PVMT01

PV module temperature sensor, Pt1000 Class A, for back-of-module temperature measurement

PVMT01 is a back-of-module temperature sensor. PVMT01 is used to estimate and correct the performance index for the temperature dependence of module efficiency. The sensor meets the requirements of the highest-class systems for PV monitoring: IEC 61724-1 Class A. IEC suggests 3 such sensors per monitoring station, and requires that 6 or more sensors are used on a PV system, depending on the size of the system. PVMT01 includes a Pt1000 in a small aluminium disk, and a thin and flexible 1 m cable with connector. The cable can be easily extended by the user.

Figure 1 *PVMT01 installed on the rear side of a PV module. The sensors are preferably installed at the centre of a cell close to the centre of the module. IEC requires 3 sensors per monitoring station.*

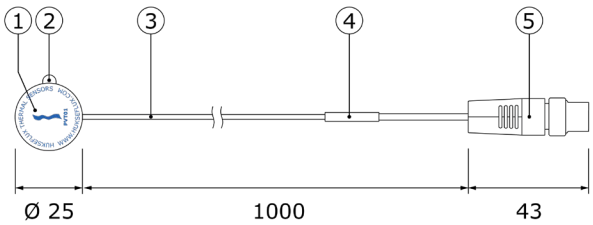

Figure 2 *Overview of PVMT01:*
(1) sensor housing, (2) adhesive, (3) cable; length 1 m, (4) product label, (5) connector. Total sensor thickness including adhesive is 5.8 x 10^{-3} m.

PVMT01: critical for effective PV panel performance assessment

PVMT01 measures the temperature of a PV module. Assessing PV system performance, this back-of-module temperature measurement allows users to estimate and correct for the temperature dependence of module efficiency. PVMT01 meets or exceeds specifications required by IEC 61724-1.

PVMT01 consists of a Pt1000 Class A, connected in a 4-wire configuration for increased accuracy. The sensor is enclosed in a small aluminium disk. The small size minimises the impact on bifacial modules (IEC requires obscuring less than 10 % of the surface area of any cell). The adhesive on the sensor disk is well-suited for long-term outdoor use. The adhesive has excellent thermal properties, including a total heat transfer coefficient larger than 500 W/(m^2· K) as required by IEC.

The flexible and weather-proof cable has a small diameter. For bifacial modules, this cable should be routed between the cells, as recommended by IEC. The small cable diameter not only helps to improve measurement accuracy, but also helps minimising the mechanical stress on the sensor disk and on the adhesive connecting the sensor to the module. PVMT01 comes with a standard cable length of 1 m. The cable can be easily extended using an extension cable.

PVMT01 is supplied in packs of ten sensors; each sensor is provided with a cleaning alcohol wipe, two polyester tapes and two solar edge clips to attach the cable to the edge of the PV module.

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Thermal Sensors

Suggested use

- long-term PV system performance monitoring
- module temperature measurement in PV prospecting

Unique features and benefits

- high measurement accuracy
- compliant with requirements of IEC 61724-1 for Class A systems
- disk adhesive rated for prolonged outdoor use
- small surface area to minimise impact on bifacial modules
- thin cable for routing between cells of bifacial modules
- thin cable minimises the mechanical force on the adhesive connecting the sensor to the module
- easily extendable cable
- ingress protection class: IP67

Installation

Installing PVMT01 is easy. The adhesive on the back of the disk is extremely strong and weather-resistant. An IPA (isopropyl alcohol) wipe is provided to clean the surface of the panel before attachment.

Mount the sensor on the rear side of the module. IEC 61724-1 recommends selecting a location at the centre of a cell close to the centre of the module. IEC requires a minimum of 3 such sensors for every monitoring station. A total of 6 or more sensors per PV system is required, depending on the size of the system.

Operation

Once installed and connected to a measuring system, PVMT01 will reliably measure the temperature of the surface of the panel. The data is collected by your data logger. The 4-wire sensor connection ensures high measurement accuracy. The cable can be extended by the user without affecting the measurement accuracy.

PVMT01 specifications

Temperature sensor

Sensor type	Pt1000 Class A Platinum resistance thermometer (PRT)
Sensor connection	4-wire
Sensor housing	aluminium disk
Rated operating temperature range	
Sensor and cable	-40 °C to +150 °C
Connector	-40 °C to + 80 °C
Measurement accuracy	± (0.15 + 0.002·T) °C

Compliance

Compliance	IEC 61724-1:2021, Class A
Number of sensors required	3 per monitoring station required, minimum 6 per PV system, depending on the size of the system as per IEC 61724-1
IP protection class	IP67

Aluminium disk

Disk material	anodized aluminium
Disk diameter	25 x 10^{-3} m
Disk thickness	5.5 x 10^{-3} m
Insulation resistance	> 2 GΩ at 1 kV as per IEC 60060-1

Adhesive

Adhesive material	acrylic sticker
Adhesive thickness	0.13 × 10^{-3} m
Total heat transfer coefficient	> 500 W/(m^2·K) as required in IEC 61724-1

Cable & connector

Cable length	1 m
Cable extension	to preferred length, should be extended by the user
Cable diameter	2.5 × 10^{-3} m
Connector type	4P, male M12-A connector
Cable connector	4P or 5P female M12-A connector

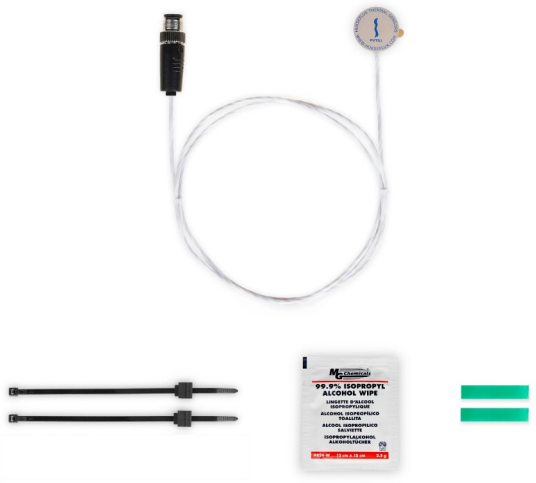

Figure 3 *PVMT01 measures the PV module temperature. The Pt1000 sensor is incorporated in a small aluminium disk and supplied with 2 x solar clips, 2 x polyester tapes and a pre-saturated IPA wipe.*

PVMT01 maintenance

PVMT01 requires little maintenance. The sensor and cable should be regularly checked for damage, contamination, correct attachment to the PV panel and correct fitting of connectors.

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