Precipitation Measurement
OTT Pluvio² L –
Universal precipitation gauge
for liquid, solid, and mixed precipitation

OTT Pluvio² L

Precipitation gauge using the balance principle

It does not matter whether it is drizzle or a cloudburst, sleet, hail or snow, the new OTT Pluvio² L reliably and accurately measures both the amount and the intensity of liquid, solid, and mixed precipitation. It works according to the balance principle, taking account of external factors such as temperature and wind that could distort the results. Both digital outputs (impulse/0.1 mm and status) and the serial interface (freely configurable as SDI-12 or RS-485) are available for transferring the data.

High-precision technology and robust design provide high accuracy and complete reliability. Load cell and sensor electronics are reliably protected from damaging environmental influences. Carrier, bucket, and protective housing parts are designed to be particularly robust. All materials used comply with the high-quality standards for outdoor operation and are particularly resistant to the influences of sunlight and temperature. And the best thing is: The OTT Pluvio² L saves valuable time, as it not only provides precise precipitation data, but is also practically maintenance-free.

Meteorology

Setting standards with the OTT Pluvio² L

Ready for anything

When collecting climate data throughout the world, different demands are made regarding the bucket orifice of the rain gauge. In accordance with the standards applicable in the world, we therefore offer the OTT Pluvio² L in two versions.

- OTT Pluvio² L 200,
  Bucket orifice 200 cm²,
  Measuring capacity 1500 mm
- OTT Pluvio² L 400,
  Bucket orifice 400 cm²,
  Measuring capacity 750 mm

Both versions are optionally available with ring heating.

OTT Pluvio² L 200

OTT Pluvio² L 400

The balance measuring process

Below the collecting bucket and well protected from damaging environmental factors, there is a high-precision, hermetically sealed load cell in stainless steel. This measures the total weight on it. The sensor electronics attached use the measured value to continually calculate the increase in precipitation and to derive the temperature-compensated amount and intensity.

An integrated temperature sensor provides the current environmental temperature at the time. The raw data obtained is subjected to a plausibility check by the OTT Pluvio² L. Factors affecting the result, such as wind or temperature, are eliminated by using a mathematical algorithm, thus providing adjusted precipitation data.

Accurate, stable long-term and robust

Developed in conjunction with technologically leading meteorological services, the OTT Pluvio² L fulfills the highest expectations and at the same time stands out with relatively low operating costs. Thus it meets today's requirements even from the economic point of view.

- Fulfills all requirements of WMO manual No. 8
  (WMO = World Meteorological Organisation).
- Precisely records even extreme precipitation events of up to 3,000 mm/h without a time lag – that even exceeds the current WMO requirements (up to 2,000 mm/h).
- Calibration of the load cell and sensor electronics is valid for the life of the unit as the measurement system is hermetically sealed.
- The individual temperature characteristic curve of the measurement system is continually compensated in the firmware during the measurement.
- Measurement accuracy of ±0.1 mm, for the whole life of the unit.

- A cushioning spring system protects the load cell from damage for example from impact during transport or when emptying the bucket.
- The calculation electronics are well protected from environmental influences and achieve the highest EMC.
- Formed parts are made by machine, they are particularly strong, and of high-quality materials.
- The electrical supply and output interfaces are reliably protected against overload.

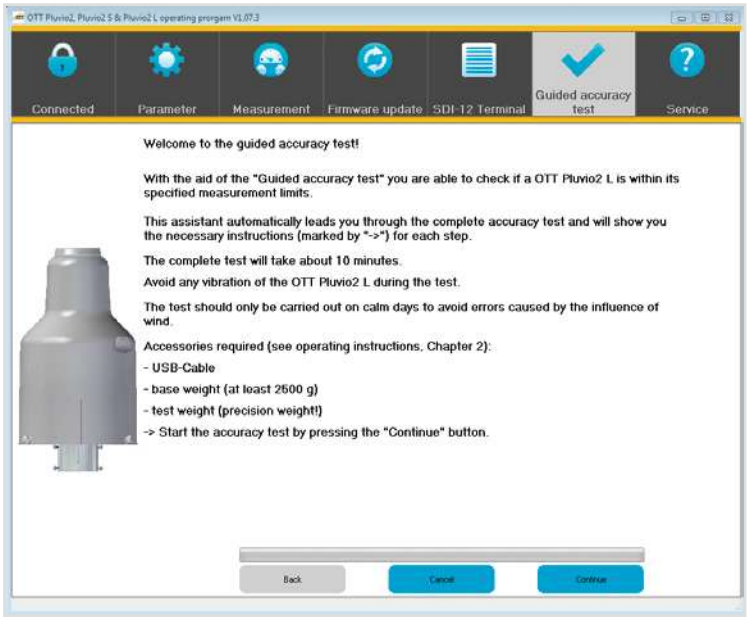
Suitable for any location

Conceived for a precipitation intensity range of 0.05 to 3000 mm/h, the OTT Pluvio² L reliably measures the drizzle of the temperate zones as well as heavy tropical rains and arctic snow showers.

- Bucket orifice without a funnel – heavy and solid precipitation are also recorded with precise timing.
- Continuous precipitation measurement and the highest availability of data – no evaporation losses from heated funnels or buckets so that solid precipitation is measured correctly.
- Anti-freeze increases the measuring volume in the case of heavy snowfall and prevents complete freezing of the bucket – operation without compromise even in areas with high levels of snow and frost.
- Ring heating optionally available – no formation of snow caps.
- Possibility of power supply using solar energy – can also be used at self-sufficient measuring stations.

Virtually maintenance-free

- Total Cost of Ownership lower than when using mechanical tipping bucket rain gauges – with noticeable savings after 2 years already.
- The highest data availability of > 99% – supplies values reliably for continuous precipitation time series without gaps.
- Maintenance work is limited to emptying the collecting bucket, occasional visual checks, and adding anti-freeze as necessary.
- Onerous cleaning work due to blocked funnels or filters are a thing of the past.
- Alarm and warning messages are transferred to the data acquisition system via the output interfaces for automatic error diagnosis – thus, a bucket overflow, for example, can automatically be detected by the status.
- Data output is blocked during maintenance work and accuracy tests.



Operating software included

The OTT Pluvio² L operating software is menu-driven and allows simple functional checks and accuracy tests on location using a notebook computer. You just connect the notebook to the Pluvio² L using the USB interface and then start the software. The power supply is provided via USB.

Reference weights of all kinds can be used for accuracy tests. You simply have to enter the exact weight into the operating software as the reference value.

OTT Pluvio² L – professional precipitation gauge

Wind protection shield OTT PWS

For particularly exposed locations, an optional wind shield is available. This allows even low-intensity precipitation to also be captured in windy weather.

- Wind shield Alter type with 24 lamellas
- Stable and robust – insusceptible to high wind speeds
- Non corrosive stainless steel construction
- No additional foundations necessary
- Installation height 100 cm, 120 cm or 150 cm

Technical data

Recordable precipitation
Liquid, solid, and mixed

Collecting area
- Pluvio² L 200: 200 cm²
- Pluvio² L 400: 400 cm²

Recordable precipitation amount
- Pluvio² L 200: 1500 mm
- Pluvio² L 400: 750 mm

Measurement method
Weighing measurement method

Sensor element
Sealed load cell

Measuring ranges
- Precipitation: 0 … 50 mm/min or 0 … 3000 mm/h
- Cumulative precipitation threshold at 60 min collection time: 0.05 mm/h
- Precipitation intensity threshold: 0.1 mm/min or 6 mm/h

Accuracy
(at –25 … +45 °C)
- Amount: ±0.1 mm or ±1 % of measured value
- Intensity: ±0.1 mm/min, ±6 mm/h or ±1 % of measured value

Resolution
- SDI-12 and RS-485 interface: 0.01 mm, 0.01 mm/min or mm/h
- Impulse output: 0.05/0.1/0.2 mm (remaining amounts in 1/100 mm will be factored in during the collecting time of 60 minutes)

Intensity output interval
1 minute

Query interval
1 minute … 60 minutes

Output delay
- Real-time: < 1 minute
- Non real-time: 5 minutes

Measurement output
Intensity *RT, amount *RT/*NRT, amount *NRT, amount total *NRT, bucket content *RT and *NRT, temperature of load cell

Status output
- Pluvio² L status,
- Heating status (if present)

Interfaces
- SDI-12 V1.3
- RS-485 (2- or 4-wire) SDI-12 protocol and ASCII.txt
- Digital outputs (2/5 Hz): impulse 0.05/0.1/0.2 mm (adjustable) status 0 … 120 impulses/min
- USB 2.0 (for service mode) (no overvoltage protection)

Power supply
5.5 … 28 VDC, typically 12 VDC secured against reverse polarity

Current consumption (without heating)
Typically 9.2 mA at 12 VDC

Power consumption (without heating)
≤ 110 mW

Ring heating, optional
- 12 ... 28 VDC, typ. 12/24 VDC; secured against reverse polarity
- Puvio² L 200: typ. 2.1 A; max. 2.2 A
- Puvio² L 400: typ. 4.2 A; max. 4.4 A

Pluvio² L 200:
- max. 50 W at 24 VDC
- max. 12.5 W at 12 VDC; temperature control range 12 K (wind 0 m/s)

Pluvio² L 400:
- max. 100 W at 24 VDC
- max. 25 W at 12 VDC temperature control range 7 K (wind 0 m/s)

Modes of operation of orifice rim heater
Heater control system:
- Disabled
- Continuously enabled
- Continuously enabled within a specified temperature range
- US NWS standard, time-controlled
- Enabled in case of precipitation (adjustable after-run time)

Dimensions
- Pluvio² L 200 (Ø x h): 450 mm x 752 mm
- Pluvio² L 400 (Ø x h): 450 mm x 677 mm
- Pedestal (Ø): 4"

Weight (bucket empty)
approx. 16 kg /16.6 kg

Material
- Base plate: stainless steel / aluminium
- Collecting bucket: polyethylene
- Bucket support: ASA, UV-resistant
- Pipe housing: ASA, UV-resistant

Environmental conditions
- Temperature, in operation: –40 … +60 °C
- Temperature, storage: –50 … +70 °C
- Relative humidity: 0 … 100 % (non-condensing)

Protection
- Housing (closed): IP65
- Housing (open): IP63
- Load cell: IP68, resistant to salt fog

Standards
- EMC: 2004/108/EG; EN 61326-1:2013

Pluvio² L operating software
- Measured value display
- Configuration
- Diagnosis
- Firmware update
- Guided accuracy test

**RT = real-time; NRT = non real-time; units can be configured in mm or in (inch), mm/min or mm/h, in/min or in/h and °C or °F*

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