NOVOS 3 x RS485 Modbus

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 (left), standard design w/o design cover (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 temperature – active RS485 Modbus

NOVOS 3 P



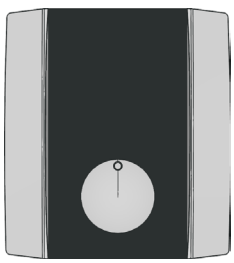
NOVOS 3 TD



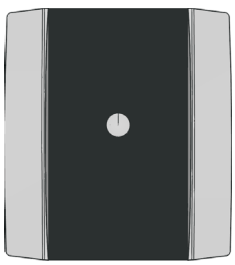
NOVOS 3 PTD



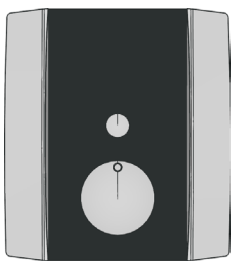
NOVOS 3 P Design



NOVOS 3 TD Design



NOVOS 3 PTD



»PRODUCT TESTING AND CERTIFICATION

Declaration of conformity
The declaration of conformity of the products can be found on our website https://www.thermokon.de/ .

»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.

»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

»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.

»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 Modbus, RTU, half-duplex, baud rate 9.600, 19.200, 38.400 or 57600, parity: none (1 stopbit, alternative 2 stopbits), even or odd (1 stopbit), **Fail-safe Biasing required**
Power supply	15..35 V = (or 19..29 V ~)* SELV
Power consumption	typ. 0,4 W (24 V =) | 0,8 VA (24 V ~)
Inputs	1x input for floating input
Set point (P) *(optional)*	potentiometer
Button (T) *(optional)*	for presence detection, with LED (TD)
LED (D) *(optional)*	for status feedback, color can be set (from 7 colours) via Thermokon NOVOSapp (any from RGB) or BUS
Enclosure	PC V0, pure white, design cover (optional)
Protection	IP20 according to DIN EN 60529
Cable entry	rear entry, breaking points bottom, drill mark top
Connection electrical	tool-free mountable spring terminal, max. 1,5 mm²
Ambient condition	-20..+70 °C, max. 85% non-condensing, with CO2 or VOC sensor operating temperature range 0..+50 °C
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

» Temperature

Measuring range temperature	-20..+70 °C | -4..+158 °F
Accuracy temperature	±0,5K (typ. at 21 °C | 70 °F)

» 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-LED indicating air quality (traffic light function 'TLF')

» VOC (optional)

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

***Power supply**
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 with each other and all "negative" operating voltage input terminals (-) (=reference potential) are connected together (in-phase connection of field devices).

In 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

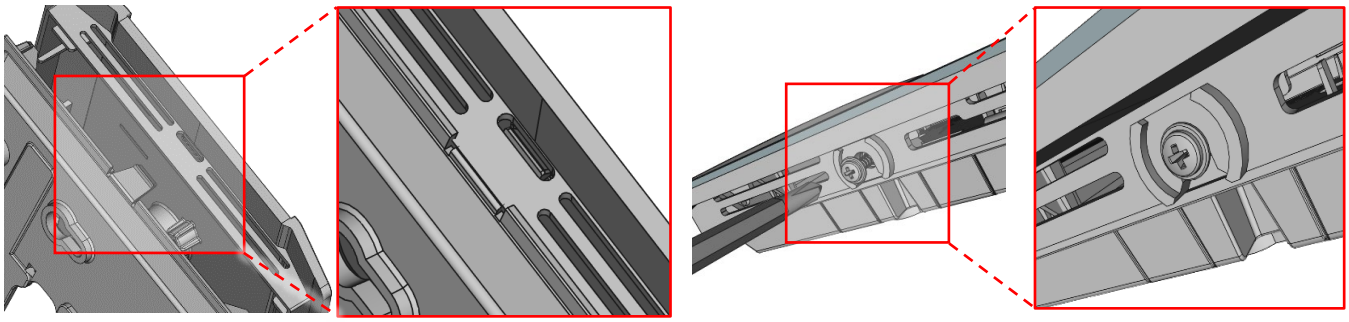
Please make sure that the device is de-energized if you want to install it!

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.

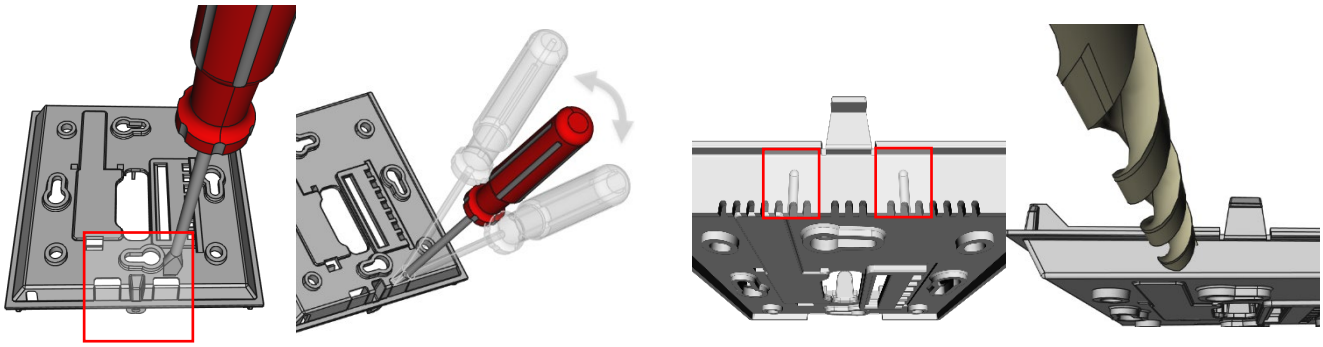
Housing open / close

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.



Cable entry

There are predetermined breaking points for 2 optional cable entries on the underside of the base plate	On the upper side of the base plate there are 2 grits as position for a drill hole max. Ø 6 mm

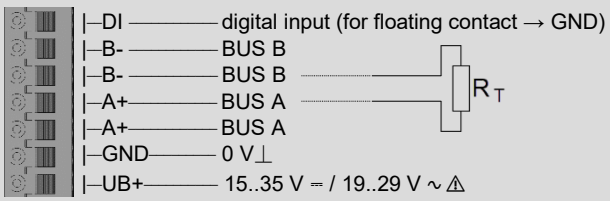


When using a drill, you should absolutely ensure that the base plate is firmly clamped. Before drilling, the pressure must be reduced and carefully drilled. A sudden break-through of the drill bit can be the result.

»CONNECTION PLAN

Room operating unit – active RS485 Modbus

NOVOS 3 RS485 Modbus

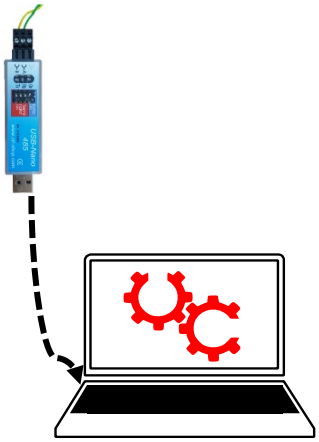
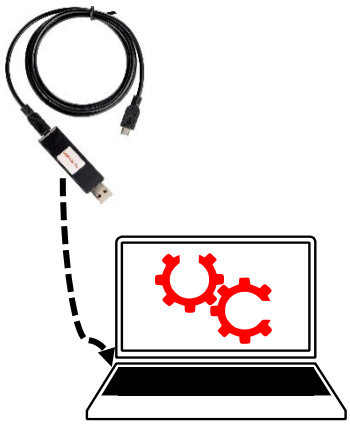


With alternating voltage, the correct polarity must be ensured!
Please note the technical data.

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	RS485	Micro-USB	Micro-USB
Configuration-adapter	USB-RS485 Converter 	Thermokon USB-Interface 	USB-Bluetooth Dongle 
Configuration-software	PC/Notebook with uConfig software *Parameterization via desktop PC/Notebook with uConfig software and a USB/RS485 converter (Item No. 668293)*	PC/Notebook with uConfig software *Parameterization via desktop PC/Notebook with uConfig software, via Thermokon USB-Interface* (Item No. 597838)*	Smartphone/Tablet with NOVOS App *Parameterization with mobile devices via Bluetooth and NOVOSapp. A separately available Bluetooth dongle* is required (item no. 668262)*

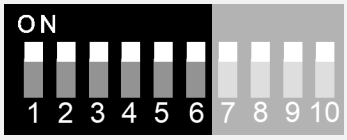
**Commercially available Bluetooth dongles or USB to Micro-USB adapter cables are not compatible. You need a mobile device that supports at least Bluetooth version 4.1. The configuration app with the corresponding instructions can be downloaded from the Google Play Store or the Apple App Store.*

A configuration during operation is additionally via BMS through RS485 connection possible.

»DIP-SWITCH-SETTINGS

The modbus address of the device is set in the range of 1 ... 63 (binary encoded) using a 6-pole DIP switch. With address 0 via DIP, an extended address range (64..247) is available via NOVOSapp.

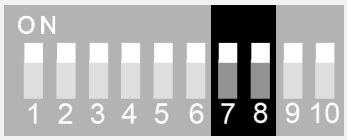
Modbus-Adress - DIP 1..6 (binary coded)



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

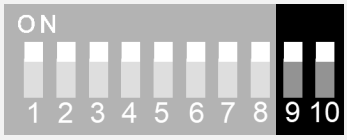
Factory default, adress 63

Baud rate - DIP 7 & 8



7	8	Baud rate	
off	off	9600	
on	off	19200	
off	on	38400	
on	on	57600	(factory default)

Parity / Stop bits - DIP 9 & 10



9	10	Parity
off	off	None – 2-Stopbits
on	off	Even – 1 Stopbit
off	on	Odd – 1 Stopbit
on	on	None – 1-Stopbit (factory default)

Address	Access	Description		Resolution /Unit	
100	R/W	Button	pressed = 1 Not pressed = 0		
426	R/W	LED ON/OFF	ON = 1 OFF = 0 (default)		
427	R/W	LED color transparent = 0 | white = 1 | red = 3 | green = 4 (default) | blue = 5 | yellow = 6 | magenta = 7 | turquoise= 8			
501	R	relative humidity	850 = 85,0 %rH	0.1	%rH
505	R	CO2		1.0	ppm
506	R	VOC		0.1	%
507	R	CO2 / VOC MIX			
514	R	Status digital input	open = 0 closed = 1		
1301	R/W	Display temperature setpoint	absolute -> 0 relative -> 1		

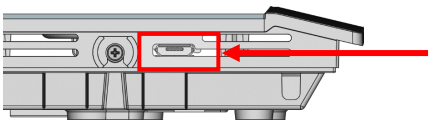
Register 1100 = 1 (Unit SI)

Address	Access	Description		Resolution /Unit		
103	R	Setpoint	210 = 21,0 °C	SI	0.1	°C
500	R	Temperature	210 = 21,0 °C	SI	0.1	°C
502	R	Absolute humidity	1500 = 15,00 g/m³	SI	0.01	g/m³
503	R	Enthalpy	550 = 55,0 kJ/m³	SI	0.1	kJ/kg
504	R	Dew point	180 = 18,0 °C	SI	0.1	°C
1302	R/W	Base set point	210 = 21,0 °C (default)	SI	0.1	°C
1303	R/W	Set point adjustment range	30 = 3,0 °C (default)	SI	0.1	°C
1304	R/W	Setpoint step width	5 = 0,5 °C (default)	SI	0.1	°C

Register 1100 = 2 (Unit Imperial)

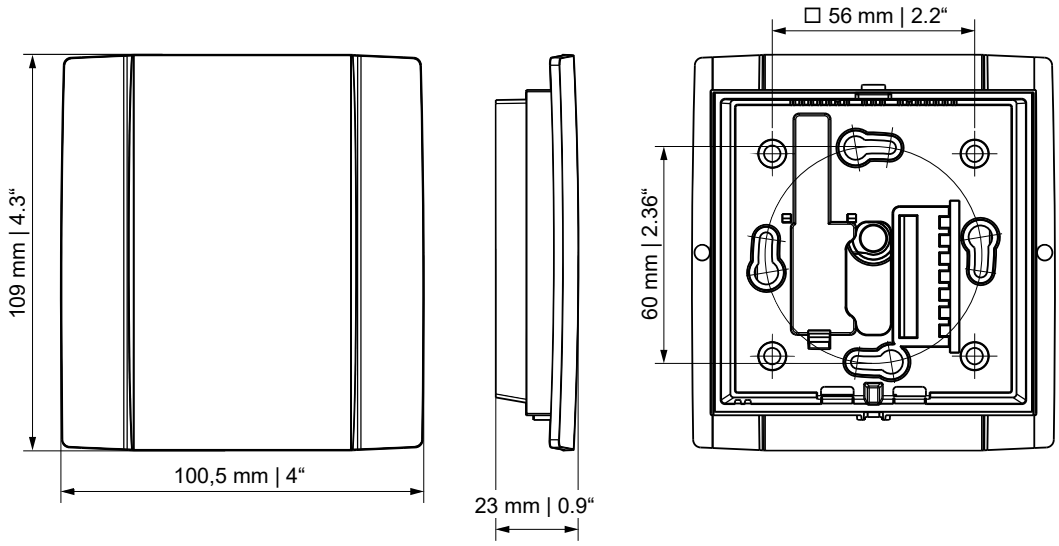
Address	Access	Description		Resolution / Unit		
103	R	Set point	700 = 70.0 °F	Imperial	0.1	°F
500	R	Temperature	700 = 70,0 °F	Imperial	0.1	°F
502	R	absolute humidity	4200 = 4,2 gr/ft³	Imperial	0.01	gr/ft³
503	R	Enthalpy	240 = 24,0 BTU/lb	Imperial	0.1	BTU/lb
504	R	dew point	600 = 60,0 °F	Imperial	0.1	°F
1302	R/W	Base setpoint	700 = 70.0 °F (default)	Imperial	0.1	°F
1303	R/W	Setpoint-adjustment range	50 = 5.0 °F (default)	Imperial	0.1	°F
1304	R/W	Setpoint step width	10 = 1.0 °F (default)	Imperial	0.1	°F

Modbus addresses:
NOVOS-RS485 Modbus Interface
A detailed description of the Modbus addresses can be found under the following link:
→ **Download**



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

»DIMENSIONS (MM | IN.)



»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
Mounting bracket (surface mounted) white	Item No. 795050
Mounting bracket (surface mounted) black	Item No. 795074
Bluetooth dongle	Item No. 668262
Thermokon USB-Interface	Item No. 597838
USB RS485 Modbus RTU Logger	Item No. 809917
USB Interface RS485 (incl. driver CD)	Item No. 668293
RS485 Biasing Adapter	Item No. 811378