

NLII-CO2-R-5-A | Room sensor CO₂ 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 (CO₂) in air. It is suitable for schools, offices, classrooms, shopping centers, homes, restaurants, fitness centers, commercial buildings, etc.

- > measures CO₂
- > 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 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 very good long term stability.

The sensor has built-in one analog output for the actual concentration of CO₂. 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 pulses when the CO₂ concentration exceeds and falls below the set CO₂ level for e.g. opening and closing a skylight, or standard switching, where relays are closed until the measured CO₂ concentration drops under the set CO₂ 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	V DC
	12 – 24	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

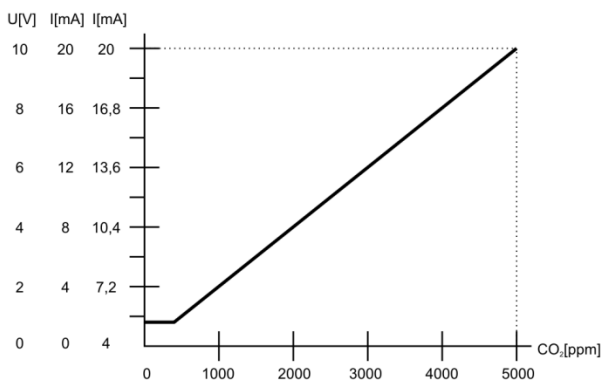


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CO₂ sensor autocalibration function

[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 CO₂ concentration



LED indication description

White LED lights:

- Less than 600 ppm CO₂.
 - maintaining low concentrations of CO₂ is not cost-effective - slightly increased concentration does not cause any health complications

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 efficiency of ventilation and air conditioning

Yellow LED lights + sound alarm:

- When the measured CO₂ concentration exceeds the level set by SET POINT rotary switch.
 - yellow LED lights always when the measured CO₂ 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.
 - CO₂ 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:

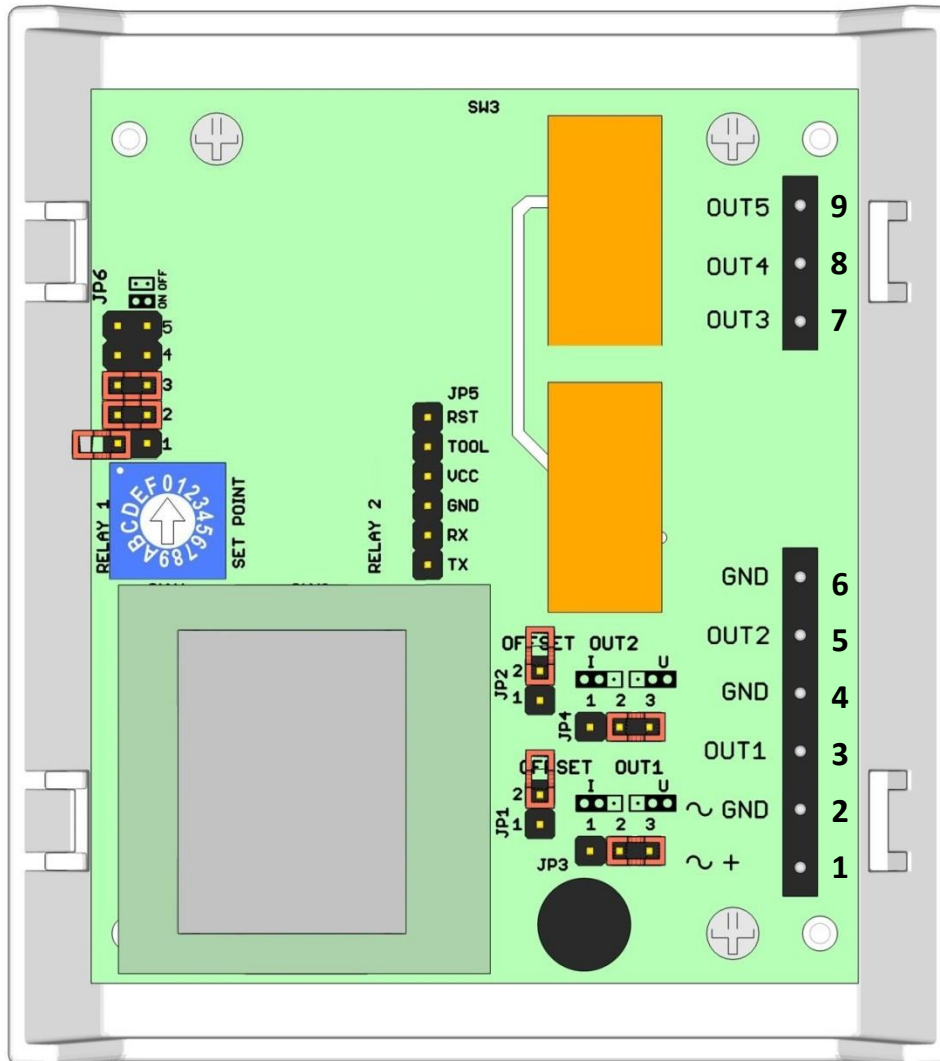
Warm-up: operational after 1 minute since power on. The declared accuracy is reached after 4 days of continuous power supply.

It is necessary to avoid severe mechanical shock of the sensor.



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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 CO₂ sensor analog output, 0-10 V or 0-20 mA or 4-20 mA
4. GND CO₂ 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 (CO₂)

SET POINT rotary switch for setting the relays switching level

RELAY 1 – switching level for CO₂ setting

Jumpers

- JP1 – unused
- JP2 – Current output offset CO₂
- JP3 – Voltage/current output CO₂
- 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 CO₂ - shift quiescent current from 0 mA to 4 mA	2 ■ 1 ■	current output CO ₂ 0-20 mA
		2 ■ 1 ■	current output CO ₂ 4-20 mA
JP3	Voltage/current output CO₂ - select the type of analog output - if the selected voltage output is CO ₂ , JP2 must not be shorted	1 2 3 ■ ■ ■	voltage output CO ₂
		1 2 3 ■ ■ ■	current output CO ₂
JP6 - 1 JP6 - 2 JP6 - 3	Switching mode, signalization and alarm - LED indication according to ambient light - when ambient light is dimmed (at night), LED indicators turn off automatically.	■ ■ 5 ■ ■ 4 ■ ■ 3 ■ ■ 2 ■ ■ 1	relays contacts closed until concentration drops sound alarm disabled LED indication according to ambient light
		■ ■ 5 ■ ■ 4 ■ ■ 3 ■ ■ 2 ■ ■ 1	relays switching in 5s pulses sound alarm enabled permanent LED indication enabled
JP6 - 4 JP6 - 5	These positions are not intended for user setting.	■ ■ 5 ■ ■ 4 ■ ■ 3 ■ ■ 2 ■ ■ 1	

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 always, when the measured concentration of CO₂ rises above the level set by the SET POINT rotary switch.

When the measured concentration of CO₂ drops below the level set by SET POINT switch minus the hysteresis value of 100 ppm, relay 2 contacts close for 5s.

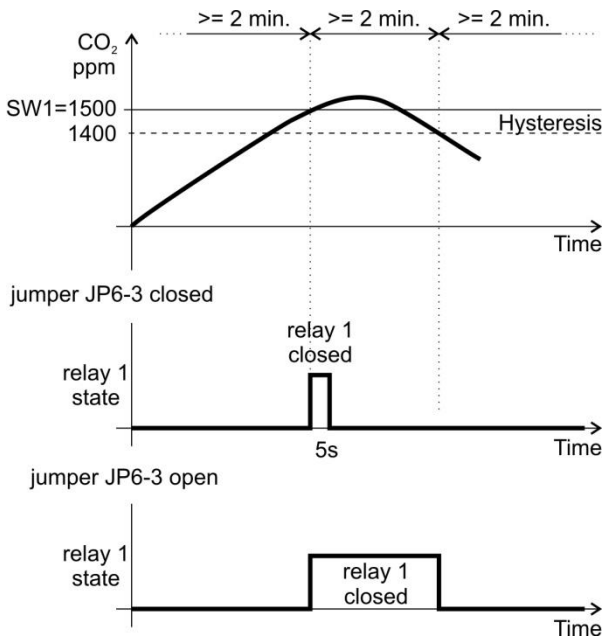
If the jumper JP6-3 is open, both relays contacts close, when the measured concentration of CO₂ rises above the level set by the SET POINT rotary switch and stay close until the measured concentration drops below the level set by SET POINT switch minus the hysteresis value of 100 ppm.

Minimum delay between changes of relays state is 2 minutes.

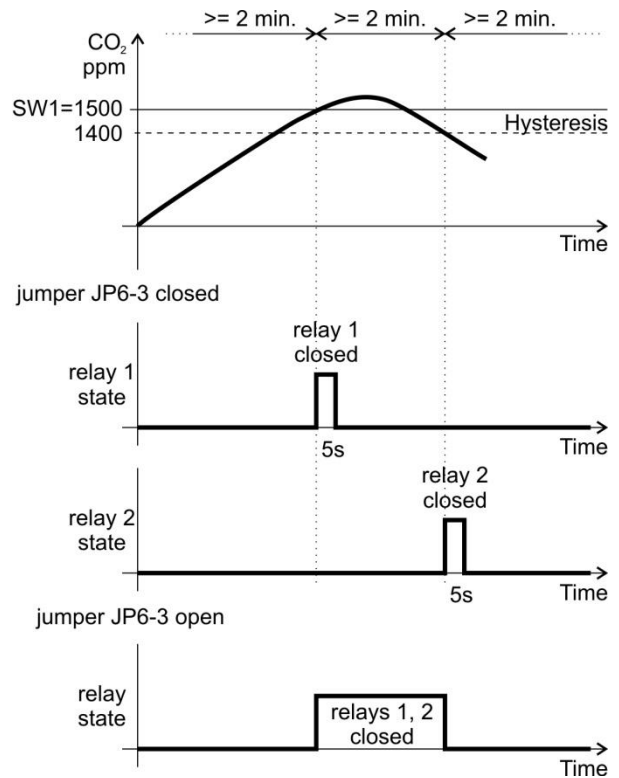


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Relay switching graph with 1 relay (NLII-CO2-R-5-A)



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

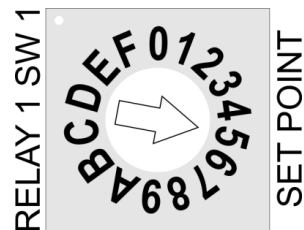


Setting the switching levels

Required concentration of CO₂

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



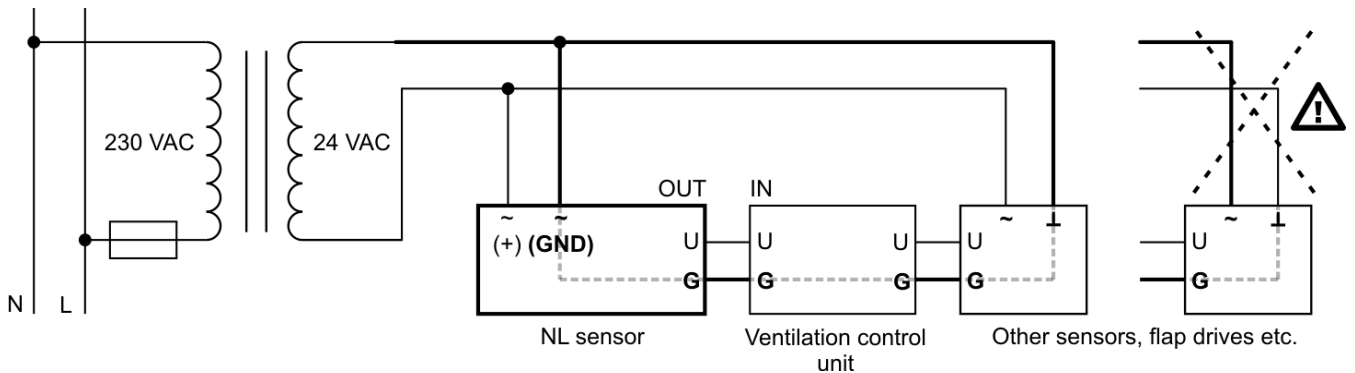
Factory settings

LED indication:	indication turns off when ambient light dims
CO ₂ analog output:	voltage output
Relay switching mode:	relays switching in 5s pulses
Switching level CO ₂ :	1500 ppm
Sound alarm:	enabled

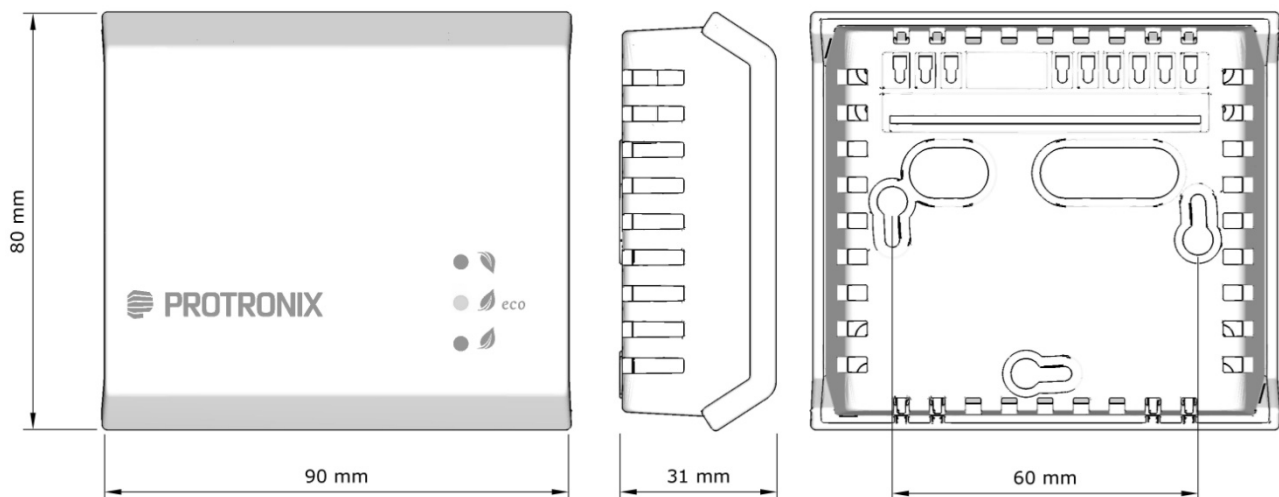


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If you connect other devices to the same AC power source as the NL sensor, it is necessary to meet GND wiring of all analog inputs and outputs, as well as power wires.



Dimensions



Sensor assembly



Box color

Front: white - RAL9016
Base: gray - RAL7035

Way to use

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

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.

