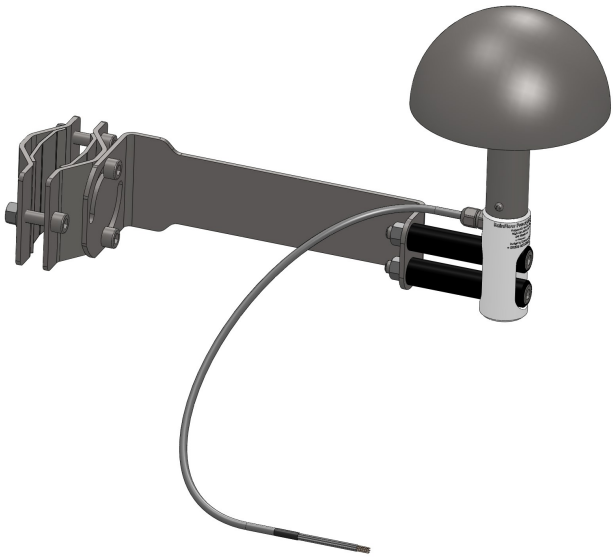
# RHD

## Rain disdrometer and hail detection sensor



The RHD is a low-cost, high precision, ultra-robust rain gauge. It features very low- power consumption, is maintenance- free and has a completely sealed acoustic sensor with no moving parts. The sensing device is a polished stainless steel hemisphere supported by a strong stainless steel arm. It detects changes of the acoustic pressure that are induced by the impact of raindrops or hailstones. The RHD also includes a distrometer that return the drop size distribution.

It features continuous or pulse analog voltage outputs and supports SDI-12 communication, serial RS-232, and Modbus RTU RS485 (using an optional adapter). The full configuration of the sensor can be customized at any time with a Plug-and-Play PC connection or remotely, using serial commands.

## Versions

| Art | Version |
|---|---|
| 21278 | Rain disdrometer and hail detection sensor with mounting kit and 3m signal cable |

## Scope of delivery

| Ref. | Description | Quantity |
|---|---|---|
| RHD | Rain & Hail sensor | 1 |
| - | Mounting arm | 1 |
| UDONG | USB dongle | 1 |

## Accessories

| Art | Accessory |
|---|---|
| 21423 | Signal converter 0-10 VDC to 4-20 mA |
| 21431 | RS-232-ModbusRTU adapter |
| - | Extension cable in custom length per meter |

# Specifications

## Measurement characteristics

| | |
|---|---|
| Measuring surface | 160 mm outer diameter hemisphere (402 $cm^2$) |
| Precipitation detected by the sensor | Liquid (undifferentiated): rain, drizzle/rain, mixed rain/snow, sleet.<br>Solid: hail. |
| Rain Intensity accuracy | ± 15% at 100% duty-cycle (most global precision and accuracy criteria) |
| Rain DSD | 27 classes from ≤ 0.75 mm to ≥ 7.0mm with a detection threshold (minimum detectable diameter) of about 0.5 mm |
| Measurement accuracy (liquid only) | A spatially distributed flux of controlled drops of a nominal diameter equal to the centre diameter of the class ± 20% produces an output centred in the corresponding class with typically ± 50% of the flux concentrated into the two lateral size-classes. |
| Hail detection* | Counting of the number of hailstone impacts up to 5 impacts per second and for hailstone diameter detection threshold of 0.5 cm. |
| Particle velocity | Not measured. |

*Note: For more specific hail detection, use the HDI hail disdrometer, variant of the RHD specialized for hail detection.

## Voltage ranges and measurement scales

| | |
|---|---|
| Voltage outputs | Continuous analogue voltage or pulse analog voltage, user selectable +0 to +2.5V or +0 to +5V are available. Pulse threshold, integrator timeout and duration are also user selectable. The continuous analog voltage persists on the outputs so that output voltages can be read at any time. |
| Rain intensity scaling | Sensitivity @voltage range +2.5V: [10 mV/(mm/h)] i.e. +2.5V corresponds to 250 mm/h |
| | Sensitivity @voltage range +5V: [20 mV/(mm/h)] i.e. +5V corresponds to 250 mm/h |
| Hail | Sensitivity @voltage range +2.5V or +5V: 5 hit/s |

## Power supply

| Supply | Ratings |
|---|---|
| Voltage | 6 V to 30 V DC (9.6 V and 16 V DC in case of powering through the SDI-12 terminals) |
| Current | < 1 mA in stand-by mode and 20 mA max in acquisition mode.<br>For a typical nominal duty-cycle of 10%: 2.1 mA (20 mA for duty-cycle of 100%). |

Interfaces

| Mode | Description |
|---|---|
| Analog | Pulse and continuous (and persistent) voltages, 0-2.5V or 0-5V |
| SDI-12 | Yes, V1.3 (distrometer output via extended SDI-12 commands) |
| RS-232 | Yes |
| Modbus RTU (RS485) | Yes (Note: requires the Modbus adapter accessory) |

Physical properties

| | |
|---|---|
| Material | Stainless steel and aluminium Ematal anodized (breakdown voltage > 40 V/µm) |
| Weight | 1.4 kg (without mounting kit) |
| Dimension (H x W x D) | 260 mm x 430 mm x 160 mm (with mounting kit) |
| Installation | Universal mounting kit provided |

Environmental conditions

| | |
|---|---|
| Temperature range | -40°C to +80°C |
| Relative humidity | 0 to 100% |
| Protection | IP67, survive to 1 m temporary immersion in salt water |
| Standards | EN 61326-1: 2013, CE compliant<br>2014/30/EU, CE compliant |