

Vaisala All Weather Precipitation Gauge VRG101



Vaisala All Weather Precipitation Gauge VRG101 features technical innovations that provide higher quality of measurement combined with lower life-cycle costs in all weather conditions. Added with advanced mechanical design the VRG101 performance remains unaffected in the most adverse weather conditions known to be problematic for conventional rain gauges.

Accuracy in all weather

The VRG101 measurement principle is based upon the latest high-accuracy, temperature-compensated load cell technology. The single point type load cell is designed for direct mounting of the weighing platform. Eliminating levers and flexures, this allows simple, robust and low cost mechanics. The load cell is insensitive to eccentric loading meaning that unsymmetrical distribution of snow in the collecting bucket does not introduce measurement errors. Another error source, the underestimation caused by water and snow sticking on the inner surfaces of the gauge inlet funnel is solved in the VRG101 design using funnel element resting on top of the collector container. Therefore, all water and snow on its surface is included in the measured mass. A larger collection area and extended container volume and geometry enhance performance in light rain and snowfall.

Features and benefits

- Reliable performance in all weather conditions
- Measurement of liquid, mixed and solid precipitation quantity and intensity with high-accuracy load cell technology
- Simple, robust and geometrically optimized mechanical design
- Enhanced performance, easy maintenance and extended service intervals for automatic precipitation monitoring
- Advanced measurement and heating control algorithms to ensure higher performance and low power consumption
- Equipped with configurable serial and pulse output data interface

Ease of maintenance

In the design special emphasis has been put on easy maintenance and extended service intervals. The hinged upper part and detachable enclosure door allow smooth access for maintenance or adding antifreeze agents, as well as easy removal of the collector container. The electronics unit, including the load cell is field-removable. Data loss is kept to a minimum, as there is no need to transport the whole gauge to the laboratory for a calibration. If needed, a field check can be done using calibration weights. A wide selection of optional features enhance performance and extends service intervals even more.

Algorithms and output options

The gauge software uses advanced algorithms to filter out noise, spurious signals (caused by i.e. vibration, wind, mechanical impacts or objects entering the collecting container), and to compensate evaporation. In addition to cumulative rainfall the gauge outputs also precipitation intensity, temperature, source voltage, gauge status and warning flags. Complete raw data (weight of the container) is also available e.g. for research purposes. The outputs include configurable RS-232 and RS-485 serial lines and a pulse output used for emulating a tipping bucket.

Technical data

General

| | |
|------------------------------|---|
| Gauge type | Weighing precipitation gauge |
| Sensor element | Single point load cell |
| Precipitation types measured | Liquid, solid and mixed |
| Collecting area | 400 cm ² |
| Capacity | 650 mm |
| Parameters measured | Cumulative precipitation (mm) Precipitation intensity (mm/h) Temperature (°C), optional |

Interface

SERIAL I/O

RS-232 and RS-485 serial lines for gauge output and configuration.

| | |
|-----------------|---|
| Output modes | Polled or automatic message (min. 1 minute interval) |
| Output messages | Data and status message |

Data message parameters

| |
|--------------------------------|
| Gauge status |
| Cumulative precipitation, mm |
| Precipitation intensity, mm/h |
| Air temperature, °C (optional) |
| Container massa, g |
| Electronics temperature, °C |
| Supply power, V |

PULSE OUTPUT

| |
|--|
| Tipping bucket emulation. |
| Tip size software configurable, default 0.1 mm. |

TEMPERATURE SENSOR

Pt100 interface

Performance

CUMULATIVE PRECIPITATION

| | |
|------------|--|
| Resolution | 0.1 mm |
| Accuracy | 0.2 mm precipitation event > 0.5 mm |

PRECIPITATION INTENSITY

| | |
|------------|---|
| Range | 0.5 ... 2000 mm/h |
| Resolution | 0.1mm/h |
| Accuracy | ± 5 % up to 1200 mm/h ± 10 %, 1200 ... 2000 mm/h |

Electrical

| | |
|-------------------|----------------------|
| Supply voltage | + 8 ... 31 VDC |
| Power consumption | < 30 mW (with Pt100) |

Mechanical

| | |
|------------|---|
| Dimensions | Height 950 mm Diameter 400 mm |
| Weight | 20.5 kg |
| Materials | Stainless steel, aluminium, high density polyethylene |

Environmental

| | |
|------------------------|-------------------|
| Temperature, operating | - 40 C ... +60 °C |
| Temperature, storage | - 40 C ... +60 °C |
| Relative humidity | 0 ... 100 % RH |

HEATING OPTION

| | |
|----------------------|--|
| Heating method | Rim heating |
| Heating control | Smart control algorithm to minimize evaporation error and power consumption |
| Heating power | 100 W |
| Heating power supply | 24 VAC/DC, 6A |
| max voltage | 36V |
| max current | 10A |

TEMPERATURE SENSOR INTERFACE

| | |
|-----------------------------------|--------------------|
| Temperature sensor type | Pt100 |
| Range | - 40 ... +60 °C |
| Resolution | ±0.1 °C |
| Measurement accuracy (electrical) | ±0.1 °C |
| Sensor excitation | 1.25 VDC, switched |

ACCESSORIES

| | |
|--|---|
| Rim heating | |
| Pedestal (optionally with screw pole foundation) | |
| Wind shields | Tretyakov wind shield Single Alter wind shield Double Alter wind shield |
| Pulse/Serial Output | Pulse output accessories Serial output accessories |



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