

## » LC-WRF04 CO2

Air quality sensor CO2 with optional passive temperature sensor

**thermokon**<sup>®</sup>  
HOME OF SENSOR TECHNOLOGY

### Datasheet

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

Room sensor CO2 + optional passive temperature – active 0..10 V

LC-WRF04 CO2 V  
LC-WRF04 CO2 VS

### » SECURITY ADVICE – CAUTION



The installation and assembly of electrical equipment should only be performed by authorized personnel.

The product should only be used for the intended application. Unauthorised modifications are prohibited! The product must not be used in relation with any equipment that in case of a failure may threaten, directly or indirectly, human health or life or result in danger to human beings, animals or assets. Ensure all power is disconnected before installing. Do not connect to live/operating equipment.

Please comply with

- Local laws, health & safety regulations, technical standards and regulations
- Condition of the device at the time of installation, to ensure safe installation
- This data sheet and installation manual

### » NOTES ON DISPOSAL



As a component of a large-scale fixed installation, Thermokon products are intended to be used permanently as part of a building or a structure at a pre-defined and dedicated location, hence the Waste Electrical and Electronic Act (WEEE) is not applicable. However, most of the products may contain valuable materials that should be recycled and not disposed of as domestic waste. Please note the relevant regulations for local disposal.

## » 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 behaviours 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 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.**

## » INFORMATION ABOUT INDOOR AIR QUALITY CO<sub>2</sub>

EN 13779 defines several classes for indoor air quality:

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

## » INFORMATION ABOUT SELF-CALIBRATION FEATURE CO<sub>2</sub>

Virtually all gas sensors are subject to some sort of drift. The degree of drift is partially dependent on the use of quality components and good design. But even with good components and excellent design, a small amount of drift can still occur in the sensor that may ultimately result in the need for a sensor to be recalibrated.

The natural drift of the sensor is caused by:

• **Dust/dirt** • **Aggressive chemicals absorbed inside chamber / optical elements** • **Corrosion inside chamber (high rh, condensation)** • **Temperature cycles causing mechanical stress** • **Electron/hole migration in the photo detector's semiconductor** • **Drift of photo amplifiers** • **External mechanical stress on chamber** • **Light source wear-off**

Most of the effects listed above will be compensated by the automatic self-calibration of the sensor's dual channel technology. In contrast to commonly used ABC-Logic self-calibrating sensors with dual channel technology are suitable for all applications including those operating 24 hours, 7 days a week, for example hospitals.

However some effects cannot be compensated automatically and may result in a very gradual natural drift of a few ppm per month. This natural drift is not covered by Thermokon's 5-year warranty.

» **TECHNICAL DATA**

Measuring values	CO2, optional temperature
Output voltage	2x 0..10 V (min. load 10 kΩ)
Output passive (optional)	<b>VS</b> PT100/PT1000/NI1000/NI1000TK5000/LM235Z/NTC.../PTC... other sensors on request
Power supply	15..24 V = (±10%) or 24 V~ (±10%) SELV
Power consumption	max. 3 W (24 V =   6 VA (24 V =)
Measuring range temperature	0..+50 °C
Measuring range CO2	0..2000 ppm
Accuracy temperature	depending on used sensor
Accuracy CO2	±75 ppm or 10% of measuring range (typ. at 21 °C), whatever is greater
Calibration	self-calibration, dual channel
Sensor	NDIR (non-dispersive, infrared)
Enclosure	PC, pure white
Protection	IP30 according to EN 60529
Cable entry	breaking points top/bottom, entry on rear
Connection electrical	terminal block, max. 1,5mm <sup>2</sup>
Ambient condition	0..+50 °C, max. 85% rH non-condensing
Mounting	to be mounted flat onto the surface using adhesive foil or screws, with frame for surface mounting (accessory) or directly on the wall, base part can be mounted and wired separately

» **PRODUCT TESTING AND CERTIFICATION**

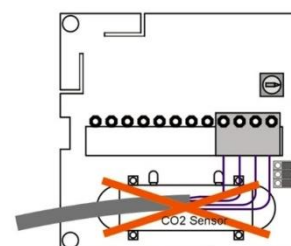
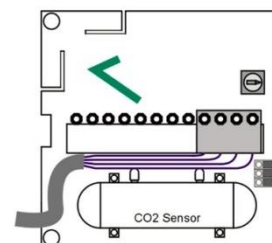
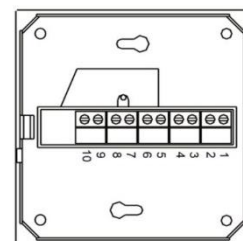


**Declaration of conformity**

The declaration of conformity of the products can be found on our website <https://www.thermokon.de/>.

» **CONNECTION PLAN**

Clamp	Type WRF04 CO2 VV	
1	GND/AC2	
2	15..24 V = (±10%) or 24 V~ (±10%) SELV	
3	CO <sub>2</sub>	0..10 V
4		
5	Not used	
6	passive sensor	(optional)
7	passive sensor	(optional)
8	Not used	
9	Not used	
10	Not used	



## » 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.

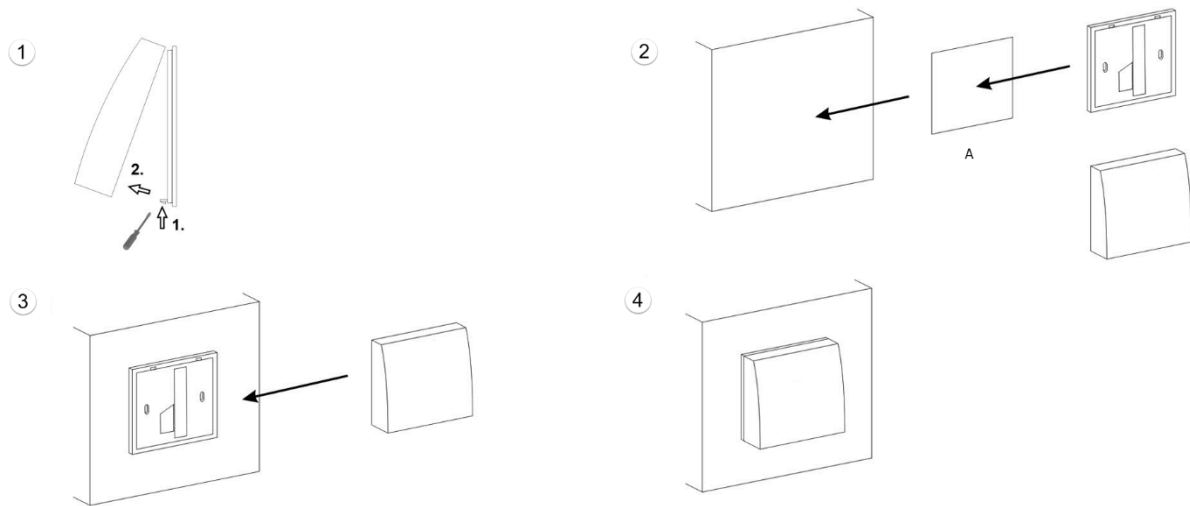
Sunlight and drafts e.g. in conduit must be avoided so that the measuring result is not distorted. If necessary, is the end of the installation tube seal

(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.

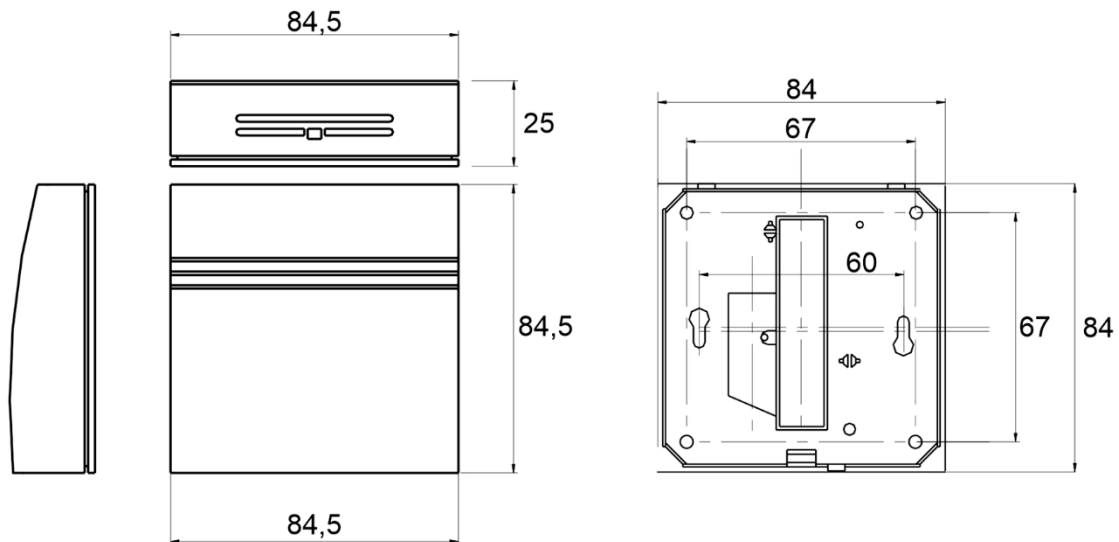
(2) The installation of the base plate to the smooth wall surface can be done either by sticking with the enclosed adhesive film (A), as well as with plugs and screws.

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

Please note the general remarks in our "INFOBLATT THK.



## » DIMENSIONS (MM)



## » ACCESSORIES

Rawplugs and screws (2 pcs. each)  
 Frame for surface mounting WRF04  
 Ball stroke protection BS100

Item No.: 102209  
 Item No.: 111584  
 Item No.: 103312