

NL-ECO-CO2 | Room sensor CO₂

Room sensor NL-ECO-CO2 is used to monitor air quality inside buildings and for effective control of ventilation (HVAC) systems according to actual indoor air quality. The sensor monitors concentration of carbon dioxide (CO₂) in air. It can be effectively used in offices, classrooms, shopping centers, homes, restaurants, fitness centers, commercial buildings, etc.

- > measures CO₂
- > precise optical principle NDIR
- > LED indication with automatic turn off at night
- > analog voltage output 0-10V
- > output relay NO/C
- > maintenance or calibration free during whole lifetime
- > long-term stability
- > verified lifetime >10 years

Description:

The measuring of CO₂ is based on the principle of infrared radiation attenuation dependence on the CO₂ concentration in the air (NDIR).

Built-in auto-calibration function ensures excellent long term stability.

The sensor has one analog output for the actual concentration of CO₂.

Ventilation and heat recovery units can be effectively controlled based on the output signal of the sensor in very efficient way.

The trigger level of CO₂ concentration output relay can be set by a rotary element.

Current air quality can be easily checked by three LED indicators with built-in automatic shut-off at night.

Explanation of abbreviations and technical terms can be found on our website in the [Glossary](#) section.



Technical data:

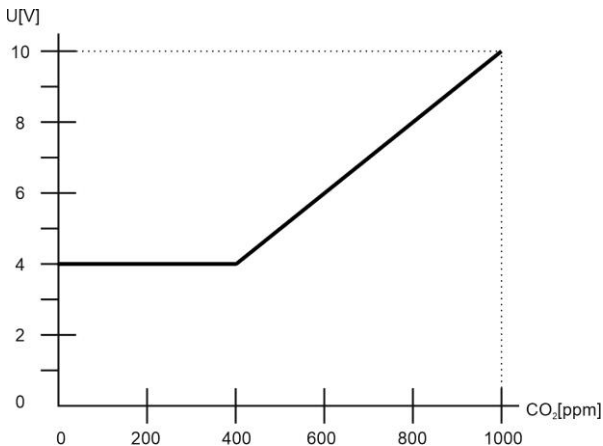
| Parameter | Value | Unit |
|-----------------------------------------------|--------------------------------------------|--------------------------------|
| Supply voltage range | 12 – 35 | V DC |
| | 12 – 24 | V AC |
| Consumption | max 1,5 | W |
| CO ₂ measuring range ¹⁾ | 400 - 1000 | ppm |
| | 400 – 2000 | |
| | 400 – 5000 | |
| CO ₂ accuracy ²⁾ | - for ranges 400 – 1000 and 400 - 2000 ppm | ± 40 ppm + ±4 % of reading |
| | - for range 400 - 5000 ppm | ± 60 ppm + ±4 % of reading |
| | CO ₂ relay - hysteresis | 5 % from range (100ppm/250ppm) |
| CO ₂ rate rise | max 1 | min |
| CO ₂ step response | (90 %) 80 | s |
| 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 | 0 – 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⁾ Measuring range can be chosen by jumper setting. Default range 400-2000 ppm.
²⁾ At 15 – 35 °C, 0-80% RH.
³⁾ Minimum achievable output value corresponds to minimum value of the measuring range.

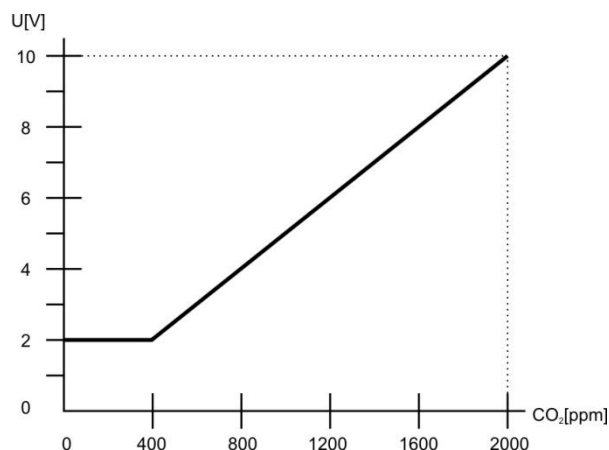


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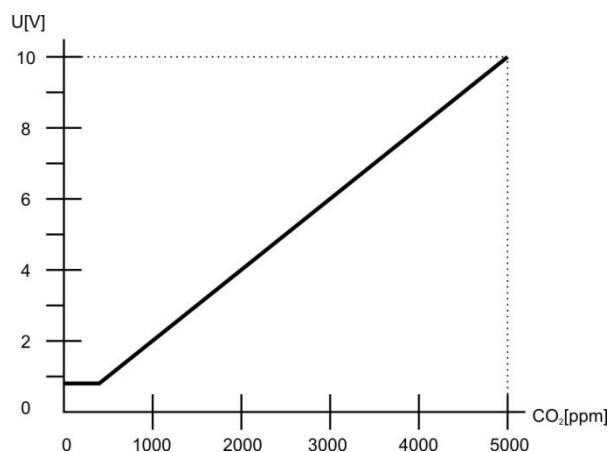
Voltage output versus CO₂ concentration for range 400 - 1000 ppm:



Voltage output versus CO₂ concentration for range 400 - 2000 ppm:



Voltage output versus CO₂ concentration for range 400 - 5000 ppm:



CO₂ sensor autocalibration function

[Autocalibration](#) 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.

LED indication description

White LED lights:

- Less than 600 ppm CO₂.
- excellent air quality, low concentrations of CO₂
 - maintaining this level is not cost-effective especially during the winter season

Green LED lights:

- More than or equal to 600 ppm CO₂, less than or equal to 1200 ppm CO₂.
- optimal balance of air quality and energy consumption for ventilation and air condition
 - maintaining the CO₂ concentration in this range does not significantly reduce the comfort of the indoor environment

Yellow LED lights:

- More than 1200 ppm CO₂.
- higher concentration of CO₂ – lower air quality, this can already cause negative effects associated with low air quality such as feeling uncomfortable, restlessness, weakness, fatigue, headache, dizziness etc.

Sensor start after power on

All three LEDs are shining simultaneously in the meantime, pending the availability of the first measured value. But no longer than 10 seconds. The sensor is fully operational after 1 minute since power on.

The declared accuracy is reached after 4 days of continuous power supply.

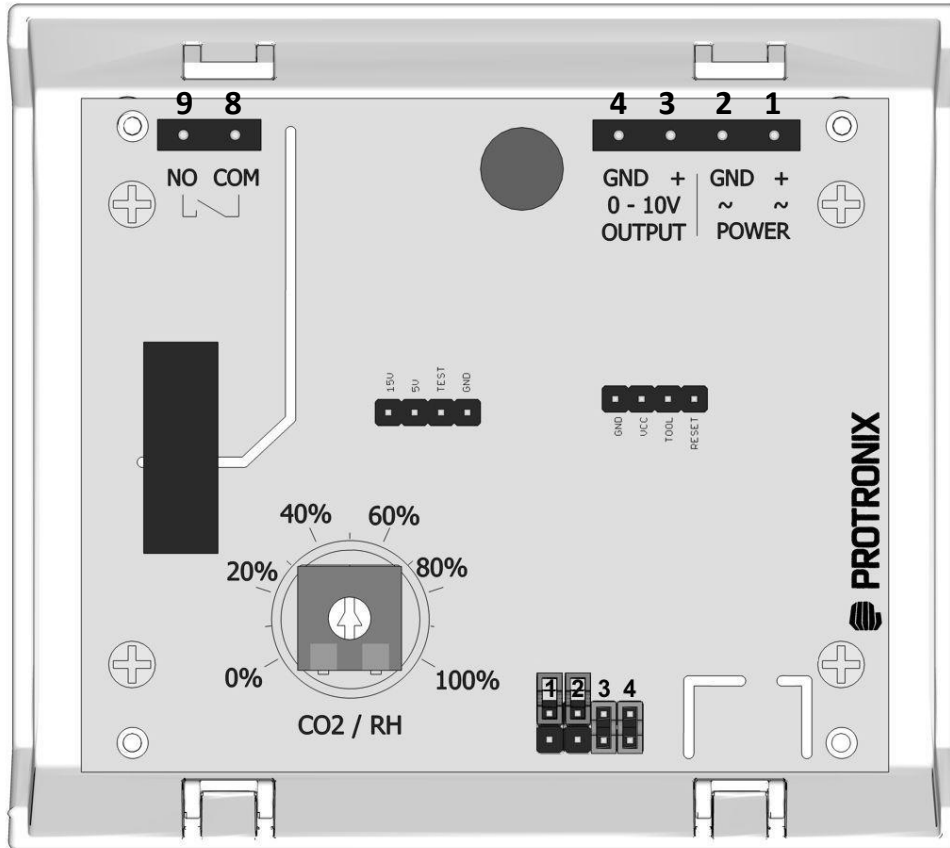
Sensor failure indication

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, GND |



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

Jumpers

| jumper | meaning | fitted | not fitted |
|----------|-----------------|---------|------------|
| 2 | LED indication | always | automatic |
| 3 | autocalibration | enabled | disabled |

Measuring range setting

| range | jumper 1 | jumper 4 |
|----------------|----------|----------|
| 400 – 1000 ppm | closed | open |
| 400 – 2000 ppm | open | closed |
| 400 – 5000 ppm | open | open |

Factory setting

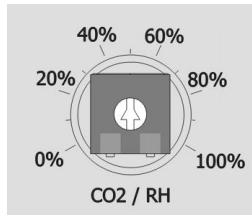
| | |
|-----------------|--------------------------|
| LED indication | automatic |
| Autocalibration | enabled |
| Switching level | 50% |
| Measuring range | 2000 ppm CO ₂ |



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Setting the relay trigger switching level using rotary selector

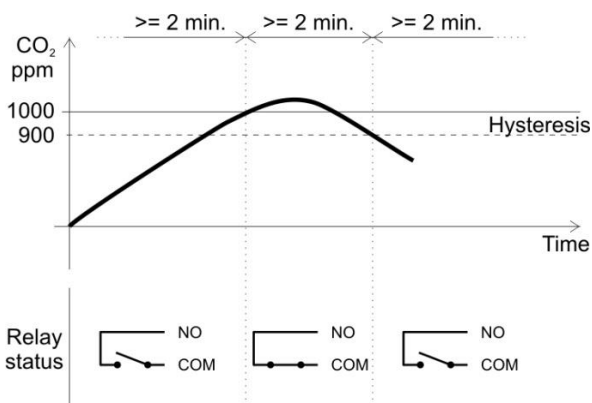
The 0 - 100% selector setting corresponds to the value of selected CO₂ measuring range – see example below.



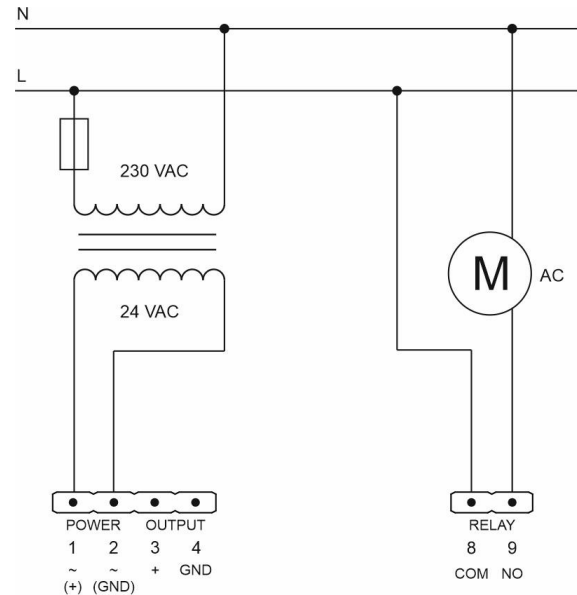
The relay switches on when the level measured value rises above the level of the rotary selector.
The relay switches off when the level measured value falls below the level of the rotary selector minus hysteresis value of 5% from measuring range.
Minimal lag between changes in state relays are 2 minutes.

| Selector value | CO ₂ (1000ppm) | CO ₂ (2000ppm) | CO ₂ (5000ppm) |
|----------------|---------------------------|---------------------------|---------------------------|
| 0 % | 0 | 0 | 0 |
| 10 % | 100 | 200 | 500 |
| 20 % | 200 | 400 | 1000 |
| 30 % | 300 | 600 | 1500 |
| 40 % | 400 | 800 | 2000 |
| 50 % | 500 | 1000 | 2500 |
| 60 % | 600 | 1200 | 3000 |
| 70 % | 700 | 1400 | 3500 |
| 80 % | 800 | 1600 | 4000 |
| 90 % | 900 | 1800 | 4500 |
| 100 % | 1000 | 2000 | 5000 |

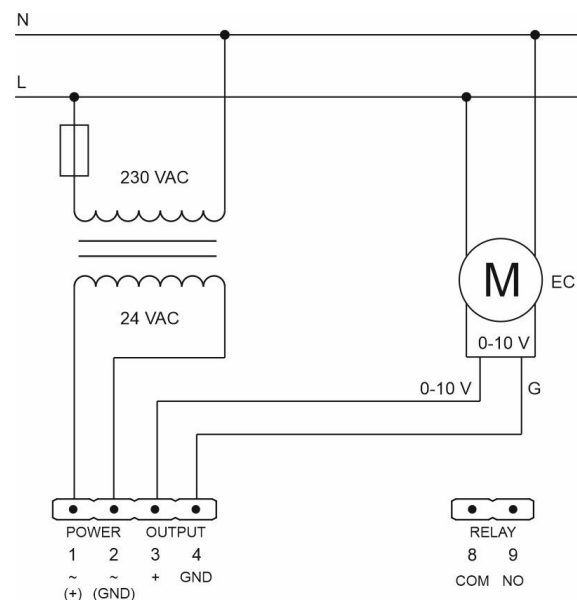
Relay switching example – selected measuring range 2000ppm, hysteresis 5% = 100ppm, selected switching level value 50% (50% correspond to 1000ppm CO₂)



Sensor connection using the output relay

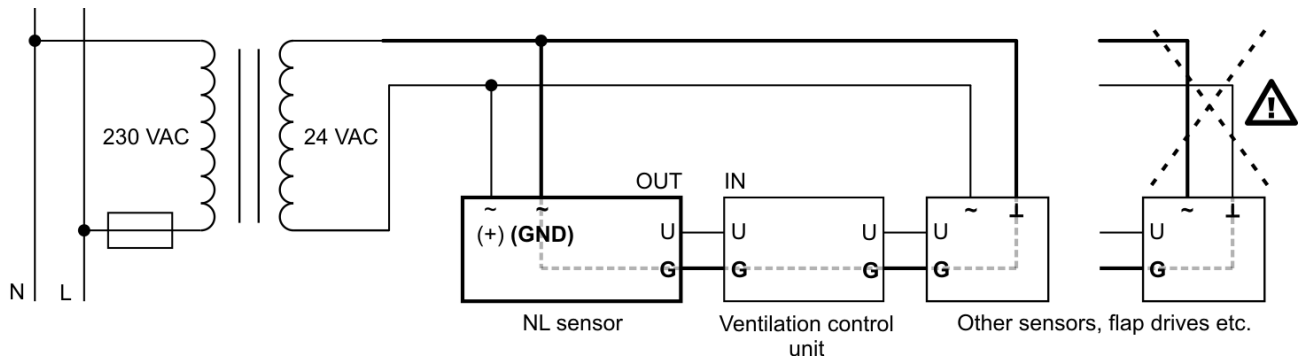


Sensor connection - direct EC motor control using signal 0-10 V



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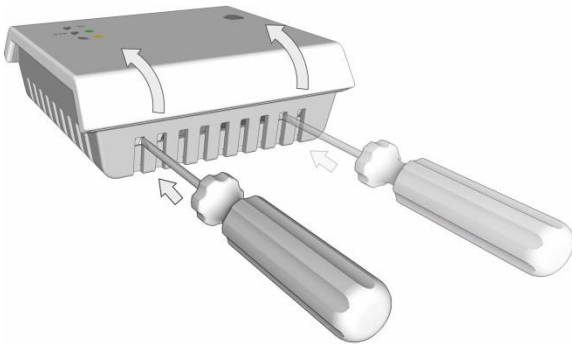
If you connect other devices or more sensors to the same AC power source as the NL sensor, it is necessary to meet GND wiring of all analog inputs and outputs, as well as power wires.



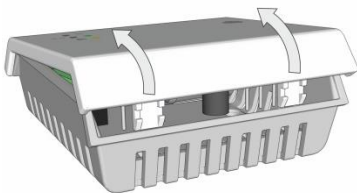
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Sensor box disassembly

Push on the two locks with a flat head screwdriver to release the upper part of the box. Then, tilt it in the indicated direction (see the picture below).



Continue to move the upper part with all the electronics until it is separated from the lower part.



Box color

White - RAL9016.

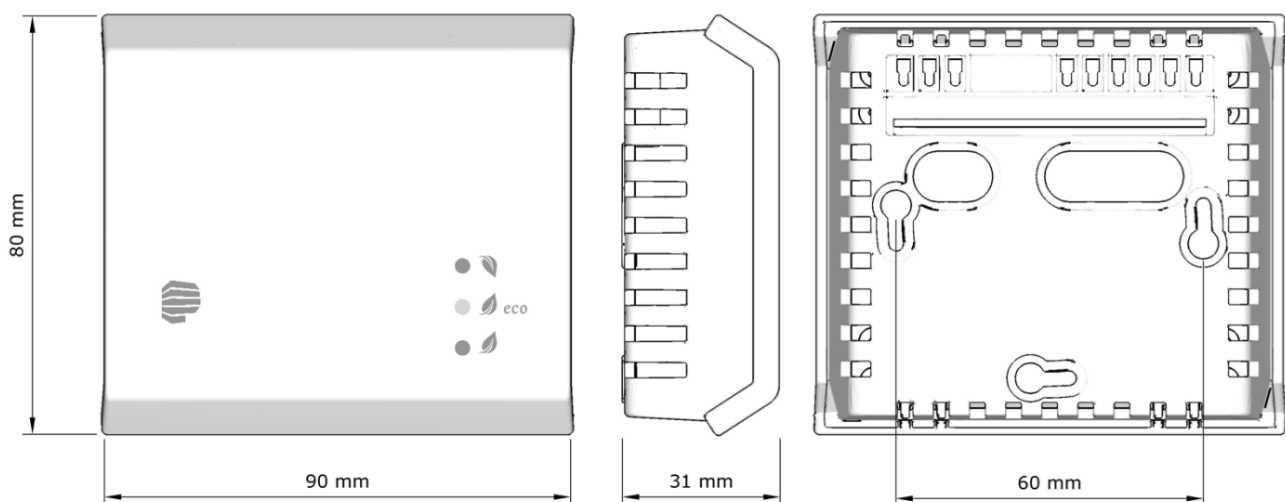
Way to use

The product is intended for indoor use only. You can read the [recommendations for sensor placement](#) on our web pages. 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.

Dimensions



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

