

## Digital Module Temperature Sensors Tm-RS485-MB / Tm-RS485-MB-A



### Safety Instructions

The installation and assembly of electrical equipment must be carried out by electrically qualified persons. The sensor may not be used with equipment whose direct or indirect purpose is to prevent death or injury, or whose operation poses a risk to humans, animals or property.

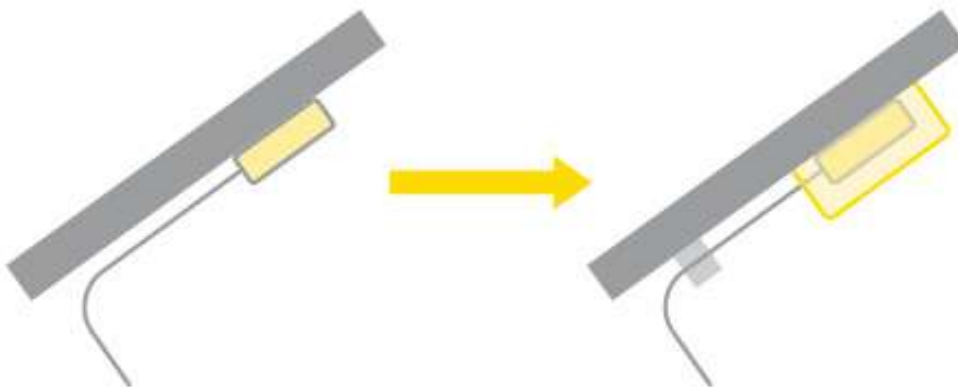
### Warranty and Liability

The sensor is designed for the measurement of a surface temperature. The warranty is for 1 year from the date of the invoice for the intended use. IMT Technology does not accept any liability for possible losses or damage due to the incorrect usage of the sensor. Liability for consequential damages is excluded.

### Mounting Instructions

The sensor element is mounted by gluing the aluminium block directly to the measurement surface. The surface must be dry, clean and degreased. Cleaning should NOT be done with glass cleaner, as some glass cleaners contain additives to prevent soiling after cleaning and these additives also prevent adhesion. Isopropyl Alcohol or Ethanol is recommended for cleaning. Temperature sensors shall be placed in representative locations to capture the range of variation and allow determination of an effective average. For crystalline silicon modules, select the centre-most cell within the module, or, when the module is built with even numbers of rows or columns of cells, select one of the cells closest to the centre. For bifacial modules, rear-side temperature sensors and wiring shall obscure < 10 % of the area of any cell, and wiring should be routed in between cells when possible.

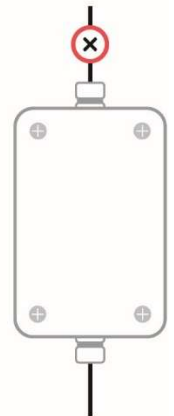
It is also recommended using an extra fixing with silicone or Sikaflex, particularly for module temperature above 75°C. The sensor cable needs a cable grip close to the sensor housing.



If mounted outdoors, avoid direct exposure to sunlight and rain to the sensor housing (aluminium block) and sensor case. If necessary, provide protection from the sun and rain.

The through holes used to fix the sensor to a stable and suitable surface shall be accessible when the housing is opened. The tightening torque of the case cover is 180 Ncm.

When installing the sensor, the cables must be routed downwards from the housing.

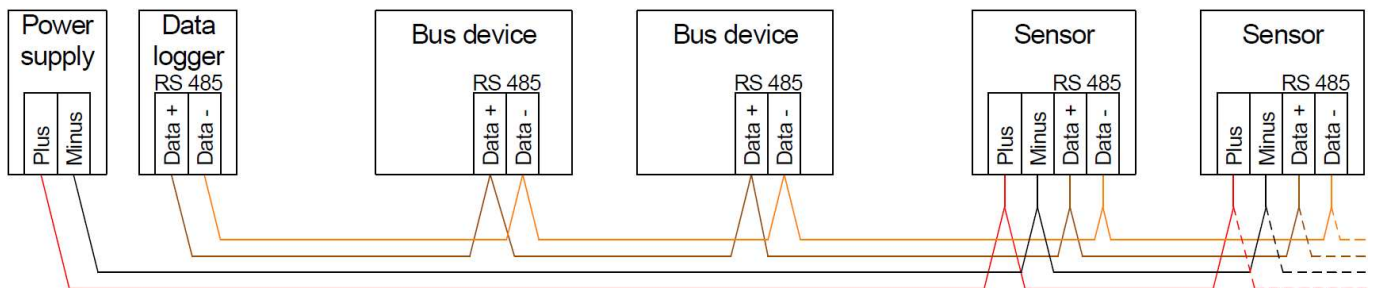
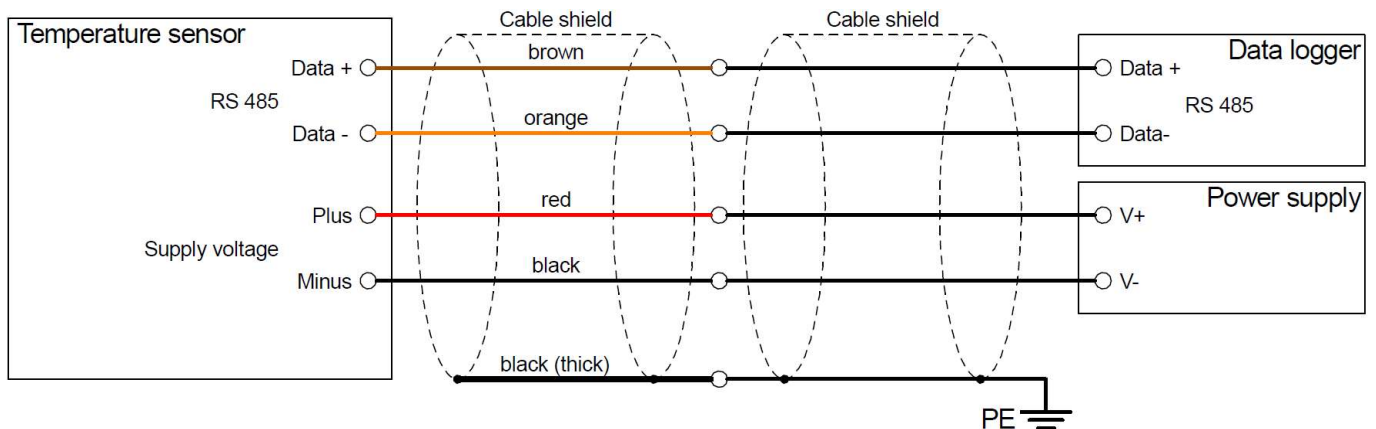


**Electrical Connection**

The sensors are designed for safety extra-low voltage (SELV) operation. The maximum power of the voltage supply is 50 VA („Class 2 limited power“).

The cable shield shall be connected to the PE during installation.

**WARNING: Connecting the supply voltage to the signal lines will damage the device.**



All MODBUS devices require the same bus parameter (baud rate, data format) but different addresses. Termination of RS485 bus usually is not needed.

**Pin Assignment Cable Socket (only for Tm-RS485-A)**

Pin number	Signal
Pin 1	RS485 – Data +
Pin 2	RS485 – Data -
Pin 3	10 to 28 V <sub>DC</sub>
Pin 4	0 V <sub>DC</sub>

**Cable length**

Supply voltage	Cable cross section						
	0.14 mm <sup>2</sup>	0.25 mm <sup>2</sup>	0.34 mm <sup>2</sup>	0.5 mm <sup>2</sup>	0.75 mm <sup>2</sup>	1.0 mm <sup>2</sup>	1.5 mm <sup>2</sup>
24 V <sub>DC</sub>	300 m	600 m	800 m	1000 m	1000 m	1000 m	1000 m
12 V <sub>DC</sub>	50 m	100 m	150 m	200 m	300 m	400 m	650 m

Maximum additional cable length of temperature sensors with 3 m connection cable.

Note: If more sensors are supplied by the same voltage supply, the possible cable length is reduced accordingly.

Example: 3 sensors at 24 V<sub>DC</sub> and cable 0.14 mm: 300 m / 3 = 100 m

**Maintenance**

Scope of the regularly check (at least once a year): Cleaning, external damage, mechanical fastening, cable laying and any damage to the cable.

Should damage be found that degrades the function or safety, the sensor is to be replaced.

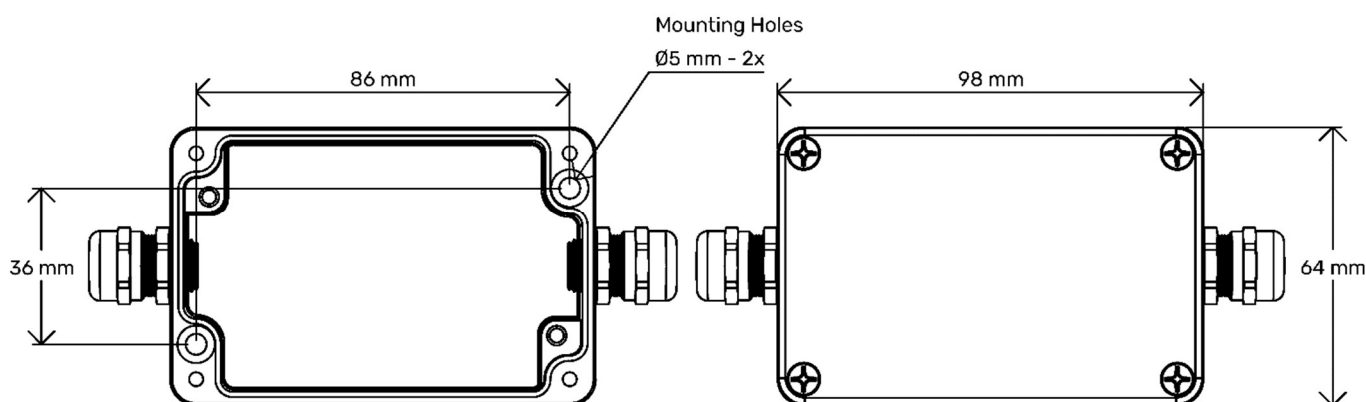
A recalibration is recommended at least every 3 years.

## Technical Data

Output signal	RS485
Measurement range	-40 to +90°C
Uncertainty (-40 to +80°C)	1 K
Supply voltage	24 V <sub>DC</sub> (10 to 28 V <sub>DC</sub> )
Current consumption	Typical 25 mA at 24 V <sub>DC</sub>
Galvanic insulation	1000 V <sub>DC</sub> between voltage supply and RS485
Sensor element	Pt1000 class A as per EN 60751
Sensor element housing	Self-adhesive aluminum block, 35 mm x 12 mm x 6 mm
Sensor cable (Pt1000)	Length: 3 m, PUR coated, shielded (LiYC11Y, 2 x 0.25 mm <sup>2</sup> )
Case material	Powder coated aluminium
Case dimension / protection level	98 mm x 64 mm x 34 mm / IP 67
Weight	500 g
Operating temperature	Sensor element -40 to +90°C (see below installation instruction) Case -40 to + 80°C

	Tm-RS485-MB	Tm-RS485-MB-A
Electrical connection	Length: 3 m, PUR coated, shielded LiYC11Y, 4 x 0.14 mm <sup>2</sup>	4-pole plug with screw connectors
Protocol	Settings (default)	Note
Modbus (RTU)	Address: 1 Baud rate: 9600 baud Format: 8N1	Settings can be changed with „Si-Modbus-Configurator“ software. Maximum baud rate: 38400 baud

## Dimensions



## Scope of Delivery

- Sensor incl. pre-assembled connecting cable
- Calibration certificate for measurement electronic
- Instruction sheet

## Intelligent Measurement & Testing