TCM-TCV

Duct-type transmitter for measuring temperature, humidity, and CO_2 concentration.

Reliable, accurate, and easy to install, perfect for air monitoring in ventilation systems.

- Measurements parameters: CO_2, RH, and temperature.
- Infrared technology (NDIR)
- Output: Modbus RTU or analog 0...10 V
- High accuracy and long-term stability
- CO_2 concentration range: 0...2000 ppm

Application

Designed for accurate measurement of carbon dioxide concentration, relative humidity, and temperature in air. Reliable and easy to install, ideal for use in HVAC systems across residential, commercial, and industrial applications. Supports efficient ventilation control and improved indoor air quality. Available with Modbus RTU or analog 0…10 V output.

Function

The TC... series transmitter feature a probe designed in the shape of a venturi tube with two separate air channels. The CO_2 sensor is integrated into the cover part of the casing, while the temperature and humidity sensor are inside the pipe.

Air from the ventilation duct is drawn through one half of the pipe to the CO_2 sensor, then returned to the duct through the other half (see Fig.1). This design ensures effective and representative air sampling, contributing to accurate and stable measurements.

Different sensor combinations can be configured based on application requirements (see *Models* table).

Measuring Principle for CO_2 Sensor

The CO_2 concentration is measured using non-dispersive infrared (NDIR) technology. In this method, infrared light passes through the gas sample, and CO_2 molecules absorb specific wavelengths. A sensor measures the remaining light, and the amount absorbed indicates the CO_2 concentration.

This method offers several key advantages:

- Very high accuracy
- Precise identification of the target gas
- Low risk of contamination
- Short response time
- Excellent long-term stability

MAIN OFFICE BRESSANONE
I-39042 Bressanone (BZ) tel: +39 0472 830626
via Julius-Durst-Str. 50 fax: +39 0472 831840
VAT No. IT02748450216 www.industrietechnik.it

Automatic CO_2 Sensor Self-Calibration (ASC)

The transmitters are equipped with an Automatic Self-Calibration (ASC) function for the CO_2 sensor, which can be activated or deactivated during operation. By default, the ASC function is deactivated at the factory.

Technical data

Power supply	16…35 Vdc, 24 Vac ±10 %, 50-60 Hz
Consumption power	< 2.5 W
Working temp.	0…+50 °C
Working humidity	10…90 % RH (without condensing)
Energy consumption	< 0.5 Wh
Humidity sensor	±3% RH (20°C)
CO_2 sensor	NDIR sensor accuracy (25 °C) ± (30 ppm + 3% of value) time stability ± 50 ppm CO_2 sampling every 2 seconds max air speed 10 m/s
Range CO_2	0…2000 ppm
Outputs	For models TCV… (analog output 0…10 V): • *CO_2:* 0…10 Vdc corresponding to 0…2000 ppm (load resistance RL > 10 kΩ) • *Temperature*: 0…10 Vdc corresponding to -20…70 °C (RL > 10 kΩ) • *Humidity*: 0…10 Vdc corresponding to 0…100% RH (RL > 10 kΩ) For models TCM….: • *Modbus RTU* (digital communication)
Transformer power	5 VA
Accuracy, Temperature	±0,4°C
TC dependence	2,5 ppm CO_2/°C
Storage	–20…+70 °C 95% RH
Materials	*Cover*: ABS, white (RAL 9010), flame rating UL94 V-0 *Base*: ABS, grey (RAL 7038), flame rating UL94 V-0
Protection class	IP65, pipe IP20
Size	100 x 75 x 266 mm
Weight	Max. 160 g
Isolation class	III

Models

Article	Description	Output	Wiring
TCV1101	CO_2 + H + T	0…10 V + 0…10 v + 0…10 V	Fig.5
TCM1001	H + T	Modbus	Fig.6
TCM0101	CO_2 + T	Modbus	Fig.6
TCM1101	CO_2 + H + T	Modbus	Fig.6

CE UK CA

EMC emissions & immunity standards: This product conforms to the requirements of the EMC Directive 2014/30/EU through product standards EN 61000-6-1 and 61000-6-3.

RoHS: This product conforms to the Directive 2011/65/EU of the European Parliament and of the Council through standard 50581:2012.

Installation

To ensure proper operation, make sure the cover is securely fastened and that the cable gland forms a tight seal around the cable. Install the transmitter in the airflow direction of the ventilation duct, aligning it according to the directional markings on the cover. Ensure that the minimum required immersion length is maintained. The airflow direction can be either from right to left or from left to right, as shown in Figure 1.

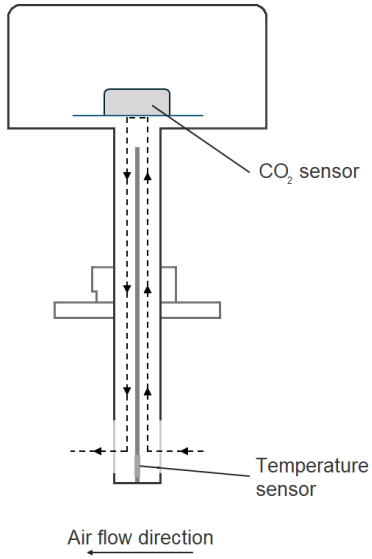

Fig. 1 Working principle

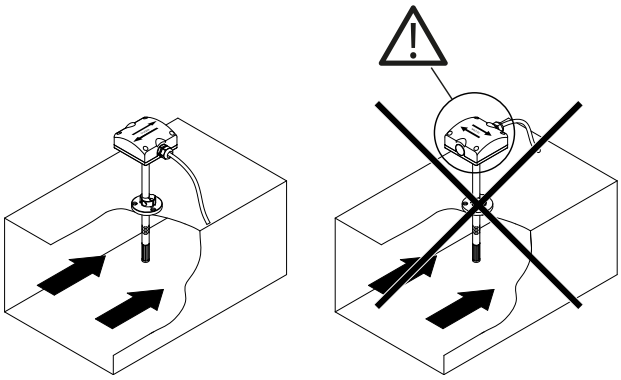

Fig. 2 The arrow direction must be the same as the flow

Dimensions

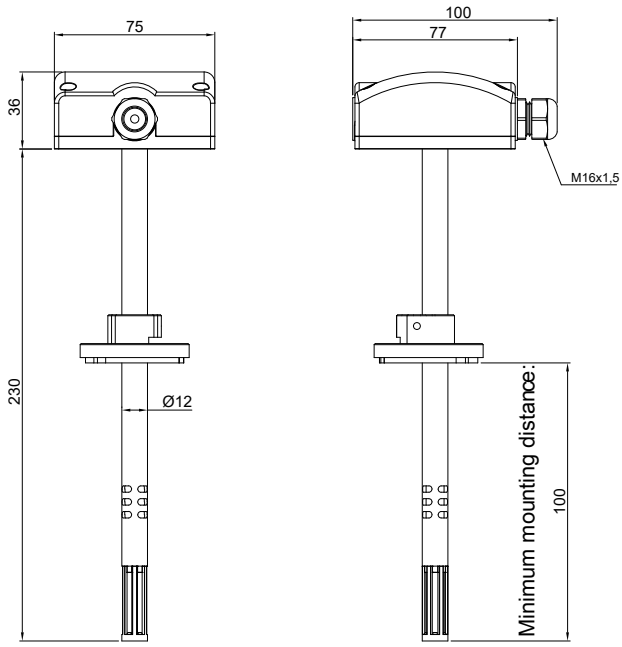

Fig. 3 Overall dimensions

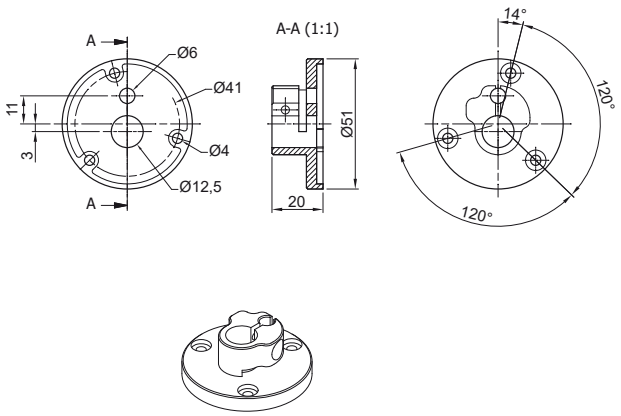

Fig. 4 Mounting bracket dimensions

Electrical wiring

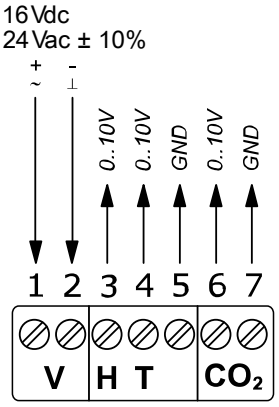

Fig. 5 Electrical wiring for 0…10 V output

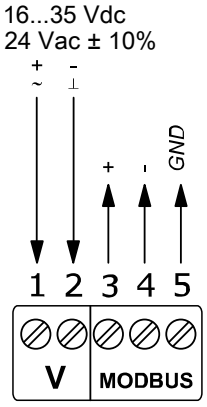

Fig. 6 electrical wiring for Modbus RTU

For 0…10 V outputs:
RL > 10 kOhm with RL load resistance applied on output

Documentation

All documentation can be downloaded from www.industrietechnik.it.