OTT HydroMet

KIPP & ZONEN
an OTT HydroMet brand

SP Lite2 Silicon Pyranometer

Operational Manual

0339231 | 01-0924

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Table of contents

1 Scope of supply

The following items are included with delivery:

- Pyranometer
- Pyranometer fixing kit
- Instruction sheet
- Test reports
- Mounting rod (optional)

2 Order numbers and variant code

2.1 Product variants

Variant	Order number
SP Lite2 Silicon Pyranometer, 5 m cable	0339920-001
SP Lite2 Silicon Pyranometer, 15 m cable	0339920-003
SP Lite2 Silicon Pyranometer, 10 µV/W/m^2, 5 m cable	0339920-021
SP Lite2 Silicon Pyranometer, 10 µV/W/m^2, 15 m cable	0339920-023

2.2 Accessories and spare parts

Item	Order number
AMPBOX signal amplifier, standard gain setting	0365900
METEON Irradiance Meter and Data Logger	0365910
Mounting Rod for SP Lite2, PQS1, CMP3, SMP3 and CGR3	0338720

3 About this manual

3.1 General signs and symbols

The signs and symbols used in the operational manual have the following meaning:

Practical tip

This symbol indicates important and useful information.

Action

✓ Prerequisite that must be met before performing an action.

▸ Step 1

⇨ Intermediate result of an action

▸ Step 2

⇨ Result of a completed action

List

– List item, 1st level

– List item, 2nd level

3.2 Explanation of warnings

To avoid personal injury and material damage, you must observe the safety information and warnings in the operating manual. The warnings use the following danger levels:

WARNING

WARNING

This indicates a potentially hazardous situation. If the hazardous situation is not avoided, it may result in death or serious injuries.

CAUTION

CAUTION

This indicates a potentially hazardous situation. If the hazardous situation is not avoided, it may result in moderately serious or minor injuries.

NOTICE

NOTE

This indicates a situation from which damage may arise. If the situation is not avoided, products may be damaged.

4 General safety instructions

4.1 Intended use

The SP Lite2 pyranometer is used to measure the solar radiation. It can be used under all weather conditions and is designed for a long operating life with simple maintenance. SP Lite2 is installed around the world for meteorology, hydrology, agriculture and building automation; where reliable measurement at relatively low cost is required, and the performance of a broadband thermopile pyranometer is not needed.

4.2 Potential misuse

Any use of the product that does not comply with the intended use, be this intentional or negligent, is forbidden by the manufacturer.

- Use the product only as described in the operational manual.

4.3 Personnel qualification

The equipment described in this manual must be installed, operated, maintained and repaired by qualified personnel only.

- Obtain training from OTT HydroMet if necessary.

4.4 Operator obligations

The installer is responsible for observing the safety regulations. Unqualified personnel working on the product can cause risks that could lead to serious injury.

- Have all activities carried out by qualified personnel.
- Ensure that everybody who works on or with the product has read and understood the operational manual.
- Ensure that safety information is observed.
- File the operational manual together with the documentation of the entire system and ensure that it is accessible at all times.
- The operational manual is part of the product, forward the operational manual together with the product.

4.5 Personnel obligations

To avoid equipment damage and injury when handling the product, personnel are obliged to the following:

- Read the operational manual carefully before using the product for the first time.
- Pay attention to all safety information and warnings.
- If you do not understand the information and procedure explanations in this manual, stop the action and contact the service provider for assistance.
- Wear the necessary personal protective equipment.

4.6 Risk of burns due to hot surfaces

If the ambient temperature is too high, the metal parts of the housing may heat up (> 60 °C). Touching the housing can cause burns.

- Do not touch the housing.
- Wear protective gloves during installation and maintenance.

4.7 Correct handling

If the product is not installed, used and maintained correctly, there is a risk of injury. The manufacturer does not accept any liability for personal injury or material damage resulting from incorrect handling.

- Install and operate the product under the technical conditions described in the operational manual.
- Do not change or convert the product in any way.
- Do not perform any repairs yourself.
- Get OTT HydroMet to examine and repair any defects.
- Ensure that the product is correctly disposed of. Do not dispose of it in household waste.

4.8 Certification

CE (EU)

The equipment meets the essential requirements of EMC Directive 2014/30/EU.

FCC (US)

FCC Part 15, Class "B" Limits

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

IC (CA)

Canadian Radio Interference-Causing Equipment Regulation, ICES-003, "Class B"

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

5 Product description

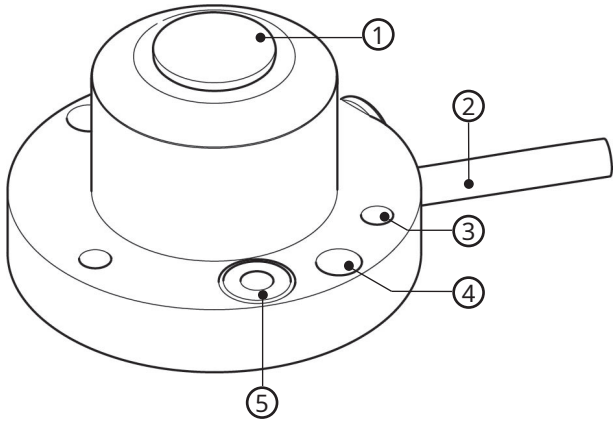
5.1 Design and function

The pyranometer measures the solar energy received from the entire hemisphere and monitors the efficiency of photovoltaic solar energy module systems. SP Lite2 uses a photodiode detector, which creates a voltage output that is proportional to the incoming radiation.

The instrument includes a yellow cable, adjustment screws and an integrated bubble level to ensure accurate installation. A threaded hole in the body of the housing takes the accessory screw-in mounting rod.

Two instruments can be bolted back-to-back and fitted with a mounting rod to make a simple albedometer. It can be directly connected to voltmeter or data logger.

5.2 Product overview



1	Diffuser	4	Screw M5 x 40 (2x)
2	2-wired signal cable	5	Bubble level
3	Screw M5 x 25 (3x)		

6 Transport, storage, and unpacking

6.1 Transport

- Transport the product always in its original packaging.
- Ensure that the product is not mechanically stressed during transport.

6.2 Storage

- Store within specified temperature ranges.
- Store in dry area.
- Store in original box where possible.

6.3 Unpacking

- Carefully remove the product from the packaging.
- Check that the delivery is complete and undamaged.
- If you find any damage or if the delivery is incomplete, then immediately contact your supplier or manufacturer.
- Keep the original packaging for any further transportation.

7 Installation

7.1 Mechanical installation

7.1.1 Required tools and aids

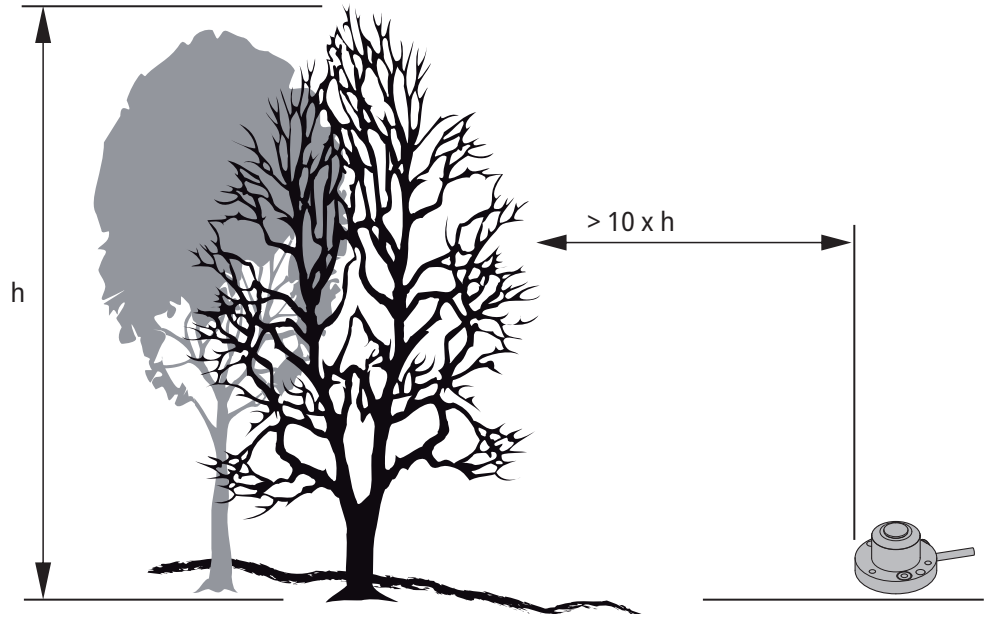
The following tools and aids are required:

- Allen key, 4 mm
- wrench, 8 mm

7.1.2 Choosing a site

There should be no obstructions to the field of vision above the instrument's sensor element. If this is not possible, the location of the instrument must be chosen to ensure that obstacles do not rise by more than 5 degrees above the azimuth range between sunrise after the shortest night and sunset on the longest day.

The 5 degrees correspond to a minimum distance from the instrument to the obstacle of 10 times the height of the obstacle:

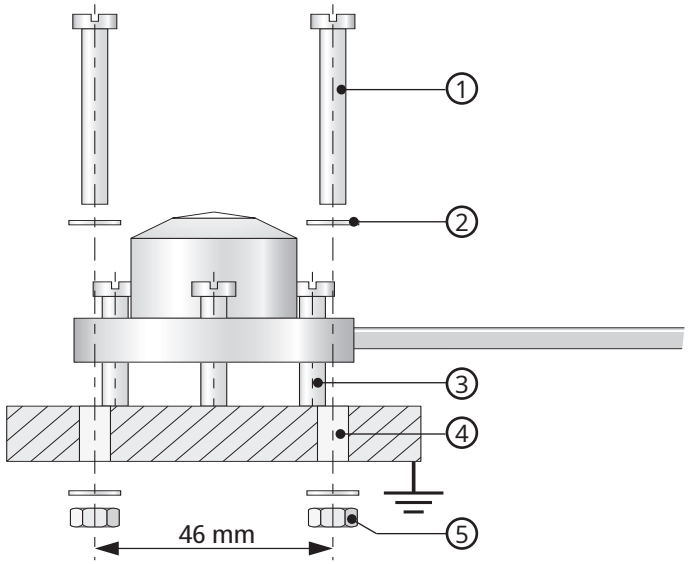


Minimum distance from insrument to obstacle

The minimum distance is important for measuring the direct radiation. The diffuse solar radiation is not so affected by obstacles near the horizon. An obstacle to the field of vision that rises 5 degrees over the entire azimuth range of 360 degrees reduces the diffuse radiation directed downwards by only 0.8 %.

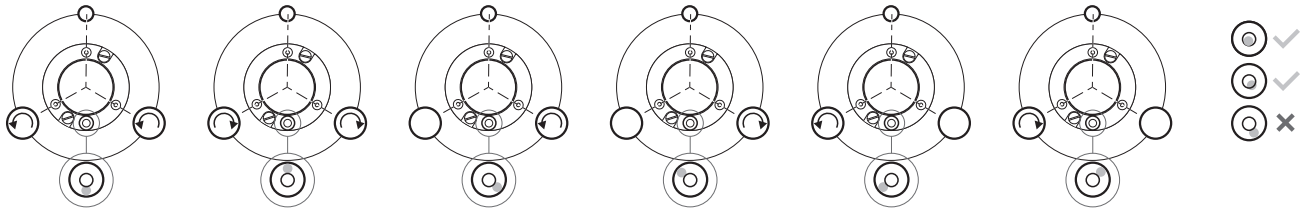
- Position the instrument in such a way that no shadows fall on it, for instance from masts.
- Avoid hot exhaust gases with a temperature of over 100 °C in the proximity of the instrument. It can cause measurement deviations.
- Do not position the instrument in front of light-colored walls or any other objects that reflect the sunlight or emit short-wave radiation.

7.1.3 Mounting instrument



1	2x M5 x 40 mm screws	4	2x Ø 6 mm
2	4x M5 washer	5	2x M5 nut
3	3x M5 x 25 mm screws		

- Position the instrument on a solid surface.
- Ensure that the instrument is grounded.
- Ensure that the instrument is not in the shade.
- Point the cable plug towards the nearest pole to reduce the UV exposure on the cable.
- To align the instrument horizontally, rotate and tilt the instrument until at least half of the spirit level bubble is in the inner ring.

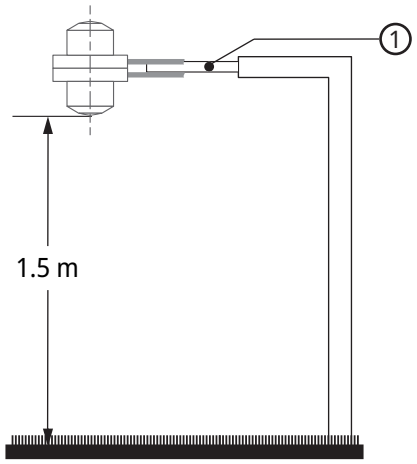


- Fix the instrument with the screws, washers and nuts. Ensure that the instrument retains the correct alignment.
- Insert the plug with the cable into the instrument's connection socket.
- Fix the cable in such a way that the cable doesn't move or cast a shadow on the instrument.

7.1.4 Installation for measuring albedo

An albedometer consists of two identical pyranometers that measure the incident radiation and the radiation reflected by the surface below.

Albedo is the ratio of the two radiation measurements and varies from 0 (dark) to 1 (bright).



1 Mounting rod

- Mount the upper pyranometer.
- Mount the lower pyranometer.

7.2 Electrical connections

- Connect the instrument to a data logger or voltmeter.
- If using a data logger, connect the red wire with data logger terminal configured for the differential high and the blue cable with the terminal configured for the differential low.
- If using a voltmeter, connect the red wire to the wire to the + pole and the blue wire to the - pole.
- If the instrument has not been grounded, connect the black shield cable to the ground.

8 Commissioning

8.1 Checking the instrument

- To check the signals of the instrumnet, place it in the sun, and use a multimeter with mV scale and see if a positive voltage is measured.
  - ⇨ A voltage between 10 – 150 mV is expected.
- Divide this voltage by the instruments sensitivity to obtain the irradiance.
- After the check, connect the instrument to a data logger to collect the measurements.

9 Maintenance

9.1 Maintenance schedule

The frequency of cleaning is dependent upon the local weather and environmental conditions. Ideally, the diffuser of the instrument should be cleaned at regular intervals.

The following maintenance intervals are recommended:

Interval	Activity	Performed by
Twice a week	▸ Clean the diffuser using a dry and lint-free cloth. ▸ For persistent soiling, use additional distilled water. If the soiling is servere, pure alcohol can be used. ▸ Ensure that no streaks or deposits are left on the diffuser.	Operator
Monthly	▸ Check that the SP Lite2 is standing horizontally or at the correct angle. Adjust the instrument if required.	Operator
Annually	▸ Check all cables for damage. ▸ Check fastenings and basic supports.	Operator
2 years	▸ Have a recalibration performed.	OTT HydroMet

10 Troubleshooting

10.1 Error elimination

Error	Possible cause	Corrective action
Output signal not available or incorrect	Instrument does not work properly	▸ Check that the cables are correctly connected to the readout equipment. ▸ Check the diffuser for contamination. Carry out maintenance work as required. ▸ Check the last calibration date to see if re-calibration is required. ▸ Check that the leveling is correct. ▸ Report any malfunctions or damage to the representative of OTT HydroMet.

11 Repair

11.1 Customer support

- Have repairs carried out by OTT HydroMet service personnel.
- Only carry out repairs yourself, if you have first consulted OTT HydroMet.
- Contact your local representative: www.otthydromet.com/en/contact-us
- Include the following information:

– instrument model
– instrument serial number
– details of the fault or problem
– examples of data files
– readout device or data acquisition system
– interfaces and power supplies
– history of any previous repairs or modifications
– pictures of the installation
– overview of the local environment conditions

12 Notes on disposing of old devices

Member States of the European Union

In accordance with the German Electrical and Electronic Equipment Act (ElektroG; national implementation of EU Directive 2012/19/EU), OTT HydroMet takes back old devices in the Member States of the European Union and disposes of them in the proper manner. The devices that this concerns are labeled with the following symbol:

- For further information on the take-back procedure contact OTT HydroMet:

OTT HydroMet B.V.
Service & Technical Support
Delftechpark 36
2628 XH Delft
The Netherlands
phone: +31 15 2755 210
email: solar-info@otthydromet.com

All other countries

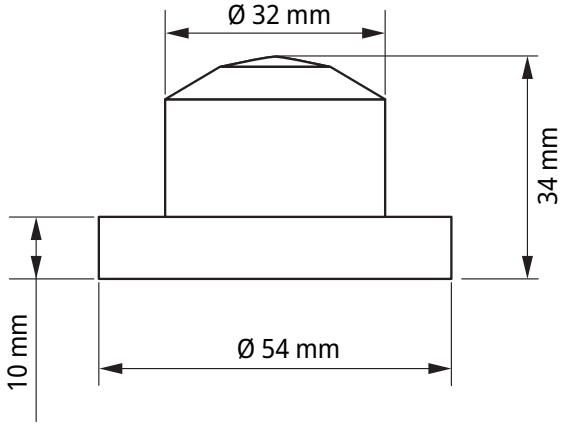
- Dispose of the product in the proper manner following decommissioning.
- Observe the country-specific regulations on disposing of electronic equipment.
- Do NOT dispose of the product in household waste.

13 Technical data

13.1 Optical and electrical data

Specification	Value
Spectral range	400 to 1100nm
Sensitivity Sensitivity (10 µV/W/m^2 version)	60 to 100 µV/W/m^2 10 ±0.5 µV/W/m^2
Impedance Impedance (10 µV/W/m^2 version)	50 Ω < 10 Ω
Expected output range (0 to 1500 W/m^2) Expected output range (10 µV/W/m^2 version)	0 to 150 mV 0 to 15 mV
Maximum operational irradiance	2000 W/m^2
Response time (95 %)	< 500 ns
Non-stability (change/year)	< 2 %
Non-linearity (0 to 1000 W/m^2)	< 2.5 %
Directional response (up to 80° with 1000 W/m^2 beam)	< 10 W/m^2
Temperature response	- 0.15 %/°C
Field of view	180°
Accuracy of bubble level	< 0.2 °
Detector type	Photodiode
Operating temperature range	-40 °C to +80 °C
Storage temperature range	-40 °C to +80 °C
Humidity range (non-condensing)	0 to 100 %
Protection rating	IP67

13.2 Dimensions and weight



Specification	Value
Instrument weight	110 g
Albedo weight	320 g

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Contact Information