

LC-WRF04 CO2

Air quality sensor CO₂ with passive temperature sensor (optional)

thermokon
Sensortechnik GmbH

Data Sheet

Subject to technical alteration
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Application

Surface mounted sensor for detection of CO₂ and temperature (passive, optional) in room and office spaces. Also possible with operating elements. For direct connection to a DDC or a monitoring system, using 0..10 V output.

Types available

LC-WRF04 CO2 V	CO ₂ : 0..10 V
LC-WRF04 CO2 VS	CO ₂ : 0..10 V / Temperatur passiv

Security Advice – Caution

The installation and assembly of electrical equipment must be performed by a skilled electrician.

The device should only be used for the appropriate application. Unauthorised conversions or alteration are prohibited! The modules must not be used in relation with equipment that threatens, directly or indirectly, human health or life or with applications that can result in danger for people, animals or assets. Before connecting devices, the installation must be isolated from the power source!

For devices with controlling units (signal transducers, transmitters, etc.), it is important to make sure that the signal receiving device (actuators, generators, etc.) does not accept damaging or threatening conditions, that may arise from false signals during installation / configuration of the control unit. If necessary, disconnect the signal receiver from any source of power.

CAUTION! Risk of electric shock due to live components within the enclosure, especially devices with mains voltage supply (usually between 90-265 V).

The following procedure must be carried out:

1. Disconnect the device from power.
 2. Ensure the device is secured against reconnection.
 3. Verify the device is not powered.
 4. Prior to reconnection, ensure that the enclosure is securely closed.
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Please verify and consult:

- Laws, standards and regulations.
- The current condition of the device at the time of installation, to ensure safe installation.
- The devices technical data and installation manual.



Notes on Disposal

The product is considered electrical and electronic waste and must be disposed accordingly. Special treatment for specific components may be legally binding or ecologically sensible. The local and current applicable legislation must be followed.

Remarks to Room Sensors

Location and Accuracy of Room Sensors

The room sensor should be mounted in a suitable location for measuring accurate room temperature. The accuracy of the temperature measurement also depends directly on the temperature dynamics of the wall. It is important, that the back plate is completely flush to the wall so that the circulation of air occurs through the vents in the cover. Otherwise, deviations in temperature measurement will occur due to uncontrolled air circulation. Also the temperature sensor should not be covered by furniture or similar devices. Mounting next to doors (due to draught) or windows (due to colder outside wall) should be avoided.

The temperature dynamics of the wall will influence the temperature measurement. Various wall types (brick, concrete, dividing and hollow brickwork) all have different behaviors with regards to thermal variations.

Surface and Flush Mounting

The temperature dynamics of the wall influence the measurement result of the sensor. Various wall types (brick, concrete, dividing and hollow brickwork) have different behaviours with regard to thermal variations. A solid concrete wall responds to thermal fluctuations within a room in a much slower way than a light-weight structure wall. Room temperature sensors installed in flush boxes have a longer response time to thermal variations. In extreme cases they detect the radiant heat of the wall even if the air temperature in the room is lower for example. The quicker the dynamics of the wall (temperature acceptance of the wall) or the longer the selected inquiry interval of the temperature sensor is the smaller the deviations limited in time are.

Build-up of Self-Heating by Electrical Dissipative Power

Temperature sensors with electronic components always have a dissipative power, which affects the temperature measurement of the ambient air. The dissipation in active temperature sensors shows a linear increase with rising operating voltage. This dissipative power has to be considered when measuring temperature. In case of a fixed operating voltage ($\pm 0,2$ V) this is normally done by adding or reducing a constant offset value. As Thermokon transducers work with a variable operating voltage, only one operating voltage can be taken into consideration, for reasons of production engineering. Transducers 0..10 V / 4..20 mA have a standard setting at an operating voltage of 24 V =. That means, that at this voltage, the expected measuring error of the output signal will be the least. For other operating voltages, the offset error will be increased or lowered by a changing power loss of the sensor electronics. If a re-calibration should become necessary later directly on the sensor, this can be done by means of a trimming potentiometer on the sensor board.

Remark: Occurring draft leads to a better carrying-off of dissipative power at the sensor. Thus temporally limited fluctuations might occur upon temperature measurement.

Application Notice for Air Quality Sensors CO₂

Refrain from touching the sensitive sensor. Any touch of it will result in an expiration of warranty.

Information about Indoor Air Quality CO₂

EN 13779 defines several classes for indoor air quality:

Category	CO ₂ content above the content in outdoor air in ppm		Description
	Typical range	Standard value	
IDA1	<400 ppm	350 ppm	High indoor air quality
IDA2	400.. 600 ppm	500 ppm	Mean indoor air quality
IDA3	600.. 1.000 ppm	800 ppm	Moderate indoor air quality
IDA4	>1.000 ppm	1.200 ppm	Low indoor air quality

Information about Self-Calibration Feature CO₂

All gas sensors are subject to drift caused by components. This fact results generally in the need to recalibrate the sensors regularly.

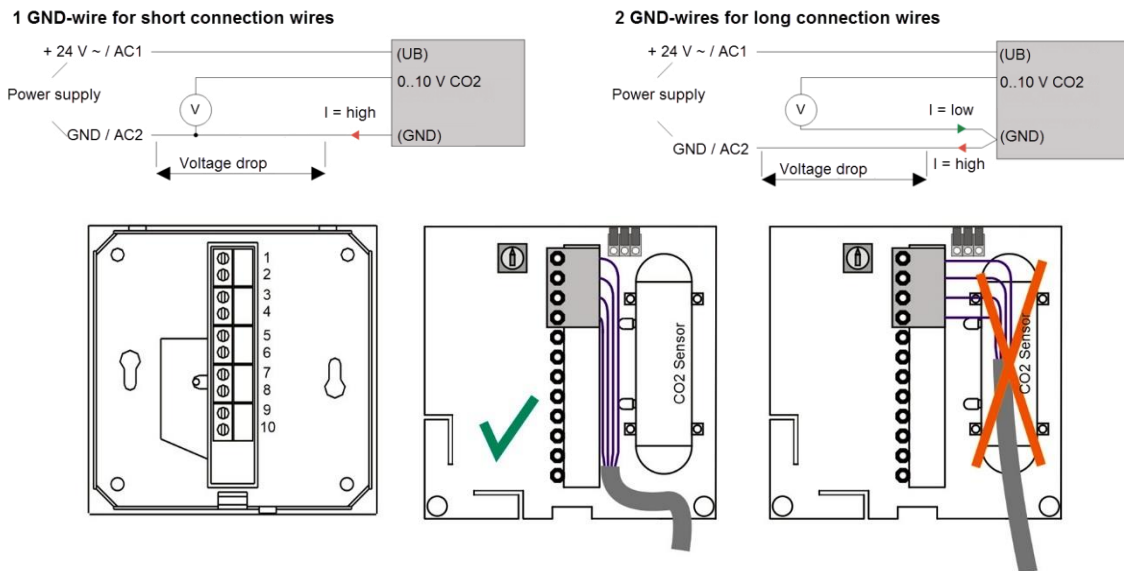
With Dual-Channel technique Thermokon integrates automatic self-calibration in the sensors for different fields of operation.

Therefore manual calibration is not necessary.

Technical Data

Output Voltage	1x 0..10 V (V), 1x 0..10 V + pass. sensor (VS)
Load output	max. 10 mA
Measuring values	V: CO ₂ , VS: CO ₂ + temperature (passive)
Power supply	15..24 V = (±10%) or 24 V~ (±10%)
Power consumption	max. 3 W (24 V =) 6 VA (24 V ~)
Measuring range CO ₂	0..2000 ppm
Measuring range temperature	depending on used sensor (passive)
Accuracy CO ₂	±75 ppm o. 10% of measuring range (typ. at 21 °C)
Accuracy temperature	depending on used sensor (passive)
Calibration	Self calibration dual channel
Sensor	NDIR (non dispersive, infrared)
Ambient temperature	0..+50 °C
Ambient humidity	max. 85% rH non condensed
Cable entry type	Rear entry or top/bottom of enclosure
Protection	IP20 according to EN 60529
Terminal block	Terminal block, max. 1,5 mm ²
Enclosure colour	pure white
Enclosure material	ASA
Temperature dependence	typ. 2 ppm pro °C (0..+50 °C)
Warm up time	<2 minutes
Response time	<10 minutes
Stability CO ₂	<2% full scale over life of sensor (typ. 15 years)
Weight	90 g

Connection Plan



Clamp		Clamp	
1	GND / AC2	6	Sensor A
2	UB +24 V ~, AC1	7	Sensor B
3	CO ₂ 0..10 V	8	unoccupied
4	unoccupied	9	unoccupied
5	unoccupied	10	unoccupied

Mounting Advices

Make sure that the device is power-off, if you install it!

The device can be installed on a smooth wall surface or a flush box. It should be selected a representative location for the measuring medias. The use of deep installation boxes is recommended due to the increased storage capacity for the cabling.

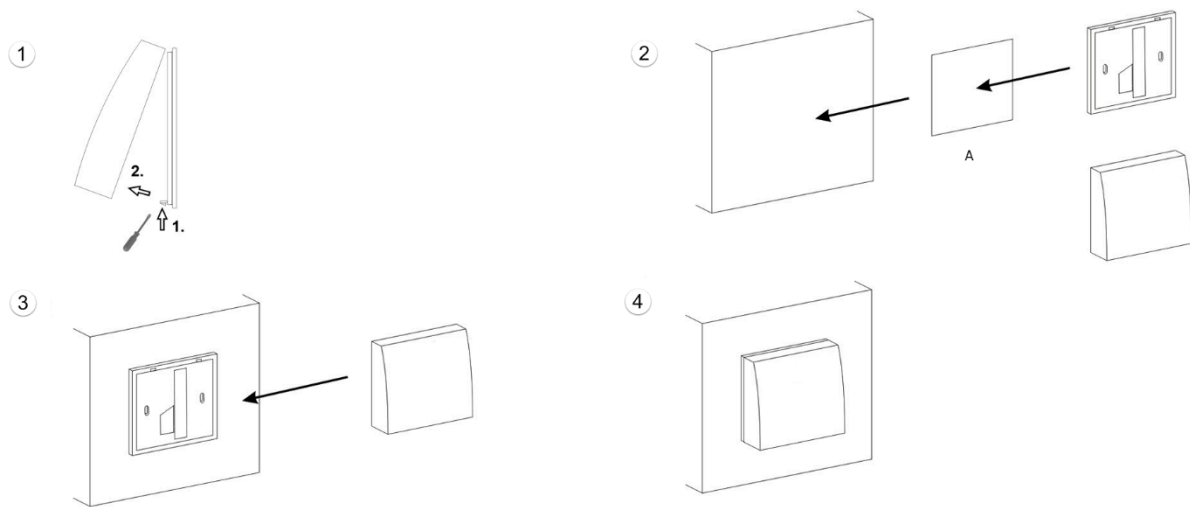
Sunlight and drafts e.g. in conduit must be avoided so that the measuring result is not distorted. If necessary, is the end of the installation tube seal

(1) For wiring, the upper part of the base plate must be solved. Base plate and upper part are connected with each other by mounting clips.

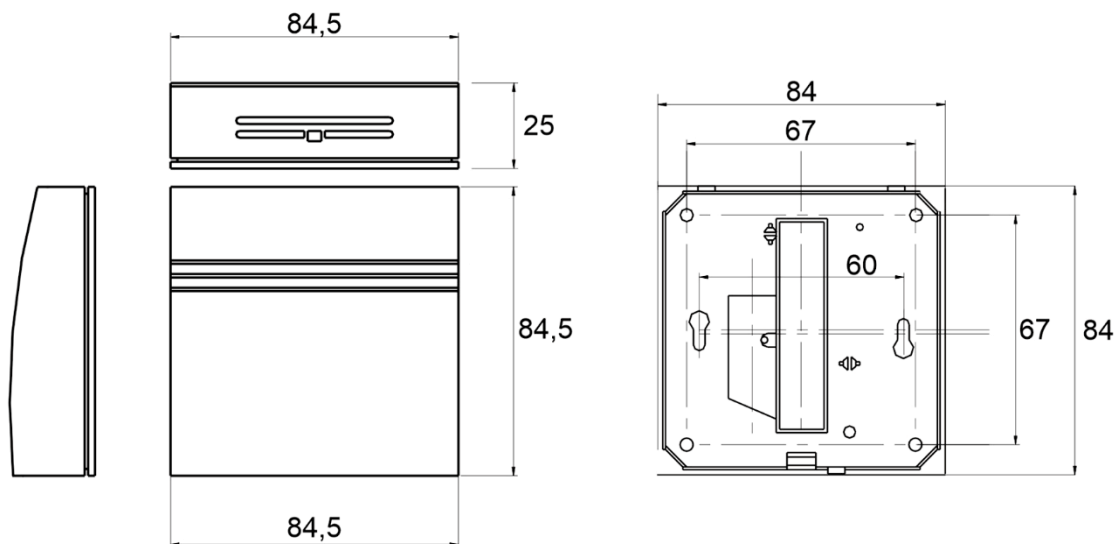
(2) The installation of the base plate to the smooth wall surface can be done either by sticking with the enclosed adhesive film (A), as well as with plugs and screws.

(3) Then, the device is placed on the base plate.

Please note the general remarks in our "INFOBLATT THK.



Dimensions (mm)



Accessories

Rawl plugs and screws (2 pcs. Each)

Frame for surface mouting WRF04

Ball stroke protection BS100 (only for WRF04)