# LK-SX $CO_2$+VOC

Sensor for detection of carbon dioxide ($CO_2$)
and mixed gas content in air ducts

thermokon Sensortechnik GmbH

**Data sheet**

Subject to technical alteration
Issue date: 24.08.2015

## Application

For detection of CO2 and VOC. Designed for duct mounted applications with up to 2 0..10 V outputs.

## 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.

## 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!**

## Application Notice for Air Quality Sensors VOC

Unlike $CO_2$ sensors, which specifically measure $CO_2$, mixed gas sensors detect a wide range of gases. The sensor signal does not indicate the type of gas or it's concentration in ppm. Mixed gas sensors detect gases and vapours consisting of carbohydrates, or more generally gases that can be oxidised (burnt): Odours, perfume, cleaning fluid scent, tobacco smoke, new materials fumigations (furniture, carpets, paint, glue ...).

Unlike $CO_2$, which humans cannot sense, the amount of odours (VOC) indicates the level of air quality. VOC sensors have proven their value in a multitude of applications for many years.

**Measuring principle:**

Similar to a catalyst converter the organic molecules are burnt (oxidized) when in contact with the sensor's heated -dioxide surface, adding a small amount of heat combustion. The increased temperature is measured providing a signal proportional to the number of molecules being burnt. $CO_2$ cannot be detected as it cannot be further oxidized.

**Refrain from touching the sensor's element sensitive surface. Touching the sensitive surface element will void warranty.**

## Information about Calibration VOC

Similar to a catalyst converter the VOC sensor will deteriorate over time, which will affect the sensitivity. This VOC sensor automatically compensates the decrease in sensitivity by dynamic auto-calibration.

The reference level of air quality is derived from the ambient conditions over a 72h period. The lowest reading within this 72h time period will be used as reference level, representing the "clean and fresh air level".

## Technical Data

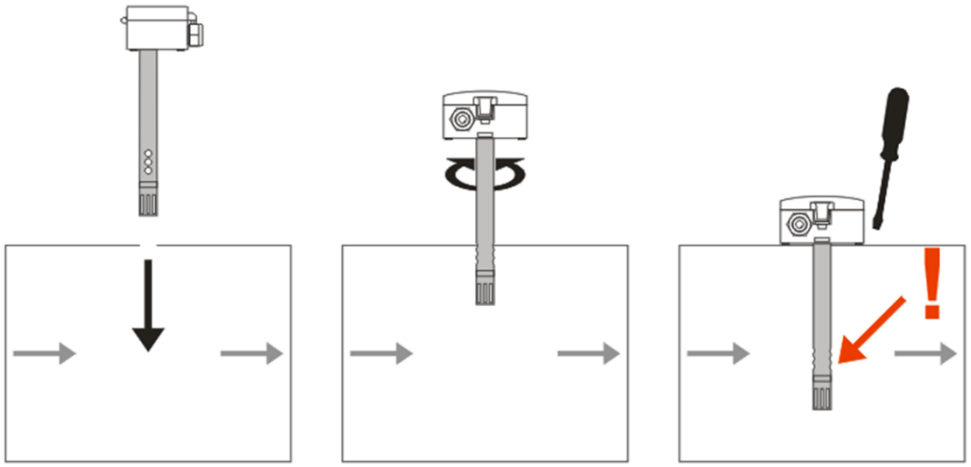
| | |
|---|---|
| Measuring values | CO2, VOC |
| Output voltage | 2x 0..10 V, load min. 10 kΩ |
| Power supply | 15..24 V = (±10%) or 24 V ~ (±10%) |
| Power consumption | max. 1,5 W (24 V =) \| 2,9 VA (24 V ~) |
| Measuring range CO2 | 0..2000 ppm |
| Accuracy CO2 | ±75 ppm or ±10% of measured value |
| Calibration | Self calibration dual channel (CO2) |
| Air speed | min. 0,3 m/sec, max. 10 m/sec |
| Sensor | VOC-Sensor, NDIR (non-dispersive infrared) |
| Enclosure | PA6, pure white |
| Protection | IP54 according to EN 60529, IP65 with bolted cover |
| Cable entry | M20 for wire max 8 mm |
| Connection electrical | Terminal block max 1,5 mm² |
| Pipe | PA6, black, Ø=19,5 mm, L =180 mm |
| Filter | stainless steel, wire mesh |
| Ambient condition | 0..+50 °C, max 85% rH short term condensation |
| Weight | 400 g |
| Delivery content | MF20 flange |
| 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 advices

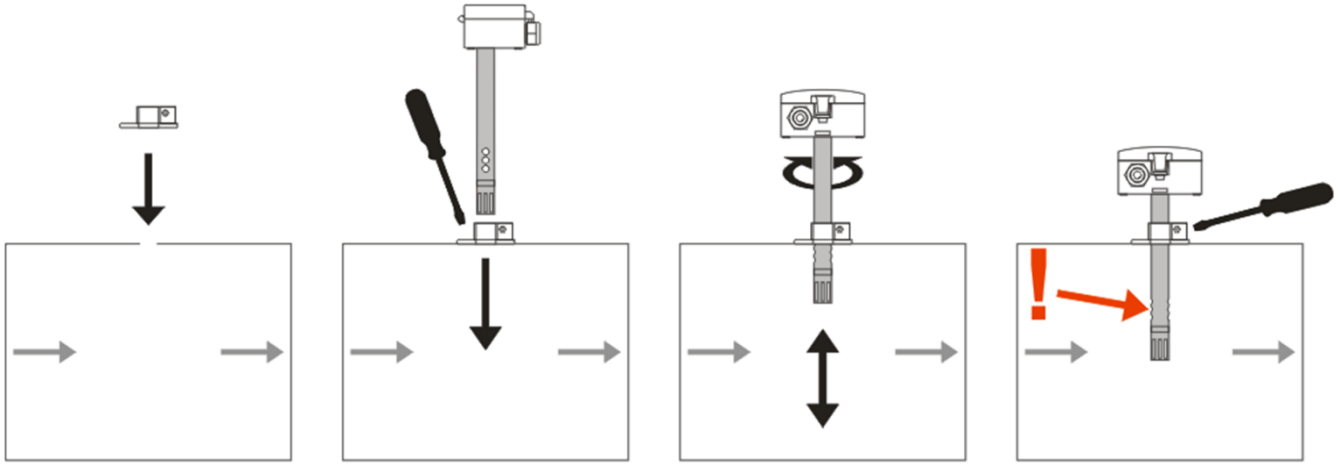
The sensor can be mounted on a flange (recommended) or directly into the ventilation duct.

**Please note that during installation the openings of the pipe are mounted in the direction of air flow!**

**Mounting without and with mounting flange:**



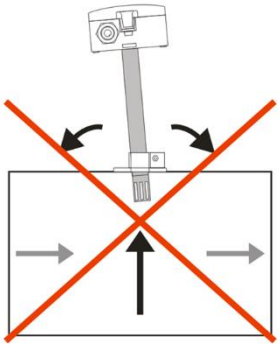
**Mounting with mounting flange**



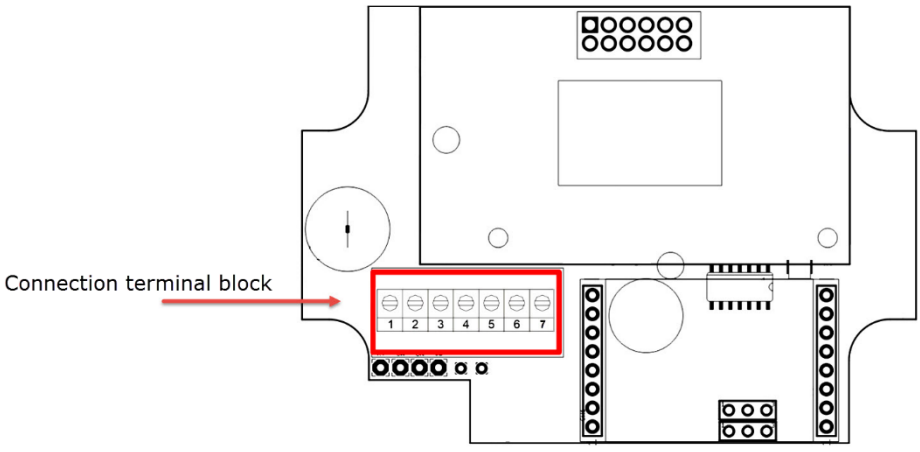
## Dismounting Advices

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

**Pay close attention to the correct dismantling of the component!**



## Connection Plan




| Clamp | Function |
|---|---|
| 1 | 24 V |
| 2 | GND |
| 3 | Not used |
| 4 | Not used |
| 5 | Not used |
| 6 | output CO2 0..10 V |
| 7 | output VOC 0..10 V |

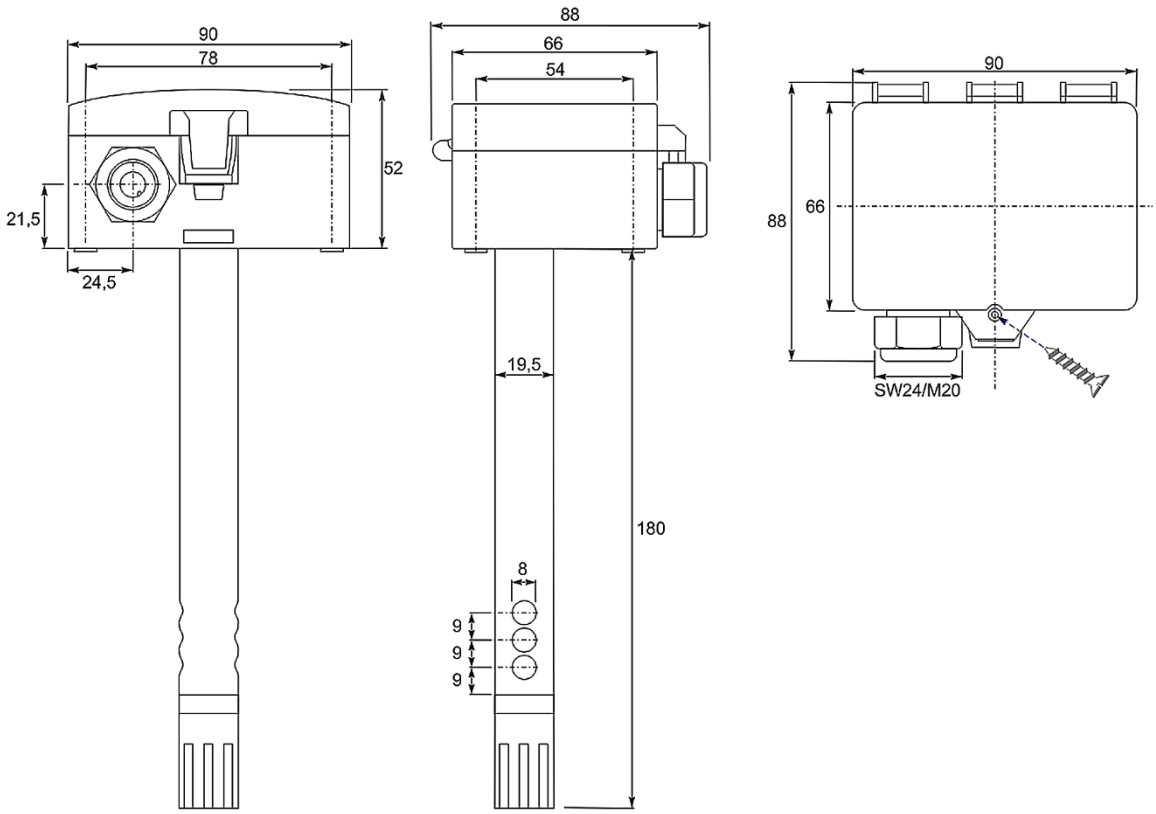
## Application notice

Dirt in the air can collect on the filter and then adversely affect the operation of the sensor after a certain time.

Under normal ambient condition an annual maintenance is recommended. Rinse the filter after cleaning with distilled water and dry it using clean oil-free air or nitrogen. Extremely contaminated filters should be replaced.

At extreme ambient conditions, e.g. corrosive gases, the humidity sensor may have to be changed.

## Dimensions (mm)




## Accessories

| | |
|---|---|
| Rawl plugs and screws (2 pcs each) | Item No. 102209 |
| Filter stainless steel, wire mesh | Item No. 231169 |
| Mounting flange MF20 TPO | Item No. 612562 |