PROTRONIX IL- CO2-R-5-R1 Carbon Dioxide Sensors User Manual

Contents

PROTRONIX

PROTRONIX IL- CO2-R-5-R1 Carbon Dioxide Sensors

Product Information

Specifications

- Supply voltage range: 250/30 V AC / V DC
- Average consumption: 100 ppm max 2 min
- CO2 measuring range: 7 min
- CO2 accuracy: > 10
- CO2 relay – hysteresis: IP65
- CO2 rate rise: 80x125x58 mm
- CO2 step response: -20 to +60
- Max. switching voltage: 250/30 V AC / V DC
- Max. switching current: IP65
- Switching level range: 80x125x58 mm
- Working humidity non-condensing: > 10
- Working temperature non-condensing: -20 to +60
- Storage temperature: > 10
- Expected lifetime: IP65
- Ingress protection: IP65
- Dimensions: 80x125x58 mm

Product Usage Instructions

CO2 Sensor Autocalibration

The sensor features an autocalibration function that compensates for long-term aging of key components. This function operates continuously when sensor power supply is uninterrupted, eliminating the need for calibration during operation.

LED Indication Description

The sensor’s LEDs provide valuable information:

- Green LED lights indicate optimal air quality and energy efficiency ranges.
- Yellow LED lights signal higher CO2 concentrations or humidity levels that may pose health risks.

Sensor Failure Indication

If all three LEDs are shining permanently, it indicates a sensor failure.

Sensor Warm-up and Accuracy

The sensor is operational after a 2-minute warm-up period post-power-on. Full accuracy is achieved after 4 days of continuous power supply.

Sensor Connection Example

Refer to the provided example for proper sensor connection.

FAQ

- **Q: How long does it take for the sensor to reach full accuracy?**
  - A: The sensor reaches its declared accuracy after 4 days of continuous power supply.
- **Q: What do the different LED colors indicate?**
  - A: Green LEDs indicate optimal air quality, while yellow LEDs signify higher CO2 concentrations or humidity levels that may pose health risks.

Product Information

Room sensor IL-CO2-R-5-R1 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). It is suitable for areas where there is an increased requirement for sensor coverage, such as basements or industrial use.

- monitors CO2
- 1x analog voltage/current output
- 1x output relay – NO/C
- maintenance during operation is not required
- long life and stability

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 one built-in analog output for CO2 concentration. It is possible to select the desired type of 0 – 10 V DC analog output by a jumper (optionally 0 – 20 mA or 4 – 20 mA). Minimum achievable output value corresponds to minimum value of the measuring range. Relay trigger level can be set by SET POINT rotary element. 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 ventilation,

heating 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 – 40 12 – 30	V DC V AC
Average consumption	0,5	W
CO_2 measuring range	400 – 5000	ppm
CO_2 accuracy	± 75 ppm ±10 % of reading	
CO_2 relay - hysteresis	100	ppm
CO_2 rate rise	max 2	min
CO_2 step response	7	min
Max. switching voltage	250/30	V AC / V DC
Max. switching current	5/5	A AC / A DC
Switching level range	500 – 5000	ppm
Working humidity non condensing	0 – 95 %	RH
Working temperature no condensing	0 to +50	°C
Storage temperature	-20 to +60	°C
Expected lifetime	> 10	years
Ingress protection	IP65	
Dimensions	80x125x58	mm

CO2 sensor auto-calibration 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.

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)

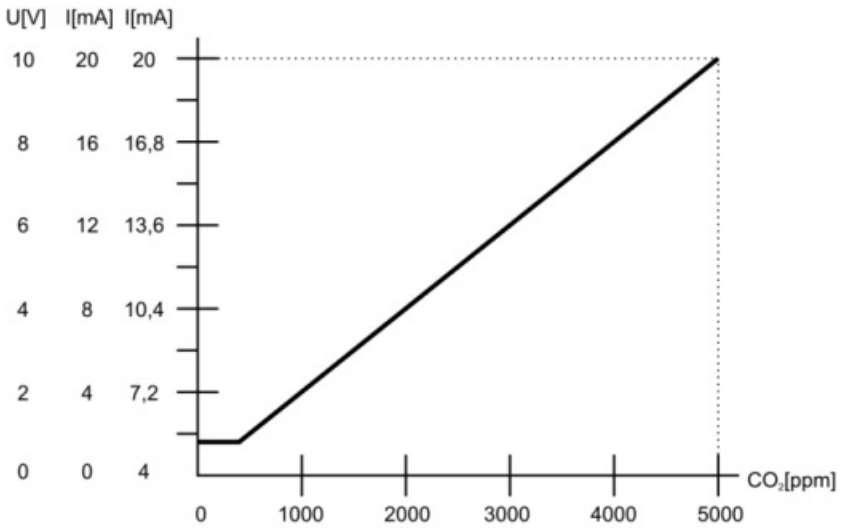
- optimal balance of air quality and energy efficiency of ventilation and air conditioning
- optimal relative humidity for humans

Yellow LED lights:

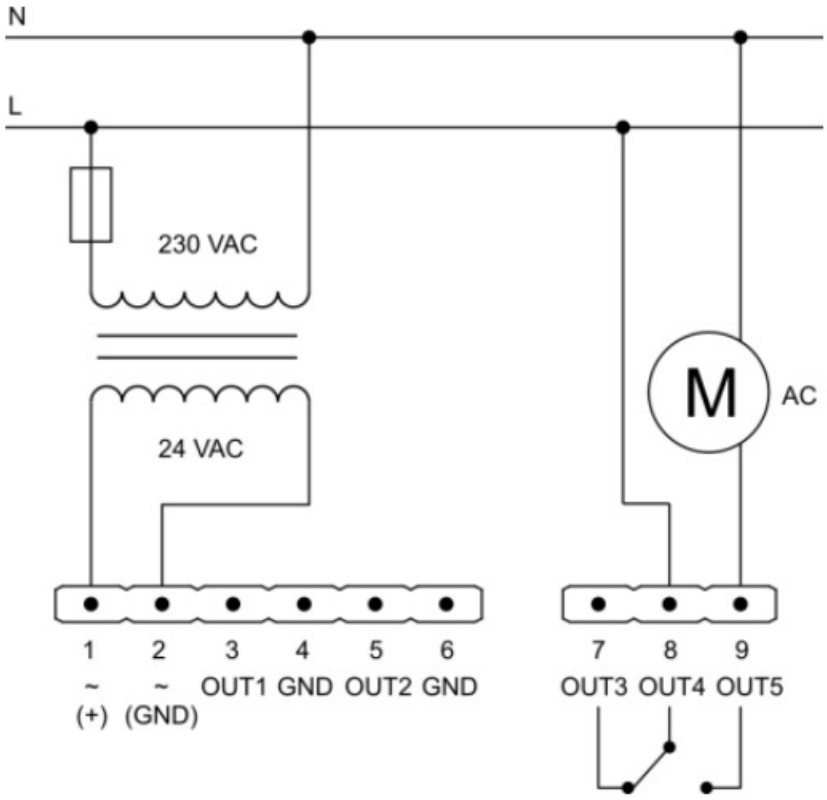
More than 1200 ppm CO2 or more than 60 % RH. (according to the quantity selected for indication)

- 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

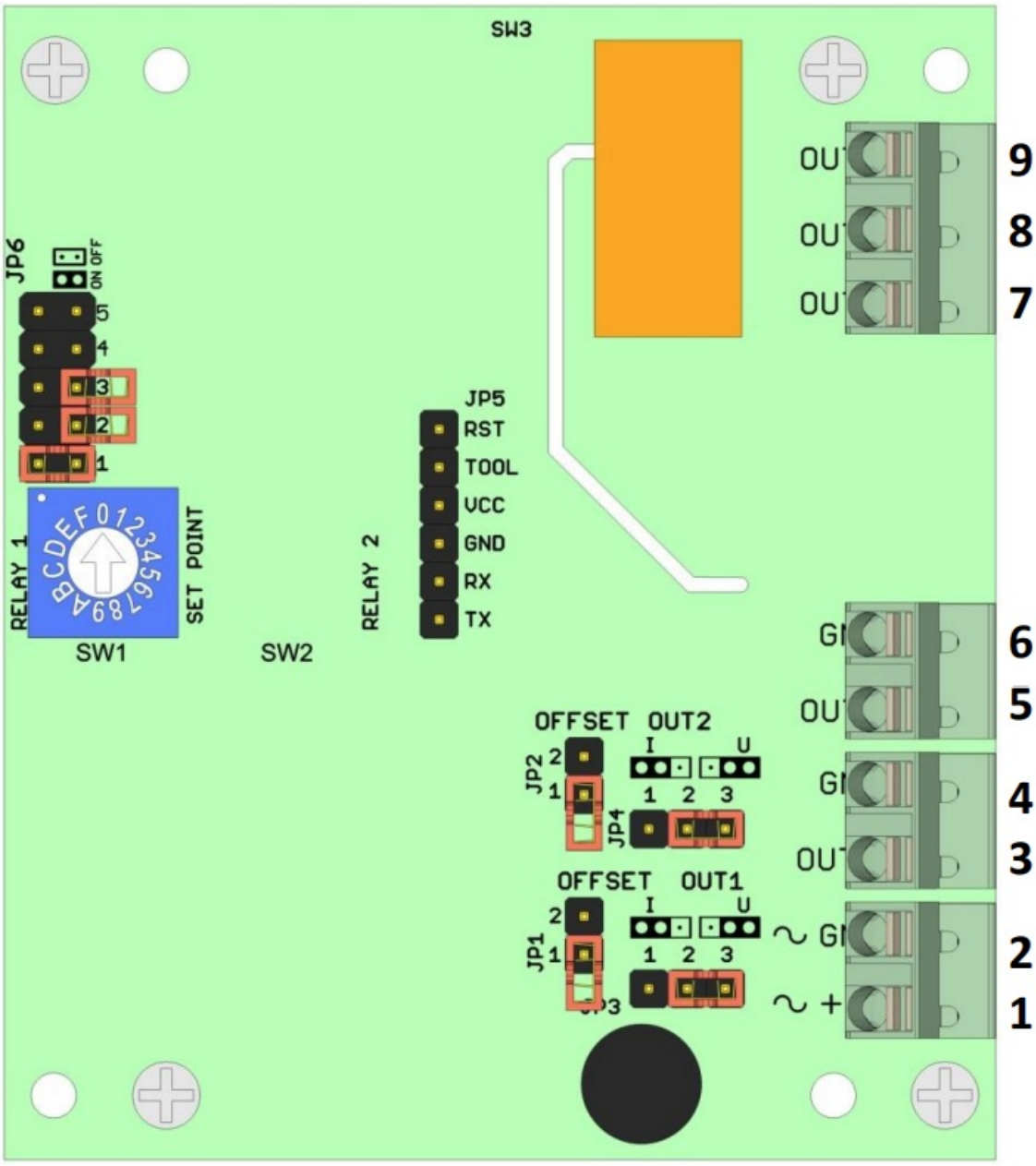
Analog output values versus actual CO2 concentration



Sensor connection example


N
L
230 VAC
24 VAC
M
AC
1
2
3
4
5
6
~
~
OUT1
GND
OUT2
GND
(+)
(GND)
7
8
9
OUT3
OUT4
OUT5

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 NOT USED
6. GND NOT USED
7. OUT3 NC relay normal connect
8. OUT4 C relay common contact
9. OUT5 NO relay normal open

SET POINT rotary switch for setting the relay switching level

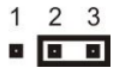
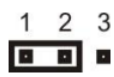
- RELAY 1 SW1 – switching level for CO2

- Jumpers
- JP1 – NOT USED
- JP2 – current output offset CO2
- JP3 – voltage/current output CO2
- JP4 – NOT USED
- JP6 – LED indication setting

Protronix s.r.o., Pardubická 177, Chrudim 537 01, Czech Republic

- www.protronix.eu
- www.careforair.eu

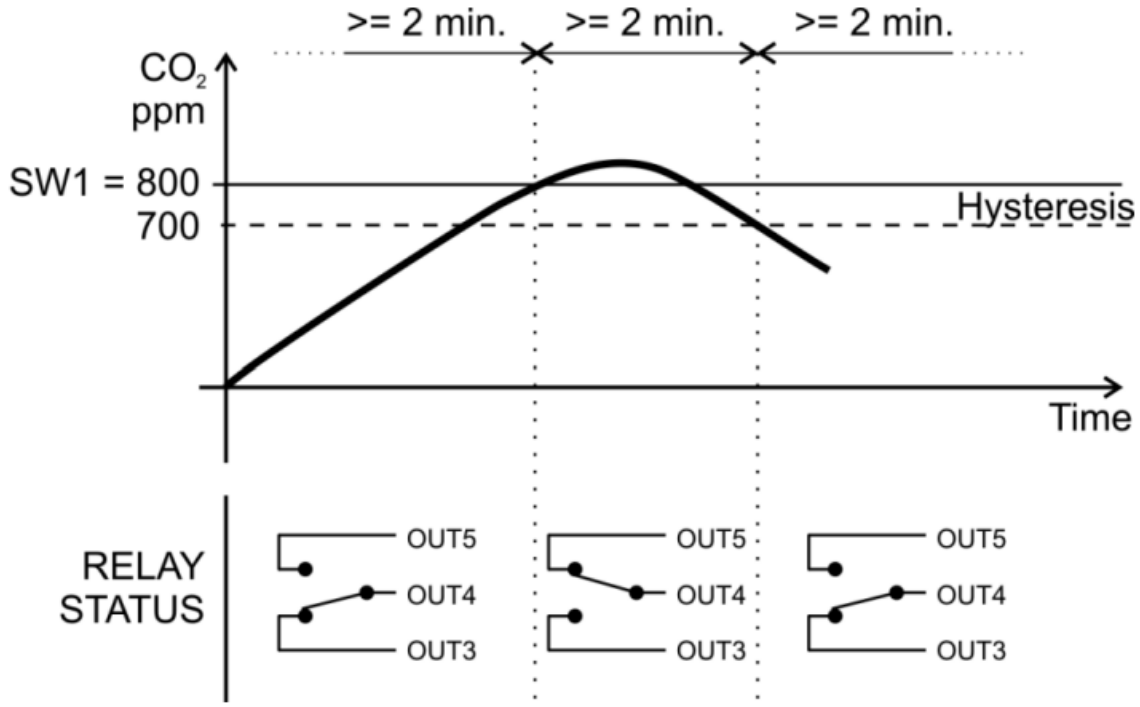
Jumpers on the electronics board

Mark	Description	Setting	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 voltage output is selected, JP1 must not be shorted		voltage output CO_2
			current output CO_2
JP6	**LED indication setting**		LED indication disabled
			LED indication enabled

Setting the relay switching using SET POINT rotary switch

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

Relay switching example

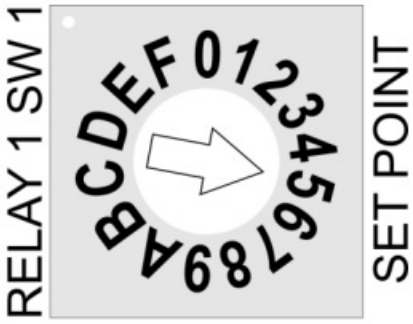


Setting the switching levels

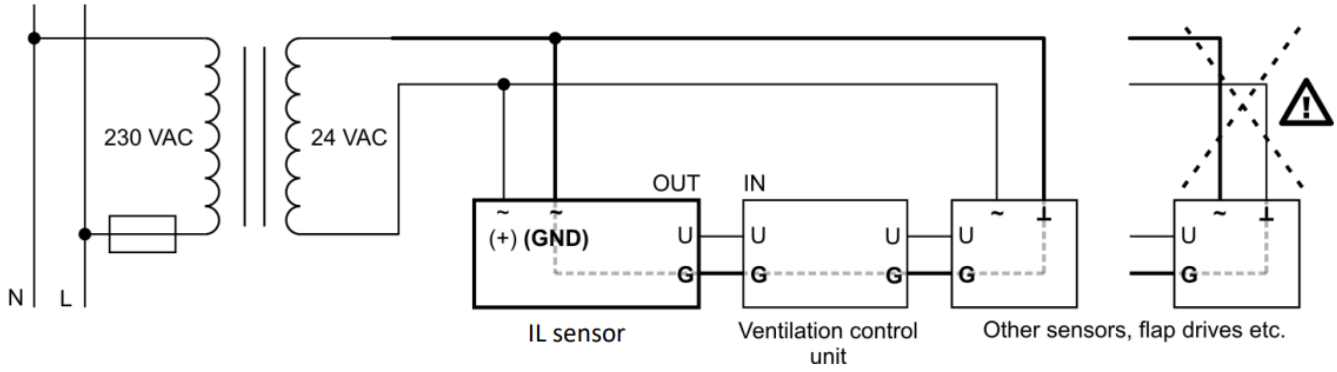
Required concentration of CO_2

SET POINT	CO_2 [ppm]
0	500
1	800
2	1100
3	1400
4	1700
5	2000
6	2300
7	2600
8	2900
9	3200
A	3500
B	3800
C	4100
D	4400
E	4700
F	5000

Example for setting the concentration of 2000 ppm:

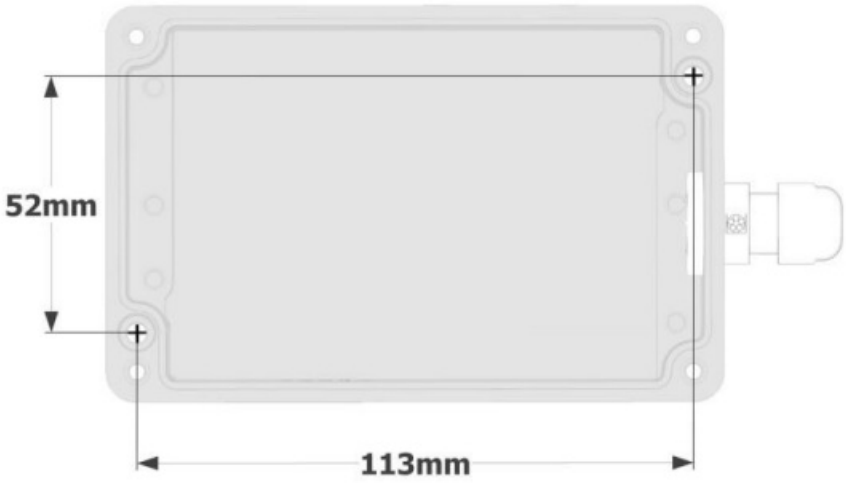


If you connect other devices to the same AC power source as the NL sensor, it is necessary to meet GND wiring of all analog inputs and outputs, as well as power wires



Dimensions

Wall mounting



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.

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

Documents / Resources

	**PROTRONIX IL- CO2-R-5-R1 Carbon Dioxide Sensors** [pdf] User Manual IL- CO2-R-5-R1 Carbon Dioxide Sensors, IL- CO2-R-5-R1, Carbon Dioxide Sensors, Dioxide Sensors, Sensors

References

- **User Manual**