NOVOS 5 x (LCD) RS485 BACnet

Room operating unit temperature, optional with humidity | CO2 | VOC

thermokon®
HOME OF SENSOR TECHNOLOGY

Datasheet

Subject to technical alteration
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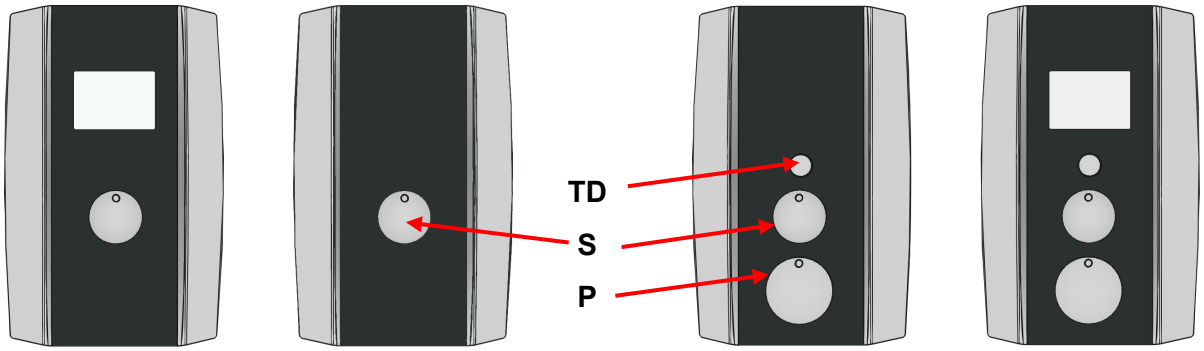
With design cover black (left), standard design design cover pure white(right)

»APPLICATION

Room operating unit with recording room temperature, optional with humidity, CO2 or VOC. The maintenance-free sensor creates the conditions for a pleasant indoor climate and well-being. Typical applications are schools, office buildings, hotels, cinemas or similar.

»TYPES AVAILABLE

Room operating unit optional with display– active BUS



TD: Button + Diode
S: Rotary switch
P: Potentiometer
LCD: optional

»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/

»MOUNTING ADVISE ROOM SENSORS

The Accuracy of the room sensors are influenced by the technical specifications as well as the positioning and the installation type.

During Assembly:

- Seal mounting box (if present).
- Installation type, air draught, heat source, radiation heat or direct sunlight can affect the measurement.
- Bulding material specific properties of the installation place *(brick-, concrete-, partition wall, cavity wall, …)* can affect the measurement. *(e.g.: Concrete accepts room temperature variation slower than cavity walls)*

Assembly not recommendet in…

- Air draught (e.g.: close to windows / doors / fans …)
- Near heating sources,
- Direct sunlight
- Niches / between furniture / …

»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 (±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 therm 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.

»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 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).

»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

»APPLICATION NOTICE FOR AIR QUALITY SENSORS VOC

Volatile organic compunds (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 odur | tobacco smoke | odur 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.

» TECHNICAL DATA

Measuring values	temperature | humidity | CO2 | VOC
Network technology	RS485 BACnet, **Fail-safe Biasing required**
Power supply	15..35 V = (or 19..29 V ~)* SELV *With alternating voltage, the correct polarity must be ensured.*[1]
Power consumption	typ. 0,4 W (24 V =) | 0,8 VA (24 V ~)
Measuring range temp	-20..+70 °C | -4..+158 °F
Accuracy temperature	±0,5K (typ. at 21 °C | 70 °F)
Inputs	1x input for floating contact
Set point (P)	potentiometer
Rotary switch (S)	for fan stage adjustment (max. 5 stages), 5-stages (auto,0,I,II,III), 2-stages (0,I), 3-stages (0,I,II), 4-stages (0,I,II,III)
Button (T)	for presence detection, with LED (TD)
LED (D)	for status feedback, color can be set (from 7 colours) via Thermokon NOVOSapp or BUS
Display (optional)	LCD 1.1x1.4” with RGB backlight
Enclosure	PC V0, pure white, design cover pure white, other colours on request
Protection	IP30 according to DIN EN 60529
Cable entry	rear entry, breaking points bottom, drill mark top
Connection electrical	tool-free mountable spring terminal, max. AWG16
Ambient condition	-20..+70 °C | -4..+158 °F, max. 85% non-condensing, with CO2 or VOC sensor operating temperature range 0..+50 °C | +32..+122 °F
Mounting	surface mounted on flush-mounting box (Ø=60 mm) or to be mounted flat onto the surface using screws, base part can be mounted and wired separately

» Humidity (optional)

Measuring range humidity (optional configurable)	**relative humidty** (default) 0..100% rH	**Enthalpy** 0..85 KJ/kg 0..37 BTU/lb	**absolute humidity** 0..50 | 0..80 g/m³ 0..1,5 | 0..2,3 g/ft³	**dew point** 0..+50 | -20..+80 °C +32..+122 | -4..+176 °F
	configurable via Thermokon NOVOSapp or BUS			
Accuracy humidity	±2% between 10..90% rH (typ. at 21 °C | 70 °F)			

» CO2 (optional)

Measuring range CO2	0..2000 ppm | 0..5000 ppm (configurable via Thermokon NOVOSapp or BUS)
Accuracy CO2	±(50 ppm +3 % of reading), (typ. at 21 °C | 70 °F, 50% rH, 1015 hPa)
Calibration	self-calibration dual channel
Sensor	NDIR (non-dispersive, infrared)
Display (optional)	RGB LCD backlight indicating air quality (traffic light function ‘TLF’)

» VOC (optional)

Measuring range VOC	0..100 %
Calibration	self-calibration
Sensor	VOC sensor (heated metal oxide semiconductor)

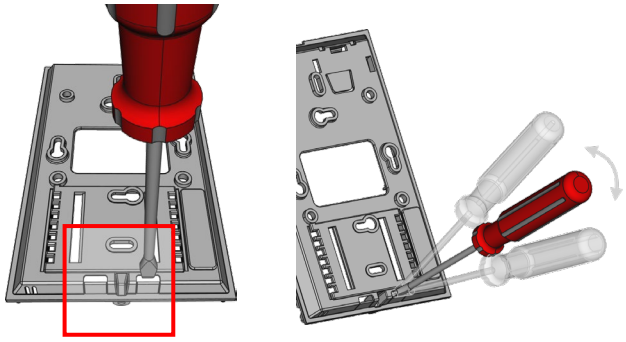
[1] When several BUS devices are supplied by one 24 V AC voltage supply, it is to be ensured that all “positive” operating voltage input terminals (+) of the field devices are connected and all “negative” operating voltage input terminals (-) (=reference potential) are connected (in-phase connection of field devices).In the case of reversed polarity at one field device, a supply voltage short-circuit would be caused by that device.

The consequential short-circuit current flowing through this field my cause damage to it. Therefore, pay attention to correct wiring.

»MOUNTING ADVICES

Cable entry

There are predetermined breaking points for 2 optional cable entries on the underside of the base plate.



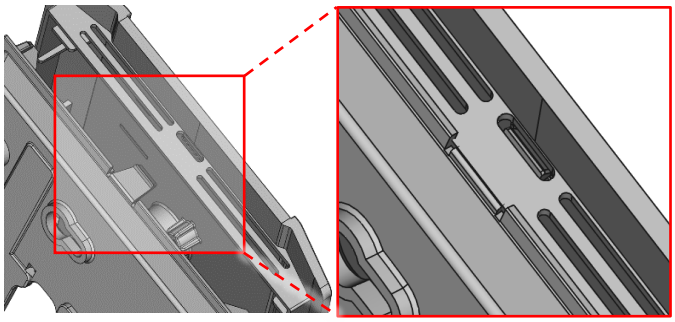
Please make sure that the device is de-energized if you want to install it!

The installation can be performed on the flat wall surface or on a flush-mounted box. A representative place should be selected. Sunshine and draft, e.g. in the installation tube should be avoided, so that the measurement result is not falsified. Seal the end of the installation tube.

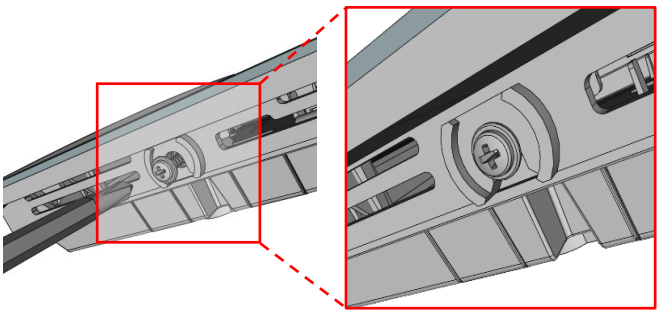
- For wiring, the upper part of the device must be removed from the base plate. Base plate and upper part are detachably connected to each other by means of locking lugs.
- The mounting of the base plate on the flat wall surface is done with rawplugs and screws.
- Finally, the device is attached to the base plate and fixed with the screw.

Housing open / close

Snap the upper part of the housing into the locking lug on the upper side



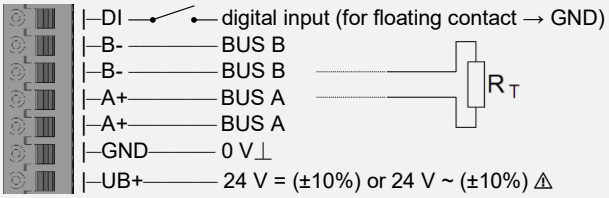
Fix the upper part of the housing on the underside with the screw included in the delivery.



»CONNECTION PLAN

Room operating unit – active RS485 BACnet

Novos 5 (x) RS485 BACnet

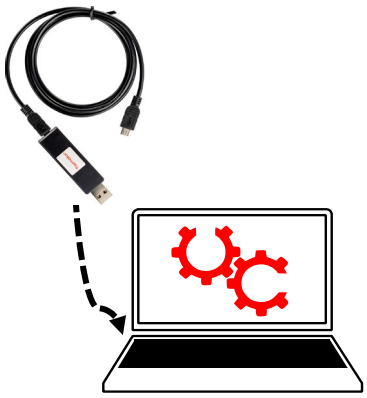


With alternating voltage, the correct polarity must be ensured!
Please note the technical data.

Don´t forget the BUS termination (120 Ω) at the last device of the line!
(Not included in delivery)

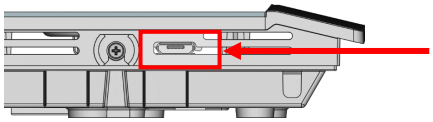
»CONFIGURATION

The configuration is performed in powered state. The following options are available for configuring the device:

Device connection	Micro-USB	Micro-USB
Configuration-adapter	Thermokon USB-Interface 	USB-Bluetooth Dongle 
Configurations-software	PC/Notebook with uConfig software *Partly parameterization with Thermokon software uConfig, via Thermokon USB-Interface* (Art.-No.: 597838)*	Smartphone/Tablet with NOVOS App *Parameterization with mobile device via bluetooth and NOVOSapp. Seperately available Bluetooth Dongle* required: (Art.-No.: 668262)*

**Commercially available Bluetooth dongles or USB to Micro-USB adapter cables are not compatible. You need a mobile device that supports at least Bluetooth version 4.1. The configuration app with the corresponding instructions can be downloaded from the Google Play Store or the Apple App Store.*

Additionally a configuration via RS485 interface via BMS during powered state is possible.

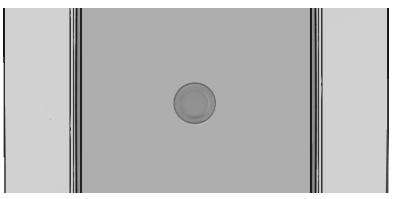


Position of the micro USB port, see bottom of the device, for configuration with Bluetooth dongle or Thermokon USB-Interface

»TLF – TRAFFIC LIGHT FUNCTION (DISPLAY-RGB-BACKLIGHT)

The traffic light function can be implemented with any available measured variable. Different colours can be assigned for up to 5 different measuring ranges.

Example: CO2 TLF
The LED visualizes the air quality value (Thresholds and colors optionally configurable via Thermokon NOVOSapp or BUS).

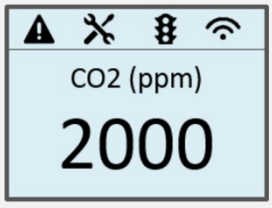
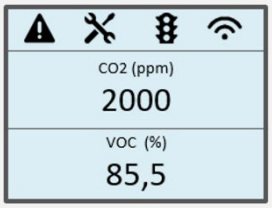
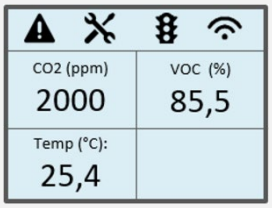
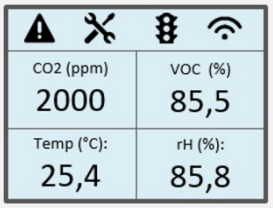


CO2 (Factory default)	Behavior of the RGB Backlight
0..750 ppm	LCD lights up in green
751..1250 ppm	LCD lights up in yellow
1251..2000 ppm	LCD lights up in red

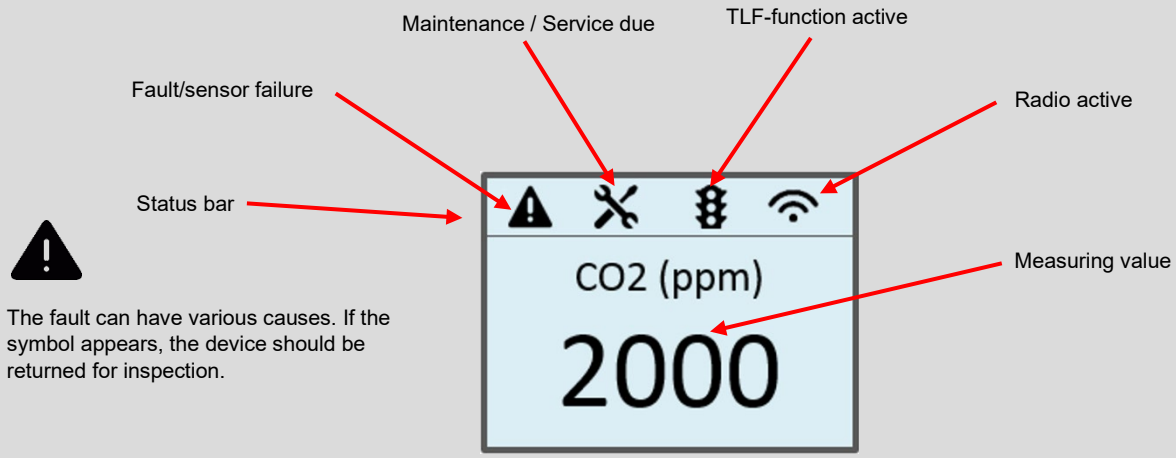
»DISPLAY

Depending on the device and the number of measured values, the display automatically scales. Parameters, such as the fading in / out of measured values, brightness and TLF function, are changed via the app.During the boot process, the software and hardware versions are displayed. Novos devices can visually display measured values via the RGB display. Thresholds for color changes can be configured through the app.

Example

1 Measuring value	2 Measuring values	3 Measuring values	4 Measuring values
			

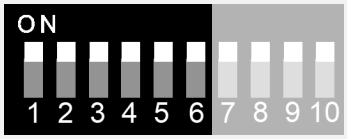
Display



»DIP-SWITCH-SETTINGS

The BACnet address of the device is set in the range of 1 ... 127 (binary encoded) using a 6-pole DIP switch. With address 0 via DIP, an extended address range (128..247) is available via NOVOSapp.

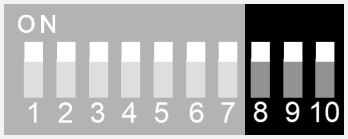
BACnet-Address - DIP 1..7 (binary coded)



Dip switch	1 = on	2 = on	3 = on	4 = on	5 = on	6 = on	7 = on
Value	2^0 (1)	2^1 (2)	2^2 (4)	2^3 (8)	2^4 (16)	2^5 (32)	2^6 (64)

Factory default, adress 127

Baud rate - DIP 8..10



8	9	10	Baud rate
off (on)	off (on)	off (on)	9600 (factory default)
on	off	off	19200
off	on	off	38400
on	on	off	57600
off	off	on	76800
on	off	on	115200

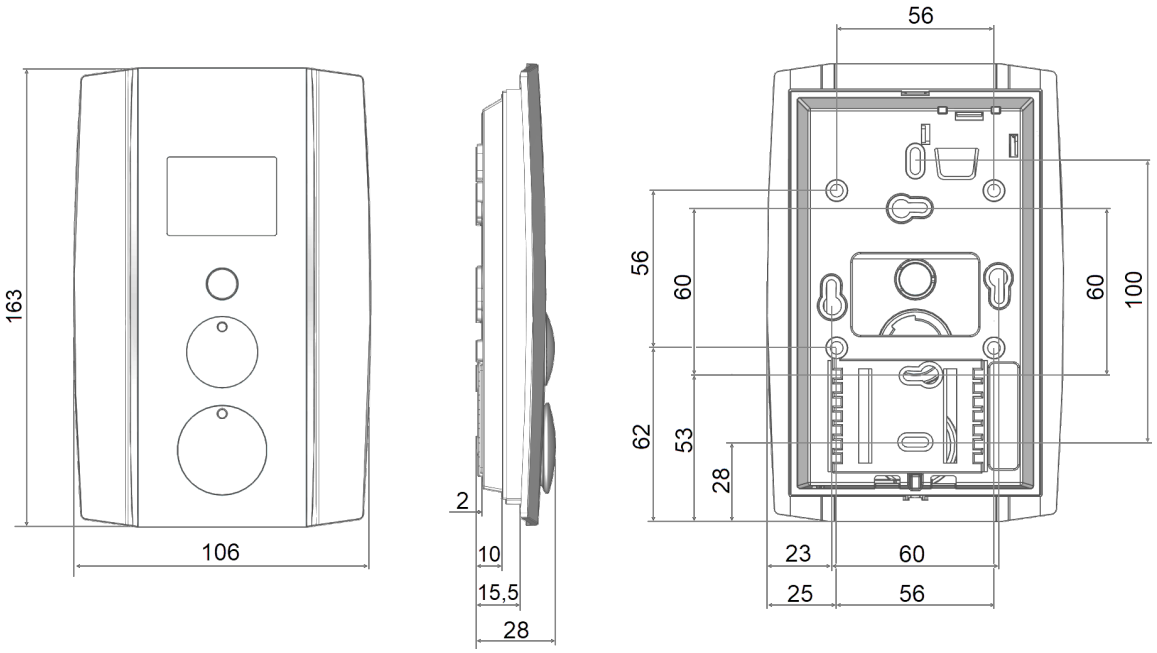
»BACNET OBJEKTE

Obj. Type	Inst.-Nr	Object name	Unit *configurable via <File Transfer>*	
			SI	IMP
AI	500	Temperature	°C	°F
AI	501	relative humidity	%rF	
AI	502	absolute humidity	g/m³	gr/ft³
AI	503	Enthalpy	kJ/kg	BTU/lb
AI	504	Dew point	°C	°F
AI	505	CO2	ppm	
AI	506	VOC	%	
AI	507	CO2 / VOC MIX	%	
BI	514	Status digital input	1 ON / 0 OFF	
AI	103	Set point (Base setpoint + setpoint adjustment)	°C	°F

Obj. Type	Inst.-Nr	Object name	Present Value	
			ID	Description
BI	100	Room occupancy	0 1	unoccupied occupied
MI	104	Fan stage	1 2-6 7	Off Stage 1-5 Auto
MV	426	LED Status	1 2 3	off on Occupancy
MV	427	LED color	1 2 3 4 5 6 7 8	white black red green blue yellow magenta cyan

BACnet Objects, PICS und BIBBs
NOVOS-RS485 BACnet Interface
A detailed description of the BACnet interface can be found under the following link: → Download

» DIMENSIONS (MM)



» ACCESSORIES (OPTIONAL)

Rawlplugs and screws (2 pcs. each)	Item No. 102209
PSU-UP24 – flush mount power supply 24 V (AC Input: 100..240 V ~ | DC Output 24 V = 0,5 A)	Item No. 645737
Bluetooth dongle	Item No. 668262
Thermokon USB-Interface	Item No. 597838
USB Interface RS485 (incl. driver CD)	Item No. 668293
RS485 Biasing Adapter	Item No. 811378