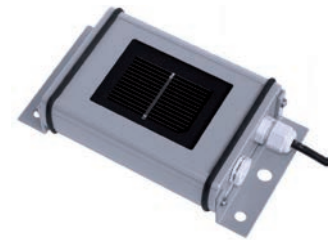


- **Build as solar module - easily comparable to energy yield and system performance of PV systems**
- **Optional cell temperature as alternative to directly measured module temperature**
- **Output signal: 0 ... 10 V for irradiance and cell temperature**



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.

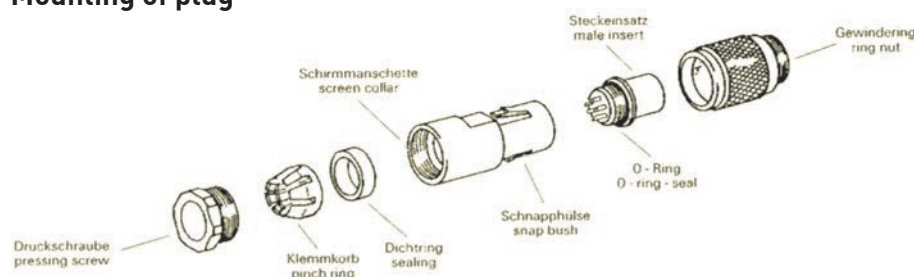
Additionally to the irradiance measurement the silicon sensors with the extension “-T” are able to measure the temperature of the solar cell using a temperature sensor laminated to the back of the cell. This solar cell temperature can approximately be used as module temperature.

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

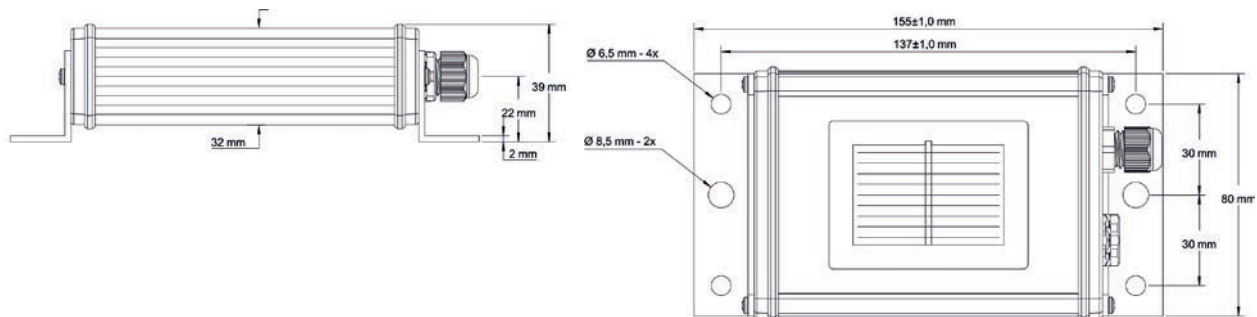
The solar cell is embedded in Ethylen-Vinyl-Acetat (EVA) between glass and Tedlar. The laminated cell is integrated into a case of powder-coated aluminium. Therefore the sensor construction is comparable to a standard PV module. The electrical connection is realized by a 3 m cable or a water proof (IP67)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

Mounting of plug



Specifications

Sensor	Si-V-10TC	Si-V-10-TC-T	Si-V-10TC-A
Ordner No.	S68120	S68261	S68101
Solar cell	Monocrystalline silicon (50 x 33 mm)		
Measurement uncertainty Irradiance	± 5 W/m ² ±2.5% of reading valid for temperature compensation, spectrum AM 1.5 and vertical light beam		
Measurement uncertainty Internal temp. measurement		1.0 K @ -35 ... 70 °C 1.1 K @ -35 ... 80 °C	
Response time (99%)	0.15 s		
Offset	2 W/m ²		
Non-Linearity	0.10 %		
Temperature dependance	0.40 % @ -35 ... 80 °C		
Power supply	24 VDC (12 ... 28 VDC) typ. < 1 mA power consumption	24 VDC (12 ... 28 VDC) typ. < 2 mA power consumption	24 VDC (12 ... 28 VDC) typ. < 1 mA power consumption
Load impedance	min. 100 kΩ		
Output signal irradiance	0 ... 10 V @ 0 ... 1500 W/m ²		
Output signal cell temperature	0 ... 10 V @ -40 ... 90 °C		
Sensor connection	LiYC11Y 4 x 0.14 mm ² UL20233; length typical 3 m, UV- and temperature resistant		Si-V-10TC-A with 4-pole plug
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


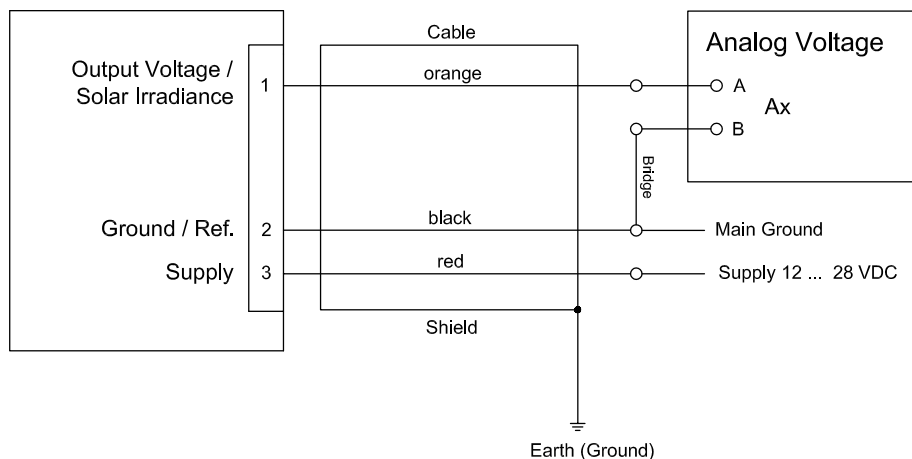
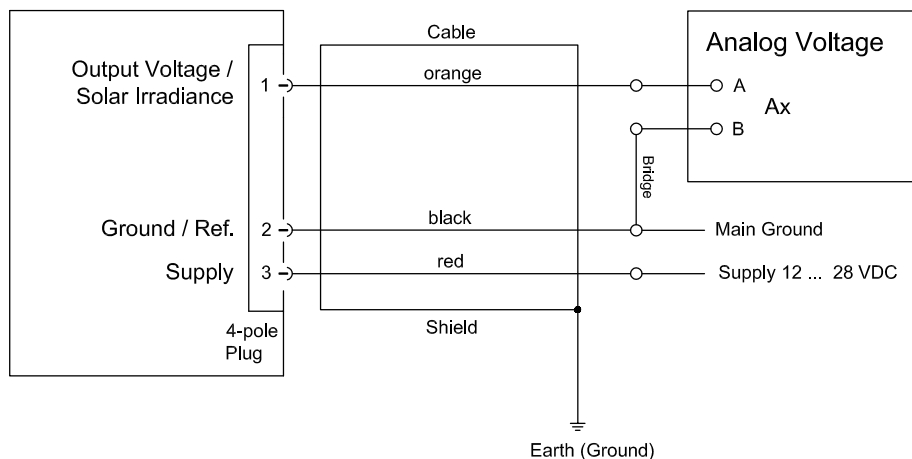
Sensor connection to Ammonit Meteo-40 data logger
Si-V-10TC (S68120) / Si-V-10TC-A (S68101)

Sensor	Plug Pin No.	Wire Colour Sensor Cable	Meteo-40 Analog Voltage
Solar irradiance	1	orange	Ax
Solar irradiance Ground / Ref.*			Bx (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 mm² (cable length: 3m)

Connect the shield logger-sided to Ground (GND)

**Silicon Irradiance Sensor
Si-V-10TC**

**Silicon Irradiance Sensor
Si-V-10TC-A**


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 Ground / Ref.*			Bx (Main Ground)
Solar irradiance	2	orange	Ax+1
Solar irradiance Ground / Ref.*			Bx+1 (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 mm² (cable length: 3m)

Connect the shield logger-sided to Ground (GND)

**Silicon Irradiance Sensor
Si-V-10TC-T**
**Meteo-40
Data Logger**
