# LK+ VOC LCD 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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## Application

Duct air quality sensor for detection of VOC air quality, and optional humidity combined in one unit. Designed for duct mounted applications with 2 0..10 V outputs. The sensor consists of a transmitter with VOC sensor, based on a heated tin oxide semiconductor.

## Types Available

**Duct sensor with display VOC + temp – active BUS**

LK+ VOC LCD Temp RS485 Modbus

**Duct sensor with display VOC + temp +rH – active BUS**

LK+ VOC LCD 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.

## 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.

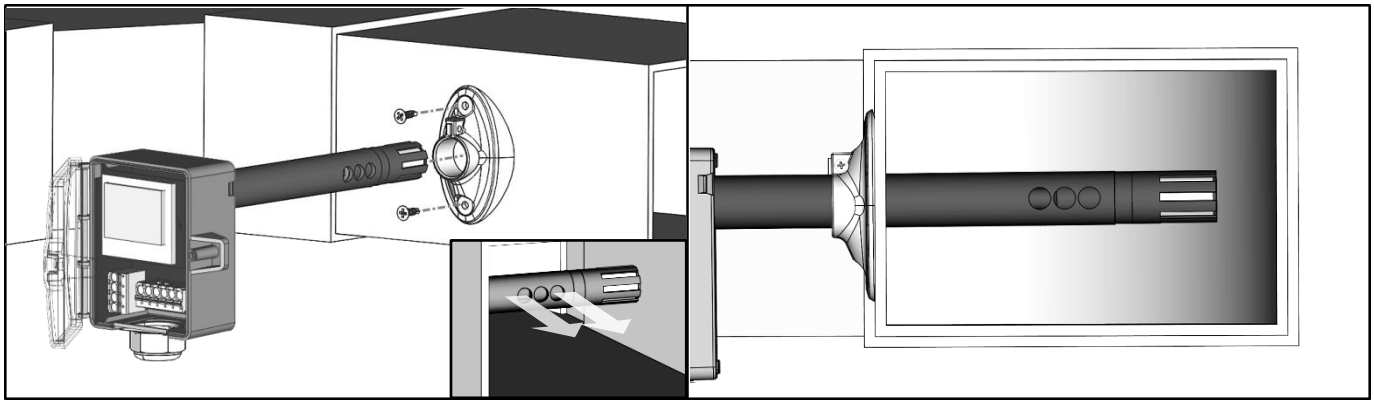
**Remark: Occurring draft leads to a better carrying-off of dissipative power at the sensor. Thus temporally limited fluctuations might occur upon temperature measurement.**

## Technical Data

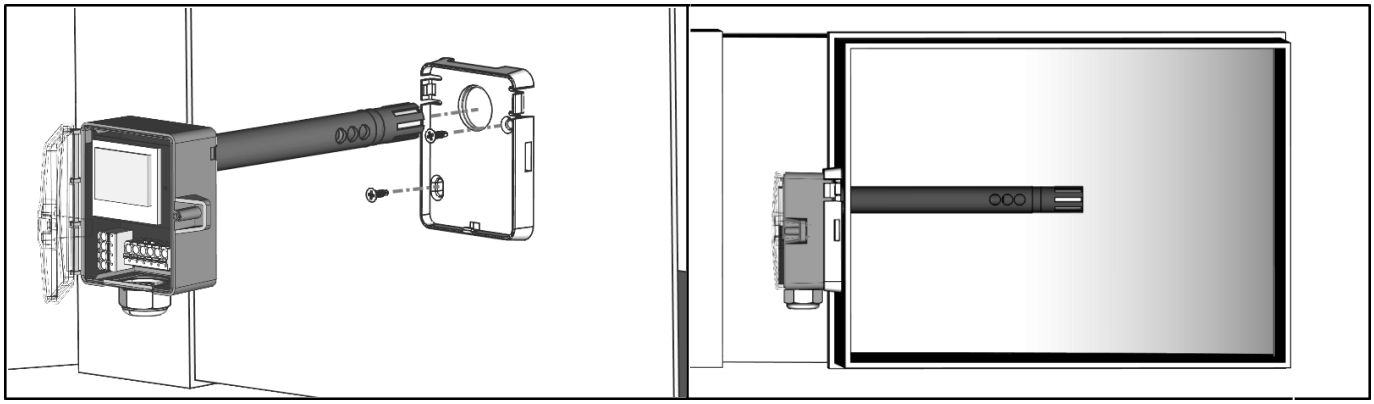
| | | |
|---|---|---|
| Measuring values | | VOC, temperature |
| | Temp_rH | + humidity (depending on the device) |
| Output voltage | | 2x 0..10 V or 0..5 V, min. load 10 kΩ<br>(live-zero configuration via Thermokon USEapp) |
| Network technology | | RS485 Modbus |
| Power supply | | 15..35 V = or 19..29 V ~ |
| Power consumption | | max. 2,5 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<br>(enthalpy, absolute humidity, dew point) |
| 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) |
| Air speed | | min. 0,3 m/s, max. 12 m/s |
| Calibration | | self-calibration |
| Sensor | | VOC sensor (heated metal oxide semiconductor) |
| 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 | | 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 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.



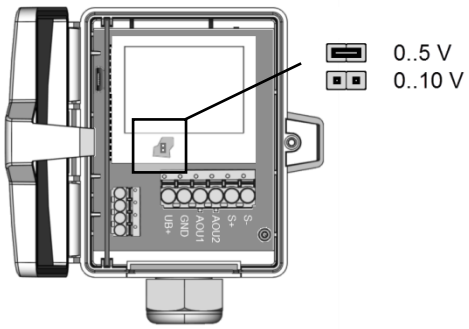
**optional:**

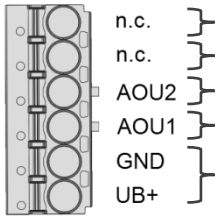


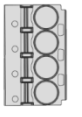
## Connection Plan

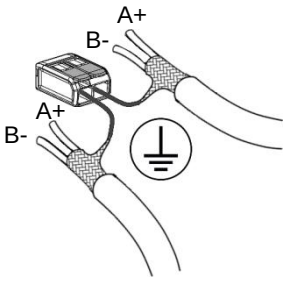
To change the output voltage range (default 0..10 V to 0..5 V) via jumper, the display must be removed from the board first. If the RS485 cable is looped through, connect both cable shields using the enclosed 2-pol. Connect terminal as shown.

LK+ VOC **RS485 Modbus**



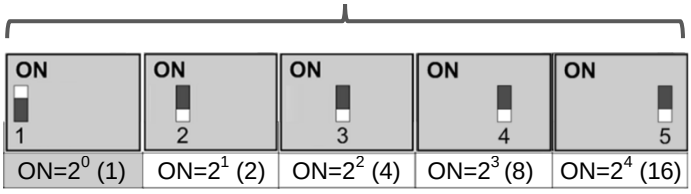



The modbus address of the device is set in the range of 1 ... 31 (binary encoded) using a 5-pole DIP switch. With address 0 via DIP, an extended address range (32..247) is available via USEapp.

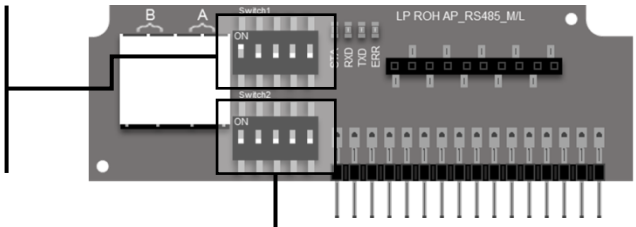
**Modbus addresses:**
USE-RS485 Modbus Interface

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

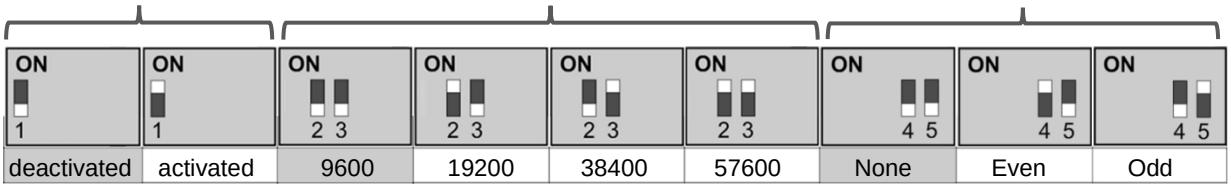
**Address**




default




**Termination 120Ω** **Baud rate** **Parity**




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.**

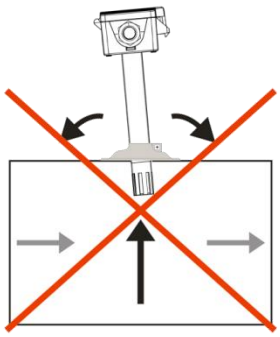
Application-specific reconfiguration of the devices can be carried out using the Thermokon USEapp. The configuration is carried out in the voltage-supplied state.

**The configuration-app and the app description can be found in the download area of our webpage**.

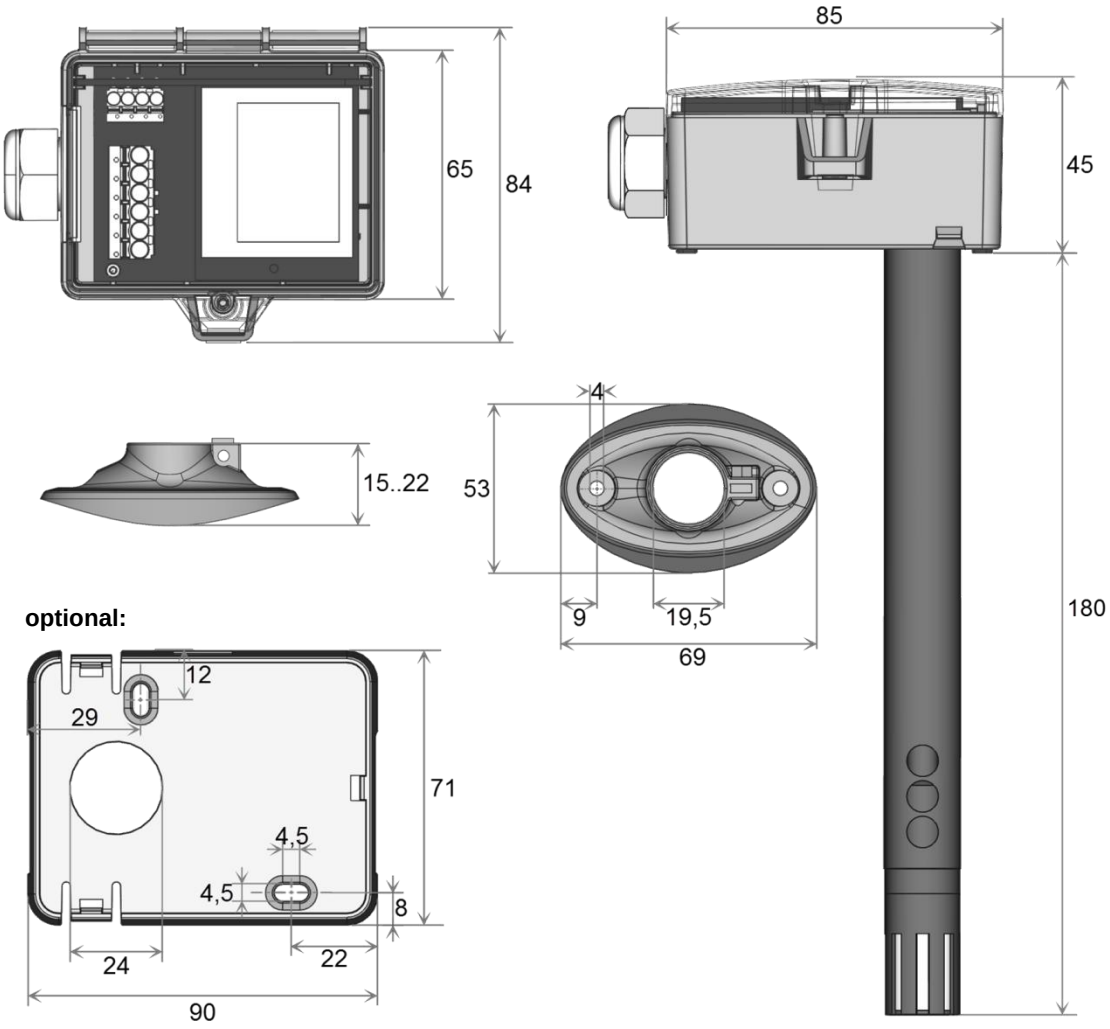
→ **Download (APK-file for Android)**

## 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)




## 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 |