NLII-CO2-R-5-A | Room sensor CO_2 with sound alarm

Room sensor NLII-CO2 is used to continuously monitor air quality inside buildings and then control ventilation (HVAC) systems according to current levels of internal air quality. The sensor measures concentration of carbon dioxide (CO_2) in air. It is suitable for schools, offices, classrooms, shopping centers, homes, restaurants, fitness centers, commercial buildings, etc.

- measures CO_2
- analog voltage/current output
- 2x output relay – 2x NO/C
- sound signalization – alarm
- two modes of relay switching
- maintenance during operation not required
- long life and stability

Type of sensor / Order code	CO_2 output	Relay
NLII-CO2-R-5-A	0-10 V/0-20 mA/4-20 mA[1)]	1x NO/C
NLII-CO2-2R-5-A	0-10 V/0-20 mA/4-20 mA[1)]	2x NO/C

[1)] It is possible to select the desired type of analog output by a jumper on the electronics board. Minimum achievable output value corresponds to minimum value of the measuring range.

Description

The measuring of CO_2 is based on the principle of infrared radiation attenuation dependence on the CO_2 concentration in the air (NDIR). Built-in auto-calibration function ensures very good long term stability.
The sensor has built-in one analog output for the actual concentration of CO_2. Relay trigger level can be set by SET POINT rotary switch.
Relay switching is indicated simultaneously with a short (1,5s) audible signal and yellow LED light.
The way of relay switching can be set by a jumper – 5s or 1s pulses when the CO_2 concentration exceeds and falls below the set CO_2 level for e.g. opening and closing a skylight, or standard switching, where relays are closed until the measured CO_2 concentration drops under the set CO_2 level. So the sensor efficiently manages ventilation and heat recovery units, based on current room air quality.
The current air quality can easily be determined by looking at the three LED indicators. The ***eco*** level means good indoor air quality necessary to achieve a sense of well-being and at the same time optimal energy costs for heating, ventilation or air conditioning.

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 12 – 24	V DC V AC
Average consumption	0,5	W
CO_2 measuring range	400 – 5000	ppm
CO_2 accuracy	± 35 ppm ±5 % of reading	
CO_2 relay - hysteresis	100	ppm
CO_2 rate rise	max 1	min
CO_2 step response	(90 %) 80	s
Max. switching voltage	250/30	V AC / V DC
Max. switching current	5/5	A AC / A DC
Working humidity no condensing	5 – 95 %	RH
Working temperature	0 to +50	°C
Storage temperature	-20 to +60	°C
Expected lifetime	min. 10	years
Ingress protection	IP20	
Dimensions	90x80x31	mm

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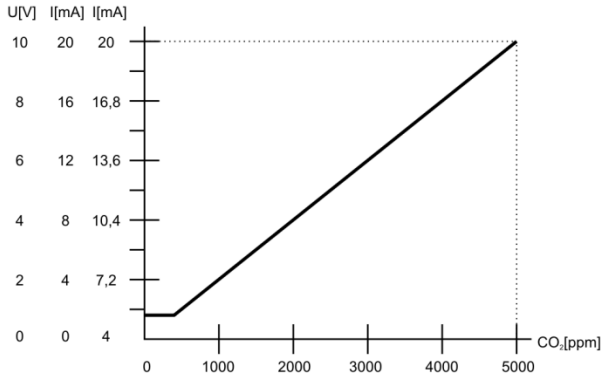
CO_2 sensor autocalibration function

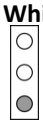
Autocalibration compensates for long-term aging of the key components of the sensor. This function is available only when sensor power supply is continuous and uninterrupted. Calibration during operation is not necessary.

Selected analog output values versus CO_2 concentration



LED indication description

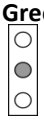
White LED lights:



Less than 600 ppm CO_2.

- maintaining low concentrations of CO_2 is not cost-effective - slightly increased concentration does not cause any health complications

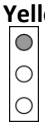
Green LED lights:



More than or equal to 600 ppm CO_2, less than or equal to 1200 ppm CO_2.

- optimal balance of air quality and energy efficiency of ventilation and air conditioning

Yellow LED lights + sound alarm:



When the measured CO_2 concentration exceeds the level set by SET POINT rotary switch.

- yellow LED lights always when the measured CO_2 concentration exceeds the level set by SET POINT rotary switch (min 1000ppm), simultaneously the sound alarm is triggered and the relay contacts close. Sensor remains in this state for 2 minutes – see relay switching graph below.
- CO_2 concentration higher than 1200 ppm can cause fatigue, restlessness, headache and feeling uncomfortable, hot etc.

Sensor start after power on

All three LEDs flash simultaneously until the first readings are available, but no longer than 10 seconds.

Sensor failure indication

All three LEDs are shining permanently.

CAUTION:

Warm-up: operational after 1 minute since power on. The declared accuracy is reached after 4 days of continuous power supply.

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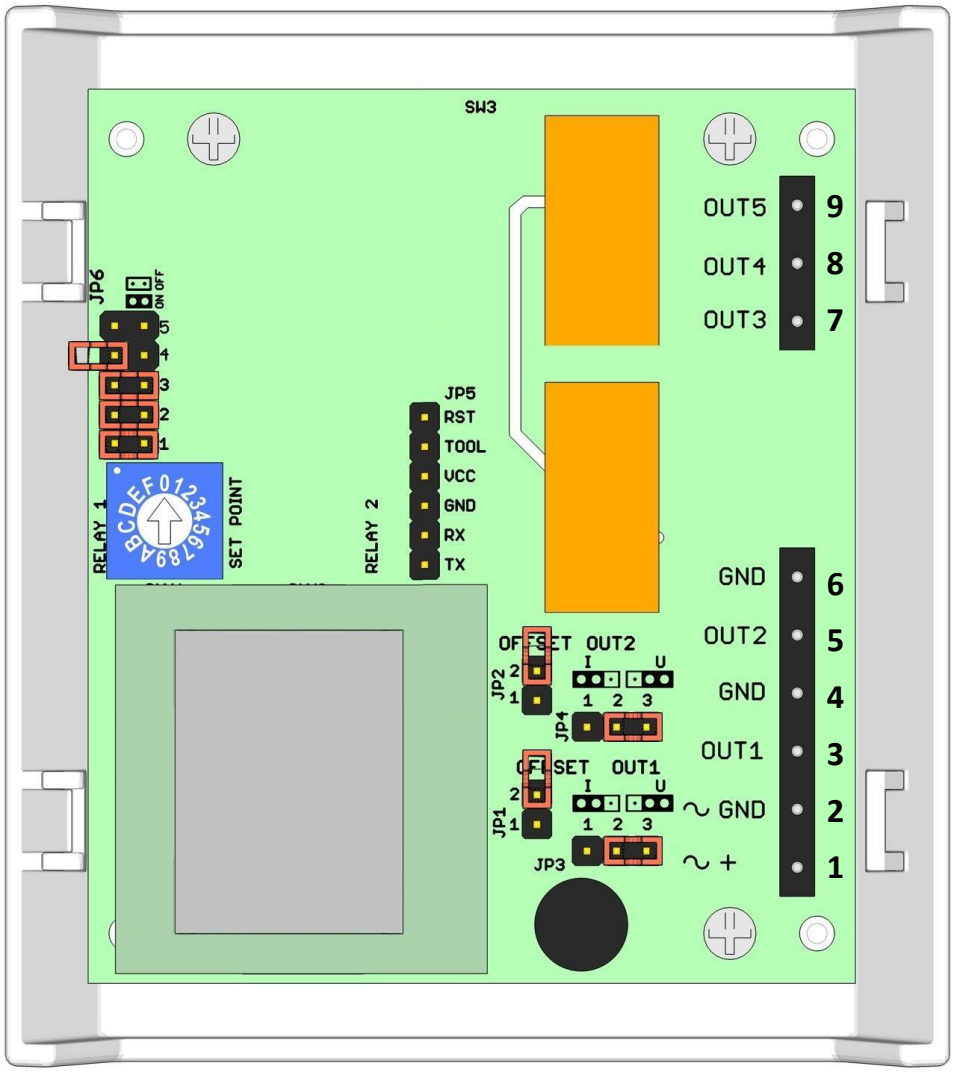
Electronic board controls and terminals



Terminals

1. ~ +	power AC or DC (+) plus pole
2. ~ GND	power AC or DC (-) minus pole, GND
3. OUT1	CO_2 sensor analog output, 0-10 V or 0-20 mA or 4-20 mA
4. GND	CO_2 sensor output GND
5. OUT2	unused
6. GND	unused
7. OUT3	NO relay 2 output, normally open (RH)
8. OUT4	C output relay, common contact
9. OUT5	NO relay 1 output, normally open (CO_2)

SET POINT rotary switch for setting the relays switching level

RELAY 1 – switching level for CO_2 setting

Jumpers

JP1 – unused
JP2 – Current output offset CO_2
JP3 – Voltage/current output CO_2
JP4 – unused
JP6 – LED indication and switching mode settings

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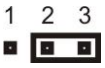
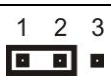
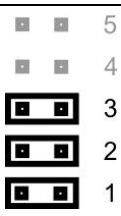
Jumpers on the electronics board

Mark	Description	Settings	Meaning
JP2	**Current output offset CO_2** - shift quiescent current from 0 mA to 4 mA		current output CO_2 0-20 mA
			current output CO_2 4-20 mA
JP3	**Voltage/current output CO_2** - select the type of analog output - if the selected voltage output is CO_2, JP2 must not be shorted		voltage output CO_2
			current output CO_2
JP6 - 1 **JP6 - 2** **JP6 - 3**	**Switching mode, signalization and alarm**		relays contacts closed until concentration drops sound alarm disabled LED indication disabled
			relays switching in 5s pulses (see JP6-4) sound alarm enabled LED indication enabled
JP6 - 4	**Duration of closed relay contacts when switching with pulses is selected (JP6-3 closed)**		relay contacts closed for 5s
			relay contacts closed for 1s
JP6 - 5	**This position is not intended for user setting.**		

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Setting the relay switching mode using jumper JP6-3 and SET POINT rotary switch

If the jumper JP6-3 is closed, relay 1 contacts close for 5s (or 1s, according to JP6-4 setting) always, when the measured concentration of CO_2 rises above the level set by the SET POINT rotary switch.
When the measured concentration of CO_2 drops below the level set by SET POINT switch minus the hysteresis value of 100 ppm, relay 2 contacts close for 5s (or 1s).

If the jumper JP6-3 is open, both relays contacts close, when the measured concentration of CO_2 rises above the level set by the SET POINT rotary switch and stay close until the measured concentration drops below the level set by SET POINT switch minus the hysteresis value of 100 ppm.

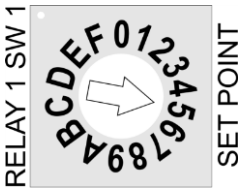
Minimum delay between changes of relays state is 2 minutes.

Setting the switching levels

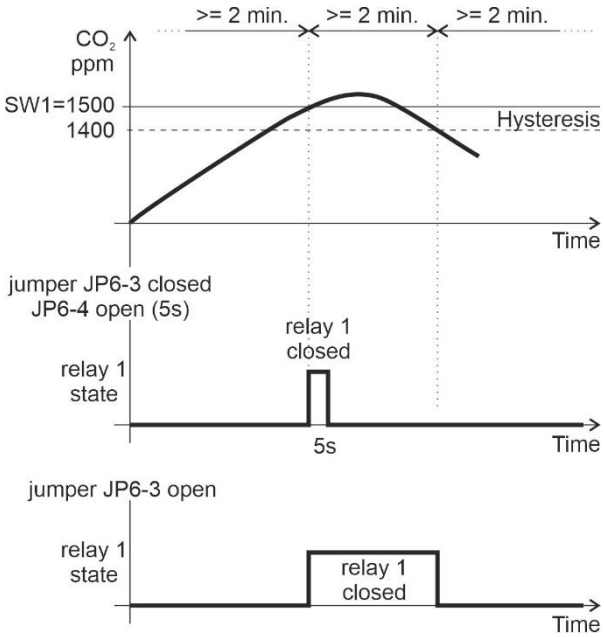
Required concentration of CO_2

SET POINT	CO_2 [ppm]
0	1000
1	1100
2	1200
3	1300
4	1400
5	1500
6	1600
7	1700
8	1800
9	1900
A	2000
B	2100
C	2200
D	2300
E	2400
F	2500

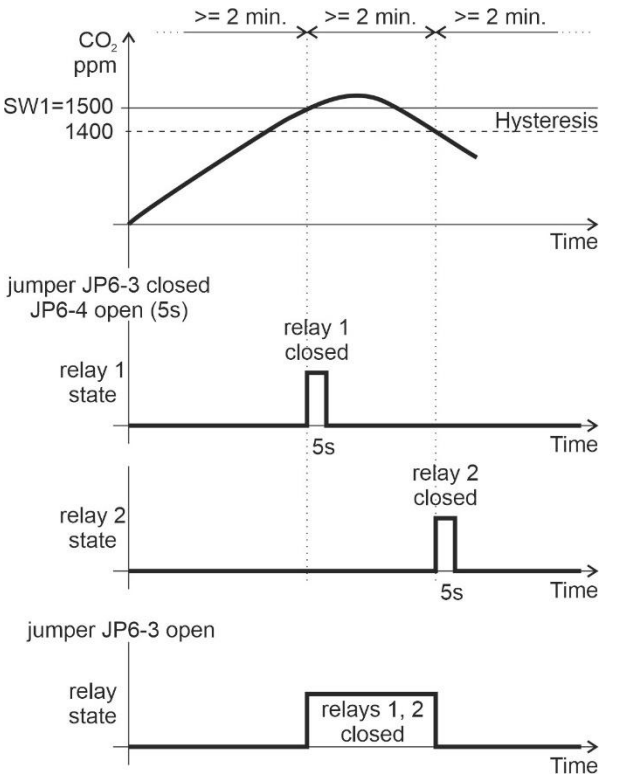
Example for setting the concentration of 1500 ppm



Relay switching graph with 1 relay (NLII-CO2-R-5-A)



Relay switching graph with 2 relays (NLII-CO2-2R-5-A)



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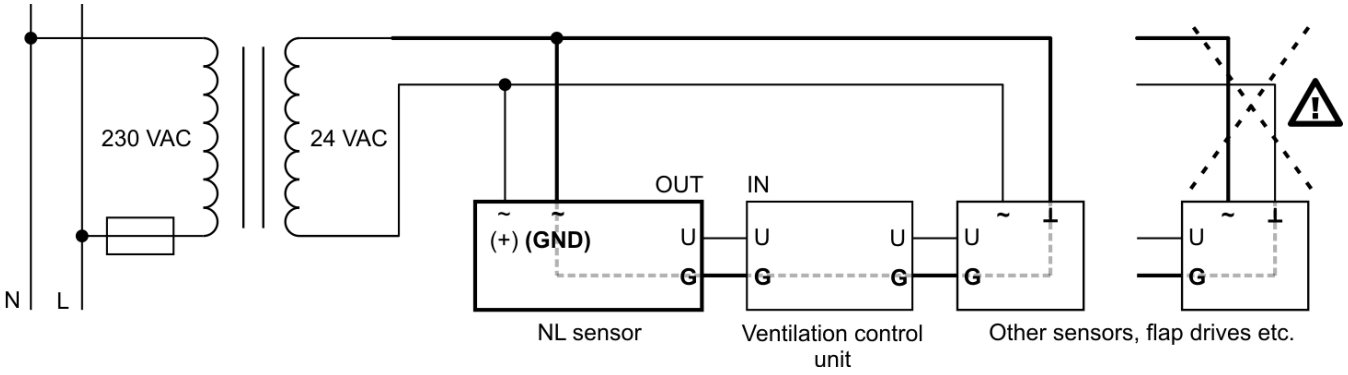
If you connect other devices to the same AC power source as the NL sensor, it is necessary to meet GND wiring of all analog inputs and outputs, as well as power wires.



Factory settings

LED indication:	enabled
CO_2 analog output:	voltage output
Relay switching mode:	relays switching in 5s pulses
Switching level CO_2:	1500 ppm
Sound alarm:	enabled

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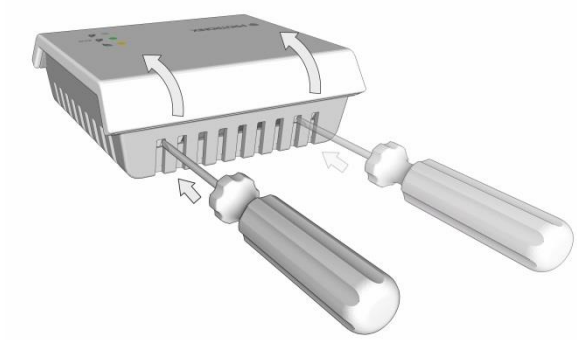
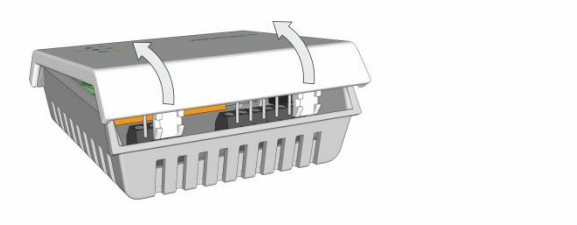
Sensor box disassembly

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.

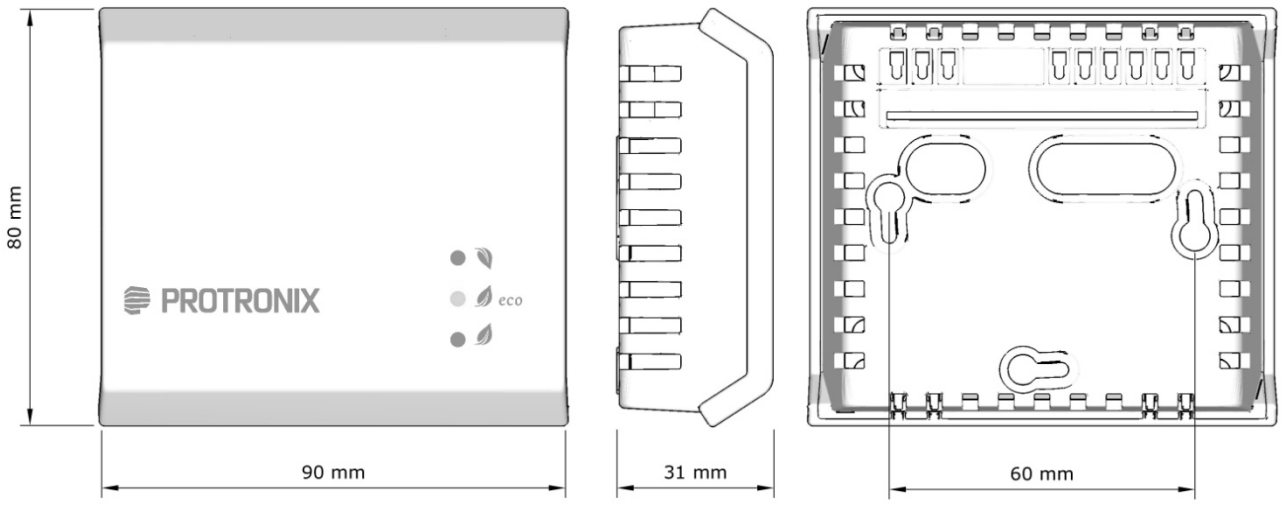
Safety warning

- 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.

Dimensions



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