LK+ CO2 LCD RS485 BACnet

Duct sensor for air quality, temperature and humidity (optional)

thermokon®
HOME OF SENSOR TECHNOLOGY

Datasheet

Subject to technical alteration
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USEapp ✓

ASHRAE **BACnet**™

Illustration similar

Application

Duct air quality sensor for detection of CO2, with temperature and humidity (optional). Designed for duct mounted applications with 2 0..10 V outputs.

Types Available

Duct sensor CO2 + temp <u>optional with display</u> – active RS485 BACnet MS/TP

LK+ CO2 LCD Temp RS485 BACnet

Duct sensor CO2 + temp +rH <u>optional with display</u> – active RS485 BACnet MS/TP

LK+ CO2 LCD Temp_rH RS485 BACnet

Options: additional passive temperature sensor
eg: PT100/PT1000/NI1000/NI1000TK5000/NTC10K... and other sensors on request.

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.

General remarks concerning sensors

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.

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.

Sensing devices with a 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 (±0,2 V). When switching the supply voltage on/off, onsite power surges must be avoided.

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 (±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_2

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	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_2

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, temperature + humidity (depending on the device)
Output voltage	2x 0..10 V or 0..5 V, min. load 10 kΩ (live-zero configuration via Thermokon USEapp)
Output passive	**passive** Options: additional passive temperature sensor eg: PT100/PT1000/NI1000/NI1000TK5000/NTC10K... and other sensors on request
Network technology	RS485 BACnet MS/TP
Power supply	15..35 V = or 19..29 V ~
Power consumption	max. 2,3 W (24 V =) | max. 4,3 VA (24 V ~)
Measuring range temp.	0..+50 °C (default setting), optionally configured via Thermokon USEapp
Measuring range humidity	**Temp_rH** 0..100% rH non-condensing, optionally configured via Thermokon USEapp (enthalpy, absolute humidity, dew point)
Measuring range CO2	0..2000 ppm (default), 0..5000 ppm (optionally configured via Thermokon USEapp)
Accuracy temperature	**Temp | Temp_rH** ±0,5 K (typ. at 21 °C)	**passive** depending on used sensor
Accuracy humidity	**Temp_rH** ±2% between 10..90% rH (typ. at 21 °C)
Accuracy CO2	±50 ppm +3% of reading (typ. at 21 °C, 50% rH)
Air speed	min. 0,3 m/s, max. 12 m/s
Calibration	self-calibration, Dual Channel
Sensor	NDIR (non-dispersiv, infrared)
Display	LCD 29x35 mm with RGB backlight
Enclosure	enclosure USE-M, PC, pure white, cover PC, transparent, with removable cable entry
Protection	IP65 according to EN 60529
Cable entry	M25, for wire max. Ø=7 mm, seal insert for fourfold cable entry
Connection electrical	**Mainboard** removable plug-in terminal, max. 2,5 mm²	**Plug-in card** removable plug-in terminal, max. 1,5 mm²
Pipe	PA6, black, Ø=19,5 mm, length 180 mm
Ambient condition	0..+50 °C, max. 85% rH short term condensation
Mounting	installation is also possible using mounting base

Declaration of conformity

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

Configuration

The Thermokon bluetooth dongle with micro-USB is required for communication between USEapp and USE-M / USE L (Item No..: 668262). Commercial bluetooth dongles are not compatible.

GET IT ON
Google Play

Application-specific reconfiguration of the devices can be carried out using the Thermokon USEapp. The configuration is carried out in the voltage-supplied state.

Download on the
App Store

The configuration-app and the app description can be found in the Google Play Store or in the Apple App Store.

Application notice

The housing cover must be completely closed in order to ensure the accuracy and reproducibility of the measured values during a test or service log via USEapp.

The Bluetooth dongle snaps into the socket easily. When removing, please fix the plug-in card (option PCB) so that it is not unintentionally pulled out.

Mounting Advices

The sensor can be mounted on the ventilation duct by means of the mounting flange MF20 TPO (optional with mounting base).
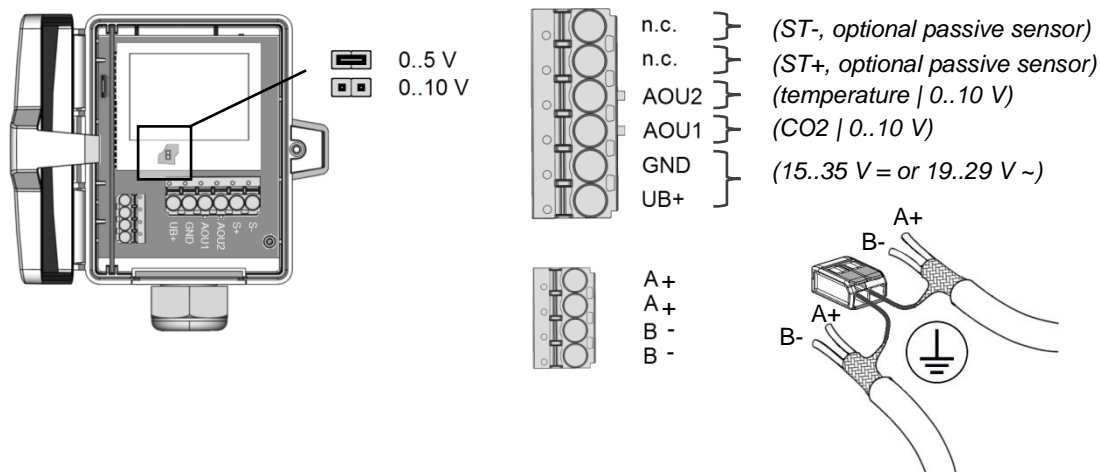Align the openings on the sensor tube according to the flow direction.
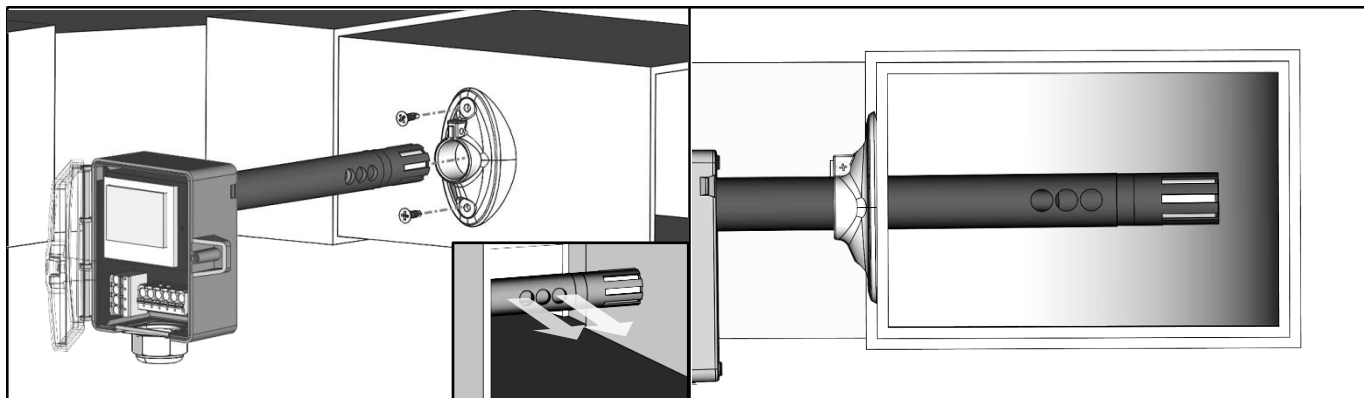
optional:
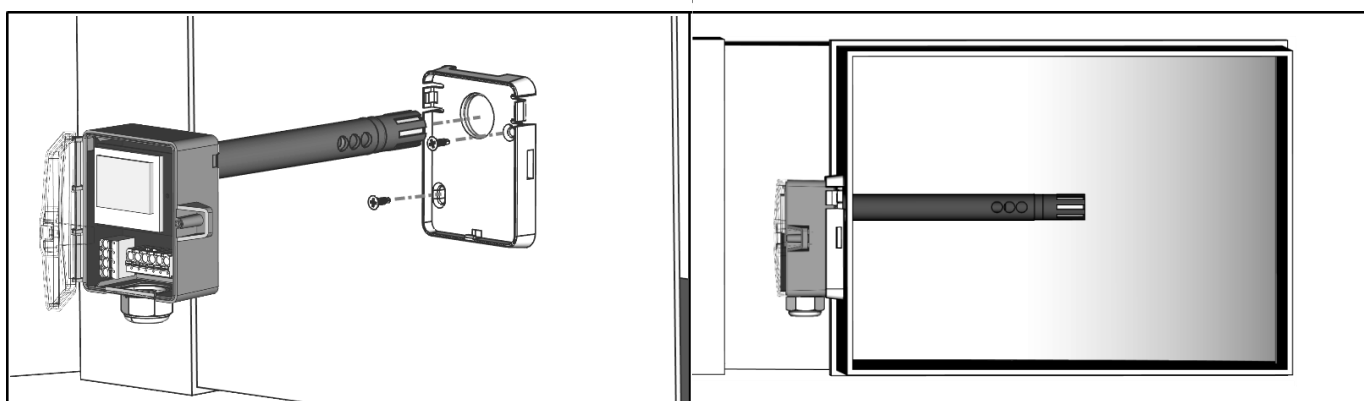
Connection Plan

To change the output voltage range (default 0..10 V to 0..5 V) via jumper, the display must be removed from the board first.

LK+ CO2 **RS485 BACnet**

0..5 V
0..10 V

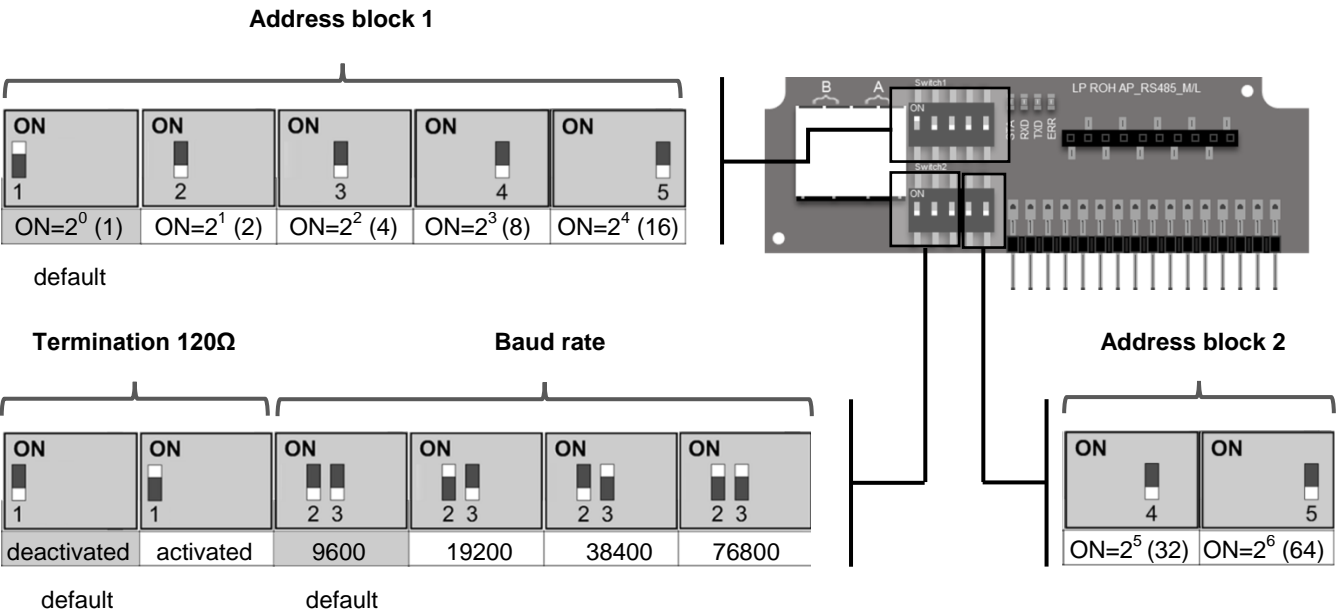|	
n.c.	*(ST-, optional passive sensor)*
n.c.	*(ST+, optional passive sensor)*
AOU2	*(temperature | 0..10 V)*
AOU1	*(CO2 | 0..10 V)*
GND	*(15..35 V = or 19..29 V ~)*
UB+	

A+
A+
B -
B -

A+
B-
A+
B-

The BACnet address of the device is set binary coded in the range of 1 ... 127 via 7 dip-switches. (the address 0 is reserved and cannot be selected).

BACnet Objects:
USE-RS485 BACnet interface

A detailed description of the BACnet interface can be found in our downloadcenter:
→ **Download**

Address block 1

ON 1	ON 2	ON 3	ON 4	ON 5
ON=2^0 (1)	ON=2^1 (2)	ON=2^2 (4)	ON=2^3 (8)	ON=2^4 (16)

default

Termination 120Ω

ON 1	ON 1
deactivated	activated

default

Baud rate

ON 2 3	ON 2 3	ON 2 3	ON 2 3
9600	19200	38400	76800

default

Address block 2

ON 4	ON 5
ON=2^5 (32)	ON=2^6 (64)

Measuring values

Object	Access	Description		Unit
AI-1	R	**relative humidity**		%rF
AI-5	R	**CO2**		ppm

Object AV-38 = 1 (Unit SI)

Objects	Access	Description		Unit
AI-0	R	**temperature**	SI	°C
AI-2	R	**absolute humidity**	SI	g/m³
AI-3	R	**enthalpy**	SI	KJ/kg
Ai-4	R	**dew point**	SI	°C

Object AV-38 = 2 (Unit Imperial)

Objects	Access	Description		Unit
AI-0	R	**temperature**	Imperial	°F
AI-2	R	**absolute humidity**	Imperial	gr/ft³
AI-3	R	**enthalpy**	Imperial	BTU/lb
Ai-4	R	**dew point**	Imperial	°F

Dismounting Advices

Remove the lower section of the sensor carefully and pulling straight out. **Pay close attention to the correct dismantling of the component!**
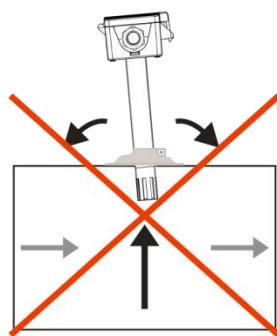
Dimensions (mm)
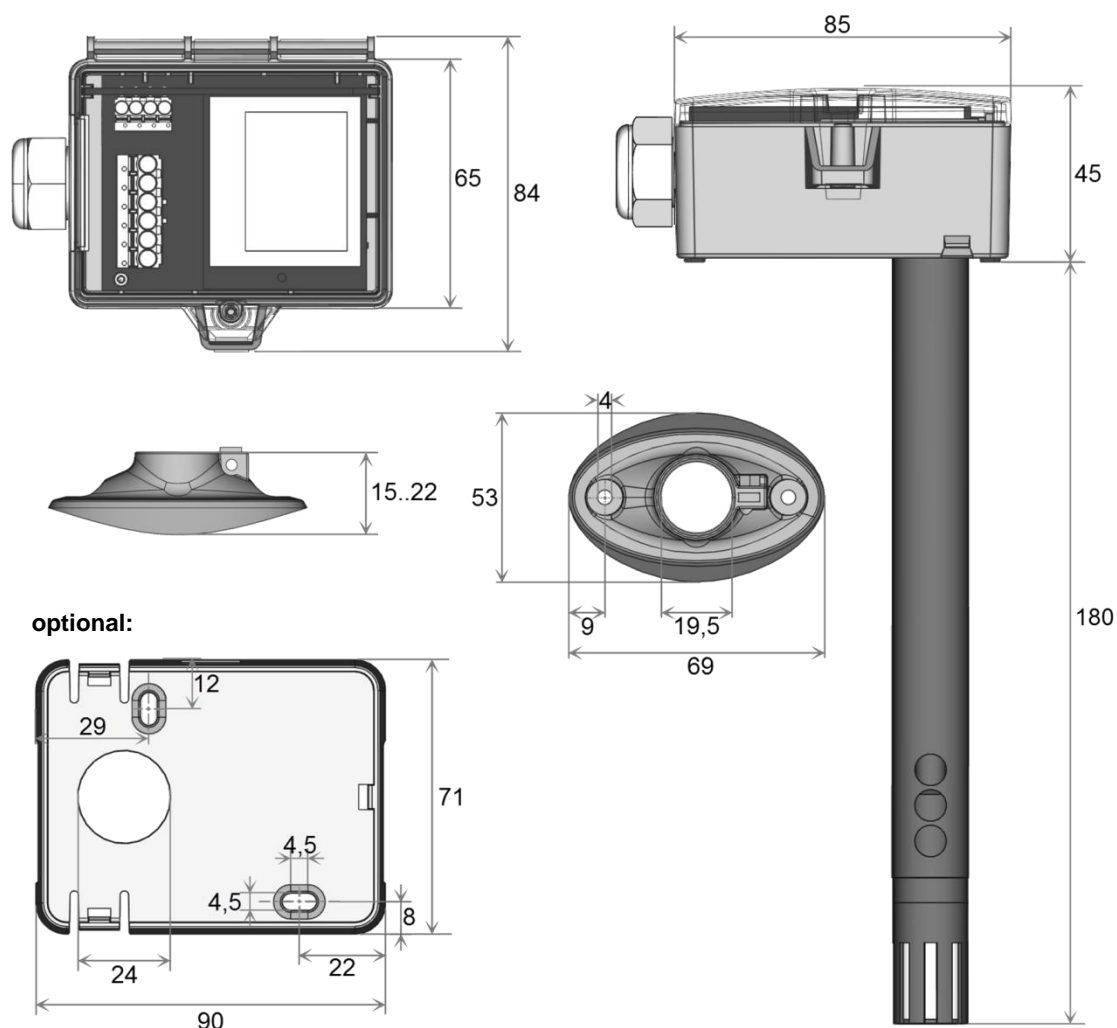
optional:

Accessories (included in delivery)

Mounting flange MF20 TPO   Item No. 612562
Mounting kit universal   Item No. 698511
• Cover screw + screw cover• 2 Rawlplugs • 2 Screws (countersunk head) • 2 Screws (rounded head)

Accessories (optional)

Mounting base   Item No. 631228
Filter stainless steel, wire mesh   Item No. 231169