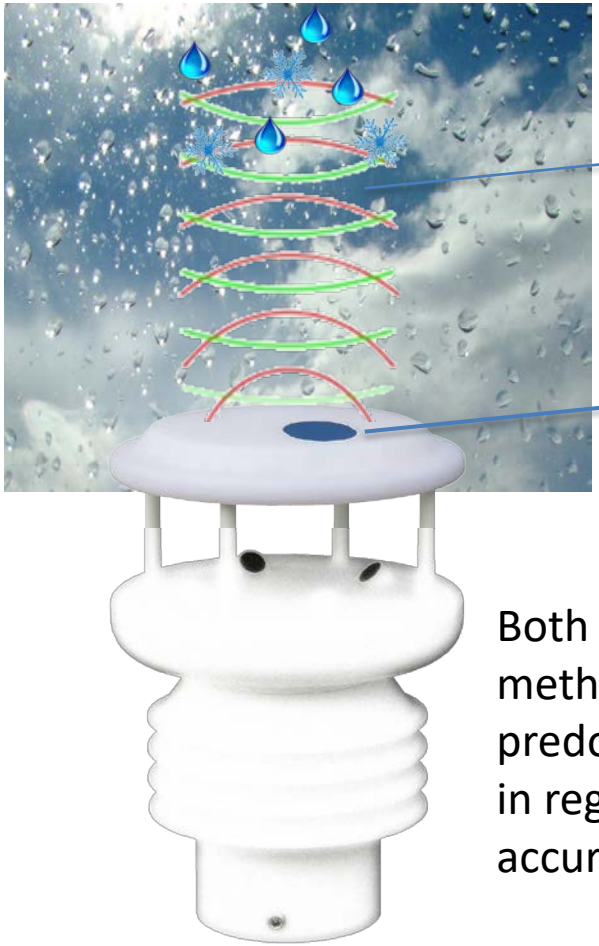
# THIES CLIMA ASSURES INNOVATION

and quality in environmental sensors.

T H E  W O R L D  O F  W E A T H E R  D A T A


# CLIMA SENSOR ULTRASONIC

# PRECIPITATION



Doppler Radar for determination of intensity, amount and type of precipitation

Heated Ceramic Precipitation detector for precise and timely recognition of precipitation events

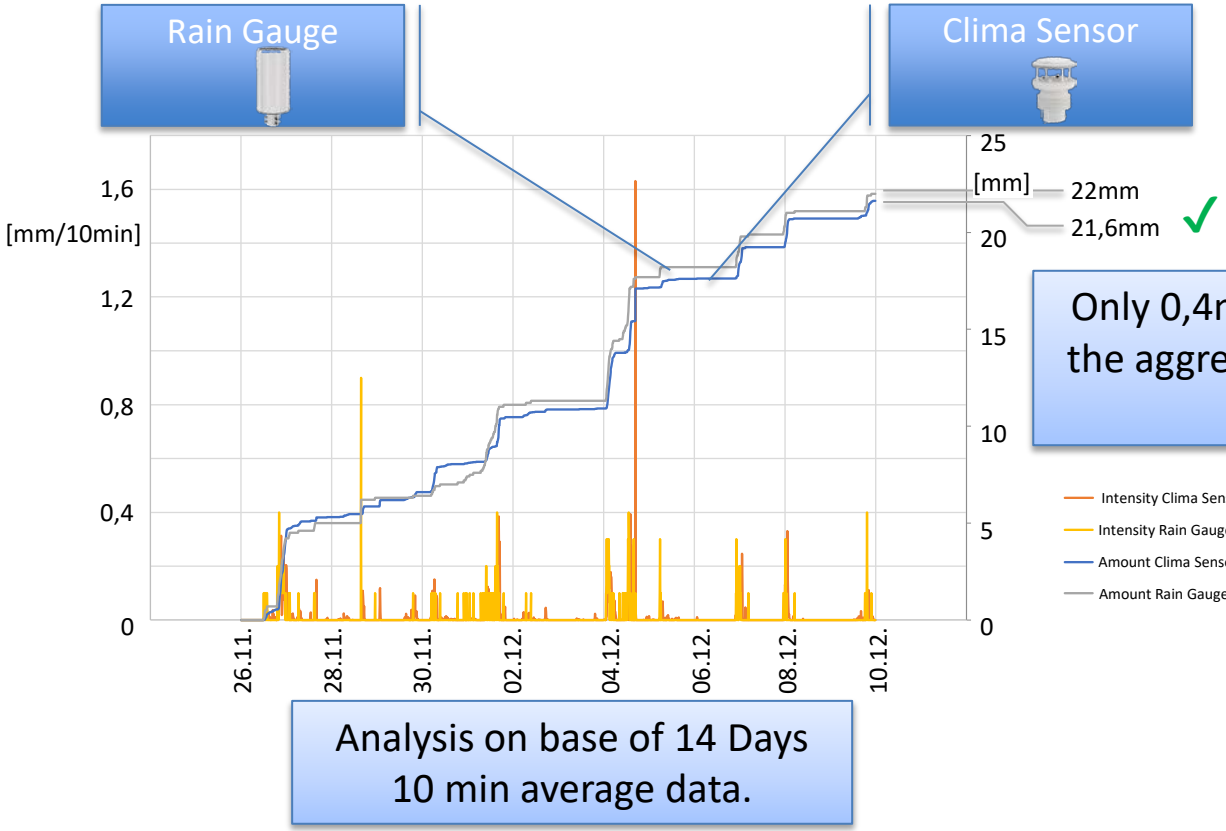
Both precipitation measuring methods in parallel ensure predominant results in regards of plausibility, accuracy and reliability.

| Measuring ranges: | |
|---|---|
| Intensities | 0.001 … 999mm/h |
| Resolution intensity | 0.001mm/h |
| Daily total | 0.01 … 999mm |
| Resolution daily total | 0.01mm |
| Droplet size | 0.25 … 5.0mm, large as hail. |
| Type of precipitation | Rain, snow, sleet, ice crystals, hail. |

# PRECIPITATION AMOUNT
## MEASURING SAMPLE


Measuring of amount and intensity at 2 sites with similar weather conditions

# PRECIPITATION AMOUNT
## COMPARISON RESULT




Only 0,4mm discrepancy for the aggregated amount over 14 days

Analysis on base of 14 Days
10 min average data.

# RADIATION

Global Radiation by aggregating all 4 directions

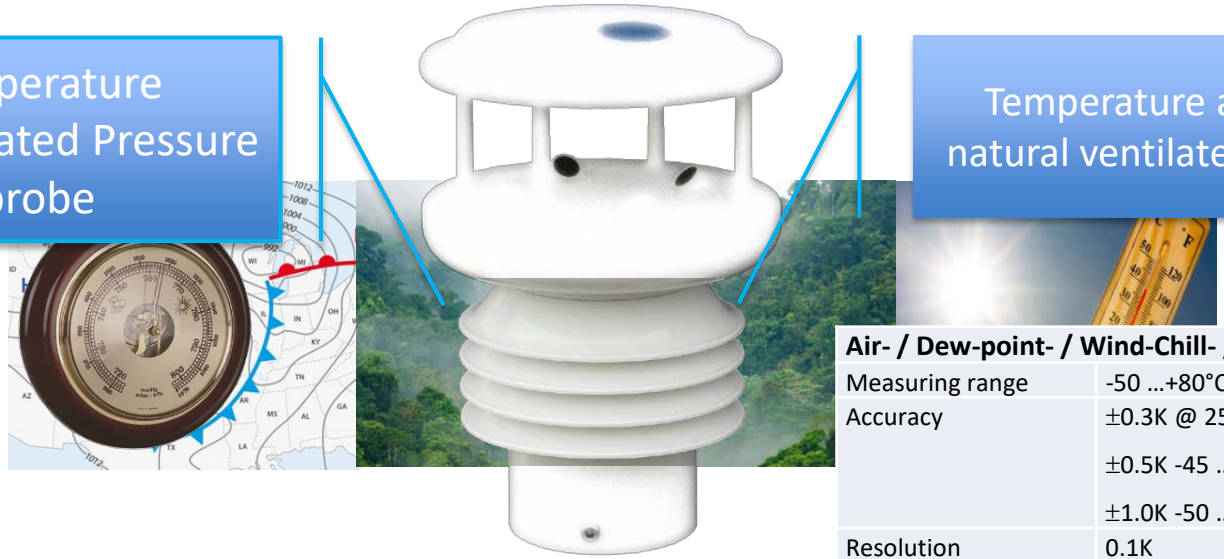
Brightness/Twilight
4 Brightness sensors to determine the brightness at each hemisphere and for twilight observation

| **Global Radiation** | |
|---|---|
| Measuring range | 0 … 2000 W/m² |
| Accuracy | Typ. ± 30 W/m² compared to a Class B pyranometer |
| Resolution | 1 W/m² |

| **Brightness** | |
|---|---|
| Measuring range | 1lux …150klux. |
| Accuracy | 3% of relative measured value. |
| Resolution | Approx. 0.3% of measuring value. |
| **Brightness direction** | |
| Measuring range | 0 … 360°, 0° ≙ Brightness <10kLux |
| Accuracy | Typically <2° in direct sunlight without clouds |
| **Twilight** | |
| Measuring range: | 0 … 250 LUX |
| Accuracy: | 3% of relative measured value. |
| Resolution: | Approx. 0.3% of measuring value. |

# TEMPERATURE, HUMIDITY, PRESSURE

Temperature compensated Pressure probe



Temperature and Humidity in natural ventilated radiation shield

| **Air pressure** | |
|---|---|
| Measuring range | 260 … 1260hPa |
| Accuracy | typ. ± 0,25hPa @ -20 … +80°C @ 800…1100hPa |
| | typ. ± 0,50hPa @ -20 … +80°C @ 600…1100hPa |
| | typ. ± 1,00hPa @ -50 … -20°C @ 600…800hPa |
| Resolution | 0,1hPa |
| Long-term stability | typ. ± 0,3hPa pro Jahr |

| **Air- / Dew-point- / Wind-Chill- / Heat-Index-Temperature** | |
|---|---|
| Measuring range | -50 …+80°C |
| Accuracy | ±0.3K @ 25°C<br>±0.5K -45 … +60°C<br>±1.0K -50 … +80°C |
| Resolution | 0.1K |
| Long-term stability | < 0.04K per year. |
| **Air humidity, relative** | |
| Measuring range | 0 …100% relative humidity. |
| Accuracy | ±1.8% of 10 … 90%, ±3.0% of 0 … 100% |
| Long-term stability | <0.5% per year. |
| Resolution | 0.1% |

# WIND & VIRTUAL TEMPERATURE

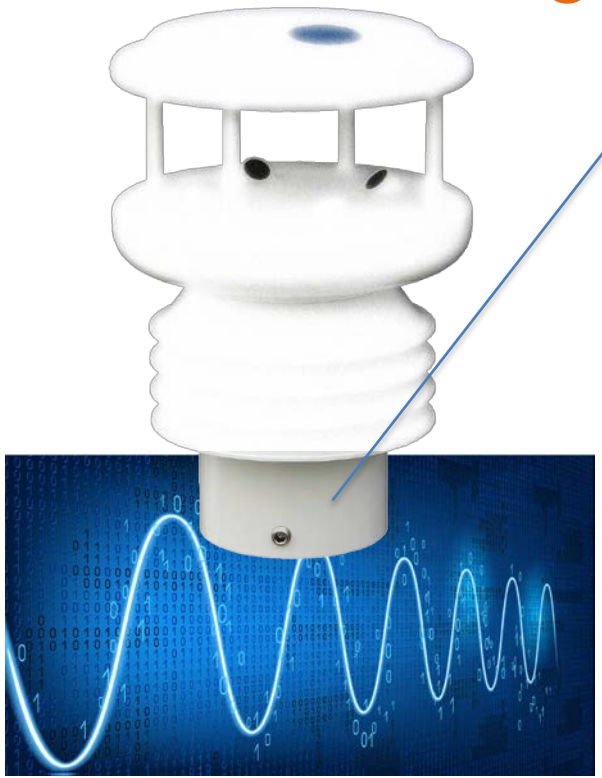
Four way Ultrasonic Measuring principle:
-No wear out
-No maintenance
-No mechanical inertia
But high accurate, fast and reliable.

Technology based on more than 20 years experience in ultrasonic wind measuring.

| **Acoustic virtual temperature** | |
|---|---|
| Measuring range | -50 ... +80°C |
| Accuracy | ±0,5K at absolutely dry air in the range of 20°C. |

| | **Wind velocity** |
|---|---|
| Measuring range | 0.01 ... 60m/s<br>Scaling of analogue output freely selectable. |
| Accuracy | ≤5m/s: ±0.3m/s<br>5 ... 60m/s:±3% |
| Resolution | 0,01m/s or 0.1m/s (Telegram specific) |
| | **Wind direction** |
| Measuring range | 0 ... 360° |
| Accuracy | ±2.0° with WS >2m/s |
| Resolution | 0,01°/1° (Telegram specific) |

# OUTPUT FORMATS

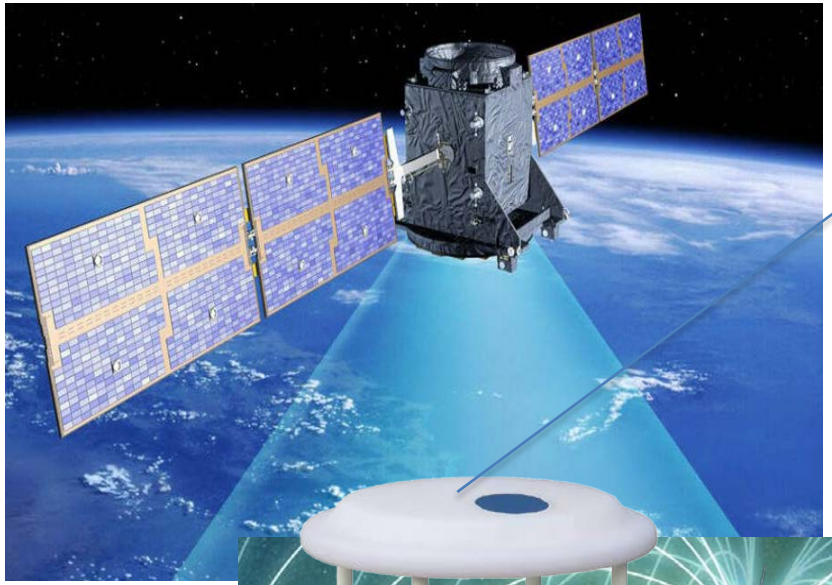


Serial Interface RS485/RS422:
-NMEA V2.0
-7 ASCII predefined Telegrams
- Scientific Telegram
- MODBUS RTU

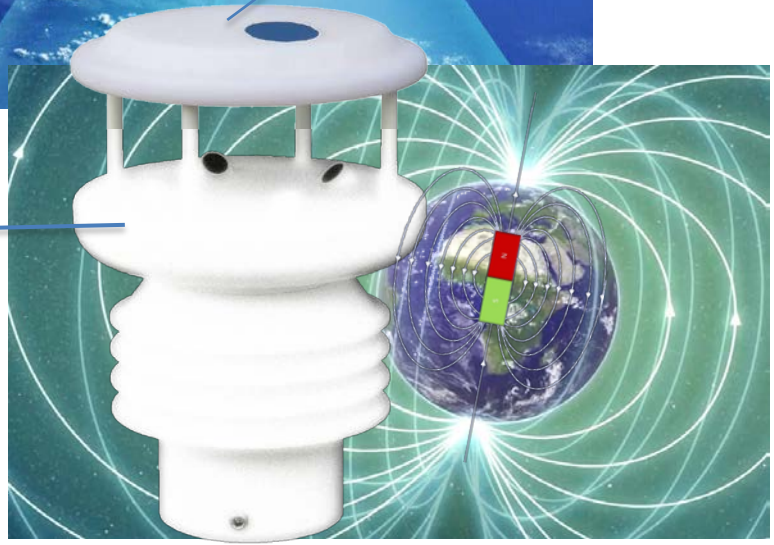
Analogue:
-8 Output channels 0-10V free scalable galvanic isolated

| **Data output digital** | |
|---|---|
| Interface | RS 485 / RS 422 Electrically isolated from supply |
| Baud rate | 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800, 921600 |
| Output | Instantaneous values, sliding means from 100msec to 10 min in steps of 100msec selectable |
| Output rate | One per 20 msec to one per 60 seconds in steps of 1 msec selectable. |
| Protocol | ASCII- Thies-Format and MODBUS RTU |
| Parameter | All available parameters depending on the respective model. |
| **Data output analogue** | |
| Electrical outputs | 8 x 0 ... 10V Electrically isolated from supply. |
| Burden | ≥2000Ω. |
| Output | Instantaneous values, sliding means from 100msec to 2min in steps of 100msec freely selectable. |
| Output rate | Update rate 10msec. |
| Resolution | 16bit |

# SPECIALS



GPS Receiver for:
- Time synchronization
- Altitude
- Location



Magnetic Compass for automatically alignment.

GPS and Compass allows a wide range of capabilities in mobile and stationary applications e.g:
- Sun Position calculation
- Pressure on see height (QNH)
- True-Wind calculation*
- Dynamic north alignment
- Position tracking

*coming soon

# GENERAL SPECIFICATIONS

- High speed wind measuring rate of 125Hz
- 1 Hz measuring rate for other readings
- Bus mode allows 99 addressable devices
- Firmware update via serial interface due to integrated boot loader
- Wide operational range of -50…80°C
- Housing made of high durable, resistant and UV stabilized LEXAN®.

| | |
|---|---|
| Supply without cover heating | 6 ... 40V DC or 10 ... 28V AC 50Hz / 60Hz<br>typ. 50mA @ 24V |
| Supply with cover heating | 24V AC/DC ±15%, 25VA typically @ 24V nominal<br>(applies for 4.9200.x0.xxx, 4.9202.x0.xxx) |
| Type of protection | IP 67 (when mounted correctly, see section "5. Installation"). |

# VARIANTS

| | Wind | Temperature | Humidity | Pressure | Precipitation | Radiation | GPS | CERAMIC |
|---|---|---|---|---|---|---|---|---|
| 4.9200.20.00x | X | X | X | X | X | X | X | X |
| 4.9200.00.00x | X | X | X | X | X | X | X | |
| 4.9202.00.00x | X | X | X | X | | | | |
| 4.9201.00.00x | X | | | | X | X | X | |
| 4.9203.00.00x | X | | | | | | | |

-RS422
-RS485
-MODBUS
-ASCII
-Analogue
-Compass
-Virtual temp.

# CABLES

## Standard connection cables

19 pol plug

| Order No. | Length | Description |
|---|---|---|
| 509311 | 10m | 16 leads for analog signals and serial Modbus/RS485 communication |
| 509427 | 10m | 8 leads for Modbus/RS422/Rs485 communication only |

## Individual assembled connection cables

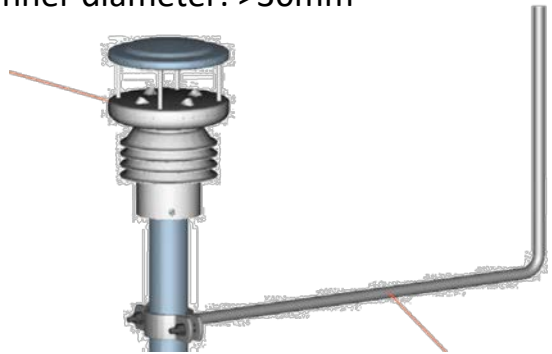
free leads

| Connector* Order No. | Cable Order No. | Assembling Order No. | Description |
|---|---|---|---|
| 212812 | 213063 per meter | 0.9100.00.901 | 16 leads for analog signals and serial Modbus/RS485 communication |
| 212812 | 211224 per meter | 0.9200.20.901 | 8 leads for Modbus/RS422/Rs485 communication only |

* Connector only required if cable ordered without instrument

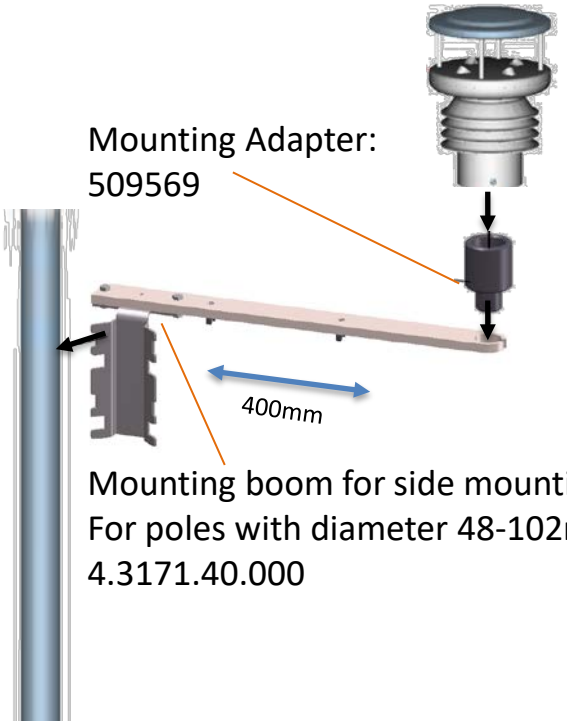
# MOUNTING ACCESSORIES

Direct on top at a pole
Outer diameter: 48-49mm
Inner diameter: >30mm



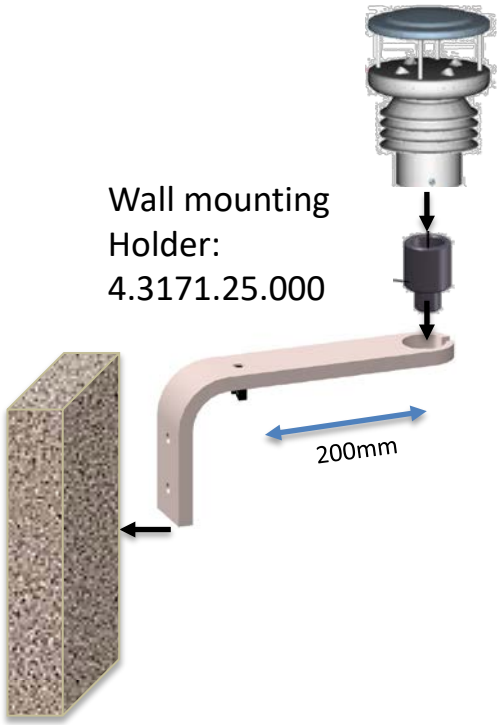
Lightning rod:
4.3100.99.000

Mounting Adapter:
509569




Mounting boom for side mounting.
For poles with diameter 48-102mm:
4.3171.40.000

Wall mounting
Holder:
4.3171.25.000



# APPLICATION SAMPLE
## AGRICULTURE

Installation and commissioning of agrometeorological stations in Kazakhstan

# APPLICATION SAMPLE
# MOBILE STATION

Mobile environmental monitoring on Cypress.


Mounted on a extendible mast at a fire engine in Germany.

# ROAD WEATHER INFORMATION SYSTEMS (RWIS)

Road Weather Stations


# CLIMA SENSOR ULTRASONIC