



## TST200 1-Wire Pt100 transmitter

Revision 1.4 / December 2022

## USER MANUAL

For pricing or any further information, please contact Omni Instruments Ltd.

## Short description

TST200 is a Pt100 transmitter with 1-Wire Interface. It is designed to connect Pt100 temperature sensors to TCW2xx and TCG1xx controllers to build temperature monitoring systems in -200 to +850 °C (-328 to 1560 °F) range.

The transmitter incorporates a precision, 24-bit, an analog-to-digital converter (ADC) and further digital signal processing to ensure accurate, drift-free performance.

RTD (Resistance Temperature Detector) commonly referred to as Pt100 is one of the most popular temperature sensors used in industry. In principle, the sensor can be connected with 2, 3 or 4 wires. The more wires are used, the more accurate the measurement is. The difference becomes significant at the longer distance. TST200 allows 3 and 4 wire connection of the Pt100 sensor, but a 4-wire connection is recommended.

Pt100 1-Wire transmitter has two RJ11 connectors, for easy daisy chain arranging of the 1-Wire bus.

## Features

- Wide measured temperature range from -200 to +850 °C (-328 to 1560 °F);
- High-temperature measurement accuracy;
- Factory calibrated;
- 3 or 4 wires connections are supported;
- Low current consumption;
- The transmitter is powered by the 1-Wire interface;

## Applications

- Accurate temperature monitoring for industrial processes;
- Temperature monitoring and control in bakeries;
- Precision Heating, Ventilation, and Air Conditioning (HVAC) systems;
- Temperature monitoring in beverage and food storages;
- Accurate temperature monitoring in pharmaceutical storages;
- Temperature monitoring and control for building management systems.

## Technical parameters

|                                     |                              |
|-------------------------------------|------------------------------|
| Supply voltage range (1-Wire bus)   | 3.5 to 5.5 V                 |
| Maximum supply current (1-Wire bus) | 6 mA                         |
| Measurement temperature range       | -200 to +850 °C              |
| Accuracy                            | 0.2 °C ± 0.05 % of reading   |
| Dimensions                          | 85 x 35.1 x 23.5 mm          |
| Operating temperature range         | -20 to +55 °C                |
| Operating relative humidity range   | 5 to 85 %RH (non-condensing) |

## Pt100 sensors

There are two types of Pt100 sensors depending on their accuracy - type A and type B.

The overall accuracy of the system depends directly on the choice of sensor type.

Basically, Pt100 is a 2 pin resistor with known resistance for different temperatures.

If just 2 wires are used for interconnection of the sensor, there isn't any compensation for wires resistance which is in series with Pt100 element. This degrades the accuracy of measurement. The effect is stronger on a longer distance.

### 3/4 Wire mode

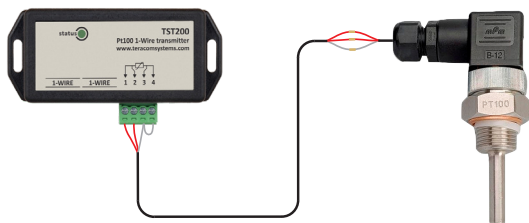
TST200 supports only 3 and 4 wires connections. For both type of connecting it is strongly recommended to use the same wires for all connections.

The working mode can be changed by a jumper on PCB. When the jumper is open, the sensor is in 3 Wire mode.

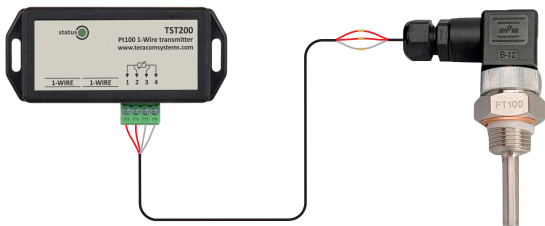
When the jumper is closed the sensor is in 4 Wire mode.

The mode of work should be changed before to connect the sensor to 1-Wire bus.

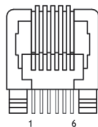
The 3 wire connection is illustrated below. It is important to shorten pin 3 and 4 in this case.



The 4 wire connection is illustrated below:



### Pin out of RJ-11 connectors

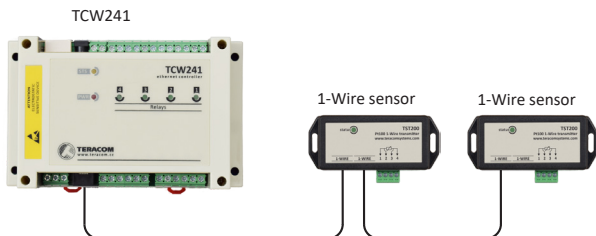


| Pin | Description | UTP wires color |
|-----|-------------|-----------------|
| 1   | 1-Wire GND  | White/Brown     |
| 2   | 1-Wire GND  | White/ Green    |
| 3   | 1-Wire Data | Green           |
| 4   | 1-Wire GND  | White/Orange    |
| 5   | 1-Wire +VDD | Orange          |
| 6   | 1-Wire +VDD | Brown           |

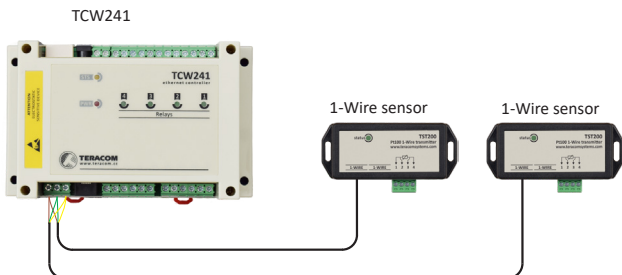
## Interface connection

1-Wire is a registered trademark of Maxim Integrated Products, Inc. It is designed to connect several sensors over a short wiring. It is not suitable for long distances or environments with EMC interference. Guidelines for reliable long line 1-wire networks can be found at <https://www.teracomsystems.com/wp-content/uploads/1-wire/guidelines-for-reliable-long-line-1-wire-networks.pdf>.

It is strongly recommended to use only UTP/FTP cables and keep total cable length up to 30 m.



“Star” topology can be used only as a last resort for up to 4 sensors and total cable length up to 10 meters:



## LED indicator

The status of the device is shown by single LED, located on the front panel:

- If the LED blinks on a period of 1 second, the sensor works properly;
- If the LED blinks on a period of 3 seconds, there isn't communication with TCW2xx controller;
- If LED doesn't blink, there isn't power supply.

## The 1-Wire Pt100 transmitter can be used with:

The status of the device is shown by single LED, located on the front panel:

- Ethernet IO module TCW241;
- Ethernet data logger TCW220;
- Temperature and humidity data logger TCW210-TH;
- GSM-GPRS Remote monitoring controller TCG120.