

LK+ CO2+VOC (LCD) (Temp_rH)

Duct sensor for air quality, optional temperature and humidity

thermokon[®]
HOME OF SENSOR TECHNOLOGY

Datasheet

Subject to technical alteration
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The following illustrations show the version with LCD

» APPLICATION

Sensor for outdoor CO₂ measurement optional temperature and humidity: cold rooms, greenhouses, production plants and warehouses. With a mix output, a mixture of CO₂ and VOC signals can be realized. The mixing ratio can be configured with the USE app. Designed for outdoor mounted applications with 0..10 V or 4..20 mA output. LCD models with RGB background light have a transparent cover. Display configuration and threshold values for color changes can be parameterized via Thermokon USEapp. With the option board relay two-point controllers or a 2-stage 2-point controller for temperature or humidity can be realized.

» TYPES AVAILABLE

Duct sensor CO₂ + VOC or Mix, optional with LCD – active 2x 0..10 V | 2x 4..20 mA | Relay

- LK+ CO₂+VOC (LCD) VV
- LK+ CO₂+VOC (LCD) AA
- LK+ CO₂+VOC (LCD) VV Relay

optionally with shorter sensor tube, Type 100

- LK+ CO₂+VOC (LCD) 100 VV
- LK+ CO₂+VOC (LCD) 100 AA
- LK+ CO₂+VOC (LCD) 100 VV Relay

Duct sensor CO₂ + VOC + temp +rH (opt.) or mix, optional with LCD – active 3x/4x 0..10 V

- LK+ CO₂+VOC (LCD) Temp 3xV
- LK+ CO₂+VOC (LCD) Temp_rH 4xV

optionally with shorter sensor tube, Type 100

- LK+ CO₂+VOC (LCD) 100 Temp 3xV
- LK+ CO₂+VOC (LCD) 100 Temp_rH 4xV

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

» PRODUCT TESTING AND CERTIFICATION



Declaration of conformity

The declaration of conformity of the products are available on our website
<https://www.thermokon.de/direct/en-gb/categories/lkplus>

» NOTES ON DISPOSAL



The crossed-out wheeled bin symbol indicates that the product or removable batteries must not be disposed of with household or commercial waste. Within the EU, you are legally obliged to dispose of the product separately and appropriately in accordance with the national laws of your country. Alternatively, please contact your supplier or Thermokon Sensortechnik GmbH. Further information can be found at: www.thermokon.com

» 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 ($\pm 0,2$ V). When switching the supply voltage on/off, onsite power surges must be avoided.

» BUILD-UP OF SELF-HEATING BY ELECTRICAL DISSIPATIVE POWER

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.

Thermokon transducers can be operated with variable operating voltages. The transducers are set at the factory with a reference operating voltage of 24 V =.

At this voltage, the expected measuring error of the output signal will be the least. Other operating voltages, can cause a measurement deviation changing power loss of the sensor electronics.

A recalibration can be carried out directly on the unit or via a software variable (app or bus).

Remark: Occurring draught 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

At regular environmental condition, it is recommended to calibrate the sensor annually to check the compliance with the accuracy required in the application. The following conditions can damage the sensor element or lead in long term to loss of the specified accuracy:

- Mechanical stress
- Contamination (e.g. dust / fingerprints)
- Aggressive chemicals
- Ambient conditions (e.g. condensation on measuring element)



Do not touch the sensor elements!

Re-calibration or exchange of the sensor element are not subject of the general warranty.

» INFORMATION ABOUT INDOOR AIR QUALITY CO₂

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 CO₂

All gas sensors are subject to drift. The degree of drift is dependent on the use of components and product design. In addition, the following environmental conditions, among others, can accelerate/ favor the aging and wear of the sensors:

- Mechanical stress (also due to temperature fluctuation)
- Contamination (dust / fingerprints e.g.)
- Abrasive chemicals
- Environmental influences (high humidity / condensation on measuring element)

An internal self calibration function with dual channel technology compensates the caused drift. Thermokon sensors are for permanent use. (e.g. hospitals).

» APPLICATION NOTICE FOR AIR QUALITY SENSORS VOC

Volatile organic compounds (VOC) are gaseous and vaporous substances of organic origin in the air. VOC-sensors monitor the significant part of humanly olfactory sensed air quality. (e.g. body odor | tobacco smoke | odor of materials, furniture, carpets, paint, adhesives, ...)

The VOC-Value is an application-specific indication for air quality and doesn't provide any information about individual components of VOC

A VOC sensor oxidises the organic molecules that collide with it, which results in changing the resistance of the semiconductor.

Any contact with the sensitive sensors must be avoided and will invalidate the warranty.

The VOC Sensor is factory calibrated and can be calibrated via USEapp subsequently, if needed.

» APPLICATION NOTICE



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.

» CONFIGURATION



The Thermokon bluetooth dongle with micro-USB (Item No.: 668262) is required for communication between USEapp and USE-M / USE L products. 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 Google Play Store or in the Apple App Store.

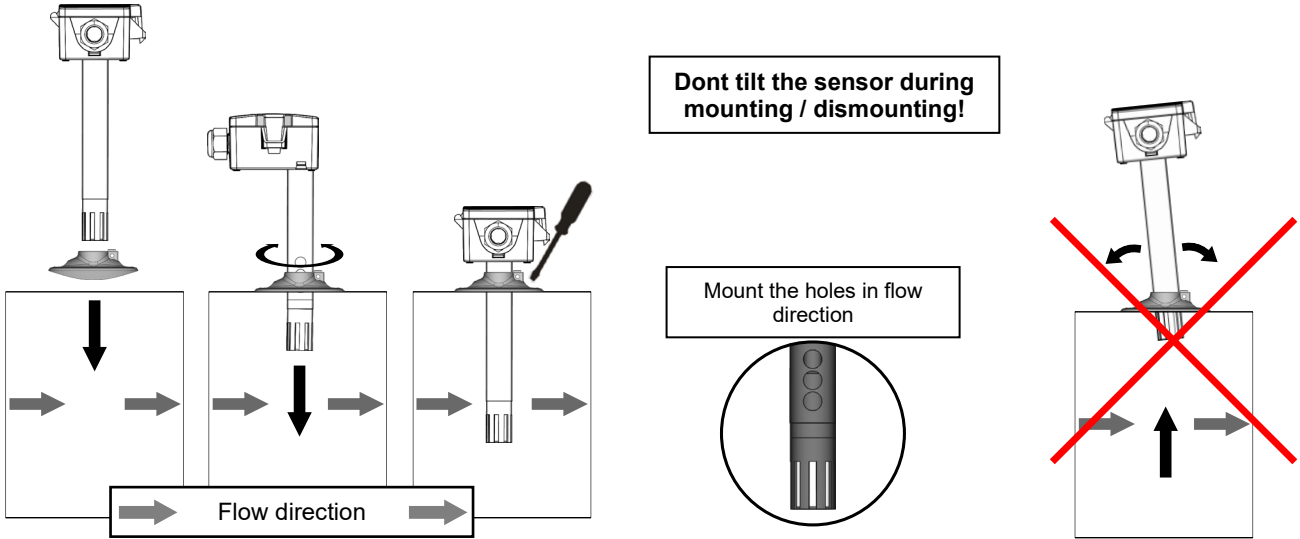
» **TECHNICAL DATA**

Measuring values	CO ₂ , VOC, temperature + humidity (depending on the device)	
Output voltage	2..4x 0..10 V or 0.5 V, min. load 10 kΩ (live-zero configuration via Thermokon USEapp)	
Output Amp <i>(type-dependent)</i>	AA 2x 4..20 mA, max. load 500 Ω	
Output passive <i>(type-dependent)</i>	passive Options: additional passive temperature sensor eg: PT100/PT1000/NI1000/NI1000TK5000/NTC10K... and other sensors on request	
Output switch contact <i>(type-dependent)</i>	Relay 2 floating contacts for 24 V ~ or 24 V = / 3 A	
Power supply <i>(type-dependent)</i>	VV 3xV 4xV Relay 15..35 V = or 19..29 V ~ SELV	AA 15..35 V = SELV
Power consumption	max. 2,3 W (24 V =) max. 4,3 VA (24 V ~)	
Measuring range temp. <i>(type-dependent)</i>	3xV 4xV +40..+140 °F (default setting), optionally configured via Thermokon USEapp	
Measuring range humidity <i>(type-dependent)</i>	4xV 0..100% rH non-condensing, optionally configured via Thermokon USEapp (enthalpy, absolute humidity, dew point)	
Measuring range CO ₂	0..2000 ppm (default), 0..5000 ppm (optionally configured via Thermokon USEapp)	
Accuracy temperature <i>(type-dependent)</i>	VV AA 3xV 4xV Relay ±0,5 K (typ. at 70 °F)	passive depending on used sensor
Accuracy humidity <i>(type-dependent)</i>	4xV ±2% between 10..90% rH (typ. at 70 °F)	
Accuracy CO ₂	±50 ppm +3% of reading (typ. at 70 °F, 50% rH)	
Air speed	min. 1 ft/s, max. 40 ft/s	
Calibration	self-calibration, Dual Channel	
Sensor	CO₂ NDIR (non-dispersiv, infrared)	VOC VOC sensor (heated metal oxide semiconductor)
Display <i>(optional)</i>	LCD 1.14x1.38 in. 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 <i>(type-dependent)</i>	VV AA 3xV 4xV Flextherm M20, for wire Ø=0.18..0.35 in., removable	Relay M25 with fourfold cable entry for wire with max. Ø=0.28 in., removable
Pipe <i>(type-dependent)</i>	VV AA VV Relay PA6, black, Ø=0.77 in., length 6 in. Type 100 Length 2.7 in.	3xV 4xV PA6, black, Ø=0.77 in., length 7.1 in. Type 100 Length 3.9 in.
Connection electrical	removable plug-in terminal, max. 14 AWG	
Ambient condition	0..+50 °C, max. 85% rH short term condensation	
Mounting	installation is also possible using mounting base	
Notes	mixed gas sensors detect gases and vapours which can be oxidised (burnt): Body odours, tobacco smoke, exhalations emitted by materials (furniture, carpets, paint, glue ...)	

» MOUNTING ADVICE

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.** To prevent condensate permeation the pipe must be installed in an orientation that occurring condensate can run off.

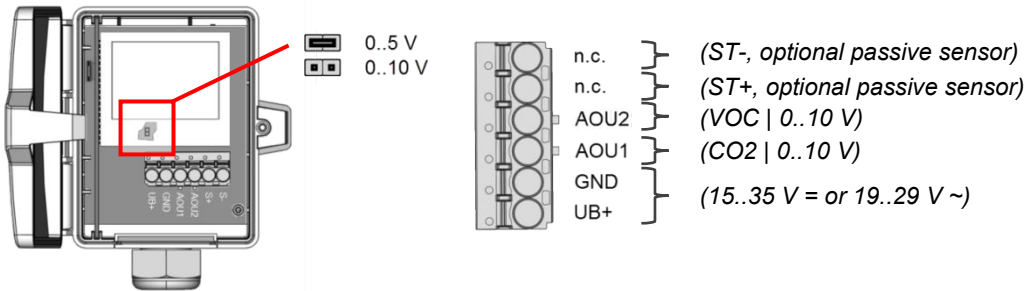
Remove the lower section of the sensor carefully and pulling straight out.



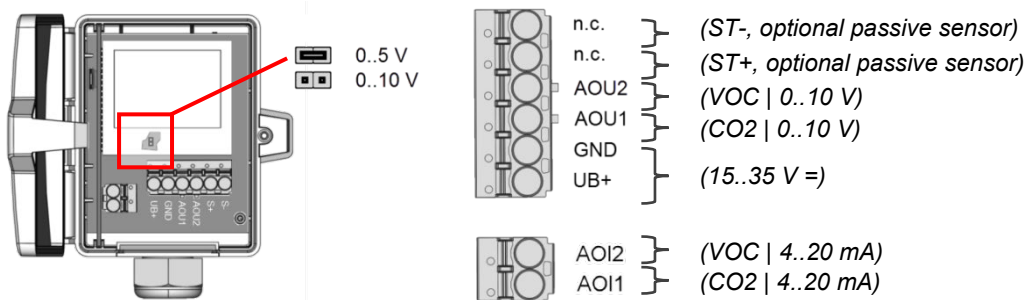
» CONNECTION PLAN

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

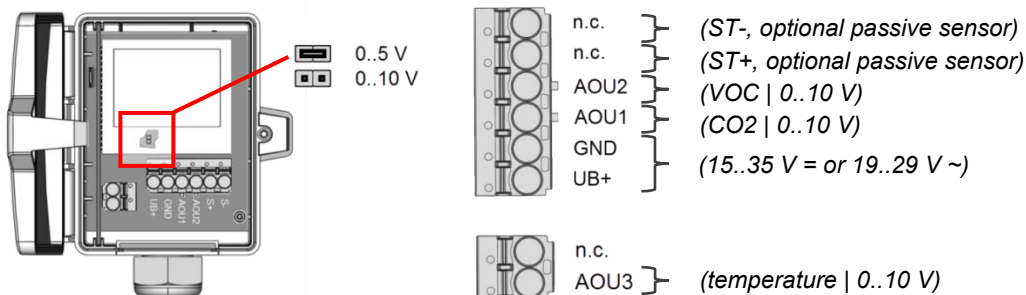
LK+ CO2+VOC LCD VV



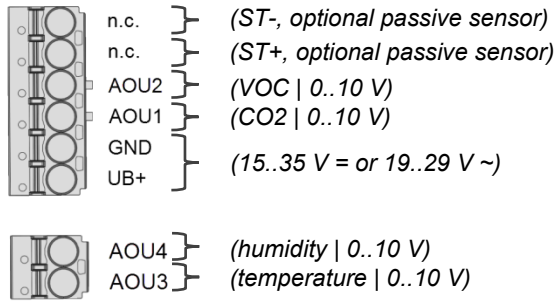
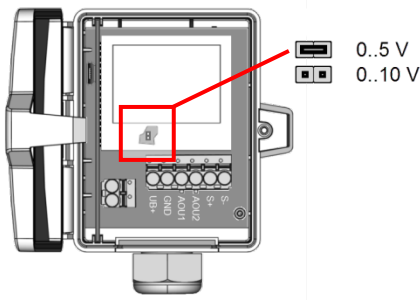
LK+ CO2+VOC LCD AA



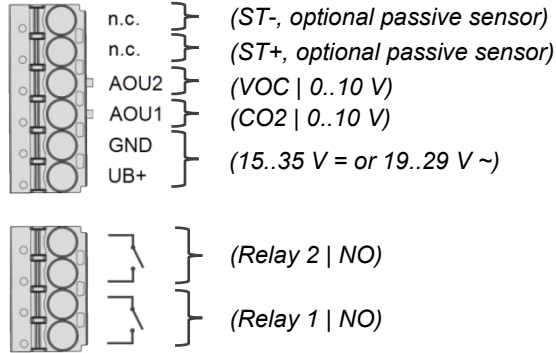
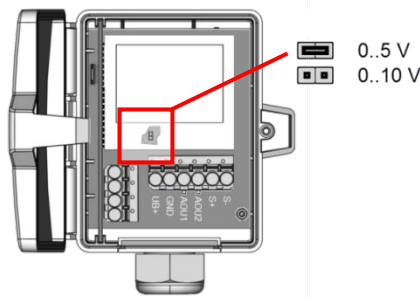
LK+ CO2+VOC LCD 3xV



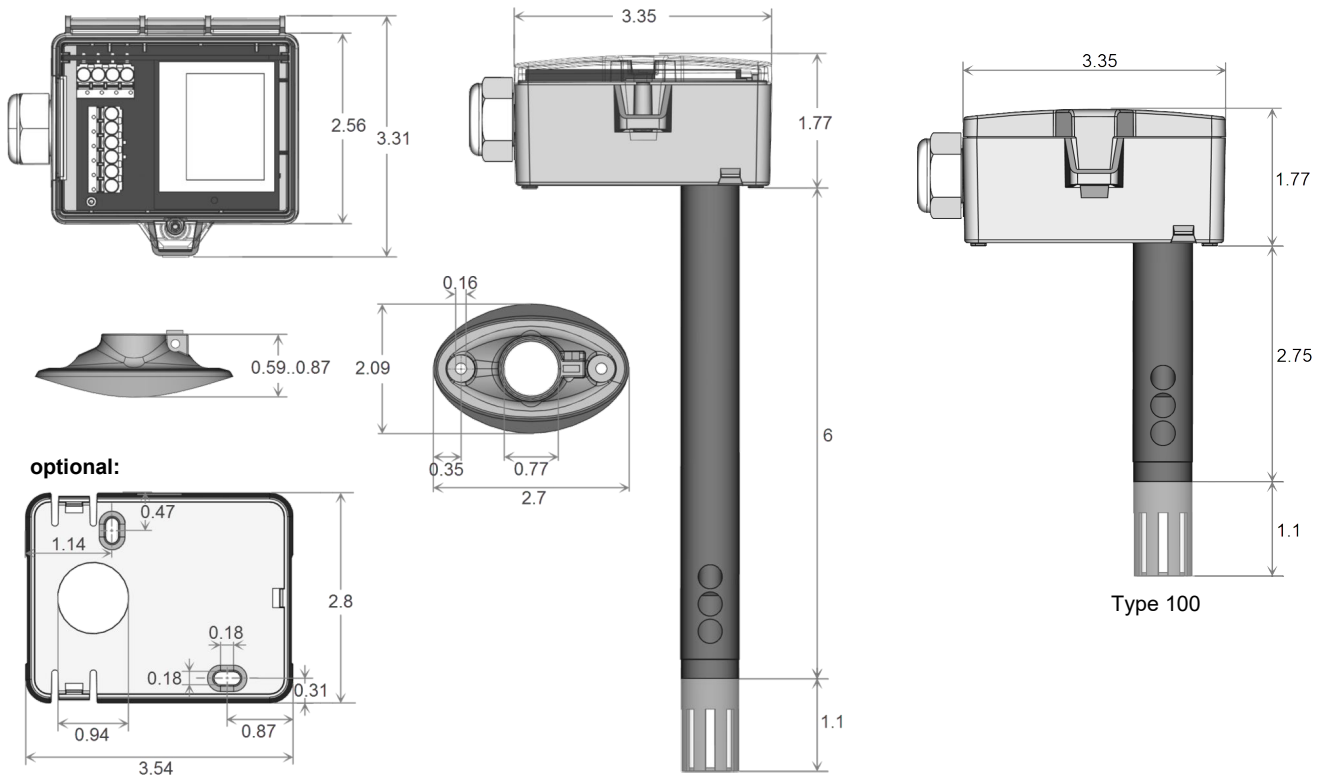
LK+ CO2+VOC 4xV



LK+ CO2+VOC LCD Relay



» DIMENSIONS (MM)



» ACCESSORIES (INCLUDED IN DELIVERY)

- Mounting base
- Mounting kit universal
- Cover screw + screw cover • 2 Rawlplugs • 2 Screws (countersunk head) • 2 Screws (rounded head)

Item No. 631228
Item No. 698511

» ACCESSORIES (OPTIONAL)

- Sealing insert M20 USE white, 2x Ø=7 mm (for 2 wire; PU 10 pieces)

Item No. 641333

- Bluetooth dongle

Item No. 668262