

## DOSi 13TC-TK... Solar radiation intensity sensor



### Summary

DOSi 13TC-TK.. sensors are electronic outdoor sensors of solar radiation intensity and temperature for photovoltaic power plants. The output signal is 0...10V DC or communication interface RS485 with Modbus RTU.

### Application

- Photovoltaic plants – monitoring of solar radiation intensity and panel temperature

### Function

The sensor contains monocrystalline solar element. Its short-circuit current is proportional to solar radiation intensity. Thanks to positive factor of the short-circuit current the measuring error is small. All TC.. sensors contain embedded temperature sensor which reduces the measuring error significantly. The signal is electronically processed and converted to 0...10 V output or brought to RS485 bus with Modbus RTU protocol.

Each sensor is calibrated against a reference element of the same type. This reference cell is periodically calibrated against an element which is calibrated in Fraunhofer institute ISE in Freiburg.

The connection cable length is 3 m. Extended cables are available on request. Wire colours see below.

### Technical data

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|   |   |
|---|---|
| Power   | 12 ... 28 V DC                                    |
| Consumption   | 800 mW  |
| Solar radiation measuring range   | 0...1300 W/m <sup>2</sup> corresponds to 0...10 V |
| Solar radiation measuring error with temperature compensation compared with a pyranometer in range of -40...85 °C | 5% (from scale of range)                          |
| Cell temperature measuring range  | -40...90 °C, $U_{out} = 2,268V + T[°C]*86,9mV/°C$ |
| Ambient temperature measuring range   | -40...85 °C                                       |
| Temperature measuring error   | +/- 1.5 °C  |
| Temperature non-linearity   | +/- 0.5 °C  |

|                     |                          |
|---------------------|--------------------------|
| Ambient temperature | -40...85 °C              |
| Protection          | IP65                     |
| Cable               | 3 m length, UV resistant |
| Cover               | aluminium                |
| Weight              | 360 g                    |
| Dimensions          | 154 x 80 x 38 mm         |

## Sensor types

| Type           | Measured values                                   | Interface          |
|----------------|---|--------------------|
| DOSi 13TC-TK   | radiation, panel temperature                      | 0...10 V, 0...10 V |
| DOSi 13TC-TKM  | radiation, panel temperature                      | Modbus RTU / RS485 |
| DOSi 13TC-TKM2 | radiation, panel temperature, outside temperature | Modbus RTU / RS485 |

## Wire colours

### DOSi 13TC-TK

|                             |               |
|-----------------------------|---------------|
| Power (+)                   | red           |
| Power (-), signal ground    | black (thin)  |
| Output 0...10 V radiation   | orange        |
| Output 0...10 V temperature | brown         |
| Shield                      | black (thick) |

### DOSi 13TC-TKM

|                          |               |
|--------------------------|---------------|
| Power (+)                | red           |
| Power (-), signal ground | black (thin)  |
| RS485 A (+)              | brown         |
| RS485 B (-)              | orange        |
| Shield                   | black (thick) |

## Modbus communication

To set up the Modbus address and other parameters, use the configuration software at <http://www.imt-solar.com/products/solar-irradiance-sensor/si-sensor.html>.

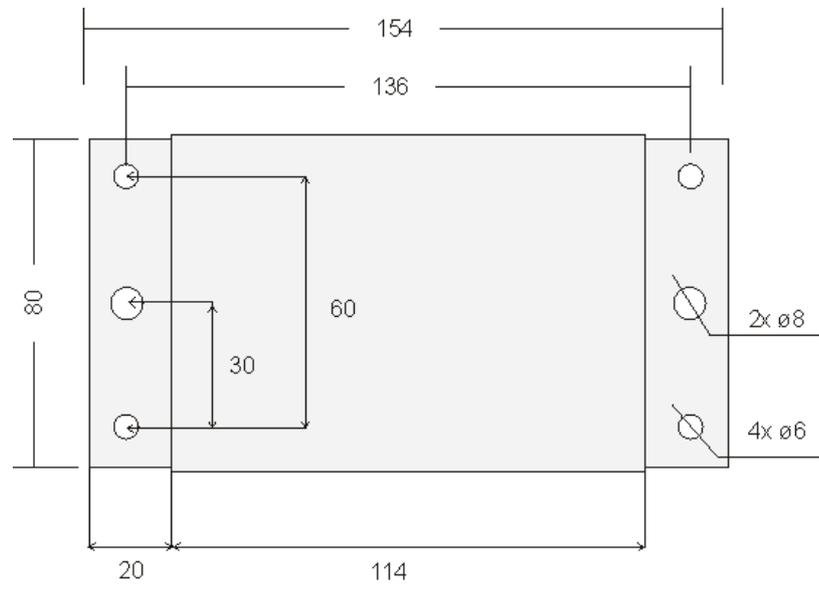
- connect the sensor to a PC through a RS485 converter (e.g. M080)
- run the configuration program
- set the correct COM port in the software
- power on the sensor
- the software should report „Sensor connected“
- set the new parameters.

Default values: 9600 Bd, 8, N, 1, address 1.

### Function 04: Read input register

| Register | Value   | Range                                   |
|----------|---|---|
| 0000     | Radiation intensity in 0.1 W/m <sup>2</sup>                               | 0...14000 for 0...1400 W/m <sup>2</sup> |
| 0001     | Cell temperature in 0.1 °C (offset -25 °C)                                | 0...1000 for -25...75 °C                |
| 0002     | External temperature in 0.1 °C (offset -25 °C) (only for DOSi 13 TC-TKM2) | 0...1000 for -25...75 °C                |
| 0003     | Reserved  |   |
| 0004     | Reserved  |   |
| 0005     | Cell temperature in 0.1 °C (offset -100 °C)                               | 600...1900 for -40...90 °C              |
| 0006     | External temperature in 0.1 °C (offset -25 °C) (only for DOSi 13 TC-TKM2) | 600...1850 for -40...85 °C              |

## Dimensions



Dimensions are in *mm*.

## Release notes

Version 02/2015 – Changes in measuring ranges, modbus table and web pages for downloading software.