control solutions
TERACOM



TSM400-1-CP

1-Wire carbon dioxide sensor

USER MANUAL

www.teracomsystems.com

1. Short description

TSM400-1-CP is a multi-parameter sensor that supports the 1-Wire protocol. The sensor measures the concentration of carbon dioxide and atmospheric pressure. Both basic sensor elements, for carbon dioxide and pressure, used in the device are digital. This ensures high measurement accuracy and long-term stability.

The basic sensing element for atmospheric pressure is factory calibrated and it does not require any lifetime recalibration. Automatic calibration is available for carbon dioxide measurements.

TSH400-1-CP is housed in a slim plastic enclosure. The bottom part of the enclosure is suitable for installation on standard flush-mounted/cavity wall boxes ø68mm, with installation openings on 61mm.

2. Features

- LED indicator for status of communication
- Excellent long-term stability
- Firmware update with Teracom controller via the 1-Wire interface

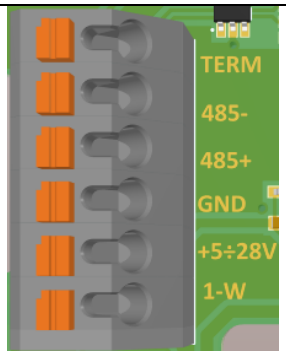
3. Applications

- Environmental quality monitoring and assessment for offices
- CO_2 pollution monitoring
- Smart ventilation systems

4. Specifications

- Physical characteristics
  Dimensions: 81 x 81 x 30 mm
  Weight: 66 g
- Environmental limits
  Operating temperature range: -20 to 60°C
  Operating relative humidity range: 5 to 95% (non-condensing)
  Storage temperature range: -20 to 60°C
  Storage relative humidity range: 5 to 95% (non-condensing)
  Ingress protection: IP20
- Power requirements
  Operating voltage range (including -15/+20% according to IEC 62368-1): 4.5 to 26 VDC
  Current consumption: 25 mA@5VDC (Peak: 150 mA@5VDC)
- CO_2 measurements
  Range: 400 to 5000 ppm
  Accuracy: ± (40 ppm + 5 %)
  Resolution: 1 ppm
  Calibration: Manual
- Pressure measurements
  Range: 10 to 1200 hPa
  Accuracy (min): ±1.5 (25°C, 750 hPa)
  Accuracy (max): ±2.5 (-20°C to + 85°C, 300 to 1100 hPa)
  Resolution: 1 hPa

5. Pinout

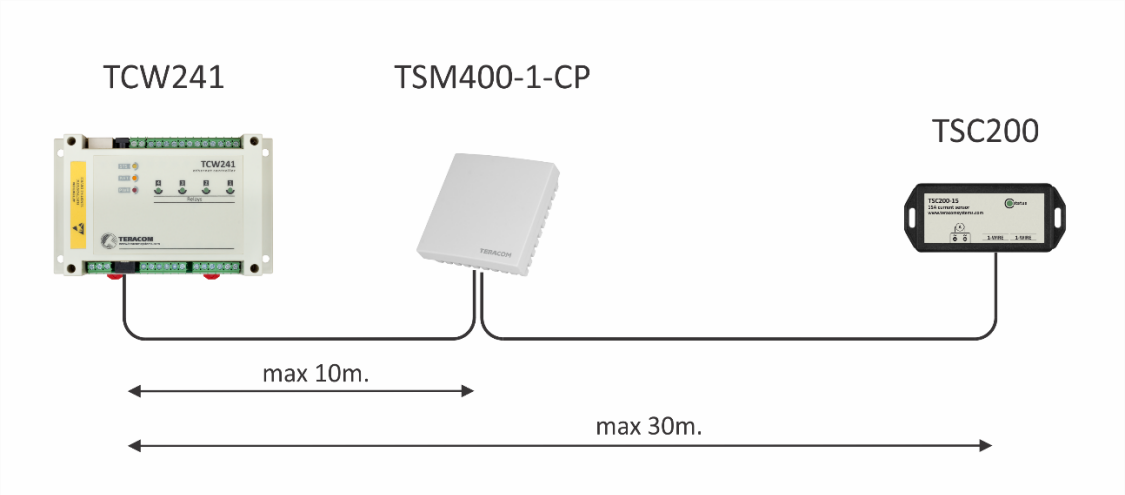


Pin	Description	UTP wires color
TERM	Not used	
485-	Not used	
485+	Not used	
GND	Ground (negative) supply	Green/White tracer Orange/White Tracer
+5÷28V	Positive power supply	Orange
1-W	1-Wire data	Green

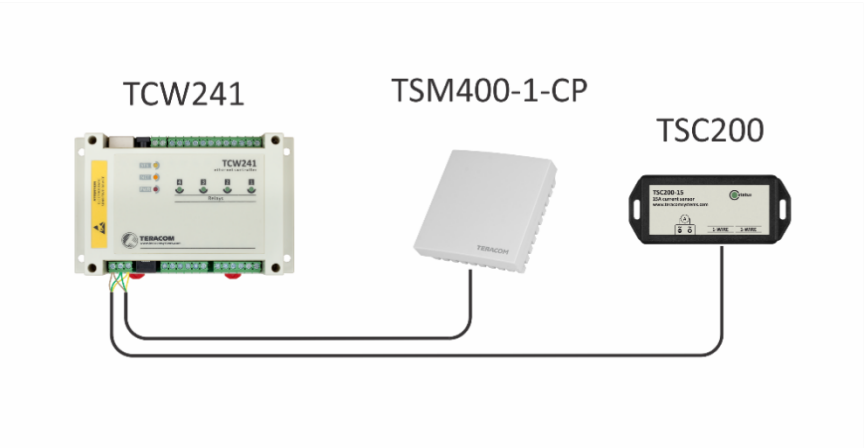
6. Installation

It is strongly recommended to use UTP/FTP cables and daisy-chained (linear) topology for multiple sensors and keep the total cable length up to 30 meters.

Attention! Due to the high peak current, only one TSM400-1-CP sensor can be connected to a controller. The length of the cable between the controller and the sensor should not exceed 10 meters. If you want to connect more than one TSM400-1-CP sensor, please contact your supplier for technical guidance.



"Star" topology can be used only as a last resort for up to 4 sensors and a total cable length of up to 10 meters.



7. Status indicator

The status of the device is shown by a single LED, located inside the box:

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

8. CO2 Calibration

The device has the capability to automatically and manually calibrate carbon dioxide measurements. It is advised by the sensor element's manufacturer to perform calibration on a weekly basis. The automatic self-calibration (ASC) feature is disabled by default.

Manual Calibration Procedure:

To manually calibrate the device, follow these steps:

- Place the device in a fresh air environment with a CO2 concentration of 400 ppm.
- While the sensor is in operation, press and hold the button.
- The “status” LED will start flashing once every second.
- After the 5th flash, the “status” LED will turn off and wait for the button to be released to initiate calibration.
- Release the button.
- The calibration procedure will begin, indicated by the “status” LED staying continuously lit for approximately 5 seconds.
- After a successful calibration, the “status” LED will flash 3 times in 1 second. In the case of a failure, it will flash rapidly (15 times within a 3-second period).
- Following the calibration, the device will enter its standard operation mode.

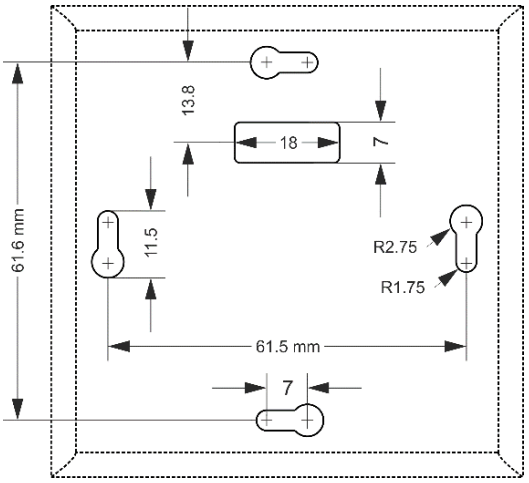
9. Installation tips

The location and the mounting position of sensors have a direct effect on the accuracy of the measurements. The tips below will ensure good measuring results:

- The sensor shall be installed about 1.2-1.4 m above the floor;
- To avoid solar radiation, the sensor should not be installed next to windows or directly in the sunlight;
- The sensors shall be installed in a place with sufficient air circulation.

1-Wire is a registered trademark of Maxim Integrated Products, Inc. It is strongly recommended to read Maxim's 1-Wire tips at https://teracomsystems.com/wp-content/uploads/AN148.pdf .

TSM400-1-CP sensor is intended for installation on a cavity wall box with 68mm diameter and 61 mm screw spacing.



10. Firmware update

The firmware of the sensor can be updated with any Teracom controller which supports a 1-Wire interface. For more details ask your dealer.

11. Recycling

Recycle all applicable material.

Do not dispose of regular household refuse.