS of reading, whichever is greater (0...65m/s) else ±5%	
General Information	Heating	20VA at 24VDC	
	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.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
- Analoge outputs in combination with 8160.UDAC
Third-Party-Rain gauge sensors are compatible: 0.1mm, 0.2mm, 0.5mm, 1mm heated and un-heated.

Lufft WS503-UMB – Tiltable 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 protocolls:
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 392 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…+40°C)	
	Tilt error (at 1000 W/m²)	< 1%	
	Spectral range	300 to 2,800 nm	
	Measuring range	1400 W/m²	
	Altitude	0…60°	
	Azimuth	-10° … +10°	
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…90m/s	
	Accuracy	±0.2 m/s or ± 2% RMS of reading, whichever is greater (0...65m/s) else ±5%	
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.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**

KIPP & ZONEN
SINCE 1830

Tiltable Pyranometer

Ultrasonic wind sensor

Aspirated temperature/humidity measurement

Open communication protocol:
- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS
- Analoge outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1mm, 0.2mm, 0.5mm, 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 protocolls:
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 317mm	
	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	
Radiation	Response time (95%)	<1s	
	Spectral range	300 to 1100nm	
	Measuring range	1400W/m²	
	Accuracy	5%	
Air pressure	Principle	MEMS capacitive	
	Measuring range	300…1200hPa	
	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…90m/s	
	Accuracy	±0.2 m/s or ± 2% RMS of reading, whichever is greater (0...65m/s) else ±5%	
General Information	Heating	20VA at 24VDC	
	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.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
- Analoge outputs in combination with 8160.UDAC

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

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 protocolls:
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… +40 °C)	
	Tilt error (at 1000 W/m²)	< 1%	
	Spectral range	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…90m/s	
	Accuracy	±0.2 m/s or ± 2% RMS of reading, whichever is greater (0...65m/s) else ±5%	
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 %	
	Operating 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**
	Rain Sensor WTB100		**8353.10**

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All in One

Aspirated temperature/humidity measurement

Open communication protocol:
- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS
- Analoge outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1mm, 0.2mm, 0.5mm, 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 protocolls:
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. 87mm	
	Weight	Approx. 1.2 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)	
Wind direction	Principle	Ultrasonic	
	Measuring range	0…359.9°	
	Accuracy	< 3° RMSE >1.0 m/s	
Wind speed	Principle	Ultrasonic	
	Measuring range	0…90 m/s	
	Accuracy	±0.2 m/s or ± 2% RMS of reading, whichever is greater (0...65m/s) else ±5%	
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 cablel, 20m		8370.UKAB20

Ultrasonic wind sensor

Aspirated temperature/humidity measurement

Open communication protocol:
- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS
- Analoge outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1mm, 0.2mm, 0.5mm, 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 protocolls:
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. 150 mm, height approx. 380 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	
Precipitation	Resolution	0.2 mm	
	Accuracy	±2%	
	Max. intensity	144mm/h	
Precipitation(with reduction ring)	Resolution	0.5mm	
	Accuracy	±2 %	
	Max. intensity	360mm/h	
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 24 V/4 A		**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
- Analoge 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 protocolls:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS

One external temperature sensor is connectable.

Aspirated temperature/humidity measurement

Maintenance-free operation

Open communication protocol:
- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS
- Analoge outputs in combination with 8160.UDAC

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. 150 mm, height approx. 280 mm	
	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 intensity	Resolution	0.1 mm/h	
Precipitation quantity	Resolution	0.01 mm	
	Measuring range	Measuring range drop size 0.3…5 mm	
	Reproducibility	typ. > 90 %	
Precipitation type	Rain/snow		
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	
	Op. power consumption	4...32VDC	
	Operating humidity range	0…100 %	
	Op. temperature range	–50…60°C	
Accessories	Surge protection		**8379.USP**
	Power supply 24 V/4 A		**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 WS304-UMB – Tiltable 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 protocolls:
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 377mm	
	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/m²	
	Accuracy	5%	
Air pressure	Principle	MEMS capacitive	
	Measuring range	300…1200 hPa	
	Accuracy	±0.5hPa (0…+40°C)	
General Information	Heating	20VA at 24VDC	
	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.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
- Analoge outputs in combination with
  8160.UDAC
Third-Party-Rain gauge sensors are compatible:
0.1mm, 0.2mm, 0.5mm, 1mm heated and unheated.

Lufft WS303-UMB – Tiltable 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 protocolls:
UMB-Binary, UMB-ASCII, SDI-12, MODBUS.

One external temperature or rain sensor is connectable.

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Lufft WS303-UMB Smart Weather Sensor			Order No.
WS303-UMB			**8374.U11**
Technical Data	Dimensions	Ø approx. 150 mm, height 392 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)	< 20 W/m²	
	Temperature dependence of sensitivity	< 5% (−10…+40 °C)	
	Tilt error (at 1000 W/m²)	< 1%	
	Spectral range	300 to 2,800 nm	
	Measuring range	1400 W/m²	
	Altitude	0…60°	
	Azimuth	-10° … +10°	
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 %	
	Operating 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

Tiltable Pyranometer

Ultrasonic wind sensor

Aspirated temperature/humidity measurement

Open communication protocol:
- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS
- Analoge outputs in combination with 8160.UDAC

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

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 protocolls:
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%)	<1s	
	Spectral range	300 to 1100 nm	
	Measuring range	1400 W/ m²	
	Accuracy	5%	
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 24 V/4 A		**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
- Analoge outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1mm, 0.2mm, 0.5mm, 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 protocolls:
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. 150 mm, height 268 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%)	< 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 dependent of sensitivity	< 5% (–10 bis +40°C)	
	Tilt error (at 1000 W/m²)	< 1%	
	Spectral range	300 to 2,800 nm	
	Measuring range	1400 W/m²	
Air pressure	Principle	MEMS Capacitive	
	Measuring range	300…1200 hPa	
	Accuracy	±0.5hPa (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 24 V/4 A		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

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Aspirated temperature/humidity measurement

Open communication protocol:
- UMB-ASCII
- UMB-Binary
- SDI-12
- MODBUS
- Analoge outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1mm, 0.2mm, 0.5mm, 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 protocolls: 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 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 24 V/4 A		**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
- Analoge outputs in combination with 8160.UDAC

Third-Party-Rain gauge sensors are compatible: 0.1mm, 0.2mm, 0.5mm, 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 protocolls:
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. 150 mm, height approx. 194mm	
	Weight	Approx. 0.8 kg	
Wind direction	Principle	Ultrasonic	
	Measuring range	0…359.9°	
	Accuracy	< 3° RMSE >1.0 m/s	
Wind speed	Principle	Ultrasonic	
	Measuring range	0…90m/s	
	Accuracy	±0.2m/s or ±2% RMS of reading, whichever is greater (0...65m/s) else ±5%	
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
- Analoge outputs in combination with 8160.UDAC
Third-Party-Rain gauge sensors are compatible: 0.1mm, 0.2mm, 0.5mm, 1mm heated and unheated.

Calibration Certificate for all UMB-Sensors

Inspection certificate
DIN EN 10204/3.1

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

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 cm²	
	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 cm²	
	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 cm²	
	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.

Safety tested
Production monitored
(S)
TÜV
SÜD
C   NRTL   US

Lufft VENTUS-UMB– Ultrasonic Wind Sensor
Metal Housing, 240 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 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 … 20 mA, 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. 150 mm, height approx. 170 mm	
	Weight	Approx. 1.62 kg	
Wind direction	Principle	Ultrasonic	
	Measuring range	0…359.9°	
	Resolution	0.1°	
	Accuracy	<2° RMSE >1.0 m/s	
	Start-up threshold	0.1 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…90 m/s	
	Resolution	0.1 m/s	
	Accuracy	± 0.2 m/s or ± 2% RMS of reading, whichever is greater (0...65 m/s) else ± 5%	
	Start-up threshold	0.1 m/s	
	Measuring rate	60 partial measurements/ 15 measurements per second	
	Measurement output rate	1-10 seconds adjustable – default 10 s	
	Unit	m/s; km/h; mph; kts	
Virtual temperature	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)	
	Measuring rate	60 partial measurements/ 15 measurements per second	
	Measurement output rate	1-10 seconds adjustable – default 10 s	
Air pressure	Principle	MEMS Capacitive	
	Measuring range	300…1200 hPa	
	Accuracy	± 1.5 hPa	
Data output digital	Interface	RS485 semi-/full duplex, isolated	
	Baudrate	1200 - 57600	
	Meas. rate instant. value	1-10 s	
	Measuring rate Avg (arithmetic, vector)	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) -20…60°C (without heating)	
	Bus operation	Up to 32 devices	
	Operating voltage electronics	12-24VDC / 1,2VA, without heating	
	with heating	24VDC / 240VA (140VA + 100VA)	
	Connection	8-pole plug	
	Housing material	Aluminum, seawater-proof	
	Protection	IP68	
	Pole diameter	50 mm/2"	
	Factory certificate	yes	
Accessories	Surge protection		**8379.USP-V**
	Power supply 24 V/10 A		**8366.USV2**
	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**

Maintenance-free
Measuring

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…20mA, 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. 150mm, height approx. 170mm	
	Weight	Approx. 0.8kg	
Wind direction	Principle	Ultrasonic	
	Measuring range	0…359.9°	
	Resolution	0.1° (standard)	
	Accuracy	< 3° RMSE >1.0m/s	
	Start-up Threshold	0.3m/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…90m/s	
	Resolution	0.1m/s	
	Accuracy	± 0.2 m/s or ± 2% RMS of reading, whichever is greater (0...65m/s) else ±5%	
	Start-up threshold	0.3m/s	
	Measuring rate	60 partial measurements/ 15 measurements per second	
	Measurement output rate	1-10 seconds adjustable – default 10s	
	Unit	m/s; km/h; mph; kts	
Virtual temperature	Principle	Ultrasonic	
	Measuring range	−50°C…+70°C	
	Resolution	0.1°K	
	Accuracy	± 2.0K (without heater and without sun exposure or wind >4ms)	
	Measuring rate	60 partial measurements/ 15 measurements per second	
	Measurement output rate	1-10 seconds adjustable – default 10s	
Air pressure	Principle	MEMS Capacitive	
	Measuring range	300…1200 hPa	
	Accuracy	± 0.5h Pa (0...+40°C)	
Data output digital	Interface	RS485 semi-/full duplex, isolated	
	Baudrate	1200 - 57600	
	Meas. rate instant. value	1-10s	
	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)	
	Bus operation	Up to 32 devices	
	Operating voltage electronics	24 VDC ± 10% or 24 VDC/1,2 VA without heating: 12 VDC	
	with heating	24VDC, max. 20 VA	
	Connection	8-pole plug	
	Housing material	Plastic	
	Protection	IP66	
	Pole diameter	50mm/2"	
	Factory certificate	yes	
Accessories	Surge protection		**8379.USP-V**
	Power supply 24 V/4 A		**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**

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.

1500m

1300m

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 lifetime
- 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)	500mm x 500mm x 1550mm	
	Weight	70kg (130kg incl. packaging)	
Operating conditions	Temperature	-40°C...55°C	
	Relative humidity	0%...100%	
	Wind	55ms^{-1}	
Measuring parameters	Measuring principle	Optical (LIDAR)	
	Measuring range (CBH)[1]	5m ... 15,000m (16ft ... 50,000ft)	
	Accuracy[2]	± 5m (± 16ft)	
	Range resolution	5m (16ft)	
	Sampling rate	100MHz	
	NetCDF raw data resolution	15m (full range, compact file sizes) 5m (5m to 150m range)	
	Time to measure	2s ... 600s (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 1064nm	
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: 230VAC, ± 10% Optional: 110VAC, ± 10%	
	Power consumption	250W (Standard) 800W (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	

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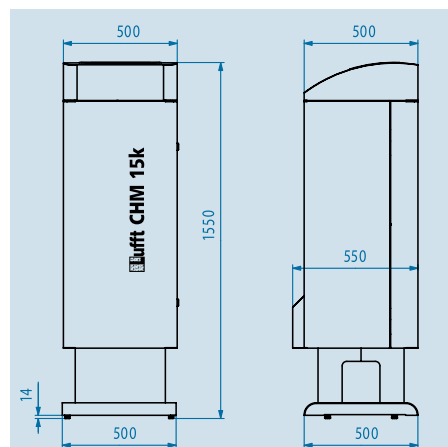
Benefits

- Great measuring range up to 15km (50,000ft)
- 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

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, 10m cable			8365.10
With RS232 and ext. heat off, 10m cable			8365.11
With RS422, 10m cable			8365.20
With RS422, 5m cable			8365.50
Technical data	Dimensions (LxBxH)	302mm × 130mm × 234mm	
	Weight	Approx. 3.3kg	
Operating parameters	Temperature range	-40°C ... +50°C	
	Relative humidity	0% ... 100%	
	Heating activity	< 0 °C (programmable)	
Measuring parameter	Snow depth	0 ... 10m	
	Distance to hard targets [1,2]	0.1 ... 30m	
	Precision / reproducibility [2]	≤ 0.5mm	
	Measuring accuracy [2,3,4]	± 1mm	
	Measuring accuracy snow [4]	± 5mm	
	Programmable measuring interval	1s ... 600s	
	Time to measure	≤ 10s	
Interfaces	Data interfaces	RS232, analog output	
	Interface modes RS 232 analog	2,4 ... 38,4 kBaud, format 8N1 3mA und 4 ... 20mA	
	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 80mm Ø		8365.608-11X
	Mounting clamp, steel, up to 300mm Ø		8365.609-11
	Mounting clamp, steel, up to 72mm 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
[2] on natural diffuse reflecting surfaces
[3] offset corrected sensor
[4] 95% statistical spread
[5] heating cycle 0 ... -30 °C, at 24 VDC
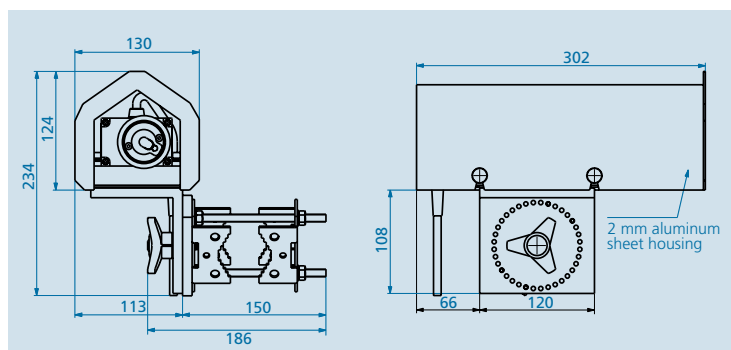
Added
Value

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, height 8mm	
	Weight (incl. cable)	Approx. 300g	
	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, e. g. 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. 150g	
	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.

Your Gateway of Measurement Technology

Lufft I-BOX

Software modules:
ready-made or custom-built for you

App-Store

As of now, recording and processing measurement data is an absolute pleasure – and at an unbeatable price – with the new I-Box from Lufft, the gateway for environmental measurements.

The Lufft I-BOX Hardware

Lufft I-BOX			Bestell-Nr.
Lufft I-BOX			**8200.00**
Technical data	Dimensions (LxWxD)	105 mm x 75 mm x 22mm	
	Weight	Approx. 140g	
	Housing	Small plastic housing, integrated DIN rail mounting fixture	
	Network	10/100BaseT, autosensing, autocrossing	
	Connections	1 x network (RJ45) Screw terminals for power supply (alternative to PoE)	
	LEDs / push buttons	System status via multi-color LED Current network speed and data transfer, manual device reset	
	Power supply Power consumption	Power-over-Ethernet (PoE) | 24 ... 48V DC (+ / -10%) using screw terminals, 60mA @ 24V / 40mA @ 48V	
Temperature	Installed side-by-side: 0 ... 65°C, installed separately: 0 ... 70°C		
Humidity	0 ... 90% relative humidity, non-condensing		
Accessories	Plug-in power supply unit 8120.NT24		**8120.NT24**
	Power supply for DIN rail		**8160.11084**

We recomment heated cabinet at extremely minus temperatures.

With the Lufft I-Box, measuring instruments are easily integrated into corporate networks and business processes. The plug-and-play system provides standardized access to live data from a variety of measuring instruments. This means that all data can be easily stored, displayed, monitored and integrated in customer systems.
In addition, the Lufft I-BOX includes an application for controlling alarms out of the box. The applications can be upgraded as required to suit individual needs. The Lufft I-BOX -the interface for environmental use.

- Easy commissioning
- Configuration and remote maintenance via browser interface
- User access protection
- Alarms by email
- Detailed help function
- Applications upgradeable as required
- 2 year warranty
- Increased interference immunity for the industrial environment
- Prepared for rail mounting
- Power consumption < 2.0 W
- Transmission of measured values to the corporate network

System Capabilities:
- Time Synchronisation
- Email-Alerts
- Datalogger Function

Data access & Integration:
- Smartview / Smartgraph
- Json-, CSV-, Excel-Download
- Data Display (Web-Browser)
- Monitoring Display
- Cloud-Access
- Smartphone / Mobile App Support

Lufft Measurment Devices:
- Lufft WS Smart Weather Sensor
- Lufft MARWIS Mobile Weather Sensor
- lufft OPUS20 datalogger
- Lufft IRS Road Sensor

More Information
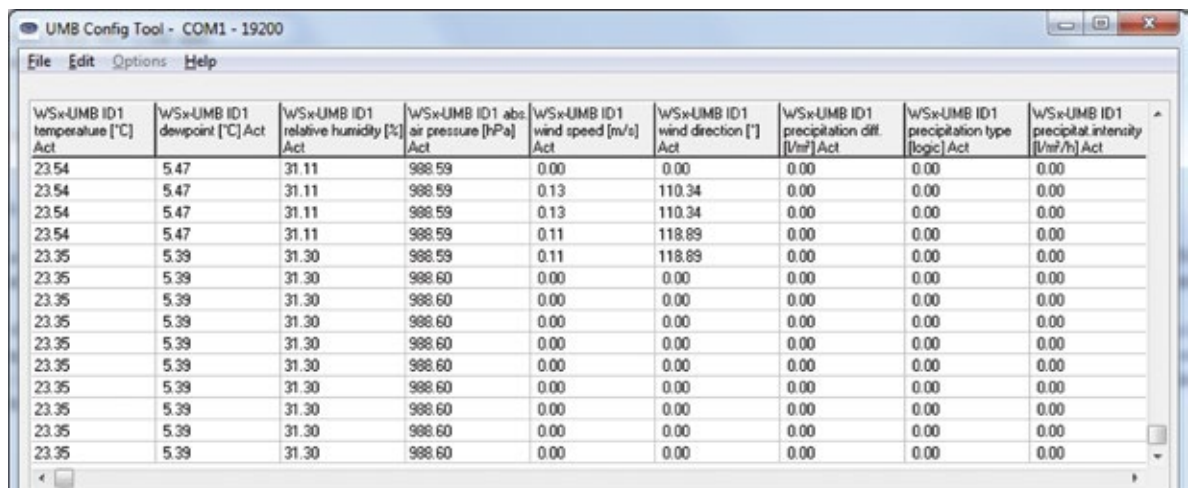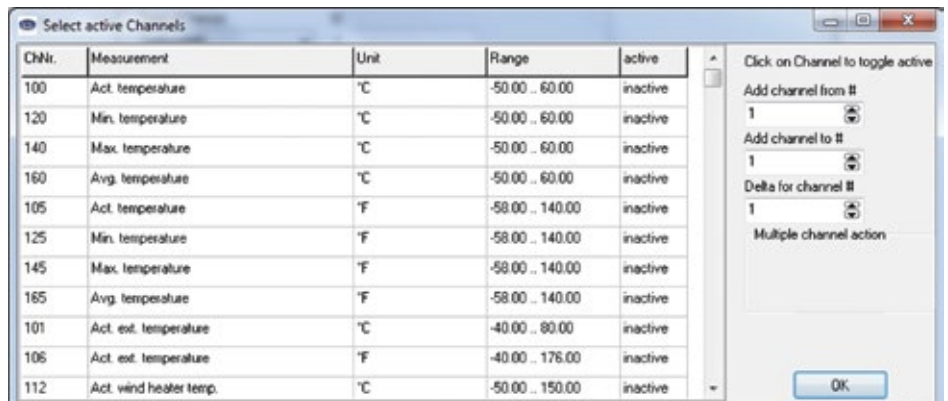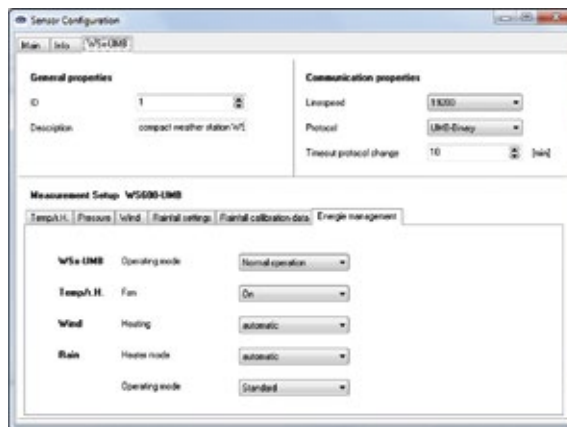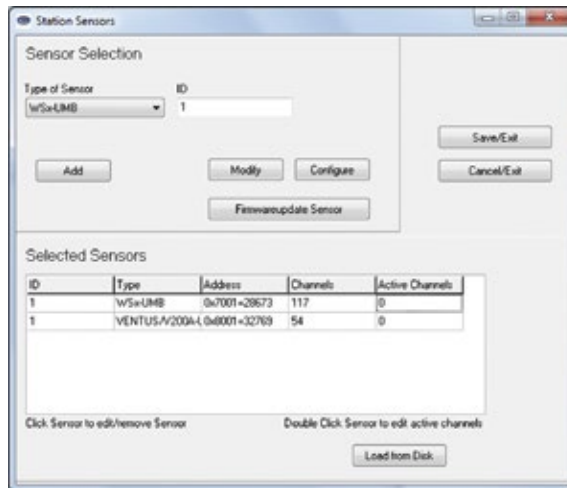**Lufft I-BOX**
www.lufft-i-box.com

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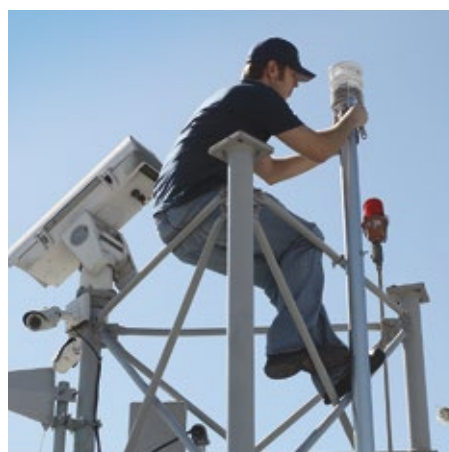
Choosing the data channels needed for your purpose. As well as raw data, these could include calculated values such as the dew point. The data can be shown in either metric or US customary units.

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 configation of your intelligent measuring device.

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