

TP540 | Room sensor VOC 0 – 10VDC

Room sensor TP540 is used to continuously monitor indoor air quality and for effective control of ventilation (HVAC) systems according to current air quality. The sensor monitors the concentration of VOC - Volatile Organic Compounds in air. It can be effectively used in restaurants, kitchens, fitness centres, toilets, changing rooms, gyms, offices, commercial buildings, schools, households etc.

- › monitors VOC
- › TVOC output in conformance with EPA and UBA standards
- › detects the true cause of ventilation demands
- › three-level LED indication
- › no disturbance at night – automatic turn off of LED indication
- › analogue voltage output 0-10V
- › three selectable TVOC ranges
- › eCO₂ output compatible with CO₂ standard
- › output relay C/NO
- › maintenance free during operation
- › long life and stability
- › wide range of supply voltage

Description

Built-in advanced VOC sensor is sensitive to volatile organic compounds typically contained in the exhausted air - gaseous metabolic products of human bodies and other gaseous pollutants such as formaldehyde, disinfectant vapours, cooking vapours, fumes from paints, varnishes, adhesives, detergents, cigarette smoke etc. that the CO₂ sensor does not detect.

There is possibility to select so called eCO₂ (estimated CO₂) measurement mode. In this mode the sensor uses special algorithm to estimate CO₂ concentration based on the assumption that the TVOC produced by human metabolism is proportional to the exhaled CO₂. The analogue voltage output of the sensor is adjusted as equivalent to a standard CO₂ sensor in range of 400–2000 ppm of estimated CO₂. The trigger level of output relay can be set by a rotary element. Ventilation and heat recovery units can be directly controlled based on the output signal of sensor in the most efficient way.

Current air quality can be easily checked by three LED indicators.



Technical data

| Parameter | Value | Unit |
|---|------------------------|-------------------|
| Supply voltage range | 12 – 35 | V DC |
| | 12 – 24 | V AC |
| Consumption | max 1,5 | W |
| Measuring range TVOC ¹⁾ | 0 – 1000 | µg/m ³ |
| | 0 – 3000 | |
| | 0 – 10000 | |
| Measuring range eCO ₂ ^{1) 2)} | 400 – 2000 | ppm |
| Relay - hysteresis | 5% from selected range | |
| Voltage output ³⁾ | 0 – 10 | V DC |
| Max. switching voltage | 250/30 | V AC / V DC |
| Max. switching current | 5/5 | A AC / A DC |
| Working humidity non condensing | 10 – 95 % | RH |
| Working temperature | 0 to +50 | °C |
| Storage temperature | -20 to +60 | °C |
| Expected lifetime | 10 | years |
| Ingress protection | IP20 | |
| Dimensions | 90x80x31 | mm |
| ¹⁾ Output type and range can be set with jumpers. Factory setting range is TVOC 0 - 3000 µg/m ³ . | | |
| ²⁾ Calculated estimated CO ₂ concentration (estimated CO ₂ - eCO ₂). | | |
| ³⁾ Minimum achievable output value corresponds to minimum value of the selected measuring range. | | |

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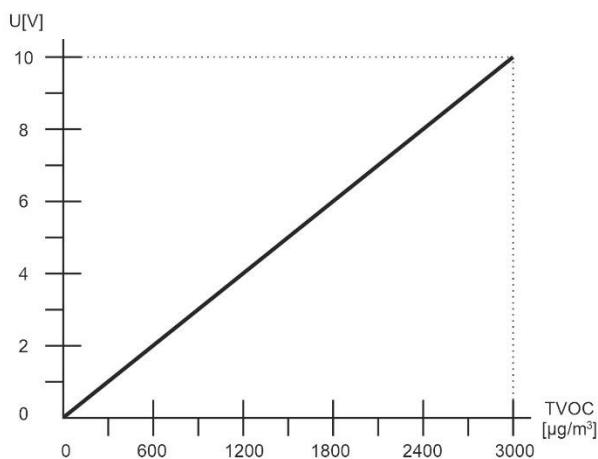
VOC sensor auto-calibration function

Built-in auto-calibration function compensates for long-term aging of the key components of the sensor. This function is active during permanent sensor power supply only.

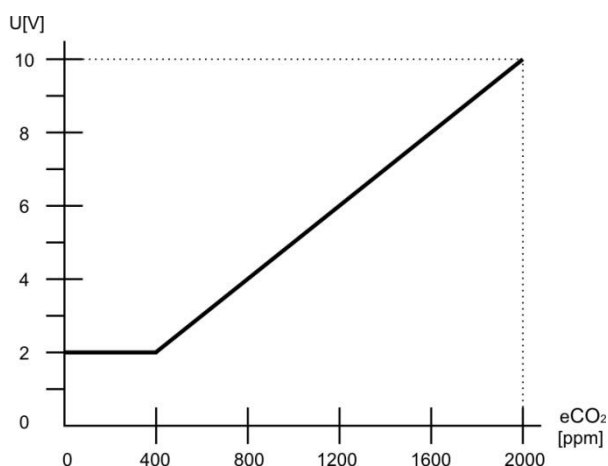
Calibration during operation throughout the lifetime of the sensor is not needed.

For the correct function of the sensor, it needs contact with fresh air approximately once per 2 – 3 weeks.

Analogue output voltage to TVOC dependency for the range 0 – 3000 $\mu\text{g}/\text{m}^3$



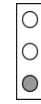
Analogue output voltage to eCO₂ dependency for the range 400 – 2000 ppm



LED indication description

White LED lights:

Less than 300 $\mu\text{g}/\text{m}^3$ TVOC.
Less than 600 ppm eCO₂.



- excellent air quality, low concentrations of VOC
- maintaining this level is not cost-effective

Green LED lights:

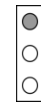
More than or equal to 300 $\mu\text{g}/\text{m}^3$ TVOC, less than or equal to 1000 $\mu\text{g}/\text{m}^3$ TVOC.
More than or equal to 600 ppm eCO₂, less than or equal to 1200 ppm eCO₂.



- optimal balance of air quality and energy consumption for ventilation and air condition

Yellow LED lights:

More than 1000 $\mu\text{g}/\text{m}^3$ TVOC.
More than 1200 ppm eCO₂.



- lower air quality, that can cause fatigue, restlessness, headache and feeling uncomfortable, too hot etc.

Sensor start-up after power on

Sensor warm up time is 2 hours after power supply connection.

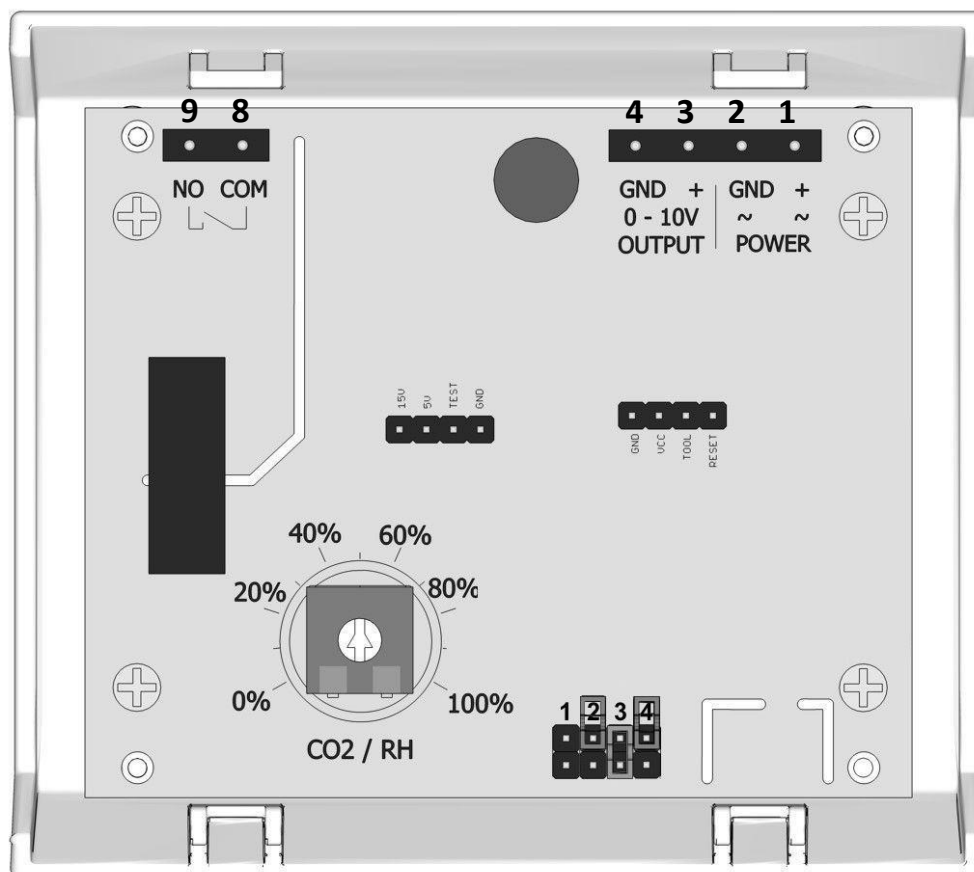
More stabilised output is reached after 2 days of uninterrupted power supply, full stabilisation of sensor parameters is achieved after two weeks of uninterrupted power supply.

Sensor failure indication

All three LED's lights up at the same time permanently.

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Electronic board controls and terminals



Terminals

POWER

| | |
|----------|-------------------------------------|
| 1. ~ + | supply AC or DC (+) plus pole |
| 2. ~ GND | supply AC or DC (-) minus pole, GND |

OUTPUT

| | |
|--------|----------------------|
| 3. + | analog output 0-10 V |
| 4. GND | output – minus pole |



| | |
|--------|-------------------------------------|
| 8. COM | output relay, common contact |
| 9. NO | output relay, normally open contact |

Jumpers

| jumper | meaning | fitted | not fitted |
|--------|---------------------------------------|--------|------------|
| 2 | LED indication | always | automatic |
| 1 | this position is not for user setting | | |

0-10 V output configuration

| Output type | jumper 3 | jumper 4 |
|-----------------------------------|----------|----------|
| TVOC: 0 – 1000 µg/m ³ | - | ✓ |
| TVOC: 0 – 3000 µg/m ³ | ✓ | - |
| TVOC: 0 – 10000 µg/m ³ | ✓ | ✓ |
| eCO ² : 400 – 2000 ppm | - | - |

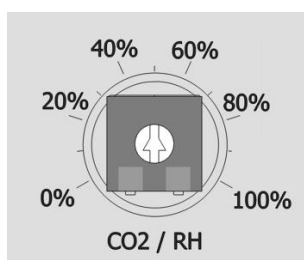
Factory setting

| Output type | TVOC |
|-----------------|----------------------------|
| Measuring range | 0 - 3000 µg/m ³ |
| LED indication | automatic |
| Switching level | 50% |

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Setting the relay switching level using rotary selector

The 0 - 100% selector setting corresponds to the value of selected range – see example below.

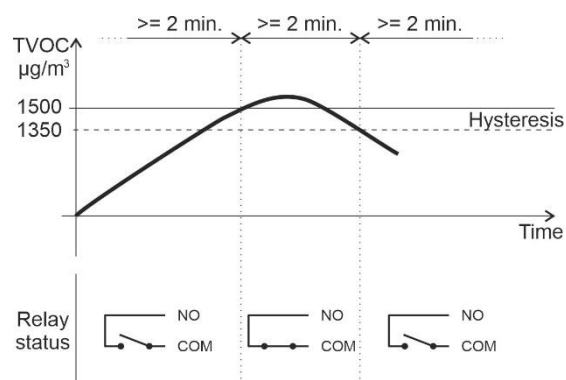


The relay switches on when the level of measured value rises above the level of the rotary selector. The relay switches off when the level measured value falls below the level of the rotary selector minus hysteresis value of 5% from measuring range. Minimal lag between changes in state relays are 2 minutes.

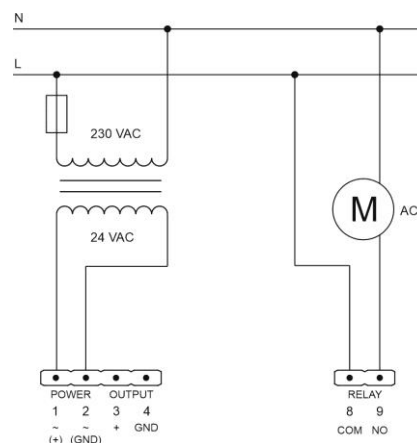
| Selector value | TVOC [$\mu\text{g}/\text{m}^3$] range 0 - 3000 $\mu\text{g}/\text{m}^3$ |
|----------------|--|
| 0% | 0 |
| 10 % | 300 |
| 20 % | 600 |
| 30 % | 900 |
| 40 % | 1200 |
| 50 % | 1500 |
| 60 % | 1800 |
| 70 % | 2100 |
| 80 % | 2400 |
| 90 % | 2700 |
| 100 % | 3000 |

Relay switching example for TVOC 0 – 3000 $\mu\text{g}/\text{m}^3$

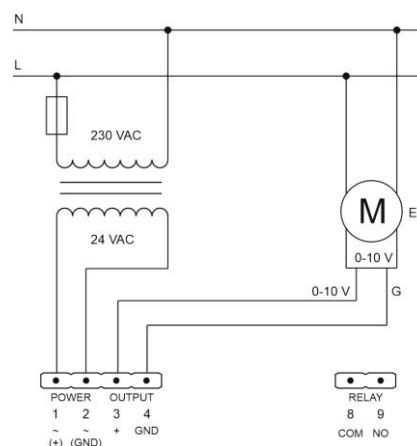
- hysteresis 5% = 150 $\mu\text{g}/\text{m}^3$
- selected switching level value 50% (50% corresponds to 1500 $\mu\text{g}/\text{m}^3$)



Sensor connection using the output relay

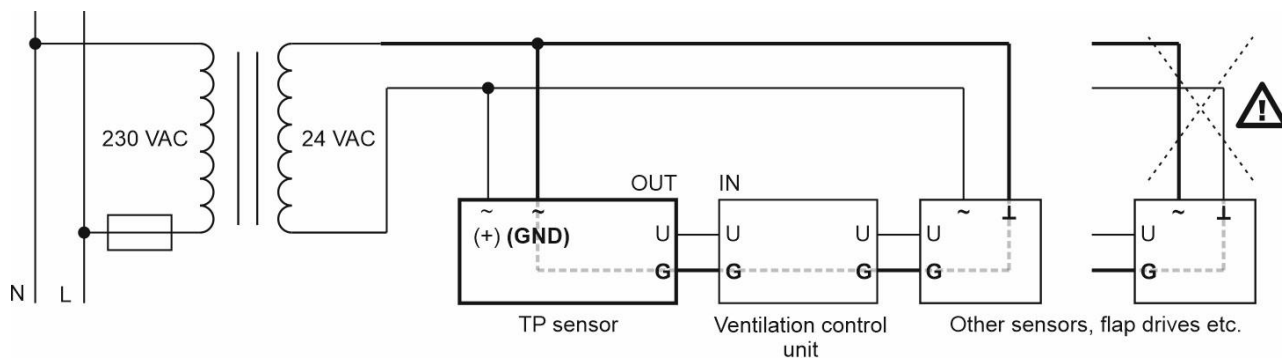


Sensor connection - direct EC motor control using signal 0-10 V

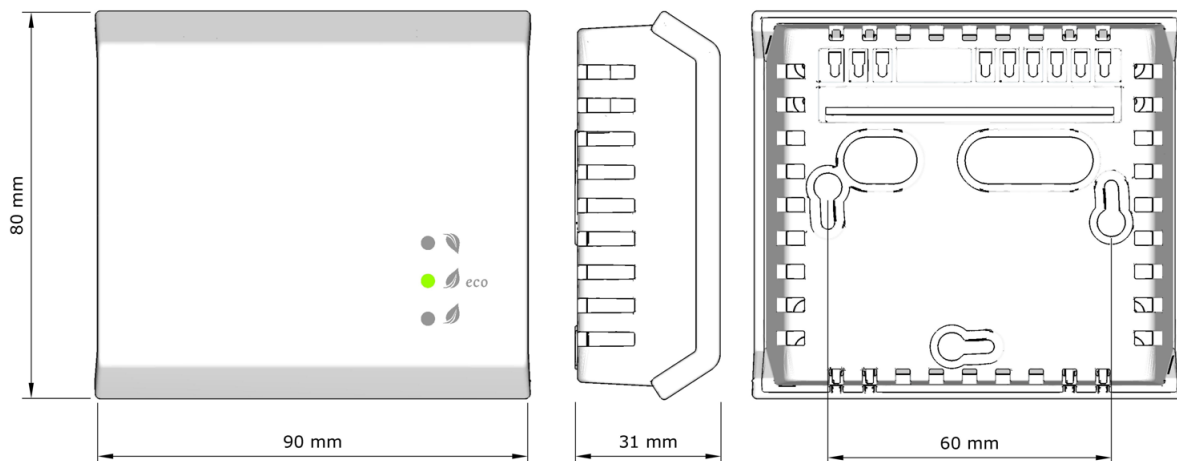


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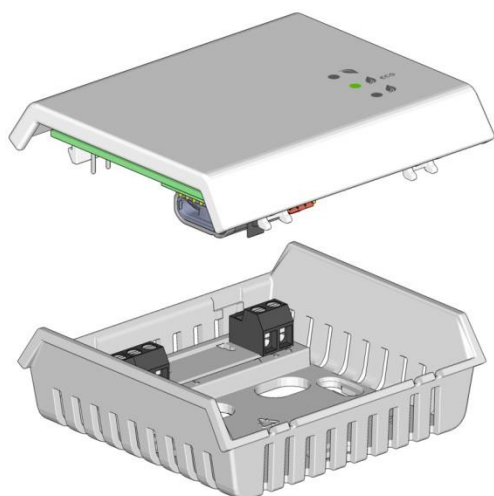
If you connect other devices to the same AC power source as the TP sensor, it is necessary to meet GND wiring of all analog inputs and outputs, as well as power wires.



Dimensions



Sensor assembly



Box color

Front: White - RAL9016. Base: gray - RAL7035.

Way to use

The product is intended for indoor use only. It is necessary to avoid severe mechanical shock of the sensor.

End of product life

Discard the product in according to the electronic waste law and the EU directives.

The producer reserves the right of technical changes in order to product improvements its properties and functions without previous notice.