

NLII-iVOC | Combined sensor VOC/RH

Room sensor NLII-iVOC is used to monitor air quality inside buildings and power control ventilation (HVAC) systems according to current levels of air pollution. The sensor measures the concentration of gaseous organic substances in the air (VOC) and relative humidity (RH) of air. The sensor can be effectively used in offices, classrooms, restaurants, kitchens, fitness centres, commercial facilities etc.

- > measures VOC and RH
- > close to the human perception of odors
- > compatibility with CO₂ standard
- > 2x analog voltage/current output
- > 2x output relay – 2x NO/C
- > cascade switching



Type of sensor	iVOC output	RH output	Relay
NLII-iVOC	0-10 V/0-20 mA/4-20 mA ¹⁾	-	-
NLII-iVOC -R	0-10 V/0-20 mA/4-20 mA ¹⁾	-	1x switching contact
NLII-iVOC +RH	0-10 V/0-20 mA/4-20 mA ¹⁾	0-10 V/0-20 mA/4-20 mA ¹⁾	-
NLII-iVOC +RH-R	0-10 V/0-20 mA/4-20 mA ¹⁾	0-10 V/0-20 mA/4-20 mA ¹⁾	2x NO/C

¹⁾It is possible to select by jumper desired type of analog output.

Built-in advanced iVOC sensor is sensitive to volatile organic substances typically contained in the stuffy air - gaseous metabolic products of human bodies and other gaseous pollutants such as formaldehyde, cooking vapors, fumes from paints, varnishes, adhesives, detergents, etc. that CO₂ sensor does not detect. NL-iVOC sensor detects gaseous pollutant substances in the air that are the main reason for ventilation. Sensor NL-iVOC approximates to human perception of air quality. The output of the sensor is calibrated as equivalent to a standard CO₂ sensor.

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 VOC and the other for the current relative humidity.

If the sensor contains 2 relays can be set two switching modes: standard (always one relay switched according to one quantity), a cascade mode (according to a selected quantity switch two relays with different levels of switching). Cascade switching, for example, can be used to switch power air conditioning units. The two rotary switches can be independently set the level at which the corresponding relay switches.

Sensor can efficiently manage ventilation and heat recovery units, based on current air quality.

By three LED indicators can be easily checked the current air quality. Preferred eco level means good indoor air quality needed to achieve a sense of well-being and at the same time can reduce energy costs for heating or air conditioning.

Based on these measurements can be directly controlled ventilation, air conditioning and heat recovery units in an efficient manner.



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Table of parameters

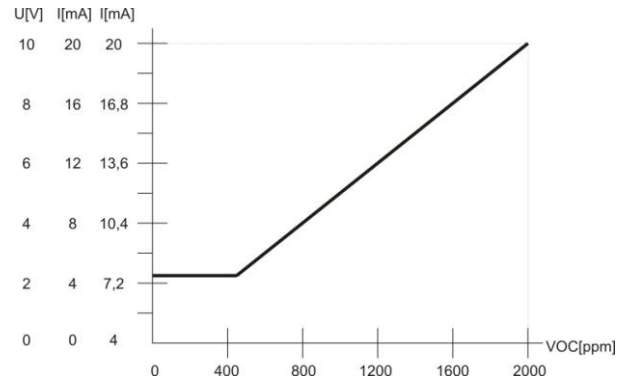
Parameter	Value	
Supply voltage range	14 V – 40 V DC or 18 V – 30 V AC	
Average consumption	0,5	W
Ingress protection	IP20	
iVOC* measuring range	450 – 2000	ppm
iVOC* relay - hysteresis	100	ppm
RH measuring range	0 – 100 %	RH
RH accuracy 20 – 80 %	± 3 %	RH
RH accuracy 0 – 100 %	± 6 %	RH
RH switching hysteresis	5 %	RH
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 +50	°C
Expected lifetime	min. 10	years
Dimensions	90x80x31	mm

* iVOC ppm equivalent to CO₂ ppm

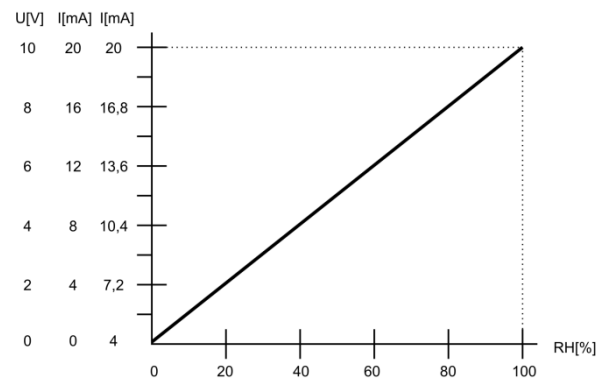
iVOC sensor auto-calibration function

Built-in auto-calibration function compensates for long-term aging of the key components of the sensor. This function is available only during permanent power sensor. Calibration during operation is not necessary.

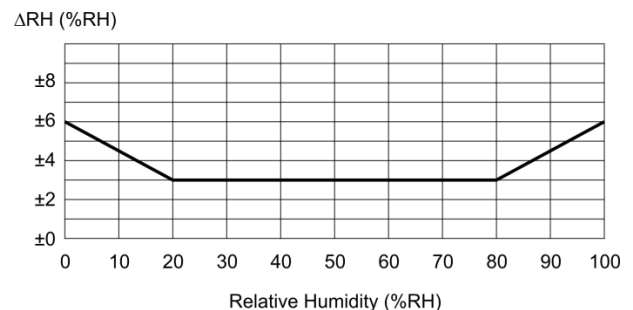
Selected analog output values versus VOC concentration



Selected analog output values versus RH concentration



Typical measurement accuracy RH at 25 °C



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LED indication description



White LED lights:

Less than 40 % RH or less than 600 ppm VOC.
(according to the values selected for indication)

- low concentrations of VOC energy is not cost-effective - too ventilated area, a little bit higher concentration of VOC does not cause any health complications
- low concentrations of RH. too dry air feels cooler person perceives as compared to the same hot air with high relative humidity, dryness of mucous membranes - respiratory problems



Green LED lights:

More than or equal to 40 % RH or 600 ppm VOC
less than or equal to 60 % RH or 1200 ppm VOC.
(according to the values selected for indication)

- optimal balance of air quality and energy consumption for ventilation and air condition
- optimal relative humidity to human stay



Yellow LED lights:

More than 60 % RH or more than 1200 ppm VOC.
(according to the values selected for indication)

- higher concentration of VOC, further increasing of VOC concentrations above this level can cause fatigue, restlessness, headache and feeling uncomfortable, hot etc.
- too high humidity, the risk of mold growth and associated health complications

Sensor start after power on

For 6 minutes after power on will the sensor warm-up. This state is indicated by simultaneous flashing of all three LEDs. The LEDs will show the condition of the air according to LED indication description after the warm-up is done.

Failure indication sensor

All three LED's lights up at the same time permanently and even after the warm-up.

CAUTION:

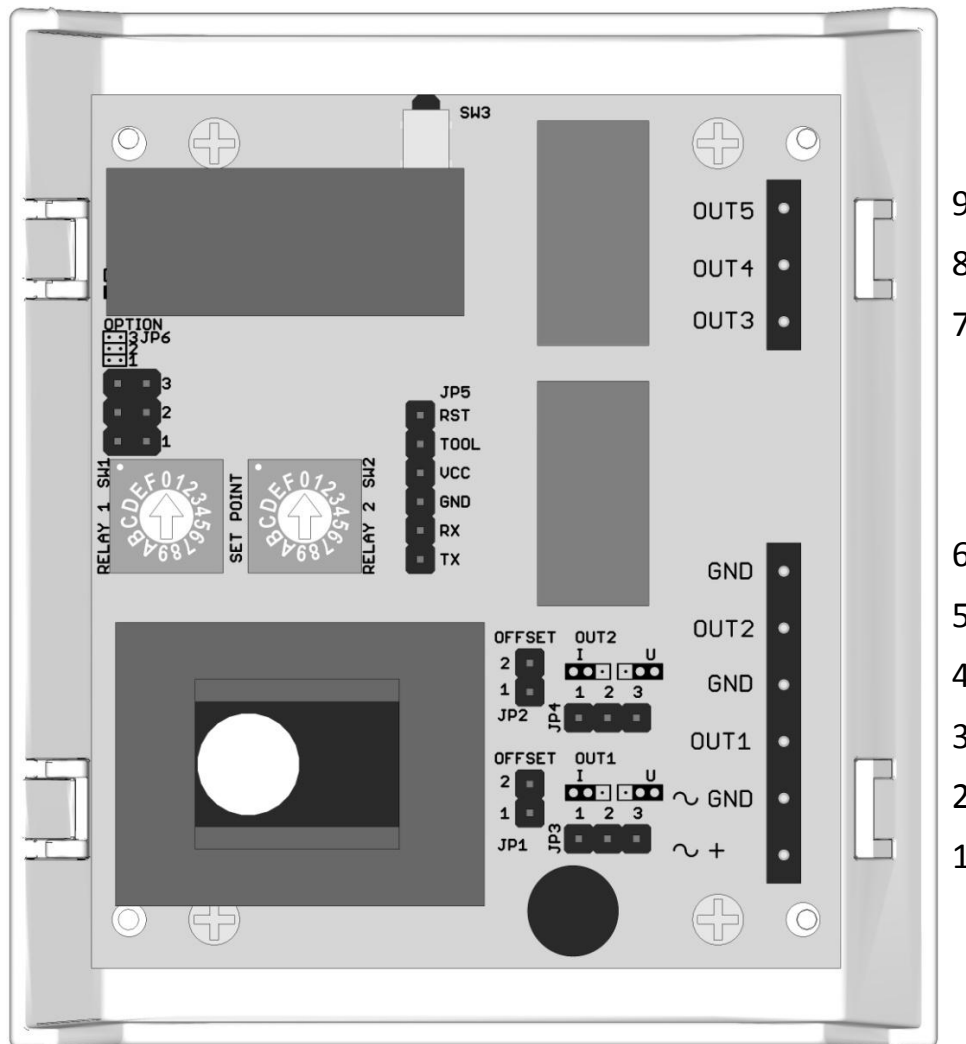
Warm-up: operational after 6 minute since power on. The declared accuracy is reached after 4 days of continuous power supply.

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



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Views electronic boards controls and terminals



Jumpers description

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

Setting switching relay by rotary switch SET POINT

- RELAY 1 SW1** – level control switching for iVOC
- RELAY 2 SW2** – level control switching for RH

Jumpers on the electronics board

- JP1** – Current output offset RH
- JP2** – Current output offset VOC
- JP3** – Voltage/current output VOC
- JP4** – Voltage/current output RH
- JP6** – LED indication and switching settings



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Jumpers on the electronics board

Mark	Description	Settings	Significance
JP1	Current output offset RH - shift quiescent current from 0 mA to 4 mA	2 <input checked="" type="checkbox"/> 1 <input checked="" type="checkbox"/>	current output RH 0-20 mA
		2 <input type="checkbox"/> 1 <input checked="" type="checkbox"/>	current output RH 4-20 mA
JP2	Current output offset VOC - shift quiescent current from 0 mA to 4 mA	2 <input checked="" type="checkbox"/> 1 <input checked="" type="checkbox"/>	current output VOC 0-20 mA
		2 <input type="checkbox"/> 1 <input checked="" type="checkbox"/>	current output VOC 4-20 mA
JP3	Voltage/current output VOC - select the type of analog output - if the selected voltage output VOC, JP2 may not be short-circuited	1 2 3 <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	voltage output VOC
		1 2 3 <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	current output VOC
JP4	Voltage/current output RH - select the type of analog output - if the selected voltage output RH, JP1 may not be short-circuited	1 2 3 <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	voltage output RH
		1 2 3 <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	current output RH
JP6 - 1	Enabling LED indication	1 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 2 <input type="checkbox"/> <input type="checkbox"/> 3 <input type="checkbox"/> <input type="checkbox"/>	LED indication enabled
		1 <input type="checkbox"/> <input type="checkbox"/> 2 <input type="checkbox"/> <input type="checkbox"/> 3 <input type="checkbox"/> <input type="checkbox"/>	LED indication disabled
JP6 - 2 JP6 - 3	Enabling cascade switching and switching settings according VOC or RH - if the selected standard mode switching, VOC and RH sensor control their every relay - if elected cascade mode switching, the chosen one sensor controls two relays according to the adjusted level of the rotary switch SET POINT (for both switches applies table according to the selected sensor)	1 <input type="checkbox"/> <input type="checkbox"/> 2 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 3 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	standard mode switching switching and LED indication by VOC
		1 <input type="checkbox"/> <input type="checkbox"/> 2 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 3 <input checked="" type="checkbox"/> <input type="checkbox"/>	standard mode switching switching and LED indication by RH
		1 <input type="checkbox"/> <input type="checkbox"/> 2 <input checked="" type="checkbox"/> <input type="checkbox"/> 3 <input type="checkbox"/> <input checked="" type="checkbox"/>	cascade mode switching switching and LED indication by VOC
		1 <input type="checkbox"/> <input type="checkbox"/> 2 <input checked="" type="checkbox"/> <input type="checkbox"/> 3 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	cascade mode switching switching and LED indication by RH

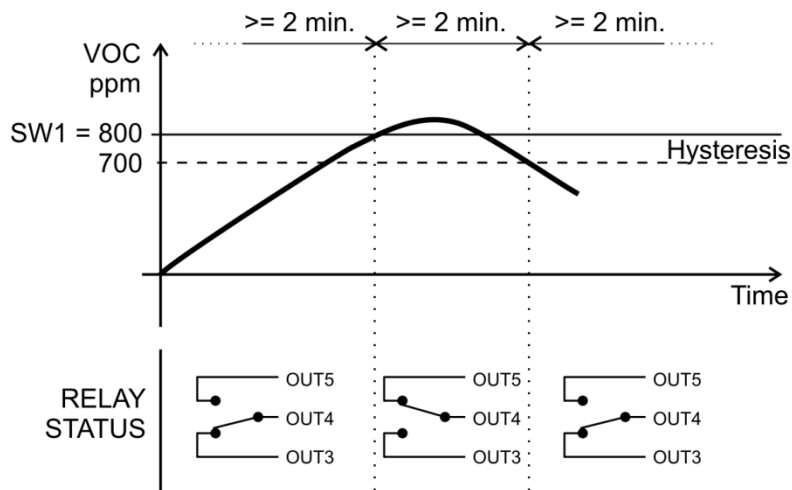


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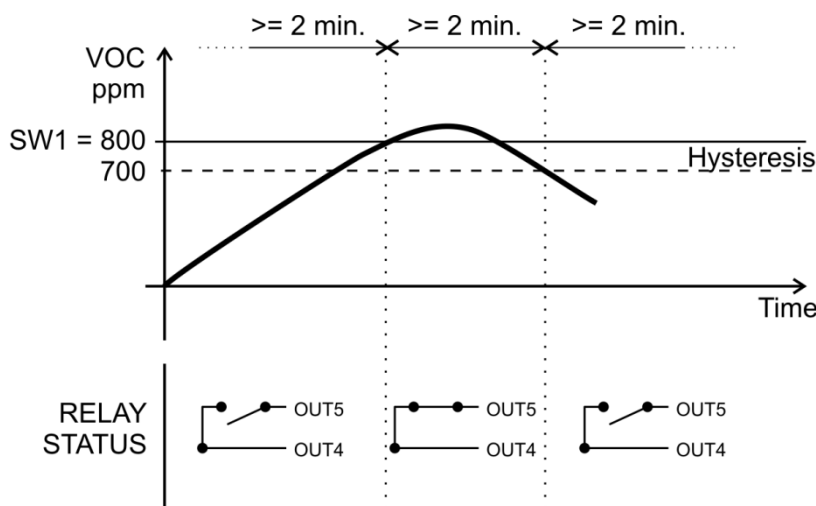
Setting the relay switching using rotary switch SET POINT

The relay switches on when the level measured variable rises above the level of the rotary switch SET POINT. The relay switches off when the level measured variable falls above the level of the rotary switch SET POINT minus hysteresis value of 100 ppm. Minimal lag between changes in state relays are 2 minutes.

Standard switching one relay (NLII-iVOC-R)

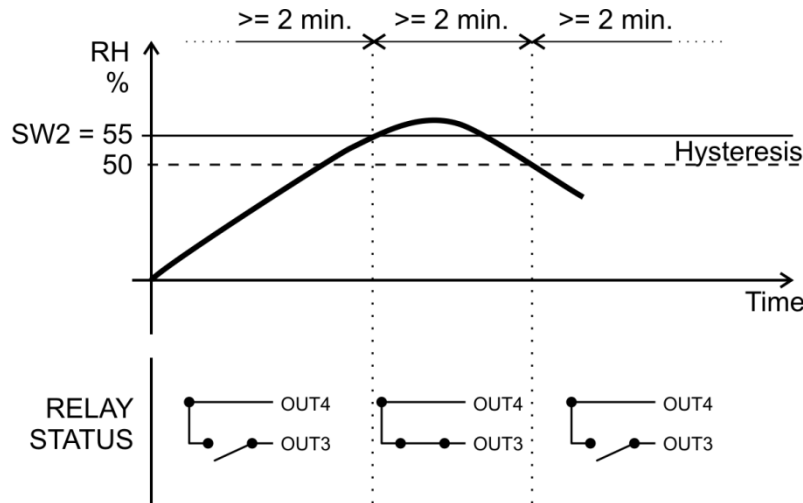


Standard switching with two relay for VOC (NLII-iVOC+RH-R)

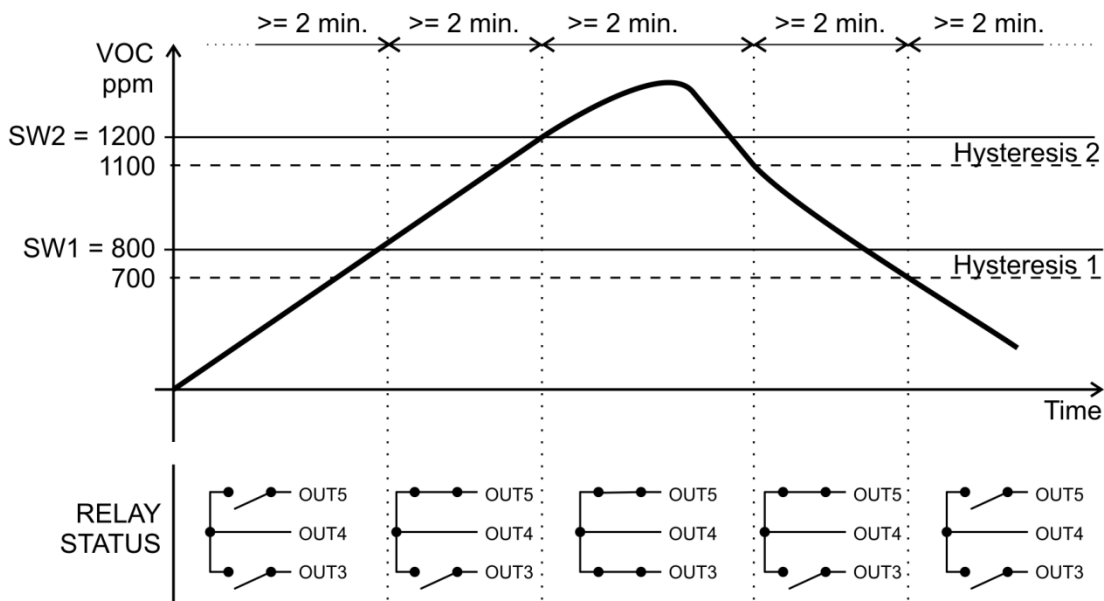


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Standard switching with two relay for RH (NLII-iVOC+RH-R)



Cascade switch with two relays (NLII-iVOC+RH-R)



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Setting switching levels

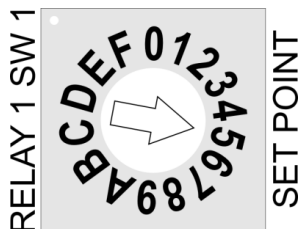
Required concentration of VOC

SET POINT	VOC [ppm]
0	500
1	600
2	700
3	800
4	900
5	1000
6	1100
7	1200
8	1300
9	1400
A	1500
B	1600
C	1700
D	1800
E	1900
F	2000

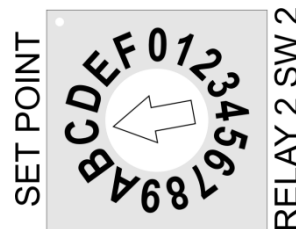
Required relative humidity (RH)

SET POINT	RH [%]
0	relay off
1	10
2	20
3	30
4	40
5	50
6	60
7	70
8	80
9	90
A	35
B	45
C	55
D	65
E	75
F	85

Example for setting the concentration of 1000 VOC:



Example for setting a relative humidity of 55%:



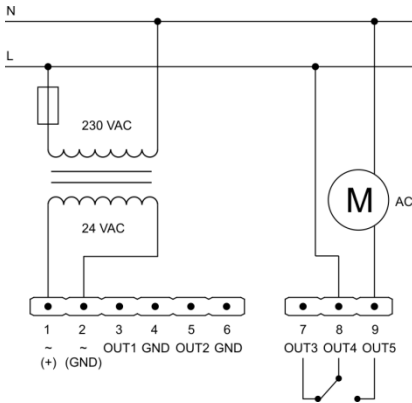
Factory settings

LED indication: VOC
 VOC analog output: voltage output
 RH analog output: voltage output
 Relay switching mode: Standard
 Switching level VOC: 1000 ppm
 Switching level RH: 55%

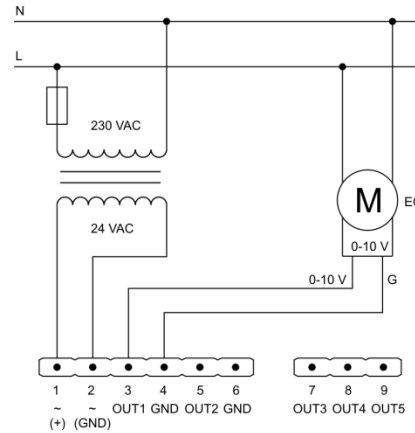


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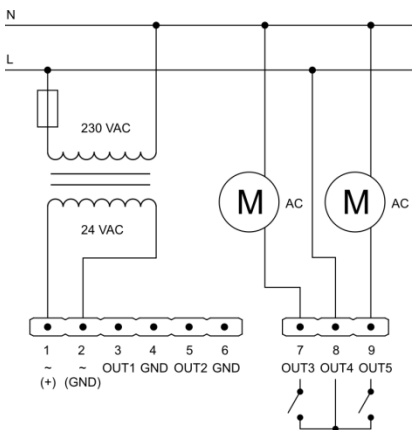
Example of sensor connection iVOC by one relay (1x switching contact)



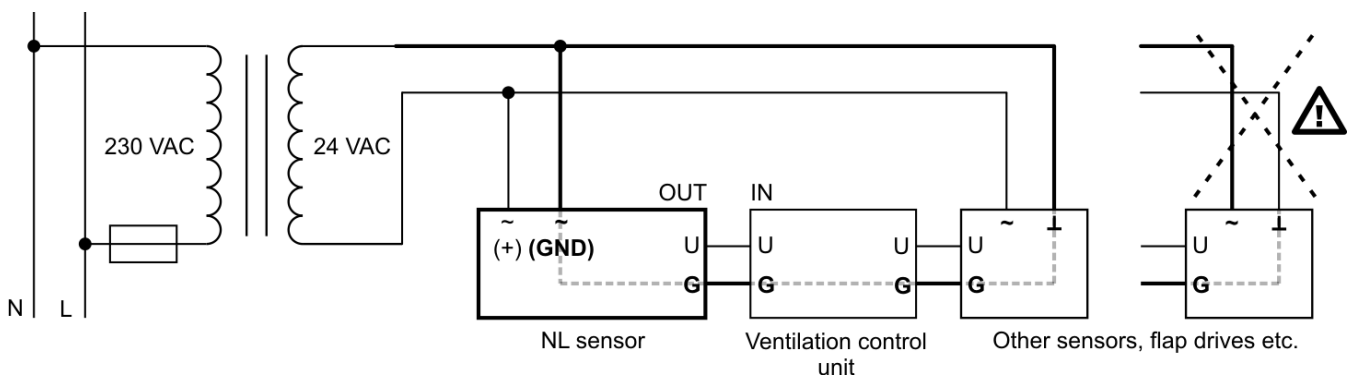
Example of sensor connection iVOC for direct EC motor control using signal 0-10 V



Example of sensor connection iVOC with two relays (2x NO/C)

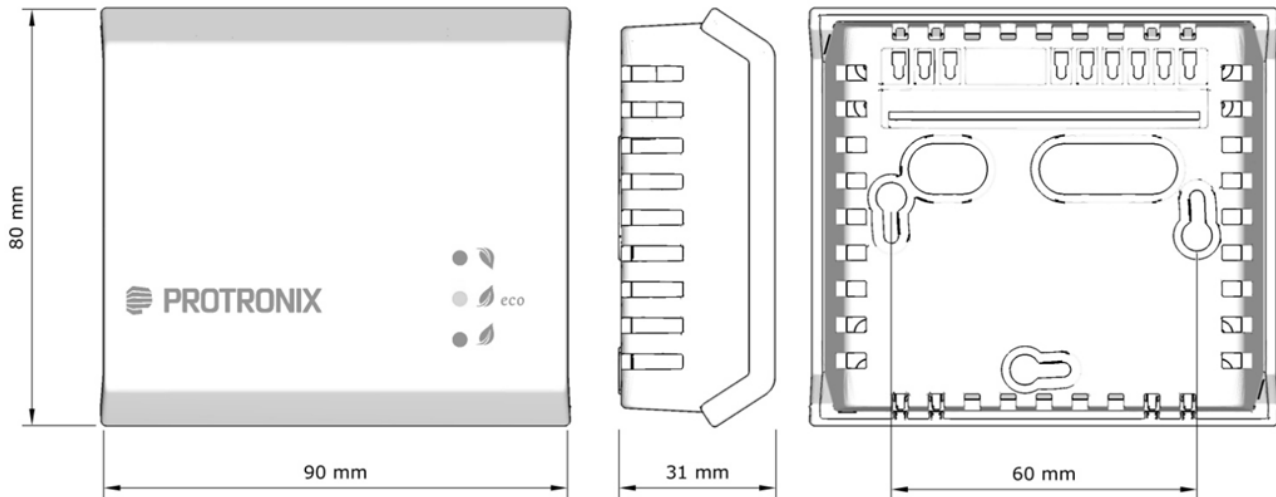


If you connect other devices to the same AC power source as the NL sensor, it is necessary to meet GND wiring of all analog inputs and outputs, as well as power wires.



NLII-iVOC | Combined sensor VOC/RH

Dimensions



Sensor assembly



Box color

Front: White - RAL9016
Base: gray - RAL7035

Way to use

The product is intended for indoor use only.

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.

