thermokon
Sensortechnik GmbH

Interface Description

for

WRF04 CO2 BACnet MS/TP RS485

1 Version Index

1.1 Document / Interface Description

Version	Date	Description
A	17.05.2013	First issue

1.2 Firmware

Version	Description
1.0.0	Initial release

Table of Contents

2 Introduction

The present document describes the functions of the room sensor WRF04 CO2 BACnet with RS485 BACnet MS/TP interface.

Further information and definitions on BACnet can be obtained under: www.big-eu.org.

3 Hardware Installation

The transceiver can be connected to the bus by means of a twisted-pair wire (line resistance 120 Ohm). It is recommended to use a shielded cable. For detailed information on installation and mounting please refer to the product data sheet of the WRF04 CO2 BACnet and the data sheet wiring_rs485_network.pdf.

3.1 RS485 Transceiver

The maximal number of bus participants without the use of a repeater is defined by the RS485 transceiver. The transceiver used only enables 32 devices per bus segment at maximum. Via a jumper a bus terminating resistor of 120 ohm can be connected.

3.2 Protocol

The protocol used is the internationally standardized BACnet/MS/TP protocol. This enables the connection to a corresponding distant end, such as an automation station or a DDC, supporting the BACnet MS/TP protocol. The transmitting parameters are defined to 8N1 (8 data bites, no parity, 1 stop bit) according to the standard. The baud rate can be field selected (9600, 19200, 38400, 57600, 76800) and adjusted via a dip switch.

3.2.1 BACnet Configuration Tool

The WRF04 CO2 BACnet MS/TP is always operated together with other BACnet automation stations or control technologies such as the BACnet operating work station. For the installation of such a BACnet network the tools of the corresponding manufacturers of the automation stations or control technologies are used.

4 BACnet

4.1 BACnet Device Profile and BIBBs

The device is working with the device profiles BACnet Smart Sensor (B-SS).

The following BIBBs are implemented:

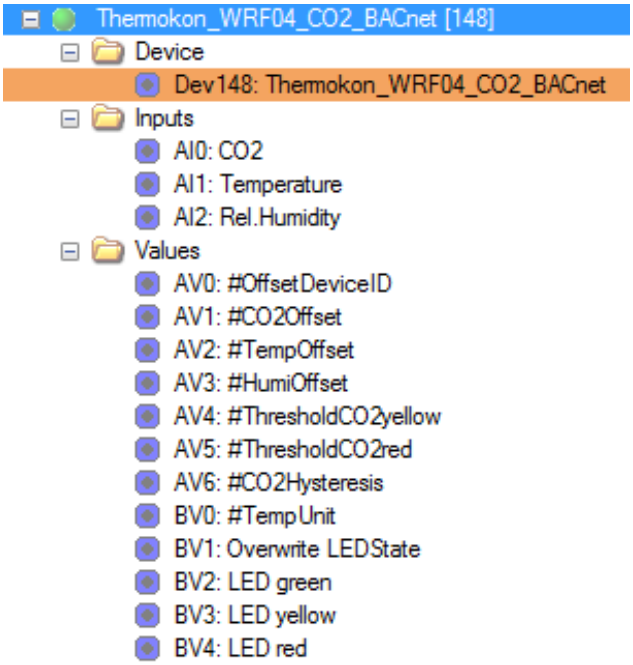
DS-RP-B	Data Sharing-ReadProperty-B
DS-WP-B	Data Sharing-WriteProperty-B

4.2 BACnet Objects

WRF04 CO2 disposes of the following numbers of BACnet objects:

- 7 (WRF04 CO2 BACnet)
- 9 (WRF04 CO2 rH BACnet
- 14 (WRF04 CO2 –Z BACnet)
- 16 (WRF04 CO2 rH –Z BACnet)

The objects marked by a rhomb (#) are configuration properties which keep their values even after a restart of the device.



Device

Object	Object Type / Instance	Function
Thermokon_WRF04_CO2_BACnet	Device Object Offset-Device-ID+MAC-Adresse	The Device-Object makes features for the characterization of the device in the BACnet network available. Among others the object list, the manufacturer and the software version are displayed. In addition, basic settings such as e.g. MAX-Master are feasible.

Analogue Inputs

Object	Value	Function
CO2	0…2000 ppm CO2	CO2 Wert, measured by WRF04 CO2
Temperature	0…50°C / 32…122°F (unit is field selectable of BV2)	Room temperature, measured by WRF04 CO2
Rel. humidity *(optional, only available for devices with devices with humidity sensor)*	0…100% rel. humidity	Relative humidity, measured by WRF04 CO2

Analogue Values

Object	Value	Function
#DeviceOffsetID	0…4194176	This value plus MAC (0-127= corresponds to Device-ID (Writeable 0 – 4194176), after writing, Reset and new initialization
#CO2 Offset	-2000…+2000 ppm CO2	Default CO2 correction (CO2-Offset)
#TempOffset	-50…+50°C/°F	Default temperature correction (Temperature Offset)
#HumiOffset *(optional, only available for devices with humidity sensor)*	-100…+100% rel. humidity	Default humidity correction (Humidity Offset)
#ThresholdCO2yellow *(optional, only available for devices with LED „CO2 traffic-light function“)*	0…2000 ppm CO2 Factory setting: 800ppm	CO2 treshold from which the yellow LED of the „CO2 traffic-light“is switched on (below this value the green LED is actived).
#ThresholdCO2red *optional, only available for devices with LED „CO2 traffic-light function“)*	0…2000 ppm CO2 Factory setting: 1200ppm	CO2 treshold from which the red LED of the „CO2 traffic-light“ is switched on.
#CO2Hysteresis *(optional, nur bei Geräten mit LED „CO2 Ampel“ verfügbar)*	0…500ppm (factory setting : 100 ppm)	Dead spot for LED „CO2 traffic-light“

Binary Values

Object	Value	Function
#TempUnit	Inactive (factory setting) Active	Inactive: °C Active: °F
OverwriteLEDState *(optional, only available for devices with LED „CO2 traffic-light“)*	Inactive Active	By activating this object the LEDS of the LED „CO2 traffic-light“ can be controlled manually via the following objects.
OverwriteLEDgreen *(optional, only available for devices with LED „CO2 traffic-light“)*	Inactive Active	Status LED green
OverwriteLEDyellows *(optional, only available for devices with LED „CO2 traffic-light“)*	Inactive Active	Status LED yellow
OverwriteLEDred *(optional, only available for devices with LED „CO2 traffic-light“)*	Inactive Active	Status LED red

4.2.1 BACnet Device Object

4.2.1.1 Device object -> MAX-Master property

This feature can be written between 1 to 127 and determines up to which address further participants in the BUS are polled (PolledForMaster). This is a MS/TP-specific feature.

4.2.1.2 Device object-> Object identifier

In a BACnet network every BACnet device requires a clear device ID. The device offers two possibilities to adjust the ID. The device ID is assembled of the MAXC-address, supplied by the address dip switch and a device ID offset. The offset is described by a BACnet object. Upon delivery, the default value for this object is 100. By changing the device address or the offset, the device identifier can be set between 0 to 4194303. After having changed the MAC address or the offset the device is newly started and initialized.

4.2.1.3 Device object-> object name, description

Both features are writable. They may have a maximal text length of 64 signs.

5 PICS

BACnet Protocol Implementation Conformance Statement

Vendor Name:	Thermokon Sensortechnik GmbH (Vendor ID: 396)
Product Name:	WRF04 CO2 BACnet
Product Model Number:	WRF04 CO2 BACnet
Application Software Version:	1.0.0
Firmware Revision:	1.0.0
BACnet Protocol Revision:	1
Product Description:	"Room Sensor for temperature, humidity and CO2 detection and BACnet MS/TP RS485 interface."

BIBBs Supported:

Supported BIBBS	BIBB Name
DS-RP-B	Data Sharing-Read Property-B
DS-WP-B	Data Sharing-Write Property-B

BACnet Standard Application Services Supported:

ReadProperty
WriteProperty
WhoIs

Standard Object Types Supported:

Object-Type	Dynamically Creatable Deleteable	Optional Properties supported	Writable Properties	Property Range Restrictions
Analogue Input		Description		
Analogue Value		Description	Present Value	
Binary Input		Description Inactive_Text Active_Text		
Binary Value		Description Inactive_Text Active_Text	Present_Value	
Device		Description Max-Info-Frames Max-Master localTime localDate	Object name Description Max_Master	
Multi-state Input		Description State Text		

Data Link Layer Option:

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

Device Address Binding:

Is static device binding supported? Yes ☐ No ☒

Character Sets Supported:

ANSI X3.4

Special Functionality:

Maximum APDU size in octets: 480