

Data Sheet

Subject to technical alteration
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Application

The sensor is designed for the detection of carbon dioxide (CO₂), temperature (optional) and relative humidity (optional) in living spaces. Wherever people are staying in rooms, the CO₂ concentration is an evident indicator for the room quality. A high CO₂ concentration implies bad air quality.

For the CO₂ measurement the "Non Dispersive Infrared (NDIR) Technology" with automatic self-calibration is used. For a direct locking-on to a DDC or a monitoring system, analog 0..10 V outputs are available.

Technical Details:

- Room sensor for measuring the CO₂ concentration, Measuring range 0..2000 ppm
- Output 0..10 V, Power supply 15-24 V = / 24 V ~
- Optionally with analogue output for temperature (0..50 °C)
- Optionally with analogue output for relative humidity (0..100%)
- Optionally with 3 LED to show the CO₂ concentration

Types available

WRF06 CO2 V ...	CO ₂ : 0..10 V
WRF06 CO2 VV ...	CO ₂ : 0..10 V / Temperature: 0..10 V
WRF06 CO2 VVV ...	CO ₂ : 0..10 V / Temperature: 0..10 V / Humidity: 0..10 V

Type / Option

Z	3 LEDs for display of CO ₂ concentration
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Security Advice – Caution



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

The modules must not be used in any relation with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people, animals or real value.

Before connecting devices with electrical power supply the installation must be isolated from power source!

Notes on Disposal

For disposal, the product is considered waste from electrical and electronic equipment (electronic waste) and must not be disposed of as household waste. Special treatment for specific components may be legally binding or ecologically sensible. The local and currently applicable legislation must be observed.

Electrical Connection

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device are valid.

Especially with regard to passive sensors in 2-wire conductor versions, the wire resistance of the supply wire has to be considered. If necessary the wire resistance has to be compensated by the follow-up electronics. Due to self-heating, the wire current affects the measurement accuracy. So it should not exceed 1 mA.

Sensing devices with transducer should always be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant. The transducers must be operated at a constant supply voltage ($\pm 0,2$ V). When switching the supply voltage on/off, onsite power surges must be avoided.

When using lengthy connection wires (depending on the cross section used) the measuring result might be falsified due to a voltage drop at the common GND-wire (caused by the voltage current and the line resistance). In this case, 2 GND-wires must be wired to the sensor - one for supply voltage and one for the measuring current.

Remarks to Room Sensors

Location and Accuracy of Room Sensors

Besides a suitable representative mounting place corresponding to room temperature, the accuracy of the temperature measurement also depends directly on the temperature dynamics of the wall. It is important, that the flush socket is completely closed at the wall side, so that the circulation of air may take place through the gaps in the cover. Otherwise, deviations in temperature measurement will occur due to uncontrolled air circulation. Furthermore, the temperature sensor should not be covered by furniture or similar devices. Besides this a mounting place next to doors (occurring draught) or windows (colder outside wall) should be avoided.

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

Room 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 a 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 Humidity Sensors

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

Under normal environmental conditions we recommend a recalibration interval of about 1 year to maintain the indicated accuracy. At high ambient temperatures and high humidity or when using the sensor in aggressive gases, an earlier recalibration or a change of the humidity sensor can become necessary. Such recalibrations or a probable sensor change are not part of the general warranty.

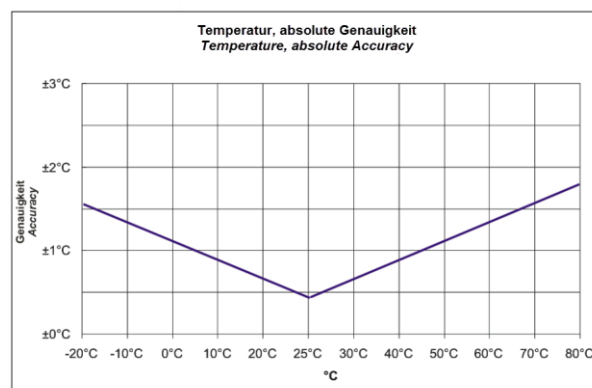
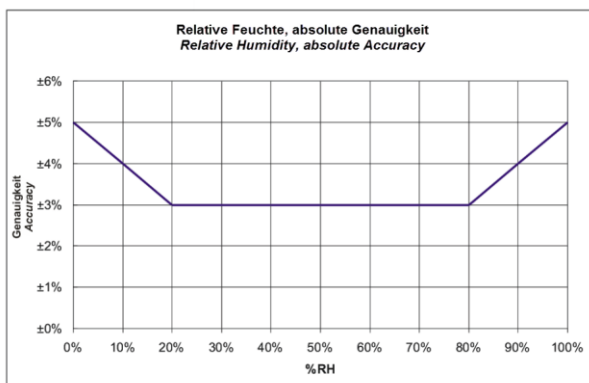
Technical Data

Power supply:	15-24 V = ($\pm 10\%$) / 24 V~ ($\pm 10\%$) (SELV)
Power consumption:	<1,6 W (typ. 0,3 W), <3,9 VA (typ. 0,7 VA)
Analogue outputs:	CO ₂ 0..10 V, load max. 10 mA Temp. 0..10 V, load max. 10 mA Rel. humidity 0..10 V, load max. 10 mA ¹⁾
CO ₂ -Sensor:	0..2000 ppm, NDIR (non dispersive infrared)
Temp. Dependence:	CO ₂ : typ. 2 ppm per °C (0..50 °C)
Accuracy CO ₂ @ 25 °C and 1013 mbar:	0..2000 ppm $\pm$ (50 ppm +2% of reading)
Sample interval:	15 s
Response Time t ₉₀ :	<195 s
Stability CO ₂ :	typ. 20 ppm / a
Calibration interval:	not required - maintenance free because of auto calibration (flashing LEDs during calibration)

Accuracy @ 21 °C:	active: see diagram passive: depending on used sensor type
Clamps:	Terminal screw max. 1,5 mm ² , pluggable
Enclosure:	Bottom part: material PA6, colour black Central plate: material PC Frame: different possibilities, switch programmes available: GIRA System 55, PEHA Aura, MERTEN System M, BERKER S1/B1/B3/B7
Protection:	IP30 according to EN 60529
Ambient temperature:	-20..+70 °C
Weight:	90 g
Option Z - LEDs:	3 LEDs to show the CO ₂ concentration; LEDs are on: 0.. 750 ppm – green LED 751..1250 ppm – yellow LED 1251..2000 ppm – red LED

¹⁾ Only available for devices with active humidity output.

Accuracy WRF06 CO₂



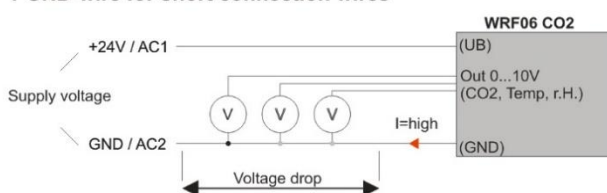
Indoor Air Quality

EN 13779 defines several classes for the indoor air quality shown in the table:

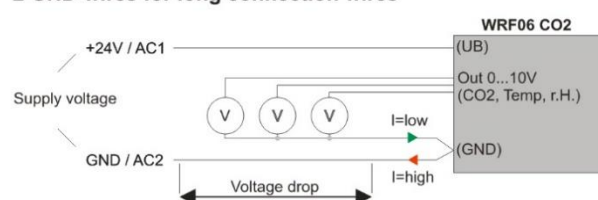
CO ₂ content over the content in outdoor air in ppm			
Category	Typical range	Standard value	Description
IDA1	<400 ppm	350 ppm	High Indoor Air Quality
IDA2	400..600 ppm	500 ppm	Mean Indoor Air Quality
IDA3	600..1.000 ppm	800 ppm	Moderate Indoor Air Quality
IDA4	>1.000 ppm	1.200 ppm	Low Indoor Air Quality

Connection Plan

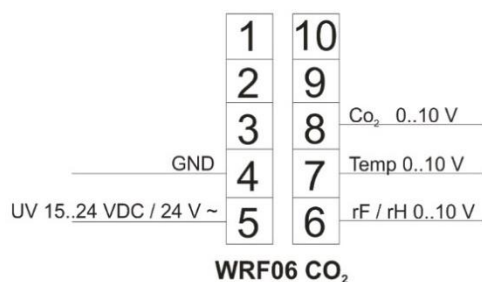
1 GND-wire for short connection wires



2 GND-wires for long connection wires



Ansicht auf Anschlussklemme
View to the terminal

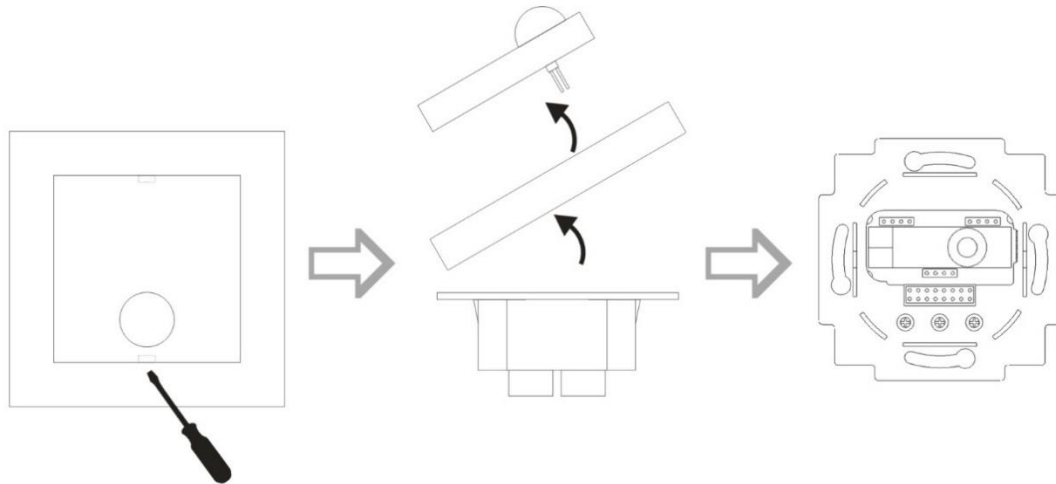


Mounting Advices

The device is designed for mounting on a flush box. The bus cable is connected to the device by a terminal screw. For pre-wiring, the terminal screw can be drawn from the device.

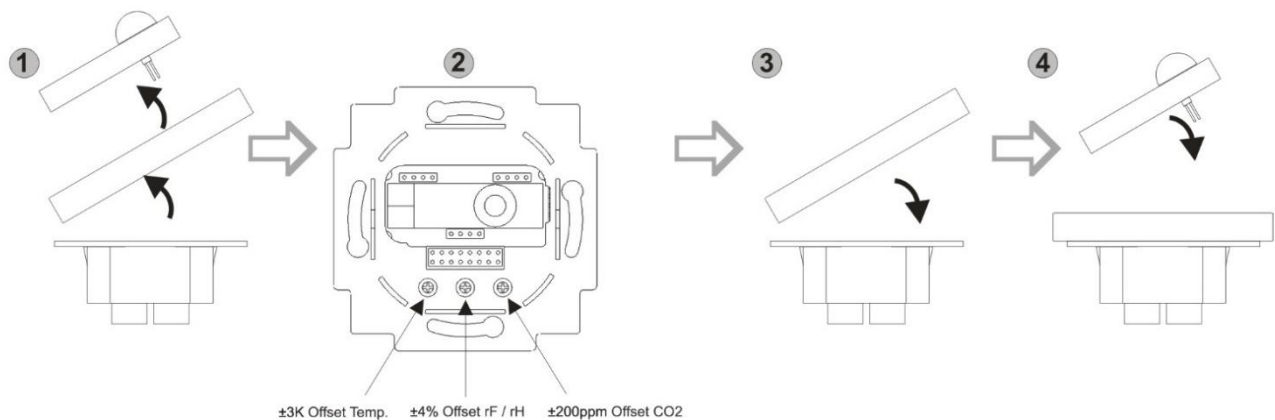
Due to the extended retaining capacity for the cabling, the use of deep installation boxes is recommended. Installation must be made on representative places for the measurement value logging to avoid a falsification of the measuring result. Solar radiation and draught should be avoided. The end of the installation tube in the flush box must be sealed to avoid any draught in the tube falsifying the measuring result.

Please note the general remarks in our "INFO SHEET THK".

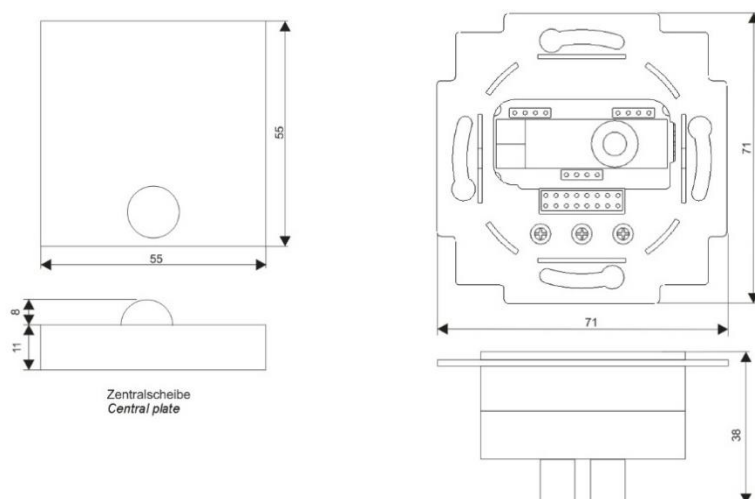


Offset Adjustment

1. Remove sensor element – with removing the last measured values of temperature/humidity/CO₂ are emitted via the three outputs.
2. Afterwards, the offset adjustment is made by means of the potentiometers „Offset Temp“, „Offset rF / rH“ and „Offset CO₂“.
Always correct temperature before correcting humidity!
3. /4. Reassemble the sensor element. After a few seconds, the current temperature/humidity/CO₂ values are emitted via the three outputs.



Dimensions (mm)



Bemerkung: Aussenabmessungen abhängig vom verwendeten Rahmen aus dem jeweiligen Schalterprogramm
 Notice: Outside dimensions are depending on the frame used of the respective switch programme

Accessories

(D+S)

1 Set (each 2 pieces) rawl plugs and screws