

NL-ECO-CO2

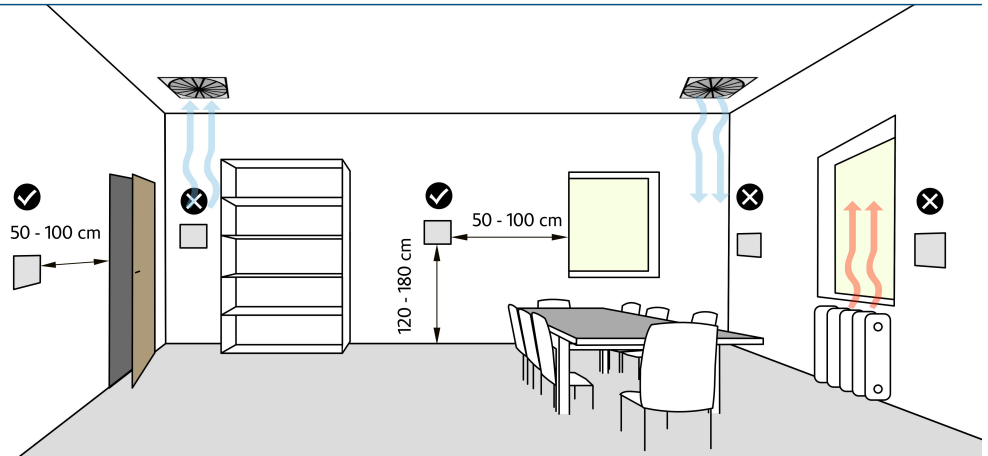
Carbon dioxide room sensor



User manual

Description	The sensor is used for continuous monitoring of the CO₂ concentration in the room and for efficiently controlled ventilation.		
Usage	Homes, offices, schools, shops, shopping centres, restaurants, waiting rooms, dressing rooms		
Key features	<ul style="list-style-type: none"> — Optical air quality indication — Night mode – LEDs turn off automatically at night — Works on advanced NDIR (Non Dispersive Infra-Red) optical principle — Long-term durability and stability — Built-in self-calibration function – requires no maintenance — Voltage output 0 – 10 V DC — Relay switch contact – adjustable relay switching level 		
Technical specifications	<ul style="list-style-type: none"> — Monitored variable — Range¹⁾ — Accuracy (400 – 2000 ppm)³⁾ — Accuracy (400 – 5 000 ppm)³⁾ — Voltage output — Relay switch contact — Switching current — Supply voltage — Maximum power input³⁾ — Expected lifetime — Operating temperature — Operating humidity⁴⁾ — Degree of protection — Storage temperature — Dimensions 	<ul style="list-style-type: none"> CO₂ (Carbon dioxide) 400 – 1 000 / 2 000 / 5 000 ± 40 + ±4 % from reading ± 60 + ±4 % from reading 0 – 10 max. 250 / 30 max. 5 12 – 24 < 1 min. 10 0 – 50 5 – 95 IP20 -20 to 60 90 x 80 x 31 	<ul style="list-style-type: none"> ppm ppm ppm ppm V DC V AC / V DC A AC / DC V AC / DC W years °C % RH - °C mm
	<p>1) User selectable range using shorting jumpers</p> <p>2) At 15 – 35 °C, 0 – 80% RH, after 3 weeks of uninterrupted operation.</p> <p>3) With the relay on and the voltage output loaded with a 1 kOhm resistor</p> <p>4) Non-condensing</p>		

Recommended sensor location

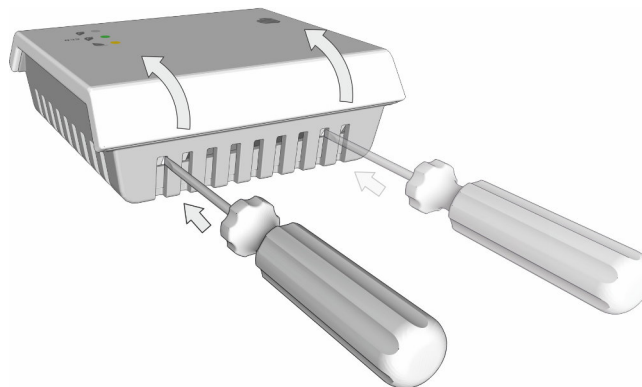


- At a sufficient distance from the source of the draught
- Ensure sufficient space around the sensor
- In principle, the same rules apply as for the positioning of the room temperature sensor or thermostat

Opening the sensor

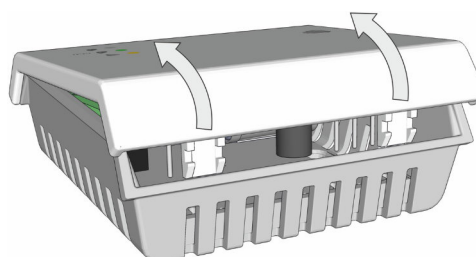
1

Squeeze the plastic latches with the appropriate size flathead screwdriver at the top of the sensor.



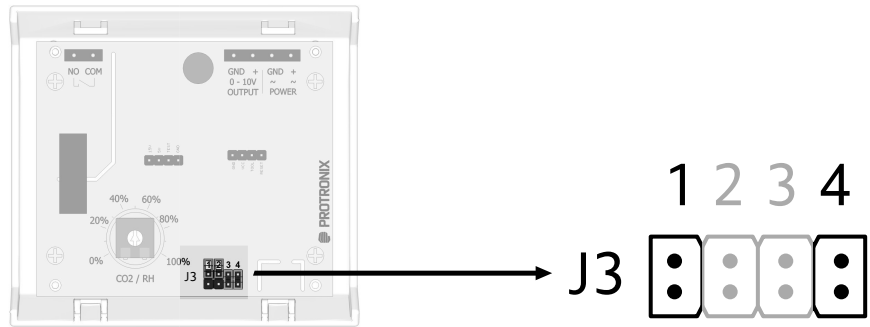
2

Tilt the front part outwards.



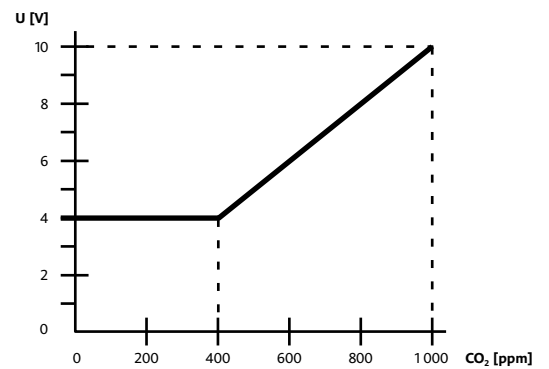
CO₂ measuring range selection

The CO₂ range is selected by jumpers J3/1 and J3/4.



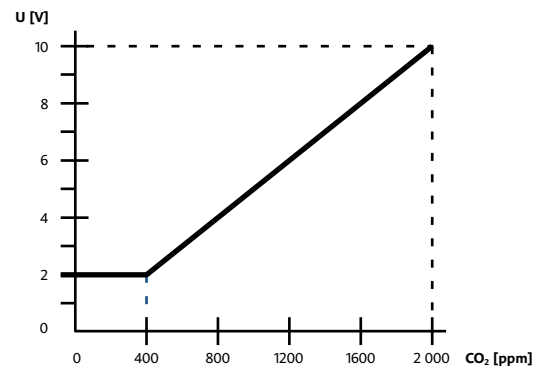
Range 400 – 1 000 ppm

Range	400 – 1 000 ppm
Jumpers	<div style="display: flex; justify-content: space-around; align-items: center;"> 1 2 3 4 </div>



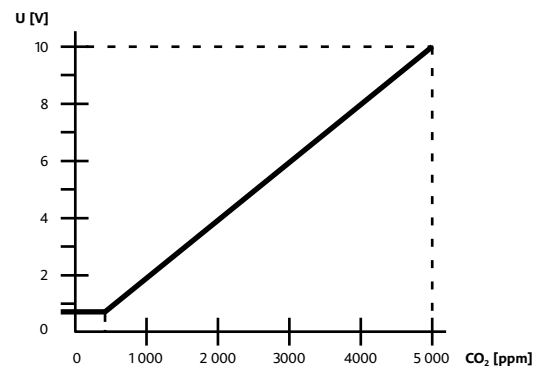
Range 400 – 2 000 ppm

Range	400 – 2 000 ppm
Jumpers	<div style="display: flex; justify-content: space-around; align-items: center;"> 1 2 3 4 </div>



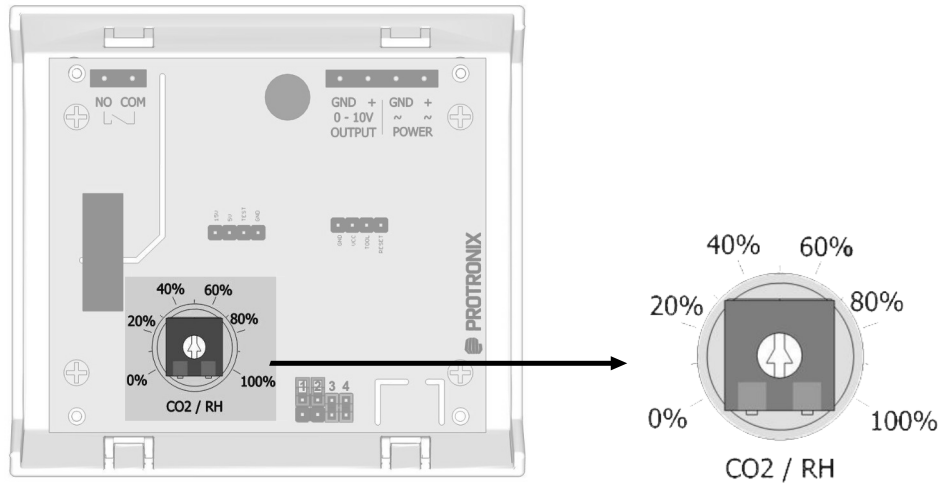
Range 400 – 5 000 ppm

Range	400 – 5 000 ppm
Jumpers	<div style="display: flex; justify-content: space-around; align-items: center;"> 1 2 3 4 </div>



Setting the relay switching level

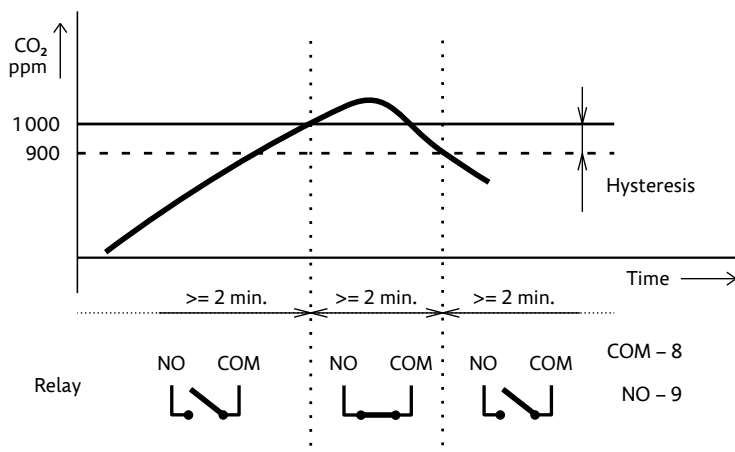
Adjustment is made using the rotary selector, from 0 – 100% of the currently selected CO₂ sensor range, see switching example below.



Set value	CO ₂ – range 1 000 ppm	CO ₂ – range 2 000 ppm	CO ₂ – range 5 000 ppm
0 %	0	0	0
10 %	100	200	500
20 %	200	400	1 000
30 %	300	600	1 500
40 %	400	800	2 000
50 %	500	1 000	2 500
60 %	600	1 200	3 000
70 %	700	1 400	3 500
80 %	800	1 600	4 000
90 %	900	1 800	4 500
100 %	1 000	2 000	5 000

Hysteresis - Hysteresis is always 5% of the selected range.

Example of relay switching - selected range 2,000 ppm, hysteresis 5% of range = 100 ppm, setpoint 50% (50% corresponds to 1,000 ppm CO₂)
Minimum delay between switching of the relay is 2 minutes.



LED indicator lights

The sensor is equipped with a three-stage optical indication of the current CO₂ concentration.

- Orange — concentration CO₂ > 1 200 ppm
- eco*

Indicates the need for ventilation.
Lower indoor air quality, which can already begin to cause a decline in concentration, fatigue, drowsiness and, if further aggravated, headaches and even dizziness, etc.
- Green — concentration CO₂ 600 – 1 200 ppm
- eco*

Indicates an optimum balance of indoor air quality and energy consumption for ventilation, very good level of indoor comfort.
- White — concentration CO₂ < 600 ppm
- eco*

Indicates excellent air quality, can also mean unnecessary overventilation and can already be energetically disadvantageous, for example in the heating season.
-

Choice of LED indication

Using the J3/2 short-circuit jumper, it is possible to select automatic LED switching off at night or permanent indication mode.

LED indication	Jumper J3/2
Automatic dimming at night	<p style="text-align: center;">1 2 3 4</p>
LED on permanently	<p style="text-align: center;">1 2 3 4</p>

Setting the self-calibration function

The [self-calibration function](#) compensates for long-term aging of key sensor components.

If the autocalibration function is enabled, no calibration is required for the lifetime of the sensor. The sensor must be permanently powered for the autocalibration function to work properly.

If the sensor is to be used 24 / 7 in a permanently occupied space, where ventilation to a level close to outside air never occurs, then it is better to disable the autocalibration function.

In this case, it is advisable to send the sensor to the manufacturer for calibration at least once every two years, or to enable the autocalibration function and to ventilate the sensor space properly several times during the following two weeks and then disable the autocalibration function again.

Selection of self-calibration function by jumper J3/3:

Self-calibration	Jumper J3/3
Enabled	<p>1 2 3 4</p>
Disabled	<p>1 2 3 4</p>

Sensor power up

When the power supply is connected, all LEDs will flash – signaling power on/reset of the sensor. Then according to the current CO₂ concentration the white, green or orange LED lights up for about within 10 seconds – sensor initialization

– All LEDs lit: sensor internal error.

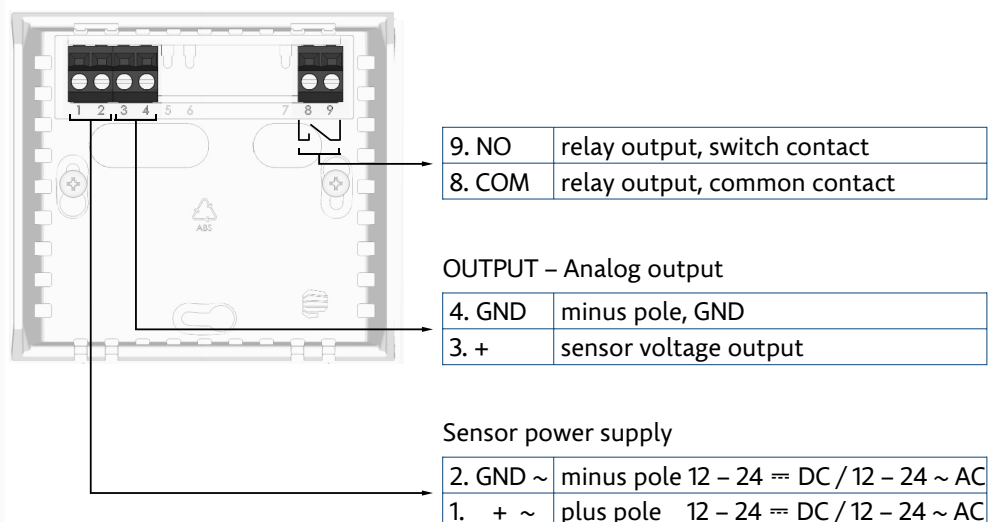
Factory default sensor settings

Measuring range	400 – 2 000 ppm CO ₂
Relay switching level	1 000 ppm (50 %)
LED indication	automatic dimming at night
Autocalibration	enabled

Electrical wiring

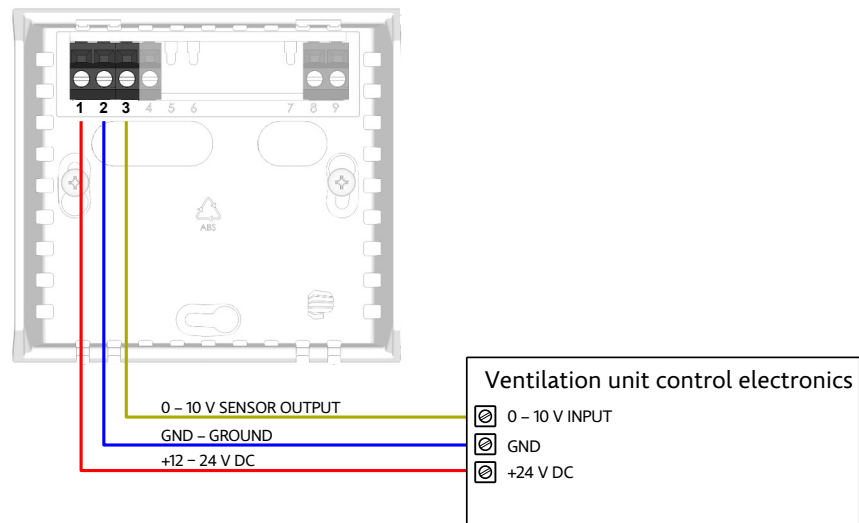
The supply wires are plugged into the terminals fixed in the bottom of the plastic sensor box.

The sensor electronics are located at the top of the box, which connects to the supply wires in the terminal box by means of contact studs after the top of the sensor has been inserted into the bottom of the box.

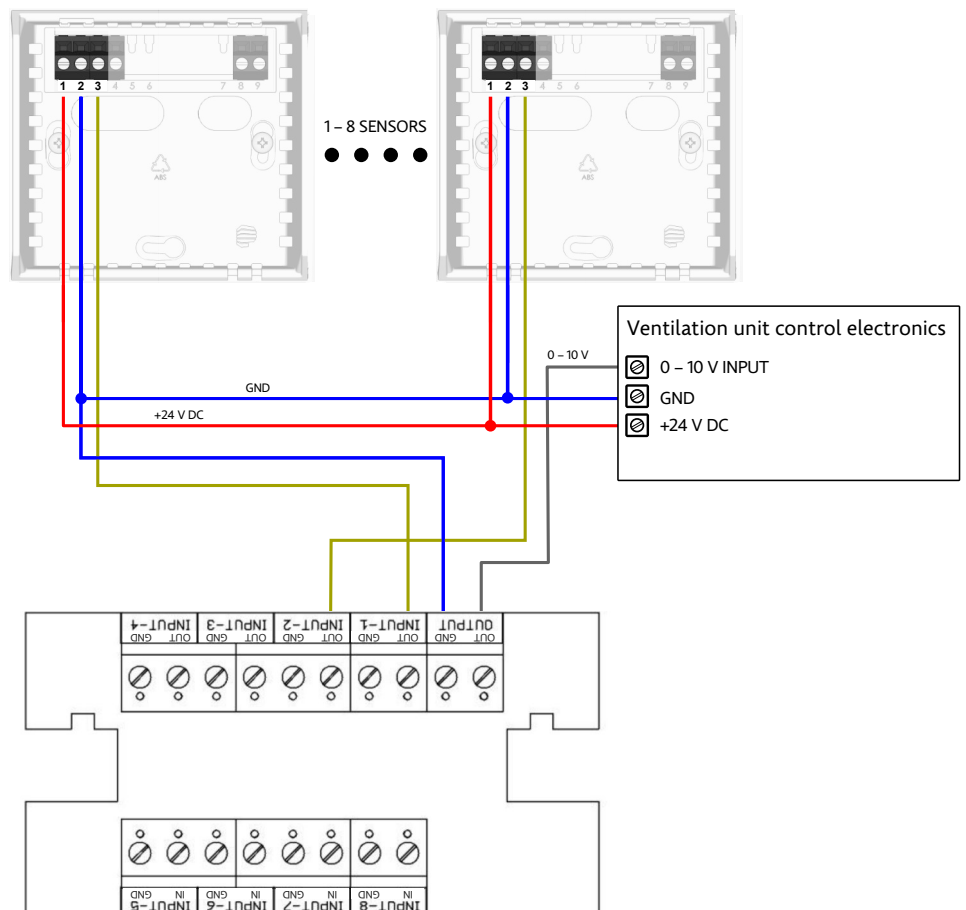


Sensor wiring examples

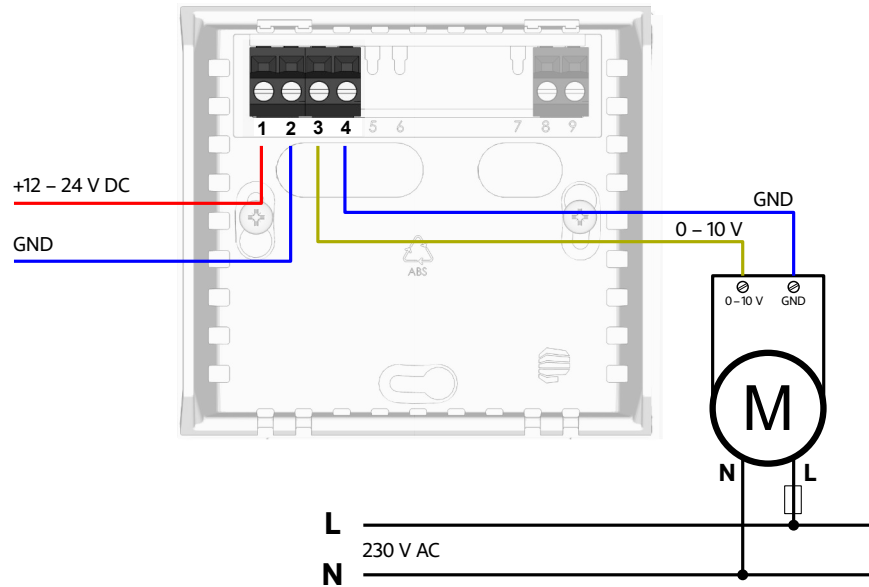
- connection to a conventional heat recovery unit with control input 0 – 10 V
- power supply of the sensor from the control electronics of the heat recovery unit



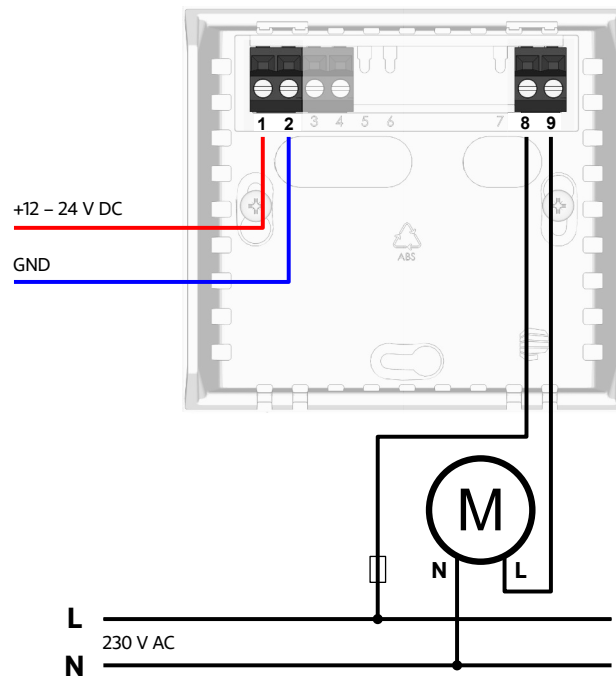
- connection of a 0 – 10 V signal combiner from multiple sensors to the 0 – 10 V control input recuperation units
- power supply from the control electronics of the heat recovery unit.



- direct EC motor control by 0 – 10 V sensor output
- DC power supply

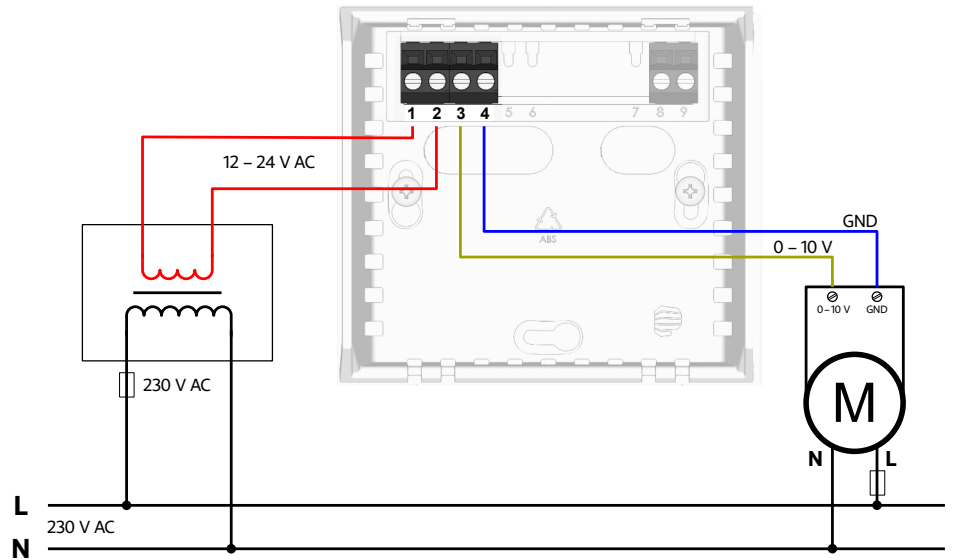


- direct switching of the fan by the sensor using the relay switching contact
- DC power supply

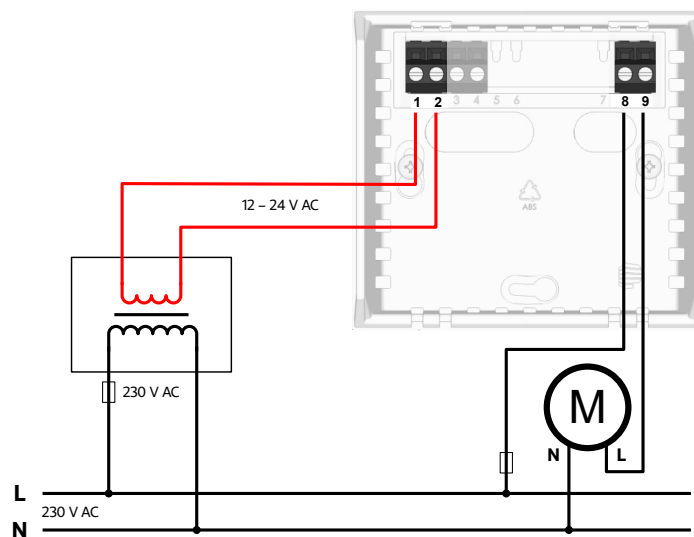


Wiring examples

- direct EC motor control by 0 – 10 V sensor output
- power supply from external AC power supply

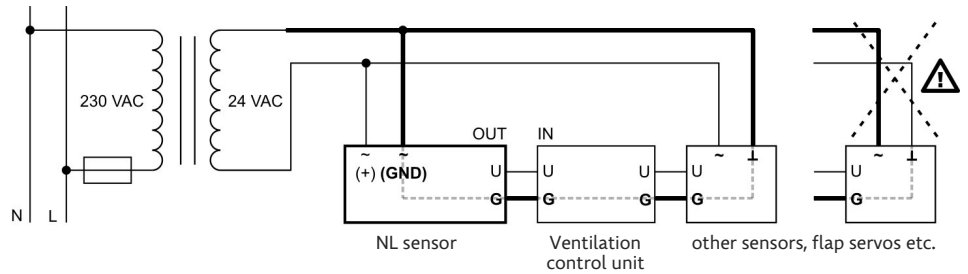


- direct switching of the fan by the sensor using the relay switching contact
- power supply from external AC power supply



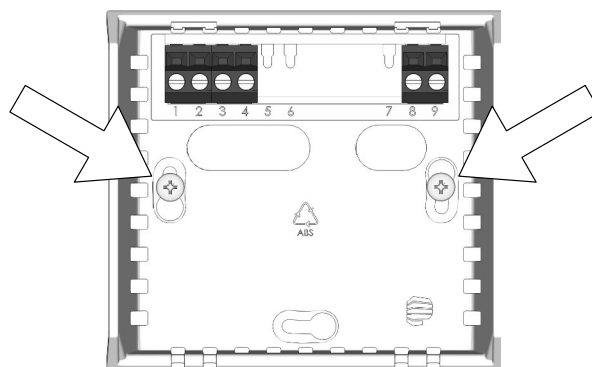
Power multiple devices from one AC power supply

If multiple sensors or other devices are connected to a common AC power supply it is necessary to maintain identical GND connection of all analog inputs and outputs as well as power supply wires! Since one pole of the power supply (2nd GND~) is internally connected to the GND voltage output of the sensor.



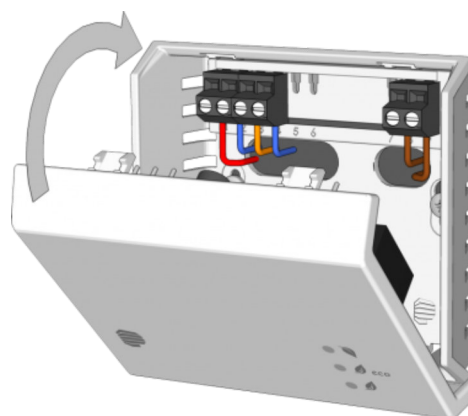
Wall mounting

The sensor can simply be screwed onto a standard concealed installation box. Screws and dowels for fixing the sensor to the wall are included.

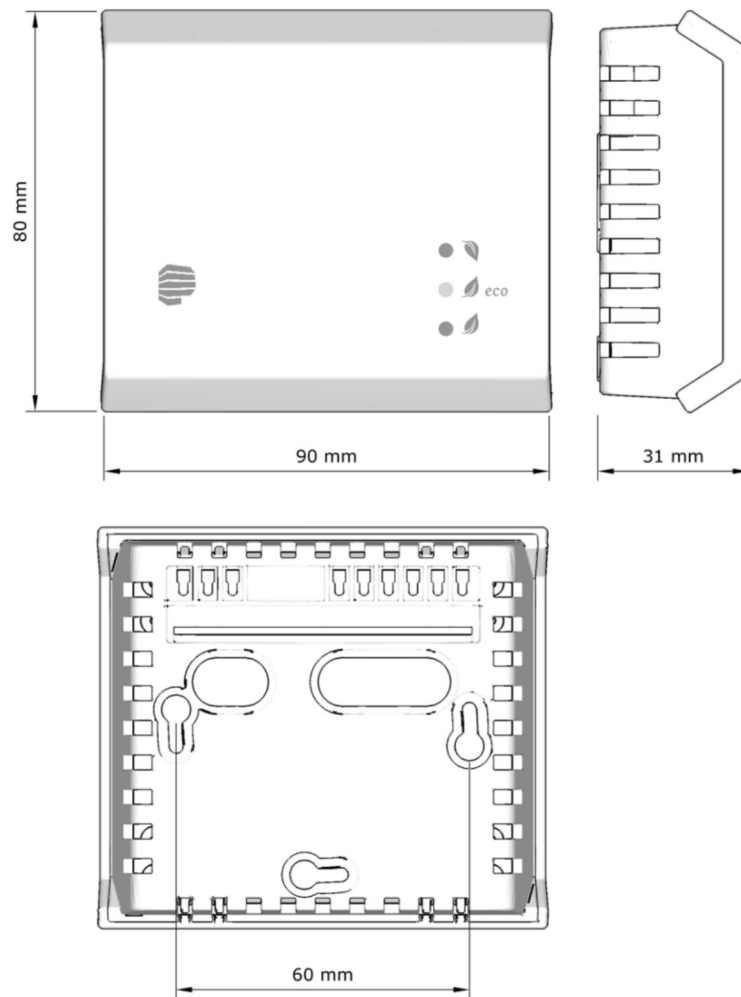


Sensor assembly

The top of the sensor must first be inserted into the plastic hinges at the bottom of the box, and then the top must be "knocked" with adequate force so that the connecting spikes fit into the corresponding clips and the two plastic latches at the top of the box fit properly into the bottom of the box.



Dimensions



Box colour	Front part white – RAL9016.	Front part white – RAL9016.
Note	Explanations of abbreviations and terms can be found on our website in the glossary section .	
Sensor fault indication	All three LEDs are permanently lit at the same time.	

SAFETY NOTICE

- Before installation and first use, carefully read the full instruction manual, including safety warnings.
- The assembly, wiring and installation of the equipment may only be carried out by a person with the appropriate electrical qualifications.
- All supply lines must be de-energized during installation and wiring and secured against accidental switching on.
- Sensors must not be used as safety devices and their use is not for the protection of health, nor must they be used to protect persons, property or assets.
- The product is intended for indoor use only.
- Mechanical stress on the equipment such as dropping or impact should be avoided.
- Use the product only as specified in this user manual.

FOR HEALTHY INDOOR ENVIRONMENT AND ENERGY SAVING

Manufacturer: Protronix s.r.o.
Pardubicka 177, 537 01 Chrudim, Czech Republic

www.protronix.cz
www.protronix-sensors.com



Dispose of the product at the end of its useful life in accordance with EU and national waste laws and directives.

The manufacturer reserves the right to make technical changes to improve the product, its features and functions without prior notice.