Measuring equipment for the Sunny Central

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1 Explanation of the Symbols Used

In order to ensure optimal use of these instructions, please note the following explanation of symbols used.

This symbol indicates an example.

This symbol indicates a notice which, if not followed correctly, will make the procedure or operation more difficult.

This symbol indicates a fact which, if not observed, could result in damage to components or represent a danger to persons. Read these passages especially carefully.

2 Introduction

The **Sunny Central** enables the direct connection of analog and digital sensors for determining environment data, such as global radiation or temperature.

*The range of **sensors** comprises, among others, the following measurements:*

- Irradiation sensor with integrated module temperature sensor **RA 100 T**
- Temperature sensor for measuring the module temperature **PT 100 M**
- Temperature sensor for measuring the ambient temperature **PT 100 U**

3 Product Presentation

3.1 Irradiation Sensor RA100 T

Description	Parameters
Voltage tolerance	max. 5 %
Temperature sensor	PT100
R_{PT100}	PT100 basic series
Tolerance	class 1/3B
Dimensions	122 x 122 x 20 mm
Cable length	approx. 5 m (4 wires)
Calibration value	see type plate
Ambient temperature	-30° ... +50°C

Wire	function
Green	irradiation sensor +
White	irradiation sensor –
Yellow	PT 100 temperature sensor
Brown	PT 100 temperature sensor

3.2 PT100 M Temperature Sensor

Description	Parameters
Connection	two-wire system up to 10 m
Mounting	installation using the provided dual-component thermal adhesive
R_{PT100}	PT100 basic series
Tolerance	class 1/3B
Dimensions	30 x 6 x 6 mm
Cable length	approx. 2.5 m (2 wires)
Measuring range	20° - 110°C

3.3 PT100 U Temperature Sensor

Description	Parameters
Connection	Four-wire system
Housing	IP 65
R_{PT100}	PT100 basic series
Tolerance	class 1/3B
Dimensions	100 x 52 x 67 mm
Measuring range	30° - 80°C

4 Electrical Wiring and Sensor Connection

The sensors are connected to the =Z5-X5 terminal.

4.1 RA100 T

Irradiation Sensor

In this case, an analog input is used as the voltage input. To do so, the positive pole of the reference cell (green wire) is connected to terminal 5 or 7 and the negative pole of the reference cell (white wire) is connected to terminal 6 or 8.

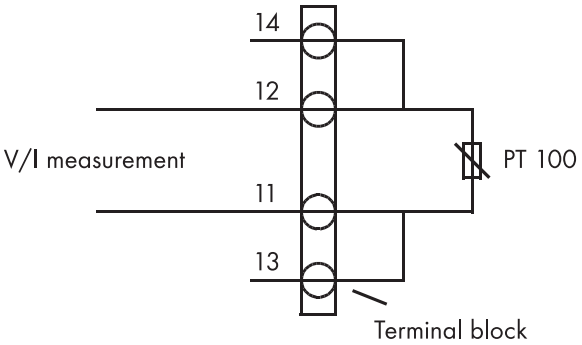
Irradiation sensor connection to "=Z5-X5"	
Terminal 5	green wire (irradiation +)
Terminal 6	white wire (irradiation -)
or	
Terminal 7	green wire (irradiation +)
Terminal 8	white wire (irradiation -)

PT100 Temperature Sensor

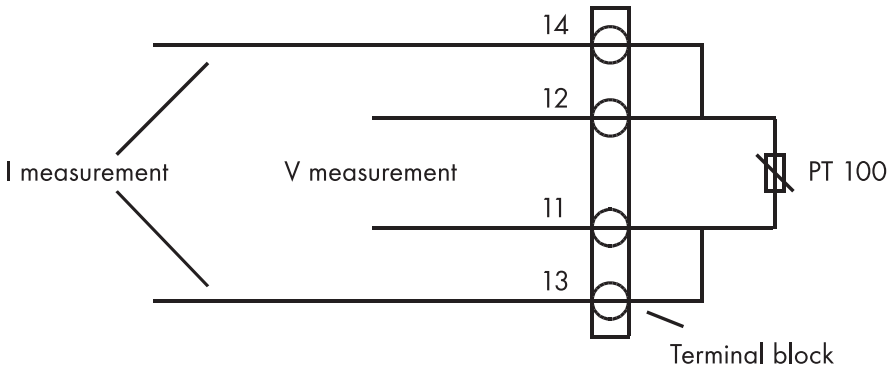
To also ensure the accuracy over greater distances, we recommend connecting the PT100 sensor resistor in a four-wire system. For this purpose, the connecting wires of the PT100 sensor resistor are duplicated directly next to the RA100 T sensor and thus a total of 6 wires (2 wires for the irradiation sensor and 4 wires for the PT100 temperature sensor) lead to the Sunny Central. The connection is established without using bridges on the terminal strip in accordance with the following connection plan:

PT100 temperature sensor connection to "=Z5-X5" in a four-wire system	
Terminal 1	yellow wire 1 (PT100 original wire)
Terminal 2	yellow wire 2 (PT100 duplicated wire)
Terminal 3	brown wire 1 (PT100 original wire)
Terminal 4	brown wire 2 (PT100 duplicated wire)

A **PT100** connection in a two-wire system



A **PT100** connection in a four-wire system



PT100 temperature sensor connection to "=Z5-X5" in a two-wire system	
Bridge terminal 1 with terminal 2	yellow wire (PT100 original wire)
Bridge terminal 3 with terminal 4	brown wire (PT100 original wire)
or	
Terminal 5	yellow wire (PT100 original wire)
Terminal 6	brown wire (PT100 original wire)
or	
Terminal 7	yellow wire (PT100 original wire)
Terminal 8	brown wire (PT100 original wire)

4.2 PT100 M

The **PT100 M** temperature sensor consists of a PT100 sensor resistor that is embedded in a metal tube. The sensor can be stuck directly to the back of the module using the provided dual-component thermal adhesive and thus determine the module temperature.

The connection is established using a 3-meter long cable in a two-wire system. Here, we also recommend installing in a four-wire system.

PT100 temperature sensor connection to "=Z5-X5" in a four-wire system	
Terminal 1	red wire 1 (PT100 original wire)
Terminal 2	red wire 2 (PT100 duplicated wire)
Terminal 3	white wire 1 (PT100 original wire)
Terminal 4	white wire 2 (PT100 duplicated wire)

PT100 temperature sensor connection to "=Z5-X5" in a two-wire system	
Bridge terminal 1 with terminal 2	red wire (PT100 original wire)
Bridge terminal 3 with terminal 4	white wire (PT100 original wire)
or	
Terminal 5	red wire (PT100 original wire)
Terminal 6	white wire (PT100 original wire)
or	
Terminal 7	red wire (PT100 original wire)
Terminal 8	white wire (PT100 original wire)

4.3 PT100 U

The **PT100 U** ambient temperature sensor consists of a PT100 sensor resistor that is embedded in glass and is installed in an IP65 plastic housing. The ambient temperature sensor is mounted using two mounting holes.

The **PT100 U** temperature sensor allows a measurement using either a two-wire or four-wire system. The connection cable is not included in the delivery and is routed into the housing interior through a PG screw fitting.

Here, we also recommend installing in a four-wire system.

PT100 temperature sensor connection to "=Z5-X5" in a four-wire system	
Terminal 1	terminal 14 on the sensor
Terminal 2	terminal 12 on the sensor
Terminal 3	terminal 13 on the sensor
Terminal 4	terminal 11 on the sensor

PT100 temperature sensor connection to "=Z5-X5" in a two-wire system	
Bridge terminal 1 with terminal 2	terminal 12 on the sensor
Bridge terminal 3 with terminal 4	terminal 11 on the sensor
or	
Terminal 5	terminal 12 on the sensor
Terminal 6	terminal 11 on the sensor
or	
Terminal 7	terminal 12 on the sensor
Terminal 8	terminal 11 on the sensor

5 Calibrating the Sunny Central Control

5.1 General Information

To properly calibrate the data logger for the irradiation sensor, the analog measuring channels are programmed directly on the Sunny Central Control in the menu item "Set-up...Interfaces...Analog In".

To calibrate the Sunny Central Control, the voltage value specified on the type plate of the RA100 T sensor is required for an irradiation of 1000 W/m². Please take note of this before installing the sensor!

5.2 RA100 T

Since the RA100 T consists of two sensors (irradiation and temperature), two sensors must be programmed at this point:

Irradiation Sensor

A suitable measuring range must first be set in the first line under the "Function" column. In case of the irradiation sensor in the RA100 T, the measurement tolerance range would be ± 500 mV.

The name of the channel can be precisely defined in the next line (e.g. irradiation).

The measurement unit of the channel can be specified in the third line (here: W/m²). The gain V is calculated from the value specified on the type plate for the measurement voltage at 1000 W/m² and at 25 °C as follows:

V = 1000 / measurement voltage at 1000 W/m²

The value for the offset is 0.

PT100 Temperature Sensor

The suitable temperature unit must first be set in the first line under the "Function" column. In case of the temperature sensor of the RA100 T, that would be °C.

The name of the channel can be precisely defined in the next line (e.g. module temperature).

The gain and offset do not require calculating.

5.3 PT100 U

PT100 Temperature Sensor

The suitable temperature unit must first be set in the first line under the "Function" column. In case of the temperature sensor of the RA100 T, that would be °C.

The name of the channel can be precisely defined in the next line (e.g. module temperature).

The gain and offset do not require calculating.

5.4 PT100 M

PT100 Temperature Sensor

The suitable temperature unit must first be set in the first line under the "Function" column. In case of the temperature sensor of the RA100 T, that would be °C.

The name of the channel can be precisely defined in the next line (e.g. module temperature).

The gain and offset do not require calculating.

6 Overvoltage Protectors

To protect the **Sunny Central** against external overvoltage, the sensors should be connected using overvoltage protectors. Overvoltage protectors can be ordered optionally.

We recommend the following overvoltage protectors.

PT 100

BLITZREDUCTOR CT

BCT MOD BE 5

DEHN item no.

919 506 + 919 620

Analog Signals

BLITZREDUCTOR CT

BCT MOD BD 30

DEHN item no.

919 506 + 919 644

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