

## 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 volatile organic compounds - VOC
- > TVOC output in accordance with [EPA](#) and [UBA](#) standards
- > detects pollutants, which are the main reason for ventilation
- > three-step LED indication
- > analogue voltage output 0 - 10V
- > three selectable TVOC output measurement ranges
- > output relay NO/C
- > easy air duct mounting
- > maintenance or calibration not required during operation
- > long life and stability

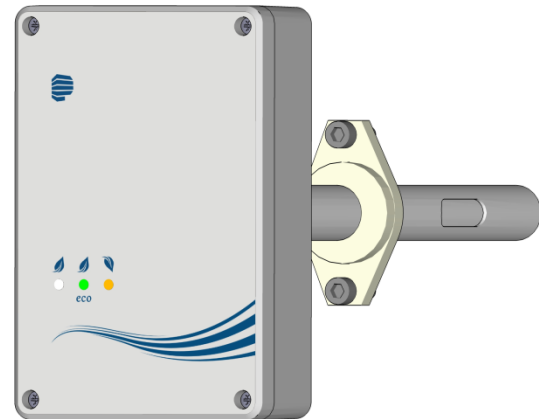
### Description

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<sub>2</sub> sensor does not detect. You can choose one of three TVOC output ranges.

You can choose one of three TVOC output ranges. 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.



### Technical data

Parameter	Value	Unit
Supply voltage range	12 – 35	V DC
	12 – 24	V AC
Consumption	max 1,5	W
Measuring range TVOC <sup>1)</sup>	0 – 1000	µg/m <sup>3</sup>
	0 – 3000	
	0 – 5000	
Relay - hysteresis	5% from selected range	
Voltage output <sup>2)</sup>	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	252x120x80	mm
<sup>1)</sup> TVOC output range can be set with according jumpers. Factory setting is 0 - 3000 µg/m <sup>3</sup> .		
<sup>2)</sup> Minimum achievable output value corresponds to minimum value of the measuring range.		



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

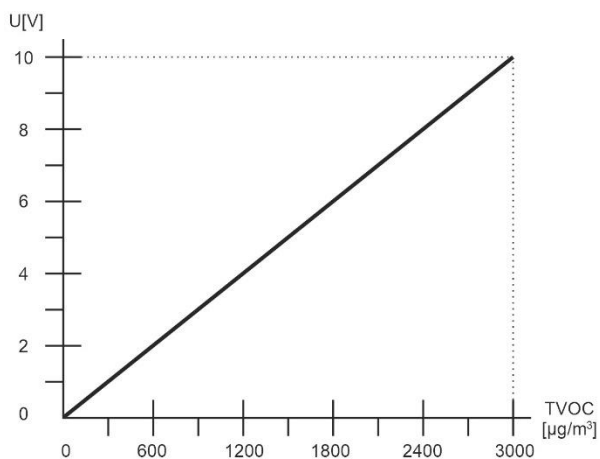
### VOC sensor auto-calibration function

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 – 3000 $\mu\text{g}/\text{m}^3$



### LED indication description

**White LED lights:** 

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

- 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.

- 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.

- 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.

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.

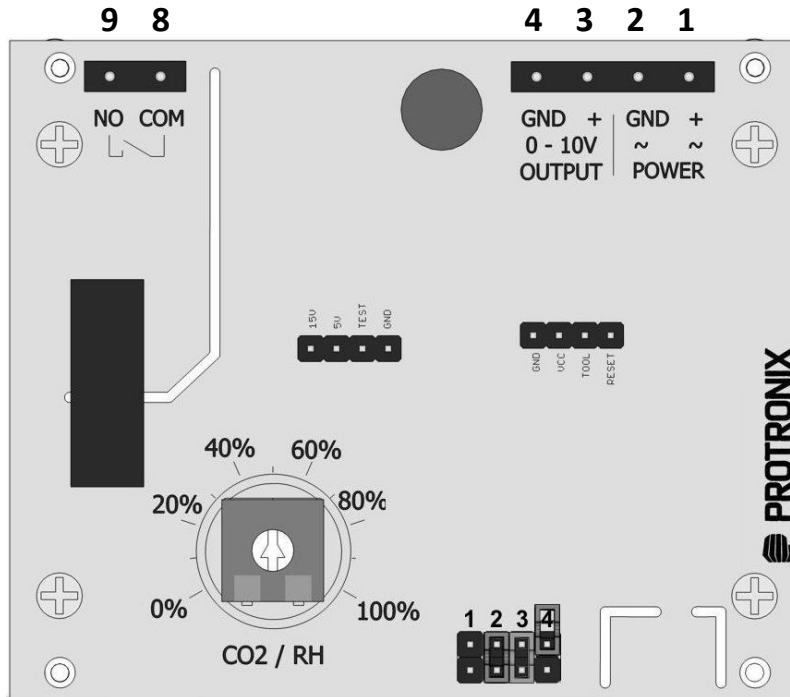
### Sensor failure indication

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



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

### 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 <sup>3</sup>	-	✓
TVOC: 0 – 3000 µg/m <sup>3</sup>	✓	-
TVOC: 0 – 5000 µg/m <sup>3</sup>	✓	✓

### Factory setting

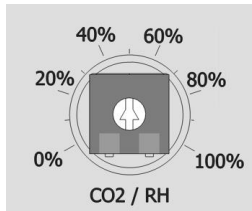
Measuring range	0 – 3000 µg/m <sup>3</sup>
LED indication	on
Switching level	50%



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

### 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.

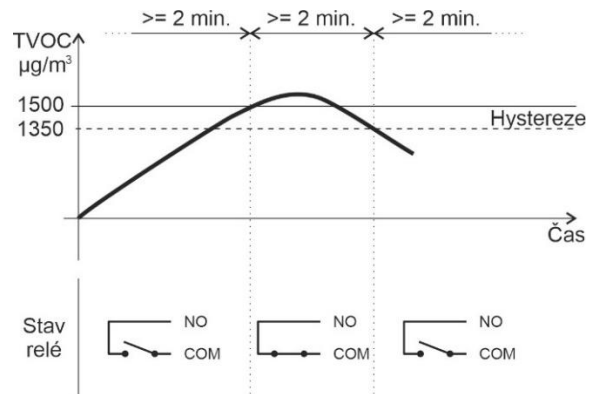
The relay switches off when the level measured value falls below the level of the rotary selector minus hysteresis value of 5% from measuring range.

Minimal lag between changes in state relays are 2 minutes.

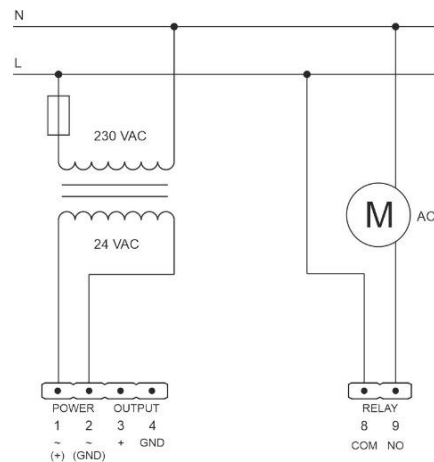
Selector value	TVOC [ $\mu\text{g}/\text{m}^3$ ] range 0 - 3000 $\mu\text{g}/\text{m}^3$
0 %	0
10 %	300
20 %	600
30 %	900
40 %	1200
50 %	1500
60 %	1800
70 %	2100
80 %	2400
90 %	2700
100 %	3000

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

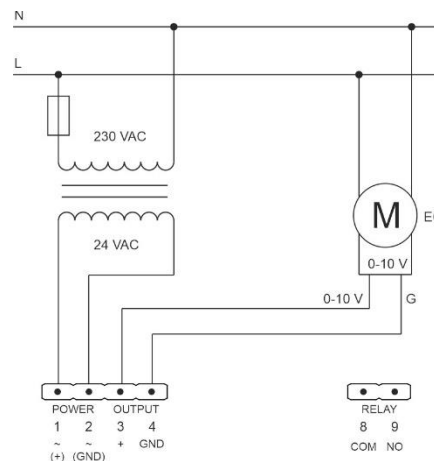
- hysteresis 5% = 150ppm
- selected switching value 50% (50% corresponds to 1500  $\mu\text{g}/\text{m}^3$ )



### Sensor connection using the output relay

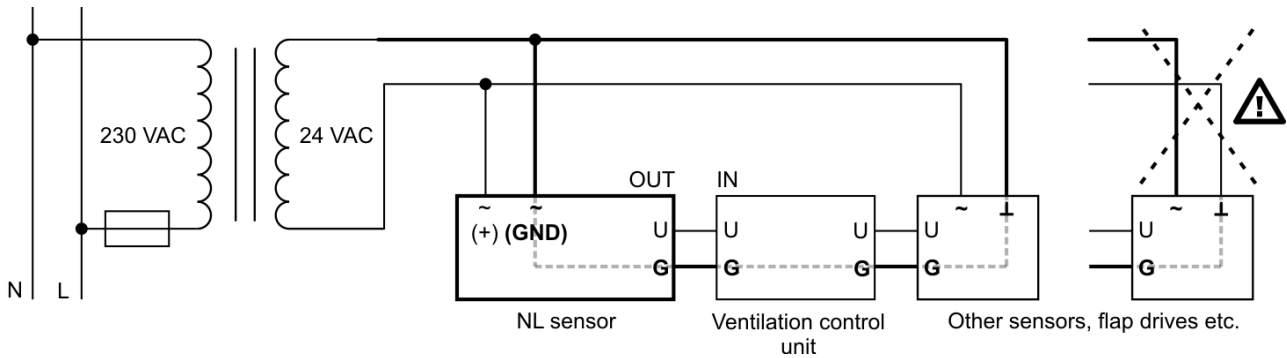


### Direct EC motor control using 0-10 V signal



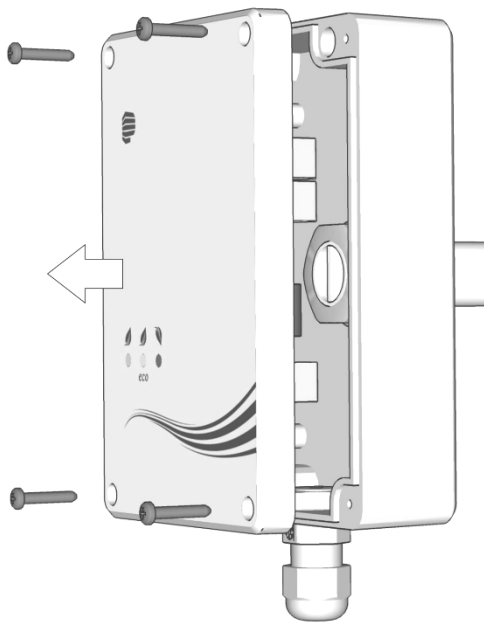
## NL-ECO-TVOC-D | Duct mounted VOC sensor

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.

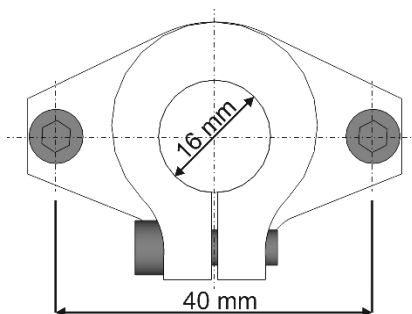


### Opening the box

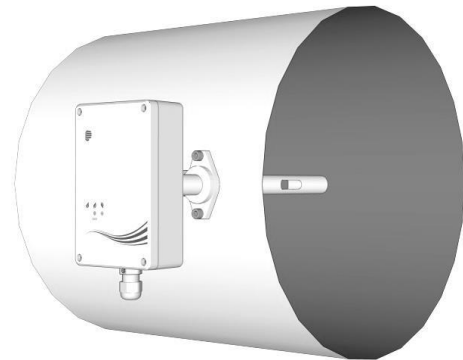
Unscrew the four cover screws and remove the cover with electronics.



### Duct mounting clamp



### Installation



### Way to use

The product is intended for indoor use only.

- **Safety warning**
- The connection and operation of the product must be carried out by a professionally qualified person according to the procedures and information provided in this manual.
- Comply with the given storage and operating conditions of the product. Failure to comply with these conditions may result in damage to the product and possibly loss of warranty.
- Violent mechanical shocks to the sensor must be avoided.
- In case of a defect, do not try to repair the product yourself; instead contact the supplier or the manufacturer directly.

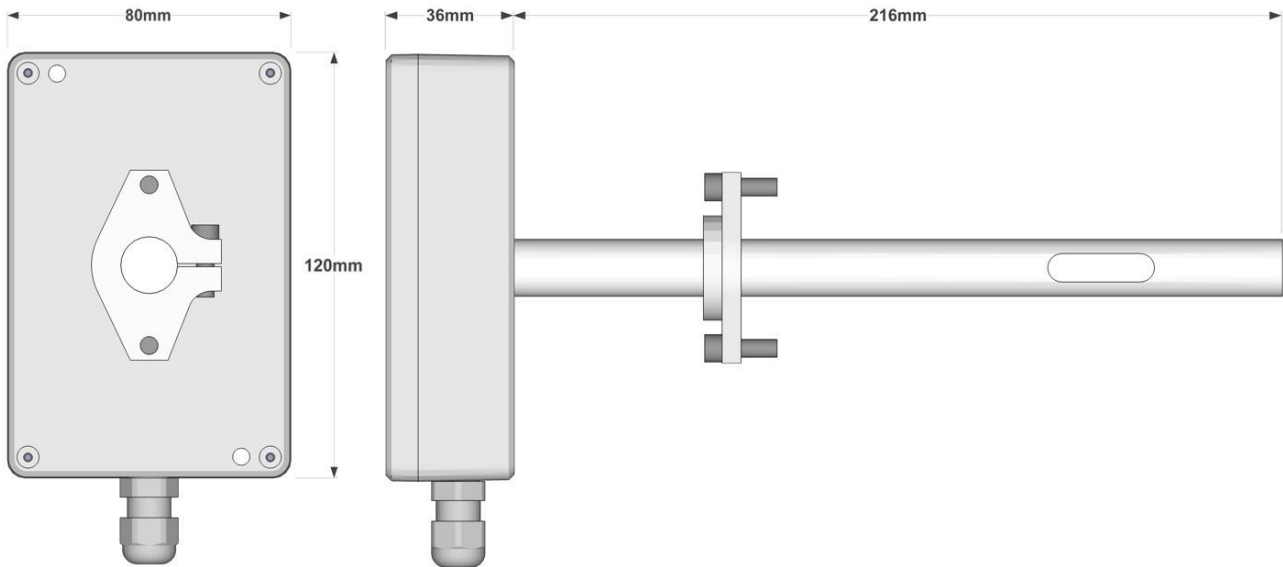
### End of product life

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



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

**Dimensions**



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

