

## Description of RS485 BACnet Interface

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*NOVOS 3*

*NOVOS 5*

**novos**  
THE NEW ROOM SERIES BY THERMOKON®

Revision

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A	22.06.2020	First issue	DF
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## 1 General

This document describes the RS485 BACnet interface for the following devices:

- NOVOS 3 RS485 BACnet
- NOVOS 3 x RS485 BACnet
- NOVOS 5 LCD RS485 BACnet
- NOVOS 5 x (LCD) RS485 BACnet

Depending on the device type and configuration level not all measuring values and configuration parameters shown in this document are available. The corresponding measured values are defined in the overview below.

	Temperature	relative humidity	absolute humidity	Enthalpy	Dew point	CO2	VOC	CO2 VOC Mix
NOVOS 3/5 Temp	•							
NOVOS 3/5 CO2 Temp	•					•		
NOVOS 3/5 CO2 Temp_rH	•	•	•	•	•	•		
NOVOS 3/5 CO2+VOC Temp	•					•	•	•
NOVOS 3/5 CO2+VOC Temp_rH	•	•	•	•	•	•	•	•

### 1.1 General Objects

General device information can be read out via the following registers.

Obj. Type	Inst.-Nr	Object Name	Present Value ID	Description
DEV	Device ID + Offset	x_Novos 3/5 BACnet MSTP		
MO	1041	Device Reset	1 2 3	running Reset Reboot
AV	4180	Device Offset ID		DWORD
MV	4183	COV Mode <i>Local-Broadcast</i> If this setting is active, the COV is sent as a local broadcast command only to the networks where the device is running. <i>Global Broadcast</i> If this setting is active, the COV is sent as a global broadcast command to all networks.	1 2 3	off Local Global
FIL	0	config.bin <i>Filetransfer</i> for transmission of configuration data The configuration and the creation of a "configuration file" is done with the uConfig configuration interface		

## 1.2 Device Object

Property	Access	Range	Default
Object Identifier (Device ID)	R	0...4194302	Device Offset ID + MAC-Address
Object Name	R		DeviceID_ModelName <i>Bsp.: "1127_Novos 3/5 BACnet MS/TP"</i>
Object Type	R		Device
Description	R/W	Max. 32 Characters	
Location	R/W	Max. 32 Characters	
System Status	R		Operational
Vendor Name	R		Thermokon Sensortechnik GmbH
Vendor Identifier	R		396
Model Name	R		Novos 3/5 BACnet MS/TP
Protocol Version	R		1
Protocol Revision	R		12
Max. APDU Length	R		480
Segmentation Support	R		no
APDU Timeout	R		3000 ms
Number APDU Retries	R		3
Max Masters	R/W		127
Max Info Frames	R		1

## 1.3 Hardware Installation

The device can be connected by means of a twisted-pair cable (line resistance 120 Ohm).

Detailed information on the installation and mounting can be found in the product data sheet of the corresponding device and the data sheet wiring\_rs485\_network.pdf.

## 1.4 RS485 Transceiver

The maximal number of bus participants without the use of a repeater is default by the RS485 transceiver.

The transceiver used in the device enables 32 devices per bus segment.

## 1.5 Protocol

The protocol used is the internationally standardized BACnet MS / TP protocol. This allows the connection to corresponding counterparts, e.g. an automation station or a BMS that supports the BACnet MS / TP protocol. The transmission parameters are set to 8N1 (8 data bits, no parity, 1 stop bit) according to the standard. The baud rate is freely selectable (9600, 19200, 38400, 57600, 76800, 115200) and can be set via dip switch.

## 1.6 Configuration Options

The device can be adapted to the corresponding bus topology by means of a dip switch.

- MAC address of device (1 - 127)
- Baud rate 9600, 19200, 38400, 57600, 76800, 115200

## 2 BACnet Object Description#

Parameters marked with "File transfer" must be parameterized during commissioning with the uConfig configuration software. In order to keep the amount of data during communication low, only important parameters necessary for operation are implemented as objects. A complete overview of the parameterization possibilities is possible with the uConfig software.

### 2.1 Room climate

The following objects concern the basic operating functions of the NOVOS 3/5 x room control unit for controlling the room climate. Room occupancy and setpoint can be read out and parameterised.

Obj. Type	Inst.-No	Object Name	Default	Present Value ID	Description
BV	100	[Occupancy]			
		Room occupancy (Toggle button)		0	Unoccupied
		Toggle OFF -> 0 = unoccupied		1	Occupied
		Toggle-ON -> 1 = occupied			
Filetransfer		Room occupancy after reset unoccupied occupied	occupied		
AI	103	[Setpoint]			
		Set point (effective) if set point-definition absolute 21,0 °C			
Filetransfer		Set point definition absolute relative	absolute		
Filetransfer		Base set point 0,0 – 50,0 °C	21,0 °C		
Filetransfer		Setpoint adjustment range ±0,0 - ± 10,0 K	± 3,0 K		
Filetransfer		Setpoint adjustment step width ±0,0 - ± 2,0 K	± 0,5 K		
MI	104	[Fan Stage] Read currently active fan stage		1	off
				2	Stage 1
				3	Stage 2
				4	Stage 3
				5	Stage 4
				6	Stage 5
				7	Auto
Filetransfer		Fan stage "Auto" available no yes	yes		
Filetransfer		Smallest fan stage, selectable on the device 0 (Off) - 5	0		
MI	105	[Auto Fan Stage] Auto fan stage indicator (if MI 104 =6)		1	Auto
				2	Auto 0
				3	Auto 1
				4	Auto 2
				5	Auto 3
				6	Auto 4
				7	Auto 5

## 2.2 LED status display

The following objects relate to the NOVOS room operating units with LED (button). The LED can be switched on/off directly using the values 0 or 1, or switched on/off when the button is pressed. It is thus possible to make the LED flash during operation or to change the colour. After restarting the device, the objects must be written again, because the values are not stored.

Obj. Type	Inst.-No	Object Name	Default	Present Value	
				ID	Description
MV	426	<b>[LED State]</b> <i>LED illumination (button) ON / OFF</i>	off	1	off
				2	on
				3	Occupancy
MV	427	<b>[LED Color]</b> <i>LED illumination (button) color</i>	green	1	white
				2	black
				3	red
				4	green
				5	blue
				6	yellow
				7	magenta
				8	cyan

## 2.3 Sensor Value

Via uConfig the unit system (SI - IMP) can be selected and transferred to the device with file transfer. Please note that the upper and lower limits of the measured values are not adjusted when changing the unit system. These must be adjusted manually.

The various measured values can be read out via the objects AI 500... AI 507.

Obj. Type	Inst.-No	Object Name
AI	500	<b>Temperature</b> [°C   °F]
AI	501	<b>Relative Humidity</b> [%]
AI	502	<b>Absolute Humidity</b> [g/m³   gr/ft³]
AI	503	<b>Enthalpy</b> [kJ/kg   BTU/lb]
AI	504	<b>Dewpoint</b> [°C   °F]
AI	505	<b>CO2</b> [ppm]
AI	506	<b>VOC</b> [%]
AI	507	<b>CO2 / VOC Mix</b> [%]

## 2.4 Digital input

The status of a potential-free contact can be read out via the digital input of the device.

Obj. Type	Inst.-No	Object Name	Present Value	
			ID	Description
BI	514	[Digital Input] <i>Status digital contact</i>	0	open
			1	closed

## 2.5 Offset/correction values

Via uConfig offset/correction values can be specified for the following measured values.

Physical Measurand	Offset-range
<i>Offset Temperature</i>	± 6,0K
<i>Offset Relative Humidity</i>	± 5,0%
<i>Offset Co2</i>	± 150ppm
<i>Offset VOC</i>	± 15%



## 2.6 Display Configuration NOVOS 5 LCD

### 2.6.1 NOVOS 5 LCD

During a user interaction, the LCD backlight is dimmed to a higher value. After a predefined time (default 120 seconds) the display brightness is dimmed down in standby or switched off completely.

If several measured variables are available, they can be shown in parallel or alternately (fix, every 5 seconds) on the display.

The following parameters for configuring the LCD can be set via uConfig.

	Description	Default
Filetransfer	LCD backlight during user interaction 0 – 100%	100%
Filetransfer	LCD backlight standby (no user interaction) 0 – 100%	50%
Filetransfer	Time after which the display switches to standby after a user interaction 1..120 seconds (0 disables the function)	120 seconds
Filetransfer	Measured values are shown alternately (for 5 seconds) or parallel on the display parallel alternating	parallel

### 2.6.2 NOVOS 5 LCD/ NOVOS 3 TLF – Traffic Light Function

With NOVOS 5, the RGB backlight of the display can be used as a colored status indicator (TLF) for each available measured value. With NOVOS 3 the integrated LED is used for the TLF function. Threshold values for changing the display colours can be defined for this function. 5 different colour sections can be defined. The TLF function is parameterized via uConfig.

### 2.6.3 Icons

Obj. Type	Inst.-No	Object Name	Standard	ID	Present Value Description
BV	16	[Show Icon Condensation]	0	0 1	off on
BV	17	[Show Icon Window open]	0	0 1	off on
BV	18	[Show Icon Calibration]	0	0 1	off on
BV	19	[Show Icon Communication Error]	0	0 1	off on
BV	20	[Show Icon Communication Mode]	0	0 1	off on
BV	21	[Show Icon ECO]	0	0 1	off on
BV	22	[Show Icon Heating]	0	0 1	off on
BV	23	[Show Icon Cooling]	0	0 1	off on
BV	24	[Show Icon Movement]	0	0 1	off on
BV	25	[Show Icon Occupancy]	0	0 1	off on
BV	26	[Show Icon Warning]	0	0 1	off on
BV	27	[Show Icon Service]	0	0 1	off on

### 3 BACnet PICS

#### BACnet Protocol Implementation Conformance Statement

Date:	19.06.2020
Vendor Name:	Thermokon Sensortechnik GmbH (Vendor ID: 396)
Product Names:	NOVOS 3 NOVOS 3 x NOVOS 5 NOVOS 5 x (LCD)
Firmware Revision:	2.1.5
Application Software Version:	2.1.5
BACnet Protocol Revision:	1.12
Product Description:	Sensor device with BACnet MS/TP RS485 interface.
BACnet Standardized Device Profile:	BACnet Smart Sensor (B-SS)

## 4 BACnet BIBBs

Supported BIBBS	BIBB Name
DS-RP-B	Data Sharing, Read Property, B
DS-RPM-B	Data Sharing, Read Property Multiple, B
DS-WP-B	Data Sharing, Write Property, B
DS-COVU-B	Data Sharing, COV Unsubscribed, B
DM-DOB-B	Device Management, Dynamic Object Binding, B
DM-DCC-B	Device Management, Device Communication Control, B
DM-DDB-B	Device Management, Dynamic Device Binding, B

### BACnet Standard Application Services Supported:

ReadProperty  
 ReadPropertyMultiple  
 WriteProperty  
 DeviceCommunicationControl  
 WhoHas  
 Whols

### Standard Object Types Supported:

Object-Type	Dynamically Creatable Deleteable	Optional Properties supported	Writable Properties
Analog Input	<input type="checkbox"/>	Description, COV Increment	COV Increment
Analog Value	<input type="checkbox"/>	Description	Present Value
Device	<input type="checkbox"/>	Description	Description

### Data Link Layer Option:

MS/TP master. Baud rate(s): [9600, 19200, 38400, 57600, 76800, 115200]

### Device Address Binding:

Is static device binding supported?

Yes

☐

No

☒

### Character Sets Supported:

UTF-8

### Special Functionality:

Maximum APDU size in octets: 480

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