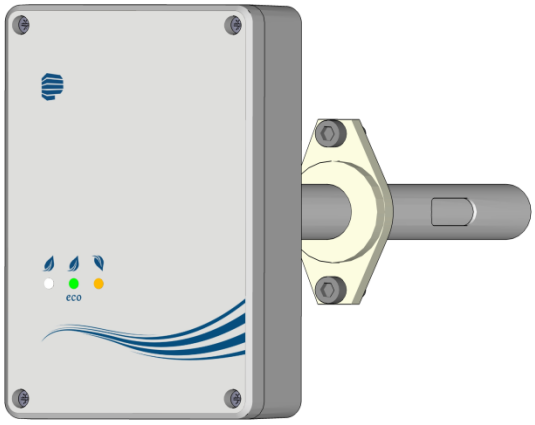
NL-ECO-TVOC-D | Duct mounted VOC sensor

Duct sensor NL-ECO-TVOC-D is used to continuously monitor indoor air quality and then effectively control ventilation (HVAC) systems according to current air quality. The sensor measures the concentration of gaseous organic substances (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.



- measures VOC
- three-step LED indication with automatic turn off when ambient light is low (at night)
- analogue voltage output 0-10V
- choose one of 3 TVOC output measurement ranges
- eCO_2 output compatible with CO_2 standard
- output relay NO/C
- easy air duct mounting
- maintenance or calibration not required during operation
- long life and stability

Description:

Built-in advanced VOC sensor is sensitive to volatile organic compounds typically contained in the stuffy air - gaseous metabolic products of human bodies and other gaseous pollutants such as formaldehyde, cooking vapours, fumes from paints, varnishes, adhesives, detergents, etc. that CO_2 sensor does not detect. NL-ECO-TVOC-D sensor detects gaseous pollutant substances in the air that are the main reason for ventilation. You can choose one of three TVOC (Total Volatile Organic Compounds) output ranges or the eCO_2 output. In case of eCO_2 output, the sensor approximates to human perception of air quality.
Sensor use special algorithm to estimate a CO_2 concentration based on the assumption that the TVOC produced by humans is proportional to their exhaled CO_2. So the analogue voltage output of the sensor is adjusted as equivalent to a standard CO_2 sensor in range of 400–2000 ppm of estimated CO_2, so called eCO_2.
The trigger level of VOC concentration 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 very efficient way.
Current air quality can be easily checked by three LED indicators.
Explanation of abbreviations and technical terms can be found on our website in the Glossary section.

Table of parameters:

Parameter	Value	Unit
Supply voltage range	12 – 35 12 – 24	V DC V AC
Consumption	max 1,5	W
Measuring range TVOC [2]	0 – 1000 0 – 5000 0 – 10000	µg/m^3
Measuring range eCO_2 [1] [2]	400 – 2000	ppm
Relay - hysteresis	5% from range (100ppm)	
Voltage output [2]	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 according jumpers. Factory setting is TVOC 0 - 5000 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 measuring range.

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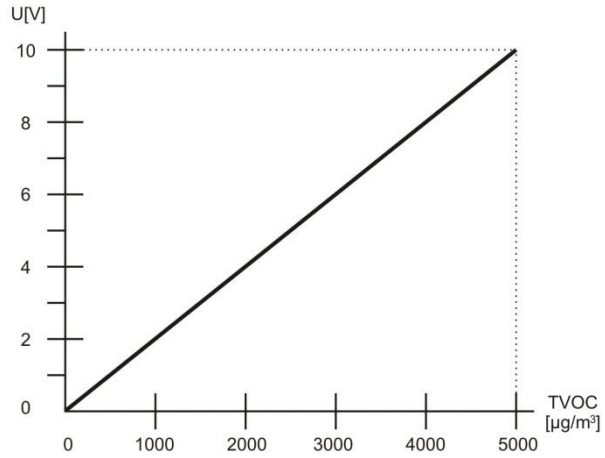
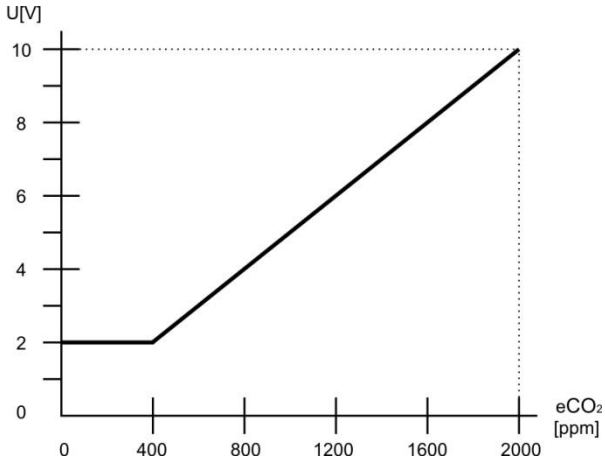
VOC sensor auto-calibration function

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

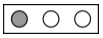
Analogue output voltage to TVOC dependency for range 0 – 5000 µg/m^3



Analogue output voltage to eCO_2 dependency for range 0 – 2000 ppm



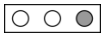
LED indication description

White LED lights: 

- Less than 1000 µg/m^3 TVOC.
- Less than 600 ppm eCO_2.
  (indication is dependent on chosen ouput type)
  - excellent air quality, low concentrations of VOC
  - maintaining this level is not cost-effective

Green LED lights: 

- More than or equal to 1000 µg/m^3 TVOC, less than or equal to 3000 µg/m^3 TVOC.
- More than or equal to 600 ppm eCO_2, less than or equal to 1200 ppm eCO_2.
  (indication is dependent on chosen ouput type)
  - optimal balance of air quality and energy consumption for ventilation and air condition

Yellow LED lights: 

- More than 3000 µg/m^3 TVOC.
- More than 1200 ppm eCO_2.
  (indication is dependent on chosen ouput type)
  - higher concentration of CO_2, lower air quality, that can cause fatigue, restlessness, headache and feeling uncomfortable, hot etc.

Sensor start-up after power on

Sensor start-up lasts for 2 hours of interrupted power supply. The LEDs will show the condition of the air according to LED indication description after the start-up is done.
More stabilised output is reached after 2 days of interrupted power supply, full stabilisation of sensor parameters is achieved after two weeks of interrupted power supply.

Sensor failure indication

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

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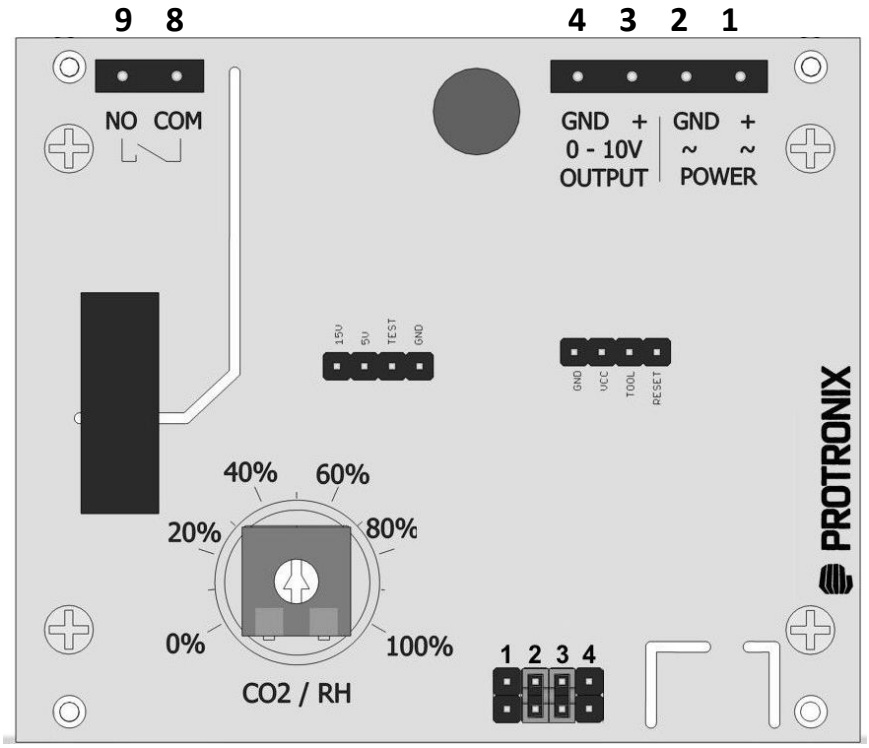
Electronic board controls and terminals



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	on	off
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 – 5000 µg/m^3	✓	-
TVOC: 0 – 10000 µg/m^3	✓	✓
eCO^2: 400 – 2000 ppm	-	-

Factory setting

Output type	TVOC
LED indication	on
Switching level	50%

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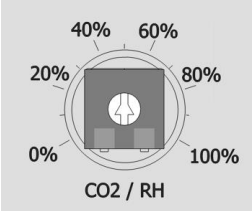
Setting the relay switching level using rotary selector

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

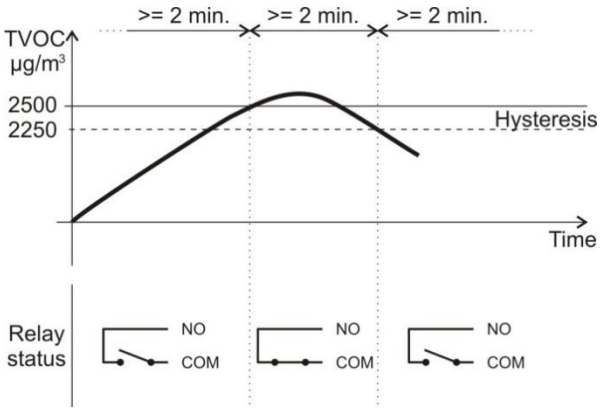


The relay switches on when the level measured value rises above the level of the rotary selector.
The relay switches off when the level measured value falls below the level of the rotary selector minus hysteresis value of 5% from measuring range.
Minimal lag between changes in state relays are 2 minutes.

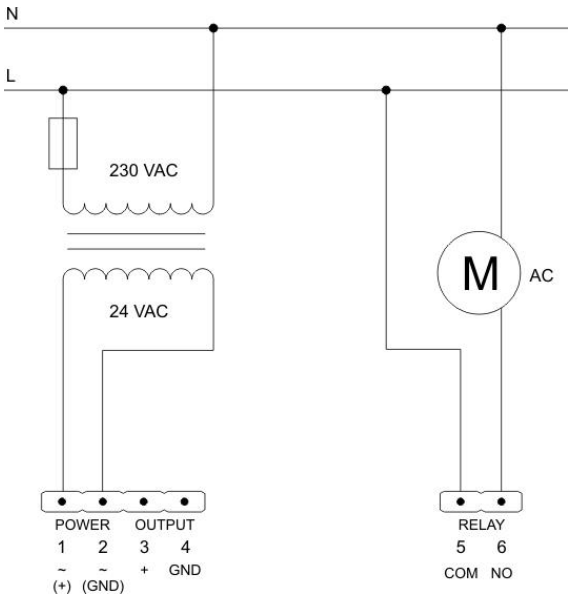
Selector value	TVOC [µg/m^3] range 0 - 5000 µg/m^3
0 %	0
10 %	500
20 %	1000
30 %	1500
40 %	2000
50 %	2500
60 %	3000
70 %	3500
80 %	4000
90 %	4500
100 %	5000

Relay switching example for TVOC 0 – 5000 µg/m^3

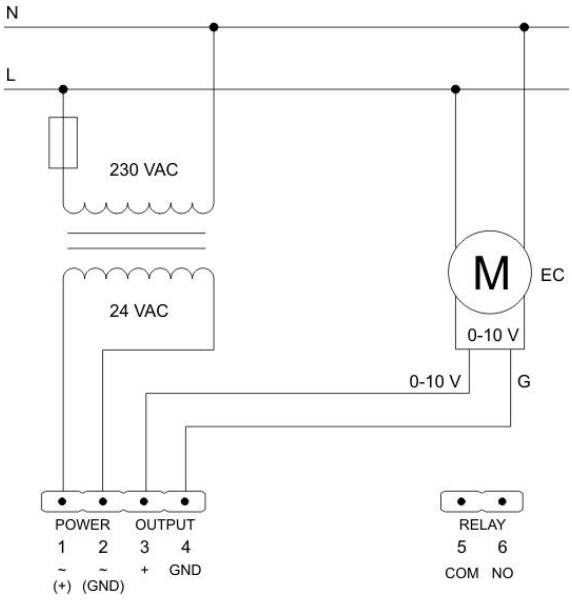
- hysteresis 5% = 100ppm
- selected switching level value 50% (50% corresponds to 2500 µg/m^3)



Sensor connection using the output relay



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



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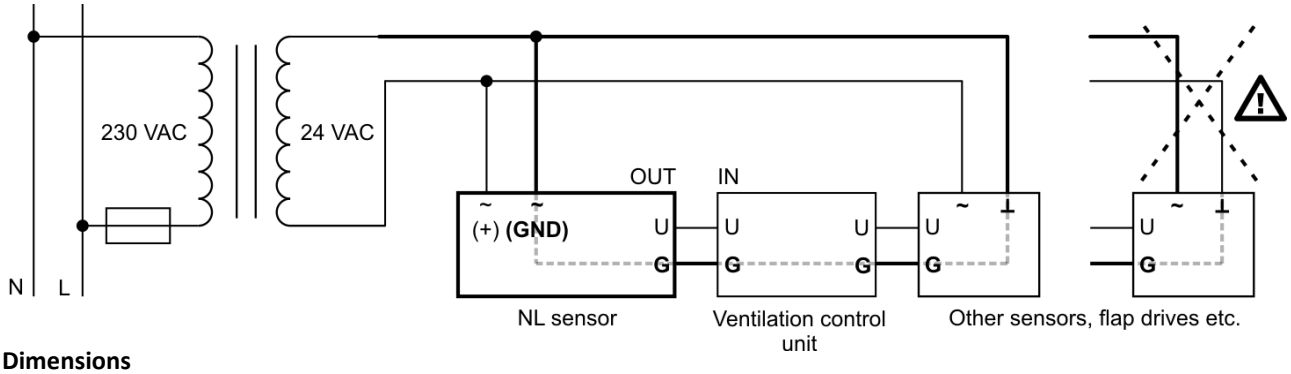
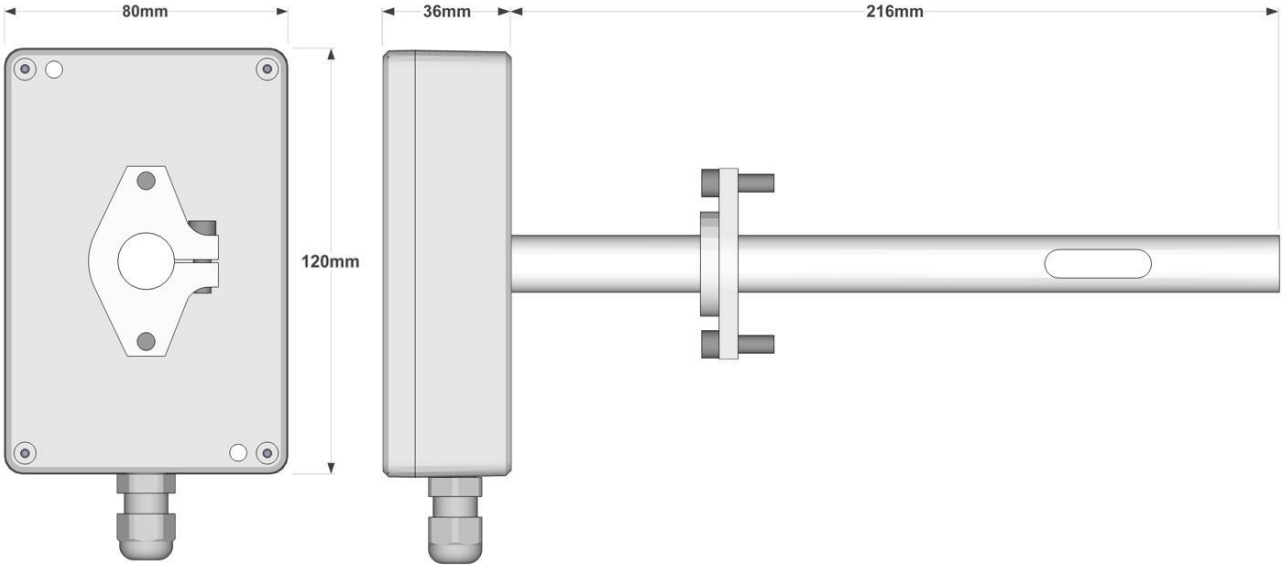
If you connect other devices to the same AC power source as the NL sensor, it is necessary to meet GND wiring of all analog inputs and outputs, as well as power wires.



Dimensions



Installation

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.