LK+ CO2+VOC RS485 Modbus

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

thermokon®
HOME OF SENSOR TECHNOLOGY

Datasheet

Subject to technical alteration
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USEapp ✓

Modbus

Application

Duct air quality sensor for detection of CO2, VOC, optional temperature and humidity. With a mix output, a mixture of CO2 and VOC signals can be realized. The mixing ratio can be configured with the USE app or via modbus. Designed for duct mounted applications with up to 2 configurable 0..10 V outputs.

Types Available

Duct sensor CO2 + VOC or mix – active BUS

LK+ CO2+VOC RS485 Modbus

Duct sensor CO2 + VOC + temp or mix – active BUS

LK+ CO2+VOC Temp RS485 Modbus

Duct sensor CO2 + VOC + temp + rH or mix – active BUS

LK+ CO2+VOC Temp_rH RS485 Modbus

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.

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 ($\pm0,2$ 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

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 technology Thermokon integrates automatic self-calibration for different fields of operation. In contrast to common used ABC-Logic sensors with self-calibration dual channel are suitable for applications operating 24 hours, 7 days a week as for example hospitals.

**Manual calibration is not necessary!**

Technical Data

Measuring values	VOC, CO2, temperature, each output can be set to get a variable mix of CO2 and VOC by configuration
	Temp_rH	+ 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)
Network technology	RS485 Modbus
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	±0,5 K (typ. at 21 °C)
	passive	typ. ±0,3 K (typ. at 21 °C), 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, CO2: Dual Channel
Sensor	VOC sensor (heated metal oxide semiconductor), CO2: NDIR (non-dispersive, infrared)
Enclosure	enclosure USE-M, PC, pure white, with removeable 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	removeable plug-in terminal, max. 2,5 mm²
	Modbus clamp	removeable plug-in terminal, max. 1,5 mm²
Pipe	PA6, black, Ø=19,5 mm, length 150 mm
	Temp | Temp_rH | + passive sensor	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

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
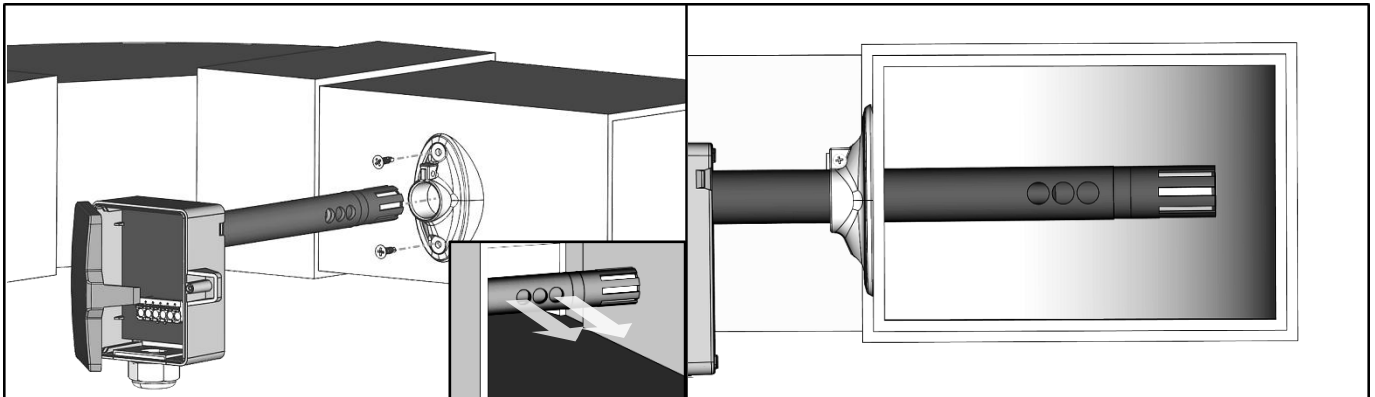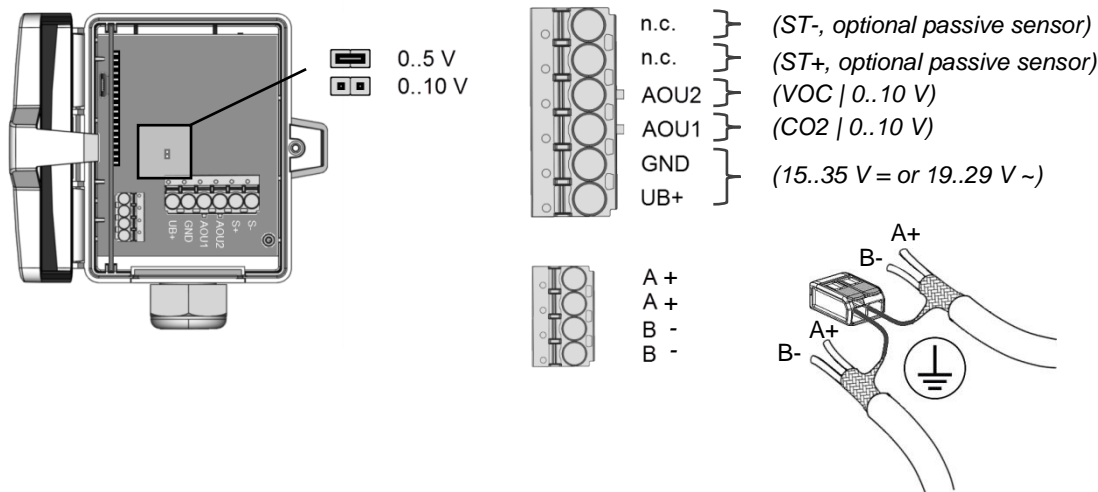

Optional mounting with mounting base (Item No. 631228), please note the installation depth of the sensor pipe.
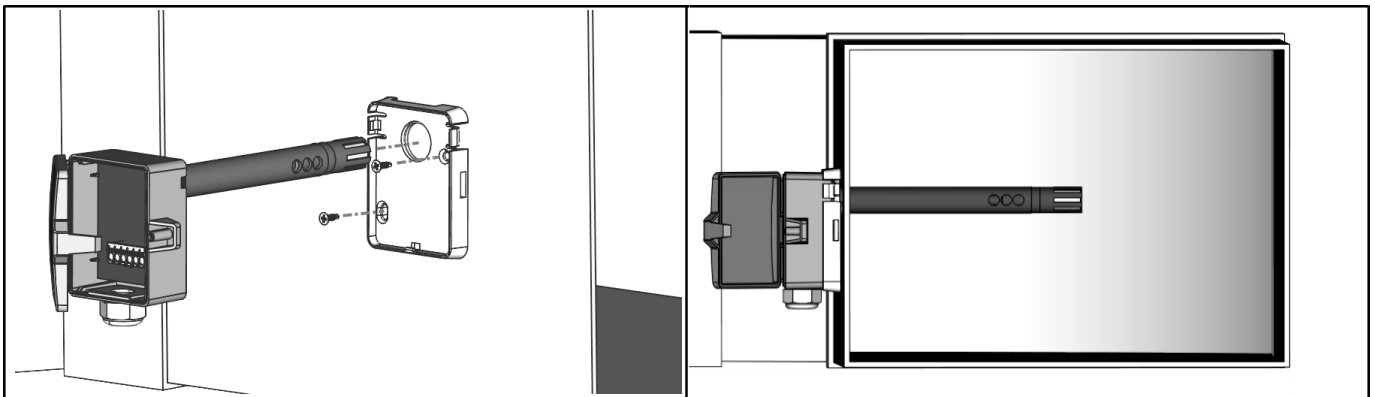
Connection Plan

If the RS485 cable is looped through, connect both cable shields using the enclosed 2-pol. Connect terminal as shown.

LK+ CO2+VOC **RS485 Modbus**

0..5 V
0..10 V

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

A +
A +
B -
B -

The modbus address of the device is set in the range of 1 ... 31 (binary encoded) using a 5-pole DIP switch. With address 0 via DIP, an extended address range (32..247) is available via USEapp.
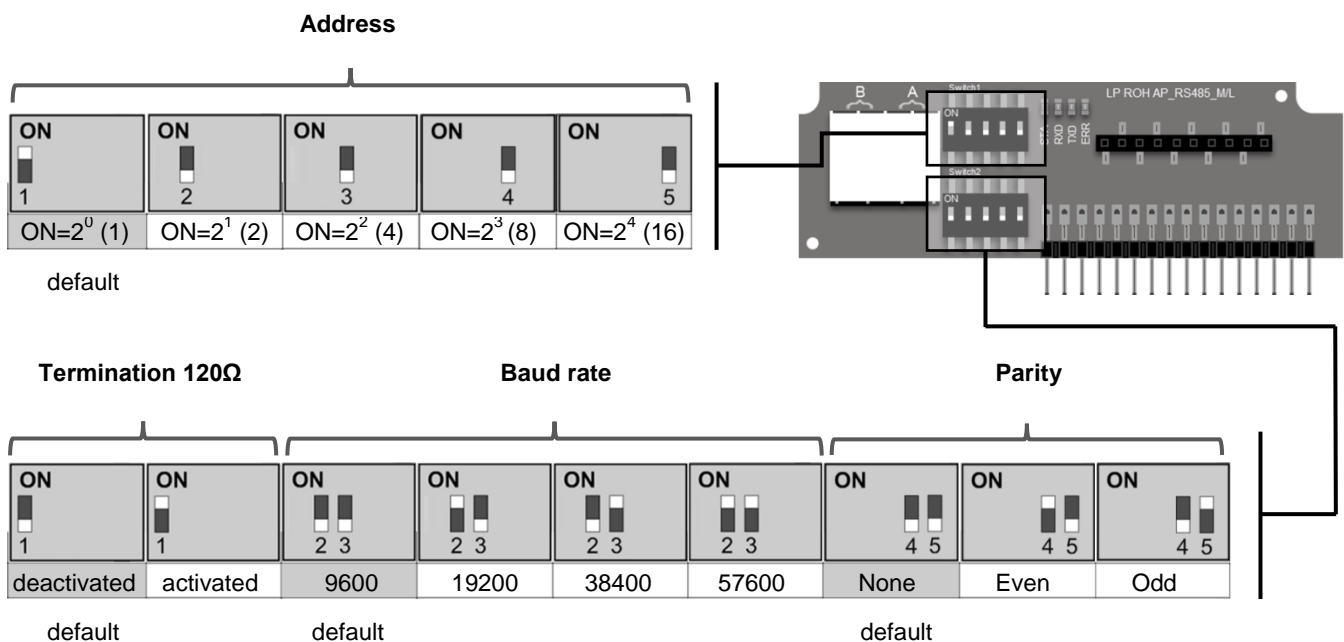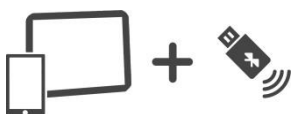
Modbus addresses:
USE-RS485 Modbus Interface

A detailed description of the Modbus addresses can be found under the following link:
→ **Download**

Address

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

default

Termination 120Ω		**Baud rate**				**Parity**		
ON	ON	ON	ON	ON	ON	ON	ON	ON
1	1	2 3	2 3	2 3	2 3	4 5	4 5	4 5
deactivated	activated	9600	19200	38400	57600	None	Even	Odd
default		default				default		

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.

Application-specific reconfiguration of the devices can be carried out using the Thermokon USEapp. The configuration is carried out in the voltage-supplied state.
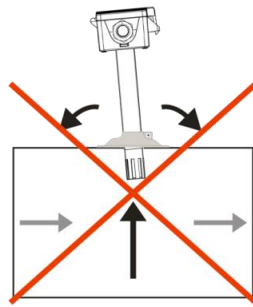
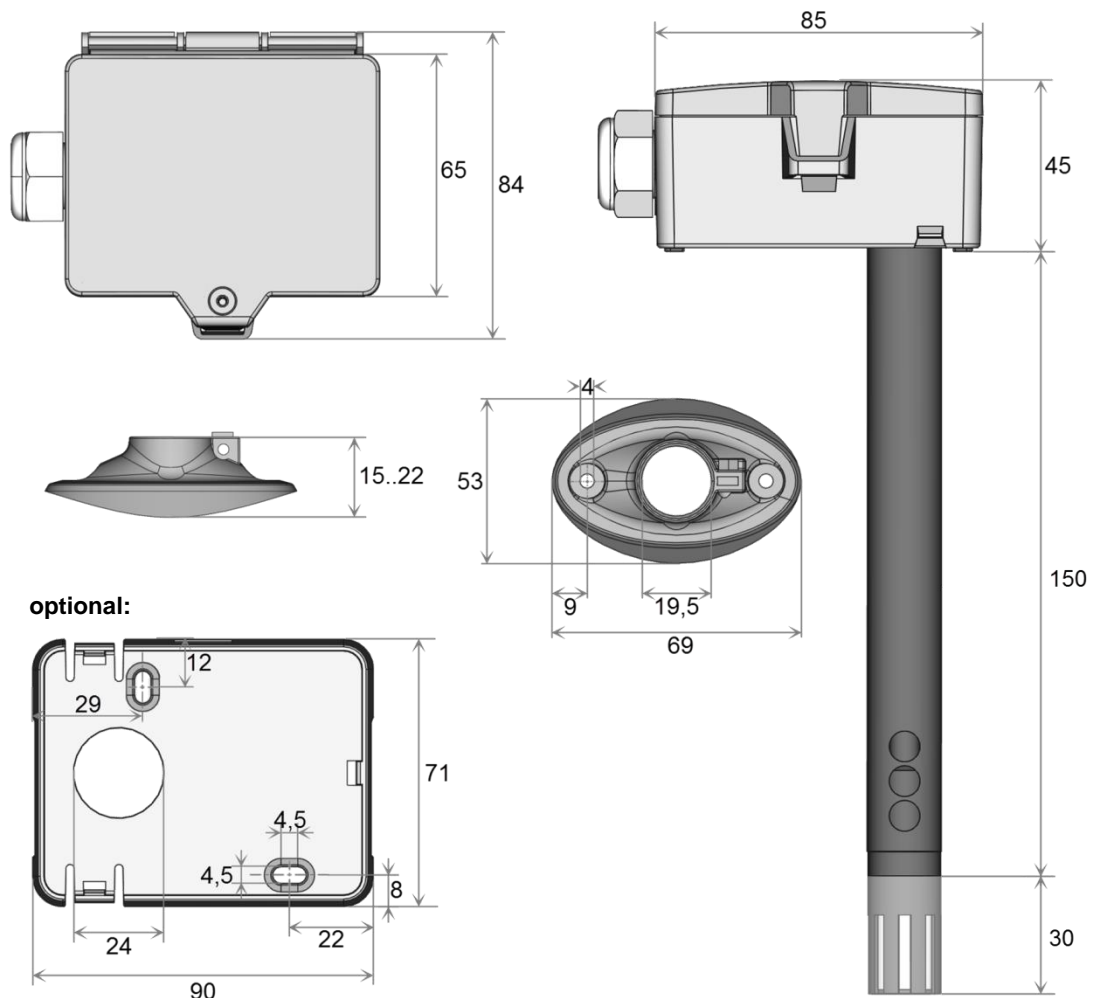**The configuration-app and the app description can be found in the download area of our webpage**.

→ **Download (APK-file for Android)**

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)

Note: Pipe length depending on device type (see technical data)

Accessories (included in delivery)

Mounting flange MF20 TPO   Item No. 612562
Mounting kit 4   Item No. 674140
• Cable entry M25 • Wago twofold terminal • Cover screw • 2 Screws (countersunk head)

Accessories (optional)

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