

NLII-CO2+RH+T-5-SX | Combined CO₂/RH/T sensor with SIGFOX

Room sensor NLII-CO2 is used to continuously monitor air quality inside buildings and then control ventilation (HVAC) systems according to current levels of air internal air quality. The sensor measures concentration of carbon dioxide (CO₂), relative humidity (RH) and temperature (T). It can be effectively used in offices, classrooms, shopping centers, homes, restaurants, fitness centers, commercial buildings, etc.

- › measures CO₂, RH and temperature
- › 2x analog voltage/current output
- › SIGFOX wireless communication
- › maintenance during operation is not required

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.

Measurement of the relative humidity is based on the principle of capacitive polymer sensor.

The sensor has built-in two separate analog outputs - one for the actual concentration of CO₂ and the other for the current relative humidity. Temperature output is available by Sigfox communication.

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.

For detailed information on the communication protocol, use the document [NLII-Sigfox-Communication](#).

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 startup	max 1	min
CO ₂ step response	(90 %) 80	s
RH measuring range	0 – 100 %	RH
RH accuracy 20 – 80 %	± 3 %	RH
RH accuracy 0 – 100 %	± 6 %	RH
T measuring range	0 – 50	°C
T accuracy	± 0,4	°C
Output ¹⁾	0-10 V / 0-20 mA / 4-20 mA	
Working humidity non condensing	0 – 95 %	RH
Working temperature	0 to +50	°C
Storage temperature	-20 to +60	°C
Expected lifetime	min. 10	years
Ingress protection	IP20	
Dimensions	110x158x31	mm
¹⁾ It is possible to select the desired type of analog output by a jumper. Minimum achievable output value corresponds to minimum value of the measuring range.		

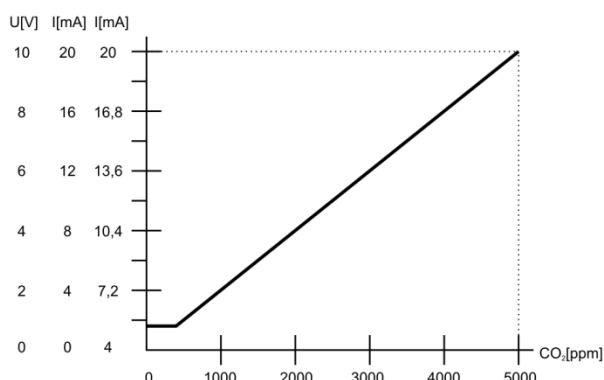


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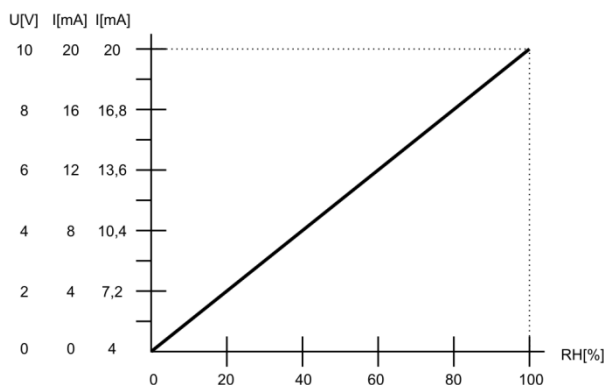
CO₂ sensor autocalibration function

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.

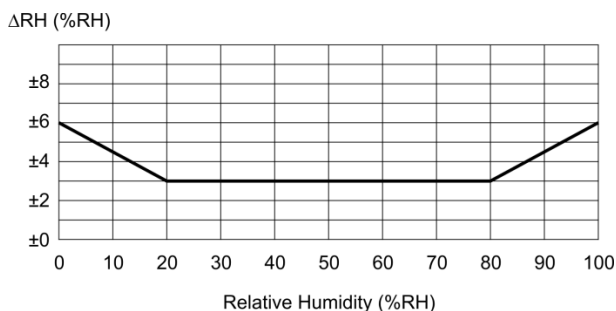
Selected analog output values versus actual CO₂ concentration



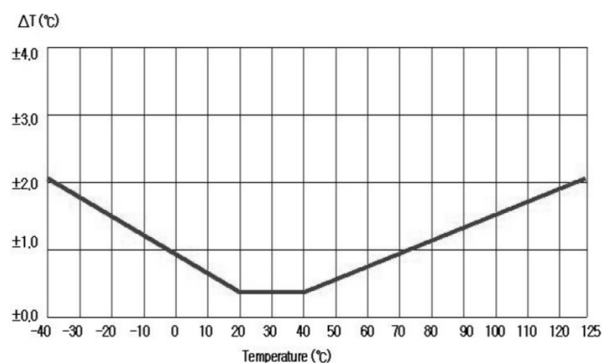
Selected analog output values versus actual RH



Typical RH measurement accuracy at 25 °C



Typical T measurement accuracy



LED indication description

White LED lights:

- Less than 600 ppm CO₂ or less than 40 % RH. (according to the quantity selected for indication)
- maintaining low concentrations of CO₂ is not cost-effective - slightly increased concentration does not cause any health complications
- low concentrations of RH. Too dry air feels cooler as compared to equally hot but more humid air – risk of drying of the mucous membranes - respiratory problems

Green LED lights:

- More than or equal to 600 ppm CO₂ or 40 % RH, less than or equal to 1200 ppm CO₂ or 60 % RH. (according to the quantity selected for indication)
- optimal balance of air quality and energy efficiency of ventilation and air conditioning
- optimal relative humidity for humans

Yellow LED lights:

- More than 1200 ppm CO₂ or more than 60 % RH. (according to the quantity selected for indication)
- higher concentration of CO₂ - further increase of CO₂ concentrations above this level can cause fatigue, restlessness, headache
- too high humidity - the risk of mold growth and associated health complications



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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

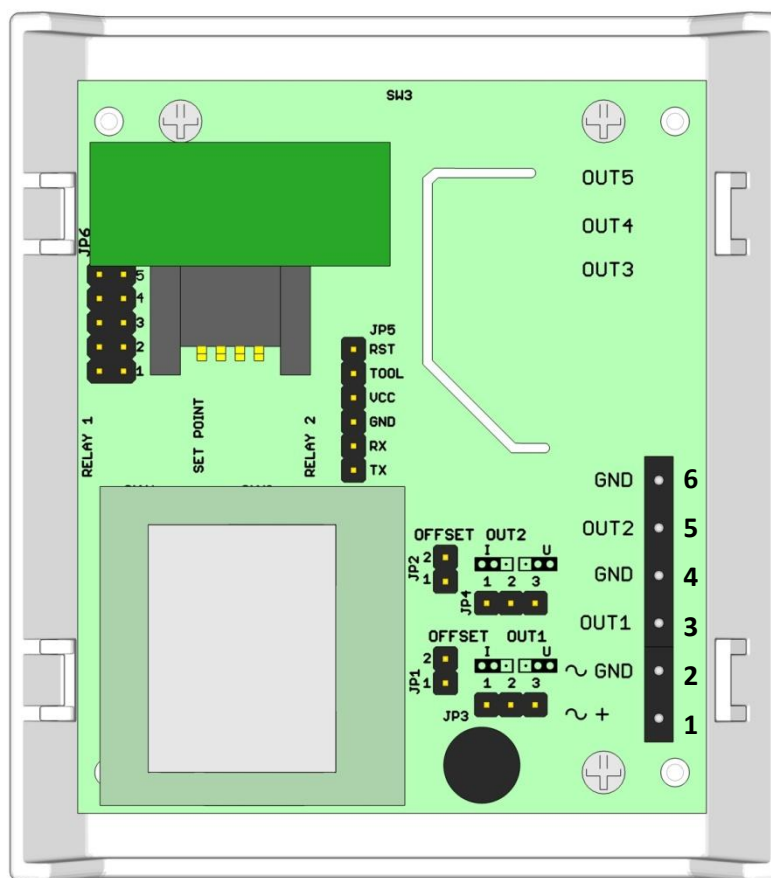
All three LEDs are shining permanently.

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.

Electronic board controls and terminals



Terminals

- 1. ~ + supply AC or DC (+) plus pole
- 2. ~ GND supply 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 RH sensor analog output, 0-10 V or 0-20 mA or 4-20 mA
- 6. GND RH sensor output GND

Jumpers

- JP1 – Current output offset RH
- JP2 – Current output offset CO₂
- JP3 – Voltage/current output CO₂
- JP4 – Voltage/current output RH
- JP6 – LED indication settings



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Jumpers on the electronics board

Mark	Description	Settings	Meaning
JP1	Current output offset RH - shift quiescent current from 0 mA to 4 mA	2 ■ 1 ■	current output RH 0-20 mA
		2 ■ 1 ■	current output RH 4-20 mA
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
JP4	Voltage/current output RH - select the type of analog output - if the selected voltage output is RH, JP1 must not be shorted	1 2 3 ■ ■ ■	voltage output RH
		1 2 3 ■ ■ ■	current output RH
JP6 - 1	LED indication - LED indication according to ambient light - when ambient light is dimmed (at night), LED indicators turn off automatically.	■ ■ 5 ■ ■ 4 ■ ■ 3 ■ ■ 2 ■ ■ 1	permanent LED indication enabled
		■ ■ 5 ■ ■ 4 ■ ■ 3 ■ ■ 2 ■ ■ 1	LED indication according to ambient light
JP6 - 4 JP6 - 5	These positions are not intended for user setting.	■ ■ 5 ■ ■ 4 ■ ■ 3 ■ ■ 2 ■ ■ 1	

Factory settings

LED indication: by CO₂, indication turns off
when ambient light dims

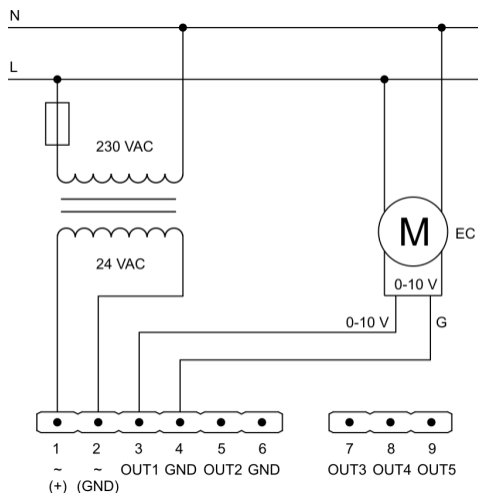
CO₂ analog output: voltage output

RH analog output: voltage output

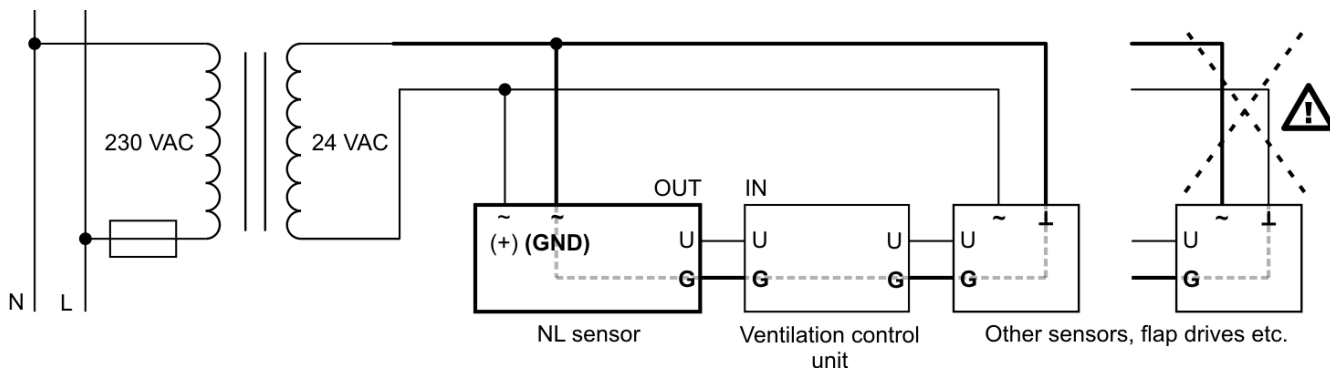


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Example of CO₂ sensor connection for direct EC motor control using 0-10 V signal

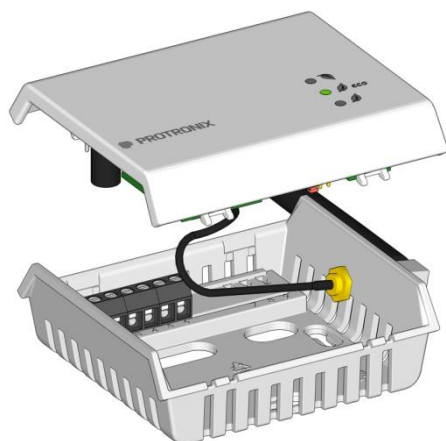


If you connect other devices to the same AC power source as the NL sensor, it is necessary to meet GND wiring of all analog inputs and outputs, as well as power wires.



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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.

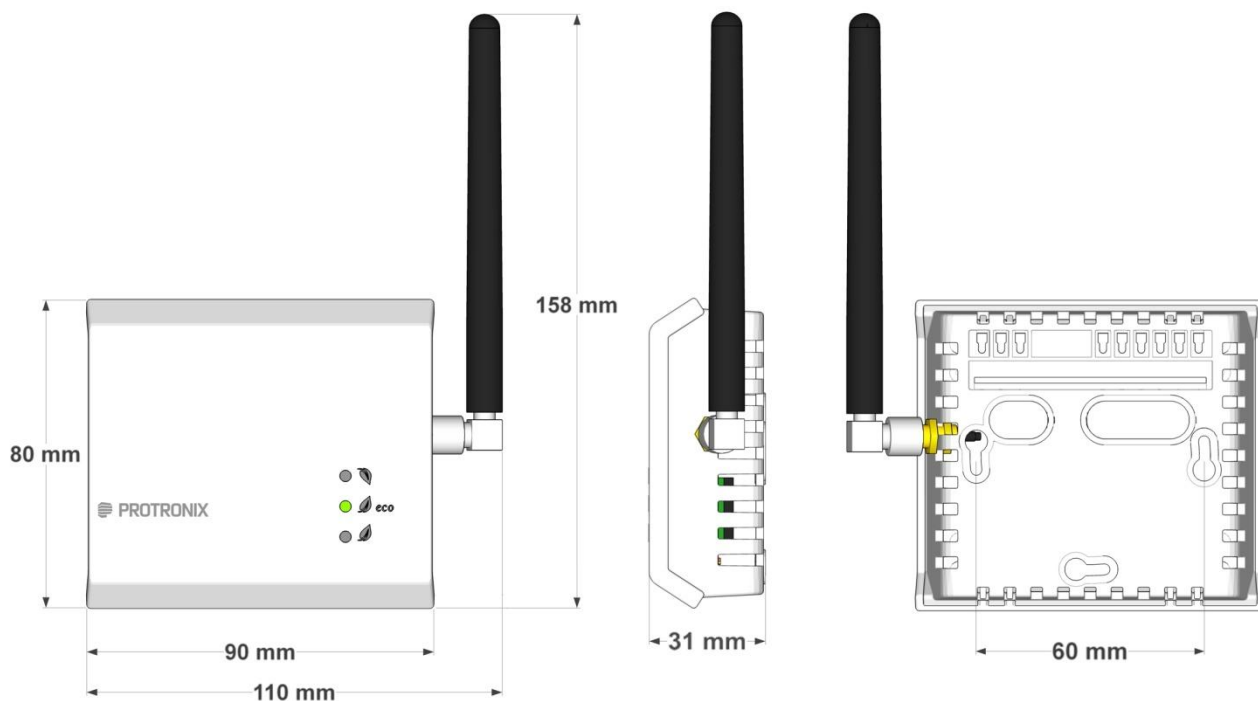
End of product life

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

Disassembly

When disassembling, be careful not to rip-out the antenna cable. It connects the antenna in lower part of the sensor with the electronics in the upper part.

Dimensions



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

