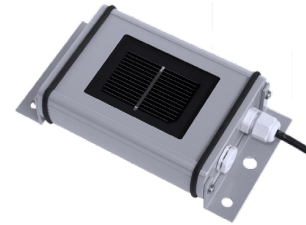


## Silicon Irradiance Sensor Si-V-10TC /-T

S68120 / S68261

- Build as solar module - easily comparable to energy yield and system performance of PV systems
- Optional cell temperature as alternative to directly measured module temperature
- Output signal: 0 ... 10 V for irradiance and cell temperature



### Description

Silicon irradiance sensors show a cost-effective, but rugged and reliable solution for irradiance measurement. Based on the construction of the sensor element corresponding to a PV module they are ideal as reference for monitoring of PV systems. Especially the spectral response comparable to PV modules as well as the similar inclination error (incident angle modifier) allow an exact analysis of PV energy yields using Si sensor data.

### Mode of operation

A silicon solar cell can be used as an irradiance sensor, because the short-circuit current is proportional to the irradiance. The sensors are build out of a monocrystalline Si solar cell connected to a shunt. Due to the low resistance of the shunt the cell operates next to short-circuit. To minimize influences of temperature to the measuring signal all of the sensors with the extension „TC“ have an active temperature compensation via a temperature sensor laminated to the back surface of the solar cell.

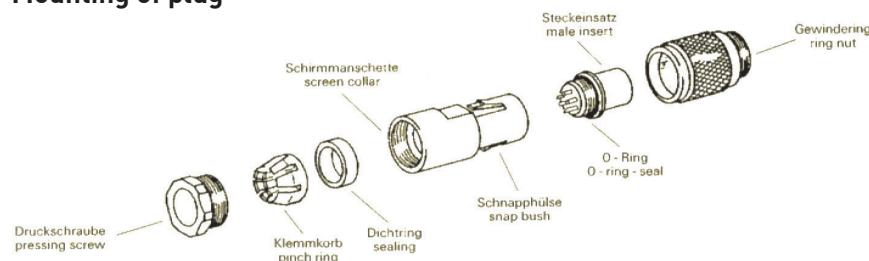
Additionally to the irradiance measurement the silicon sensors with the extension “-T” are able to measure the temperature of the solar cell using a temperature sensor laminated to the back of the cell. This solar cell temperature can approximately be used as module temperature.

All sensors are calibrated in artificial sunlight against a reference cell calibrated at the Physikalisch-Technische Bundesanstalt (PTB, National Metrology Institute of Germany).

### Mechanical construction

The solar cell is embedded in Ethylen-Vinyl-Acetat (EVA) between glass and Tedlar. The laminated cell is integrated into a case of powder-coated aluminium. Therefore the sensor construction is comparable to a standard PV module. The electrical connection is realized by a 3 m cable or a water proof (IP67) connector.

### Mounting of plug



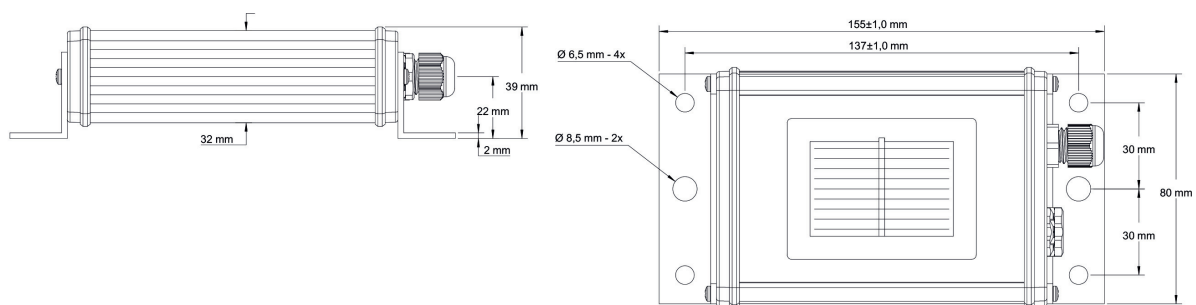
# Silicon Irradiance Sensor Si-V-10TC /-T

S68120 / S68261

## Specifications

| Sensor                                                | Si-V-10TC                                                                                                                 | Si-V-10-TC-T                                            |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Ordner No.                                            | S68120                                                                                                                    | S68261                                                  |
| Solar cell                                            | Monocrystalline silicon (50 x 33 mm)                                                                                      |                                                         |
| Measurement uncertainty<br>Irradiance                 | $\pm 5 \text{ W/m}^2 \pm 2.5\%$ of reading<br>valid for temperature compensation, spectrum AM 1.5 and vertical light beam |                                                         |
| Measurement uncertainty<br>Internal temp. measurement |                                                                                                                           | 1.0 K @ -35 ... 70 °C<br>1.1 K @ -35 ... 80 °C          |
| Response time (99%)                                   | 0.15 s                                                                                                                    |                                                         |
| Offset                                                | 2 W/m <sup>2</sup>                                                                                                        |                                                         |
| Non-Linearity                                         | 0.10 %                                                                                                                    |                                                         |
| Temperature dependance                                | 0.40 % @ -35 ... 80 °C                                                                                                    |                                                         |
| Power supply                                          | 24 VDC (12 ... 28 VDC)<br>typ. < 1 mA power consumption                                                                   | 24 VDC (12 ... 28 VDC)<br>typ. < 2 mA power consumption |
| Load impedance                                        | min. 100 kΩ                                                                                                               |                                                         |
| Output signal irradiance                              | 0 ... 10 V @ 0 ... 1500 W/m <sup>2</sup>                                                                                  |                                                         |
| Output signal cell temperature                        | 0 ... 10 V @ -40 ... 90 °C                                                                                                |                                                         |
| Sensor connection                                     | LiYC11Y 4 x 0.14 mm <sup>2</sup> UL20233; length typical 3 m, UV- and temperature resistant                               |                                                         |
| Operating temperature                                 | -35 ... +80 °C                                                                                                            |                                                         |
| Housing material                                      | Powder-coated aluminium, IP 65                                                                                            |                                                         |
| Dimensions / Weight                                   | 155 x 85 x 39 mm / approx. 350 g                                                                                          |                                                         |
| Manufacturer                                          | Ingenieurbüro Mencke & Tegtmeier GmbH                                                                                     |                                                         |

## Dimensional drawing



Silicon Irradiance Sensor Si-V-10TC /-T

S68120 / S68261

Sensor connection to Ammonit Meteo-40 data logger

Si-V-10TC (S68120)

| Sensor                             | Plug Pin No. | Wire Colour Sensor Cable | Meteo-40 Analog Voltage |
|------------------------------------|--------------|--------------------------|-------------------------|
| Solar irradiance                   | 1            | orange                   | Ax                      |
| Solar irradiance<br>Ground / Ref.* |              |                          | Bx<br>(Main Ground)     |
| Ground / Ref.                      | 2            | black                    | Main Ground             |
| Supply                             | 3            | red                      | 12 ... 28 VDC           |

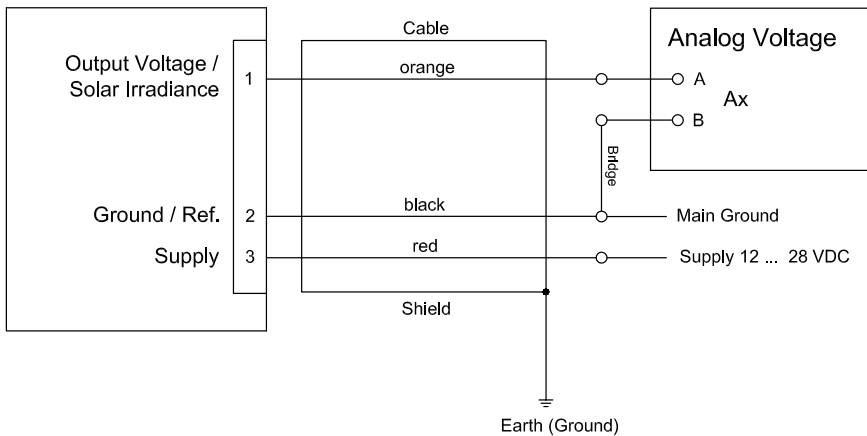
\*Minus signals are identical to Ground

Cable type: LiYC11Y 4 x 0.14 mm<sup>2</sup> (cable length: 3m)

Connect the shield logger-sided to Ground (GND)

Silicon Irradiance Sensor  
Si-V-10TC

Meteo-40  
Data Logger



## Silicon Irradiance Sensor Si-V-10TC /-T

**S68120 / S68261**

### Sensor connection to Ammonit Meteo-40 data logger

#### Si-V-10TC-T (S68261)

| Sensor                             | Plug Pin No. | Wire Colour Sensor Cable | Meteo-40 Analog Voltage |
|------------------------------------|--------------|--------------------------|-------------------------|
| Temperature                        | 1            | brown                    | Ax                      |
| Temperature<br>Ground / Ref.*      |              |                          | Bx<br>(Main Ground)     |
| Solar irradiance                   | 2            | orange                   | Ax+1                    |
| Solar irradiance<br>Ground / Ref.* |              |                          | Bx+1<br>(Main Ground)   |
| Ground / Ref.                      | 4            | black                    | Main Ground             |
| Supply                             | 3            | red                      | 12 ... 28 VDC           |

\*Minus signals are identical to Ground

Cable type: LiYC11Y 4 x 0.14 mm<sup>2</sup> (cable length: 3m)

Connect the shield logger-sided to Ground (GND)

#### Silicon Irradiance Sensor Si-V-10TC-T

#### Meteo-40 Data Logger

