CO2 and temperature duct controllers - series PCTUR

- long-term stability - NDIR sensor
- maintenance-free operations
- measuring the concentration of CO2 with an output signal of 0 ÷ 10V
- measuring temperature with an output signal of 0 ÷ 10V, by a passive sensor
- temperature control via built-in comparator (relay)
- CO2 concetration control via built-in comparator (relay)
- very compact and a space-efficient design
- easy assembly into air-conditioning ducts

The sensors are designed to measure the concentration of CO2 and the air temperature without aggressive admixtures in the air-conditioning ducts. The CO2 sensor is located inside the plastic head, into which the measured air is fed through the openings in the stop. Therefore, the openings must be directed in the direction of the airflow in the air-conditioning duct, as shown on the lid of the head. The sensors include a plastic central holder for mounting the sensors on the wall of the air-conditioning duct. The output of the CO2 concentration is the voltage signal, 0 ÷ 10V in a range of 0 ÷ 2000ppm and possible relay outputs of the comparator, which is adjustable in the range of 400 ÷ 2000ppm with 200ppm hysteresis switching. The output of the temperature is the voltage signal 0÷10V in a range 0÷50°C or 0÷35°C and possible relay output of the comparator which is adjustable in the range 14÷30°C with 0,5°C hysteresis switching. If the temperature neither requires a relay output nor a voltage signal, the instrument may be equipped with a passive temperature sensor or it may not have the option to measure temperature.

Setting the comparator level for the CO2 switch relay is done with a trimmer accessible after removing the lid of the instrument by a suitable instrument (a flat screwdriver). For example, if the trimmer is rotated with the arrow to the centre of the scale, the relevant relay will switch on (the CO2 LED will switch on) if the measured CO2 level exceeds 1200ppm and the LED switches off once the CO2 level drops below 1000ppm. This applies if the negation switching the J3 connector is not selected. In this case, the logic of switching would be the opposite under the same CO2 concentration levels. Setting the comparator level for the switching relay of the temperature is done by setting the control buttons to the required value.

Setting the comparator level for the temperatue switch relay is done with a trimmer accessible after removing the lid of the instrument by a suitable instrument (a flat screwdriver) For example, if the arrow is rotated to 22°C, the relevant relay (the LED TMP light will switch on) will switch on once the measured temperature level exceeds 22.25°C and will switch off once the level drops below 21.75°C. This applies if the negation switching the J4 connector is not selected. In this case, the logic of switching would be the opposite under the same temperature levels.

Technical parameters:

Supply voltage (Ucc)	24 VDC ±20%
Power consumption/ peak (<200ms)	35 mA / 170mA
Accuracy - CO2 (range 0 - 2000ppm)	±30ppm ±5% of range
Accuracy - temperature (temperature = 0 - 10V)	±0,5°C
Time of stabilization	30 minutes
CO2 range (0 ÷ 10V)	0 ÷ 2000 ppm
Standard temperature range (0 ÷ 10V)	0 ÷ 35 °C 0 ÷ 50 °C
Load impedance of voltage outputs (Rz)	> 50kΩ
Setting range of CO2 comparison	400÷ 2000 ppm
CO2 comparison hysteresis	200 ppm
Range of temperature comparison	14 ÷ 30 °C
Hysteresis of temperature comparison	0,5 °C
Max. switching voltage / current	50VAC, 100VDC / 6A
Accuracy temperature	sensor Pt...class B, EN60751 Sensor Ni....class B, DIN43760
Recommended/Max. measurement current	Pt1000, Ni1000 0,1mA / 1mA Pt100 1mA / 5mA
Galvanic separation of voltage output	no
Galvanic separation of relay output	yes <250V
Maximum air flow rate	10 m/s
Range of recommended working temp	0 ÷ 50 °C/ 0 ÷ 95%RH without condensation
Range of recommended storage temp. / RH	-20 ÷ 50 °C/ 0 ÷ 95 %RH without condensation
Protection type of stem	IP 20
Protection type of head	IP 65
Terminal board	CPP (max. 1 mm^2) / COB (max. 1.5 mm^2)
Cable gland/max. .Øof cable	PG 16 / 12 mm

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List of available types:

Typ	CO2 - transmitter	CO2 - comparator	temperature - transmitter	temperature-comparator
PCTUR2 - 2K - 0÷50 - L1	0÷2000ppm=0÷10V	400 ÷ 2000ppm	0÷50°C = 0÷10V	14 ÷ 30°C
PCTUR2 - 2K - 0÷35 - L1	0÷2000ppm=0÷10V	400 ÷ 2000ppm	0÷35°C = 0÷10V	14 ÷ 30°C
PCTUR1 - 2K - 0÷50 - L1	0÷2000ppm=0÷10V	400 ÷ 2000ppm	0÷50°C = 0÷10V	---
PCTUR1 - 2K - 0÷35 - L1	0÷2000ppm=0÷10V	400 ÷ 2000ppm	0÷35°C = 0÷10V	---
PCTUR1 - 2K - x - L1	0÷2000ppm=0÷10V	400 ÷ 2000ppm	Resistance sensor	---
PCNUR1 - 2K - L1	0÷2000ppm=0÷10V	400 ÷ 2000ppm	---	---
PCNUR0 - 2K - L1	0÷2000ppm=0÷10V	---	---	---

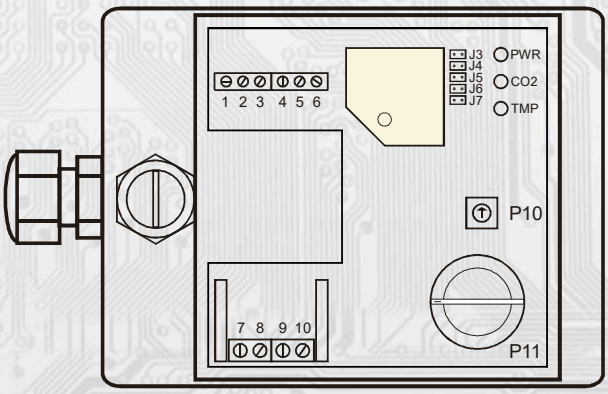
Standard lehgth L1:

180 mm
240 mm

List of type of resistance sensors....x

Type of resistance sensor	Placement after x (eg PCTUR1 -2K -PA -180)
Pt 100 / 3850 ppm	**P**
Pt 1000 / 3850 ppm	**PA**
Ni 1000 / 6180 ppm	**S**
Ni 1000 / 5000 ppm	**L**
Ni 891 / 6371 ppm	**J**
Ntc 20kΩ	**H**

Connection plan (fig.1):



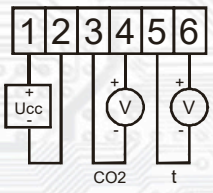
Terminal 1.....+Ucc, positive pole
Terminal 2.....GND, negative pole
Terminal 3.....common pole of output CO2 (GND)
Terminal 4.....positive pole of output CO2 (0-10V)
Terminal 5.....common pole of output temperature (GND)
Terminal 6.....positive pole of output temperature 0÷10V or resistance ouput of CO2 sensor.
Terminal 2, 3 and terminal 5 are galvanically connected

Terminals 7, 8.....switch contacts of the CO2 comparator relay
Terminals 9, 10.....switch contacts of the temperature comparator relay

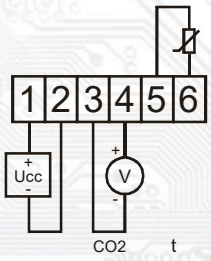
P10....setting a comparison level of CO2 concentration (range 400 ÷ 2000ppm)
P11....setting a comparison level of temperature (range 14 ÷ 30 °C)

J3.....negating the relay output of CO2. The relay will switch with a lower CO2 concentration than that set by the P10 trimmer
J4.....negating the relay output of temperature. The relay will switch with a higher temperature than that set by the P11 trimmer
J6.....ACDL (Automatic Calibration in Dimming Light mode)
J7.....MCDL (Manual Calibration in Dimming Light)

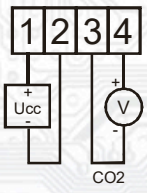
Connection (fig. 2):



CO2 = 0 ÷ 10V
temperature = 0 ÷ 10V



CO2 = 0 ÷ 10V
temperature = resistance sensor



CO2 = 0 ÷ 10V
temperature = ——

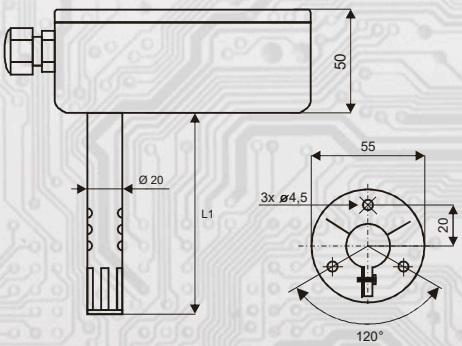
The function of the automatic calibration (ACDL) and the manual recalibration (MCDL):

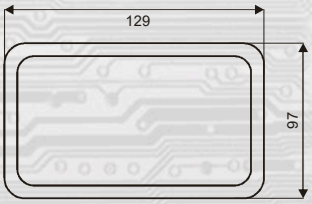
The CO2 sensor contains optical elements, which "age" during operations and the sensor losses its accuracy. In normal living rooms, where occasional complete air exchange of the room is assumed, ageing is compensated by setting the ACDL mode, which is the automatic calibration function. This function is activated by a permanent short-circuit of the J7 connector, when the first automatic calibration takes place after 3 days and then after every week.
In areas, where it is not possible to use the automatic calibration function, it is advisable to occasionally use the manual recalibration function. This is done by placing sensors with a connected voltage supply into the ventilated area, preferably into an outdoor environment (CO2 content = approx. 400ppm) for at least 30 minutes. Then, the J7 connector is short-circuited for 10 minutes. After 10 minutes, the connector is disconnected and the sensor works with modified values. The sensor must be placed in a ventilated area for the duration of the recalibration.
The instrument is supplied calibrated from the manufacturer without any set mode. It is up to the user to choose how the calibration will take place. The majority of the users use the optimal automatic calibration function (ACDL), thereby connected to J6.

Assembly and connection:

The sensors are designed to be assembled into air-conditioning ducts using the attached consoles. The air flow direction must be maintained according to the sticker on the lid in order to ensure air supply to the CO2 sensor inside the box. The electrical connection of the conductors is done after removing the transparent lid, as seen in Fig. 1 and 2 on the terminal boxes for the power supply and voltage outputs using a conductor with a max. cross-section of 1mm^2 and for relay outputs using a conductor with a max. cross-section of 1.5 mm^2.
After connecting the terminals, the P10 and P11 trimmers are set to the required comparator levels and the transparent lid is screwed on. The instrument can only measure the concentration of CO2 if the lid is screwed on and sealed perfectly. For disassembly, proceed in the reverse order.

Dimensions and accessories





Method of ordering

State the quantity of pieces and the sensor type in the order .
An example of an order: 5 pieces sensor PCTUR1-2K-PA-180

- PA-180 — Stem length (180mm)
- 2K — temperature (sensor Pt1000)
- PCTUR1 — CO2 concetration (output 0 - 10V) with comparator