

# LA+ CO2 / VOC / Temp / rH LRW

Outdoor sensor for air quality, optional temperature and humidity

**thermokon**<sup>®</sup>

HOME OF SENSOR TECHNOLOGY



## Datasheet

Subject to technical alteration  
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LA+ CO2+VOC Temp



LA+ CO2+VOC Temp\_rH

## » APPLICATION

LoRaWAN® Air quality sensor for outdoor CO2 measurement optional temperature and humidity in outdoor areas: cold rooms, greenhouses, production plants and warehouses. The device is build with 2 0..10 V output and a LoRaWAN® radio module.

## » TYPES AVAILABLE

### Outdoor sensor – active 2x 0..10 VV LRW

- LA+ CO2+VOC LRW
- LA+ CO2+VOC Temp LRW
- LA+ CO2+VOC Temp-rH LRW
- LA+ CO2 Temp LRW
- LA+ CO2 Temp\_rH LRW
- LA+ VOC Temp LRW
- LA+ VOC Temp\_rH LRW

## » 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 can be found on our website  
<https://www.thermokon.de/direct/en-gb/categories/laplus>

## » 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](http://www.thermokon.com)

## » 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 CO<sub>2</sub>

EN 13779 defines several classes for indoor air quality:

Category	CO <sub>2</sub> 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<sub>2</sub>

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 NOVOSapp subsequently, if needed.

## » USE ENCLOSURE WITH UV AND WEATHER RESISTANCE

After some time, outdoor mounted plastics can lose their color and quality. Therefore, all USE housings are made of special white polycarbonate (PC). The light-stable colorants and additives are used to achieve optimum protection of the polymer while maintaining color stability. The titanium dioxide used is specially developed for polycarbonate and offers excellent UV protection through the reflection of the entire light spectrum including the UV component by 340 nm. This effectively counteracts the otherwise occurring photochemical polymer degradation. The colors stay full for a long time without fading. The material is also resistant to cold and frost.

» **TECHNICAL DATA**

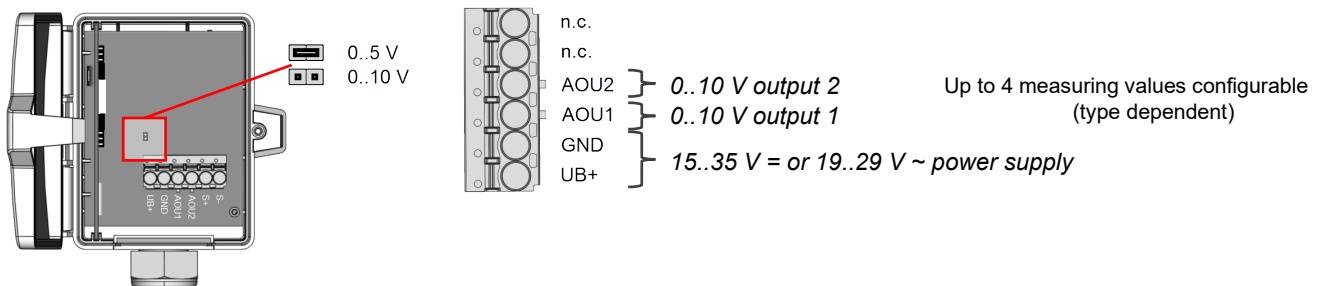
Measuring values	CO <sub>2</sub> , VOC, temperature and humidity	
Output voltage	2x 0..10 V or 0.5 V, min load 10 kΩ (live-zero configuration via Thermokon USEapp)	
Power supply	15..35 V = or 19..29 V ~ SELV	
Power consumption	max. 2,3 W (24 V =)   max. 4,3 VA (24 V ~)	
Output signal range temp. <i>*Scaling analogue output</i>	0..+50 °C (default setting), optionally configurable via Thermokon USEapp	
Measuring range humidity	0..100% rH, non-condensing	
Measuring range CO <sub>2</sub>	0..2000 ppm (default), 0..5000 ppm (optionally configured via Thermokon USEapp)	
Accuracy temperature	±0,5 K (typ. at 21 °C with default settings)	
Accuracy humidity	±2% between 10..90% rH (typ. at 21 °C)	
Accuracy CO <sub>2</sub>	±50 ppm +3% of reading (typ. at 21 °C, 50% rH)	
Calibration CO <sub>2</sub>	self-calibration, Dual Channel	
Sensor	<b>CO<sub>2</sub></b> NDIR (non-dispersiv, infrared)	<b>VOC</b> VOC sensor (heated metal oxide semiconductor)
Enclosure	enclosure USE-M, PC, pure white, with removable cable entry	
Protection	IP65 according to EN 60529	
Cable entry	M20, for wire max. Ø=4,5..9 mm (0.18..0.35 in.), removeable	
Connection electrical	removable plug-in terminal, max. 2,5 mm <sup>2</sup>	
Ambient condition	0..+50 °C, max. 85% rH short term condensation	
Configuration	Thermokon USEapp, LoRaWAN® Downlink, Jumper	
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 ...)	

» **LoRaWAN®**

Radio technology	LoRaWAN®
LoRaWAN version	1.0.2
Device class	Class A
Frequency	EU868 (863-870 MHz)
Max. transmission power	+14 dBm (25 mW)
Receiver sensitivity	-137 dBm
Antenna	Internal send- / receiver antenna, external antenna available on request
LoRaWAN Features	Over the Air Activation (OTAA), Adaptive Data Rate (ADR)
Data transmission <i>(configurable)</i>	Configurable transmission interval, factory default value 5 min

» **CONNECTION PLAN**

Switch off the power (or disconnect the plug in terminal) to change the output voltage range (default: 0..10 V to 0..5 V). The jumper has to be moved in de-energized state. The set output value range is ready approximately 2 seconds after restart of the device.



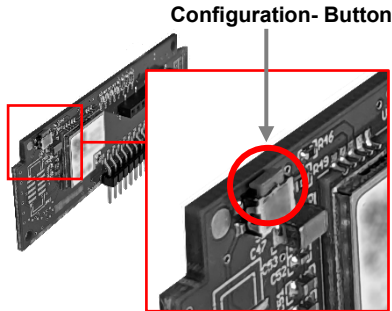
## » CONFIGURATION



The Thermokon Bluetooth-Dongle (Item-No. 668262) is required for Communication between USEapp and USE-M/USE-L LRW-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 on the website [www.thermokon.de](http://www.thermokon.de)



1. Connect the sensor with the power supply according to wiring diagram
2. Plug in the bluetooth dongle
3. Press the button to start configuration mode.
4. Configure the sensor using the USEapp on a mobile device.
5. Disconnect the bluetooth connection.
6. Remove the bluetooth dongle off the sensor.
7. Press the button to stop configuration mode.
8. Configuration values are saved and the device is ready for use.

## » INFORMATION ABOUT LORAWAN SPECIFICATION



The Thermokon LoRaWAN specification can be downloaded from our website.

## » USER ADVICE

After a certain time, dirt in the air can collect on the filter and then adversely affect the operation of the sensor. 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.

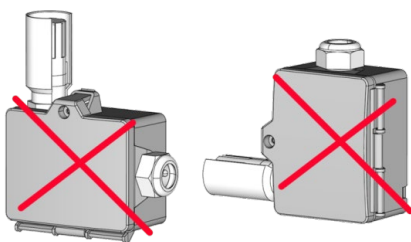


The bluetooth dongle snaps in the connector, when removing the bluetooth dongle hold the board down to prevent pulling out the board.

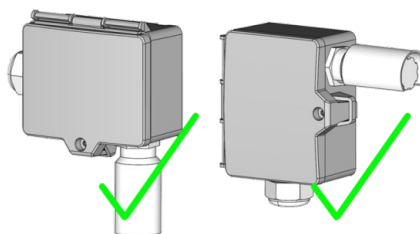
## » MOUNTING ADVICES

Avoid direct rain and contact during outdoor installation. Use sun or rain protection as required. The Cable entry is located at bottom or side of the enclosure. Set a loop if required so that precipitation can drain defined (i.e. cable routing). Observe permissible ambient condition.

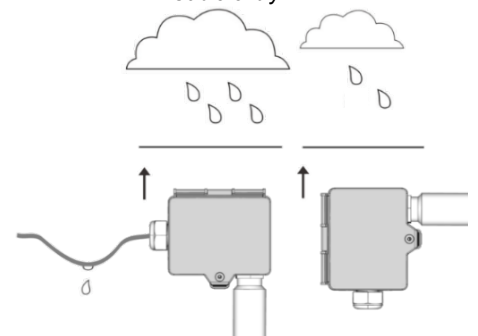
*False mounting orientation*



*Correct mounting orientation*

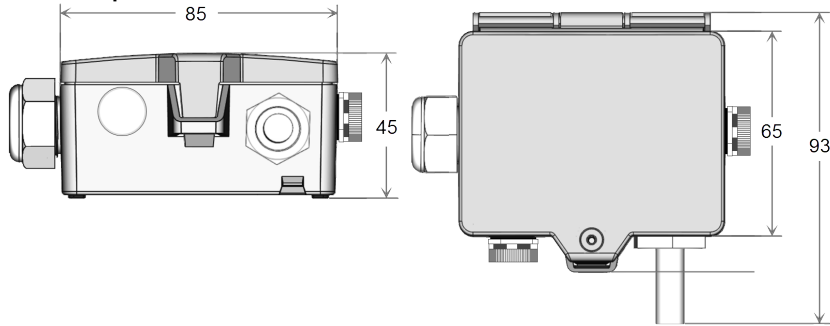


*Cable entry*

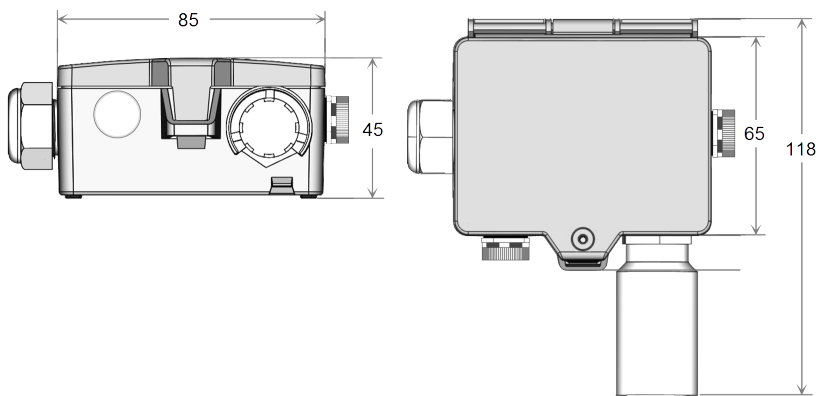


## » DIMENSIONS (MM)

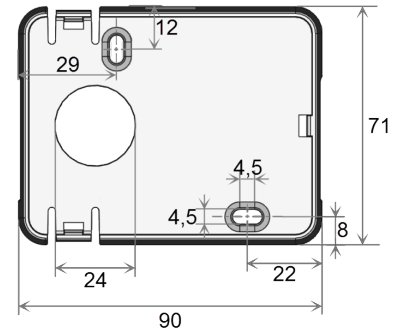
### LA+ xx Temp



### LA+ xx Temp\_rH



### Montagesocket



## » ACCESSORIES (INCLUDED IN DELIVERY)

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

Item No. 670715  
 Item No. 631228  
 Item No. 698511

## » ACCESSORIES (OPTIONAL)

Filter stainless steel, wire mesh  
 Sealing insert M20 USE white, 2x Ø=7 mm (for 2 wire; PU 10 pieces)  
 Bluetooth dongle

Item No. 231169  
 Item No. 641333  
 Item No. 668262