Modbus to BACnet Gateway

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1 Preface

1.1 About This Document

This document describes how to configure and use the Modbus to BACnet Gateway.

The instructions in this document require a basic knowledge of BACnet and Modbus technologies and terminology.

For additional related documentation and file downloads, please visit www.anybus.com/support.

1.2 Document history

Version	Date	Description
1.00	2017-06-15	First release

1.3   Document Conventions

Ordered lists are used for instructions that must be carried out in sequence:

1.   First do this

2.   Then do this

Unordered (bulleted) lists are used for:

•   Itemized information

•   Instructions that can be carried out in any order

...and for action-result type instructions:

►   This action...

➥   leads to this result

Bold typeface indicates interactive parts such as connectors and switches on the hardware, or menus and buttons in a graphical user interface.

```
Monospaced text is used to indicate program code and other
kinds of data input/output such as configuration scripts.
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This is a cross-reference within this document: *Document Conventions, p. 4*

This is an external link (URL): www.hms-networks.com

> **i**   *This is additional information which may facilitate installation and/or operation.*

> **!**   This instruction must be followed to avoid a risk of reduced functionality and/or damage to the equipment, or to avoid a network security risk.

> **⚠ Caution**
> This instruction must be followed to avoid a risk of personal injury.

> **⚠ WARNING**
> This instruction must be followed to avoid a risk of death or serious injury.

2   Safety Instructions

> ❗ This product contains parts that can be damaged by electrostatic discharge (ESD). Use ESD protective measures to avoid equipment damage.

> ❗ Connecting power with reverse polarity or using the wrong type of power supply may damage the equipment. Make sure that the power supply is correctly connected and of the recommended type.

The Modbus to BACnet Gateway should only be installed by adequately trained personnel and according to applicable safety regulations.

The unit should be mounted on a standard DIN rail or screw-mounted onto a flat surface inside a properly grounded metallic enclosure. The unit should not be mounted outdoors or exposed to direct sunlight, water, high humidity or dust.

Make sure that you have all the necessary information about the capabilities and restrictions of your local network environment before installation.

3 Product Description

3.1 General

The Anybus Modbus to BACnet Gateway is intended for integration of Modbus RTU and Modbus TCP installations into BACnet MSTP or BACnet IP enabled monitoring and control systems.

The gateway acts as a BACnet/IP Server or BACnet MSTP device, allowing other BACnet devices to perform subscription (COV) requests and reads/writes to its internal points.

On the Modbus side the gateway emulates a Modbus RTU Master device and/or a Modbus TCP Client device. The Modbus slave device(s) are read by the gateway using automatic continuous polling.

Configuration is carried out using Anybus Configuration Manager (MAPS) which can be downloaded from www.anybus.com/support..

3.2 Operation

After the startup process has completed, the gateway will continuously read data points from the connected Modbus TCP Server and/or Modbus RTU Slave devices and update these values in its memory.

On the BACnet side, the gateway will listen for any subscription (COV) request, serve any polling request, and/or perform any writing request of the internal points received from the BACnet system. The values received from BACnet are immediately written in the associated register of the corresponding Modbus TCP Server or Modbus RTU Slave device.

From the BACnet point of view, the whole Modbus system is seen as a single BACnet device containing multiple *objects*. Every register in the Modbus slave devices will be associated with a specific BACnet object. When a new value is read from Modbus for a given register, the corresponding value will be updated in the memory of the gateway. If this signal is associated with an active BACnet subscription, the new value will also be sent to the subscribing BACnet device(s).

If a device is not responding during the continuous polling of Modbus devices, a virtual signal inside the gateway will be activated indicating a communication error with the device. These virtual signals indicating real-time communication status are accessible from BACnet in the same way as other data points.

4 Installation

4.1 Overview
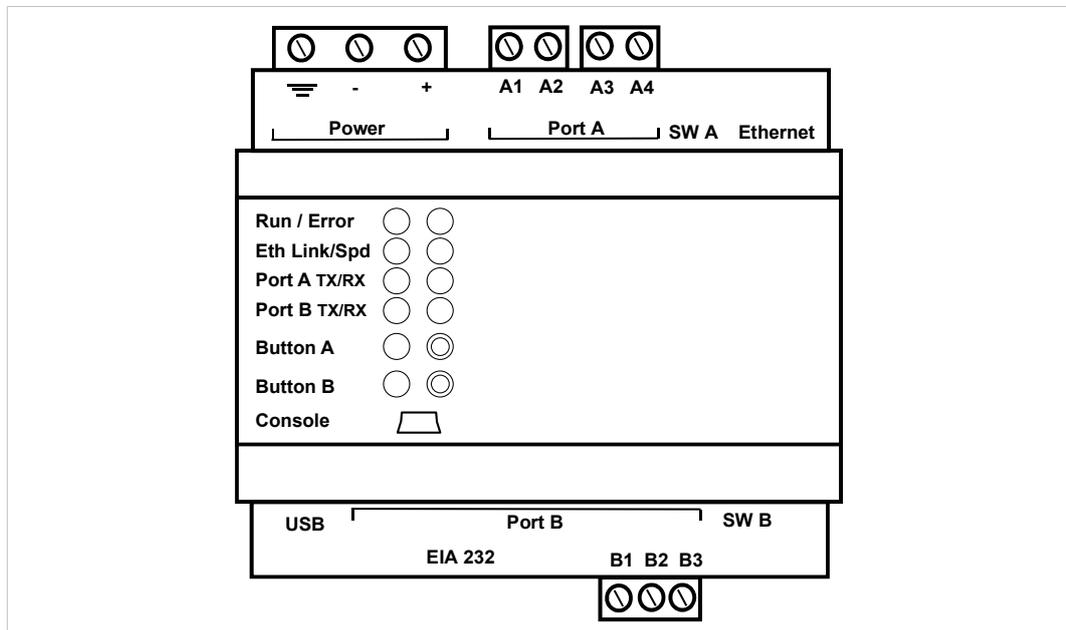
Fig. 1 Front panel

> **!** Read the *Safety Instructions* before starting installation.

Installation Procedure

These are the main steps when installing and setting up the Modbus to BACnet Gateway. Each step will be described in the following sections of this document.

1. Mount the gateway on a DIN rail or using the screw mounting clips.

2. Connect the BACnet and Modbus serial and/or Ethernet interfaces.

3. Connect a computer for configuration to the Console USB port or to the Ethernet network.

4. Connect the power supply and power on the unit.

5. Configure the unit using Anybus Configuration Manager (MAPS).

Connectors

See *Technical Data, p. 55* regarding terminal wiring and power supply requirements.

Power Connector (3-pole terminal block)

Pin	Function
⏚	Protective Earth
-	Power Ground
+	24 VAC or +9 to +36 VDC

Port A / Modbus RTU EIA-485 (2 x 2-pole terminal blocks)

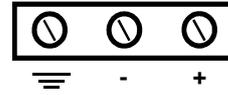| Pin	Function
A1, A2	Signal Ground
A3	EIA-485 Line A (+)
A4	EIA-485 Line B (-)
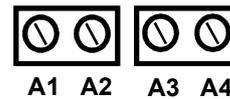
Port B / BACnet MSTP (3-pole terminal block)

Pin	Function
B1	EIA-485 Line B (-)
B2	EIA-485 Line A (+)
B3	Signal Ground
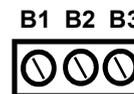
Ethernet Port (RJ-45)

Pin	Function
1	TD+
2	TD-
3	RD+
6	RD-
4, 5, 7, 8	(reserved)
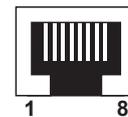
USB Port (USB Type A)

Can be used to connect a USB flash storage device for storing logfiles.
HDD drives are **not** supported (max. 150 mA load).

Console Port (USB Type Mini-B)

Used to connect the gateway to a computer for configuration.

LED Indicators
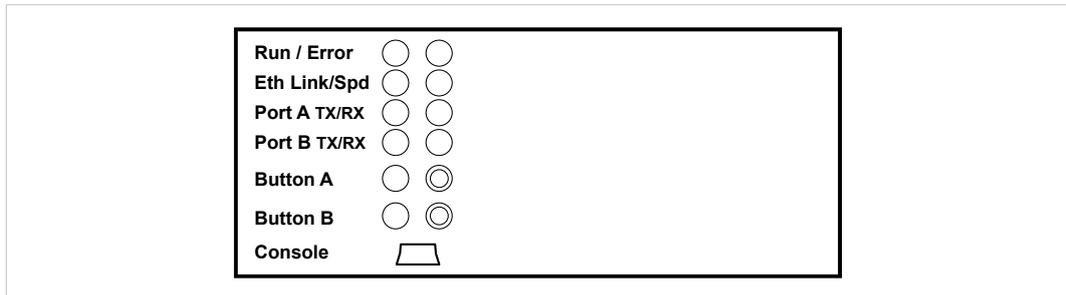
Fig. 2   Overview

LED	Indication	Meaning
Run	Green	Normal operation
Error	Red	Operating error
Eth Link	Green Yellow Flashing	100 Mbit/s Ethernet 10 Mbit/s Ethernet Ethernet traffic
Eth Spd	Green Off Flashing	Full-duplex Ethernet mode Half-duplex Ethernet mode Packet collision
Port A Tx	Green	Transmitting on Port A
Port A Rx	Green	Receiving on Port A
Port B Tx	Green	Transmitting on Port B
Port B Rx	Green	Receiving on Port B
Button A/B	(reserved for future use)	

DIP Switches

The DIP switches **SW A** and **SW B** control internal termination and polarization for ports A / B.

Switch	Function
1	ON = 120 Ω termination enabled
2, 3	ON = line polarization enabled

4.2   Mechanical Installation

The unit should be mounted on a standard DIN rail or screw-mounted onto a flat surface inside a properly grounded metallic enclosure. The unit should not be mounted outdoors or exposed to direct sunlight, water, high humidity or dust.

Make sure that there is enough space for the connectors and that the LED indicators and configuration switches are accessible after the unit is mounted.

DIN Rail Mount
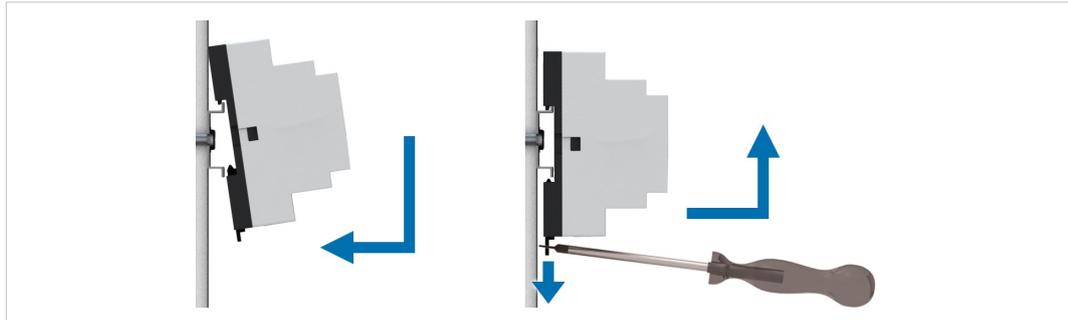
Fig. 3   DIN rail mounting option

Mounting

1.   Hook the unit onto the upper lip of the rail.

2.   Press the unit gently towards the rail until it snaps into place.

Removing

1.   Pull the tab at the bottom of the unit gently downwards.

2.   Pull the bottom end free and lift the unit from the rail.

Wall Mount

Fig. 4   Wall mounting option

Push the three mounting clips on the back of the unit from the original position to the outer position. A click indicates when the clip is locked in the outer position.

The holes in the mounting clips can now be used for screw mounting.

4.3   Connecting the BACnet interface

BACnet/IP

Connect the BACnet/IP network to the **Ethernet** port on the gateway using a straight UTP/FTP CAT5e or CAT6 Ethernet cable.

If there is no response from the network, check that the devices on the network are connected and operating and that traffic to/from the gateway is not restricted. Contact your network administrator if in doubt.

BACnet MSTP

Connect the EIA-485 bus to **Port B** on the gateway.

> **!**   Observe the correct polarity of the connections, see *Connectors, p. 8*.

If the gateway is installed at one of the ends of the serial bus, the internal termination switch for the port (DIP switch 1) should be switched on. See *DIP Switches, p. 9*.

Do not use an external termination resistor when internal termination is enabled.

4.4   Connecting the Modbus interface

Modbus TCP

Connect the network to the **Ethernet** port on the gateway using a straight UTP/FTP CAT5e or CAT6 Ethernet cable.

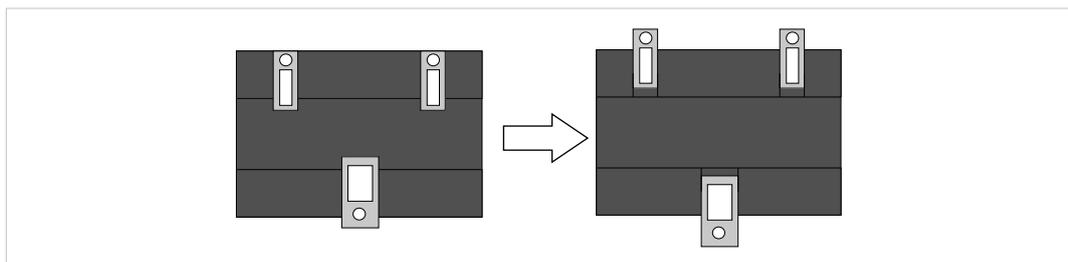If there is no response from the network, check that the devices on the network are connected and operating correctly, and that traffic to/from the gateway is not restricted. Contact your network administrator if in doubt.

Modbus RTU

Connect the EIA-485 bus to **Port A** on the gateway, and/or **Port B** if not using BACnet MSTP.

> **!**   Observe the correct polarity of the connections, see *Connectors, p. 8*.

If the gateway is installed at one of the ends of the Modbus serial bus, the internal termination switch for the port (DIP switch 1) should be switched on. See *DIP Switches, p. 9*.

Do not use an external termination resistor when internal termination is enabled.

4.5　　Connecting the Power Supply

Connect a suitable power supply to the **Power** terminal. See *Technical Data, p. 55* regarding the power supply requirements.

> **!** Observe the correct polarity of the connections, see *Connectors, p. 8*.

4.6　　Configuration Connections

Connect the computer to be used for configuration to the **Console** port on the front panel of the gateway using a standard USB type B cable.

The gateway can also communicate with the computer over Ethernet if they are connected to the same Ethernet network subnet. The gateway uses DHCP as default.

> **i** *The **USB** port next to the EIA-232 serial port is only intended for making file backups to a USB flash drive and cannot be used for configuration.*

5   Anybus Configuration Manager (MAPS)

Anybus Configuration Manager (MAPS) is a free Windows®-based software tool which is used to monitor and configure the AnybusModbus to BACnet Gateway.

5.1   Installation

Make sure that you have all the necessary information about the capabilities and restrictions of your local network environment before installing and using this software.

1.   Download Anybus Configuration Manager (MAPS) from www.anybus.com/support.

2.   Double-click on the self-extracting archive to extract the installation files to your computer.

3.   Double-click on the installer executable and follow the instructions in the installation wizard. You will be prompted for a location for the installation on your hard disk. Use the default location if unsure.
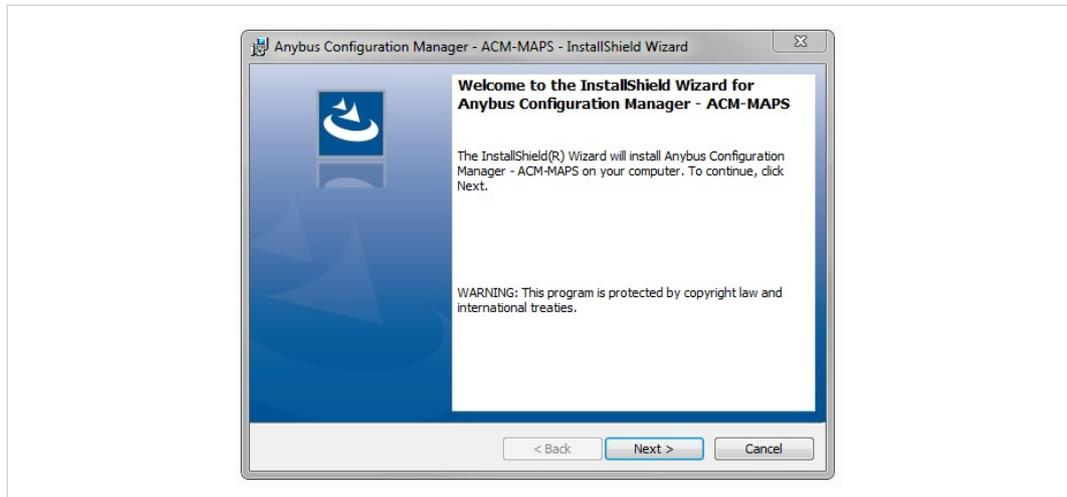
Fig. 5   Installation wizard

4.   Open Anybus Configuration Manager (MAPS) from the Start menu or by double-clicking on the icon on your desktop.

5.2   Connection Tab

Anybus Configuration Manager (MAPS) can communicate with the gateway either over an Ethernet network or directly via the **Console** USB port. Projects can be created when the gateway is offline and then downloaded to the unit once a connection has been established.

5.2.1   Connection Mode

IP

When this option is selected the computer used for configuration must be connected to the same Ethernet network subnet as the gateway. DHCP addressing is used as default.

A password is required for IP connection. The default password is "admin".

See *Configuration Tab, p. 16* on how to change the password and the IP addressing mode.
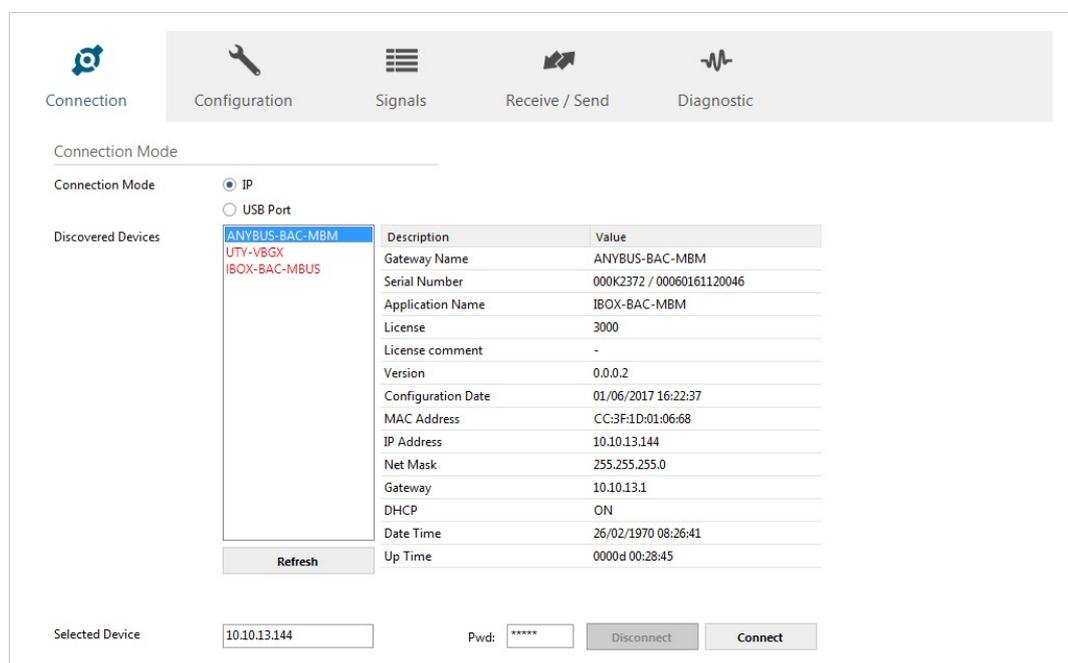
Fig. 6   IP connection

The software will scan the local Ethernet network for devices that match the current configuration. Compatible devices will be listed in black, incompatible devices in red.

Select the gateway and click on the **Connect** button or on the symbol in the footer bar. If the connection is successful the footer bar will change color and indicate that the gateway is connected.

If the gateway does not appear in the list:

► Check the network connections on the gateway and the computer.

► Check that the gateway is powered on.

► Check that the firewall settings allow communication with the gateway. Contact your network administrator if necessary.

USB Port

Select this option if the computer used for configuration is connected directly to the gateway via the Console USB port. All the available serial (COM) ports on the computer will be listed.
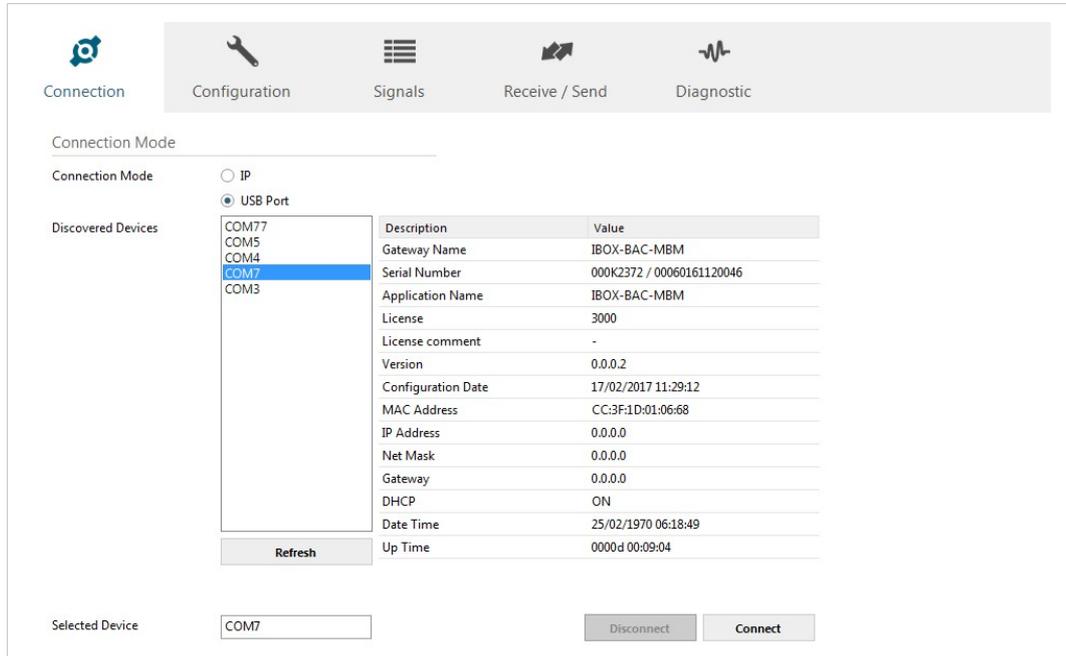
Fig. 7   USB port connection (COM port numbers may be different on your computer)

Select the COM port used by the USB interface and click on the **Connect** button or on the symbol in the footer bar. If the connection is successful the footer bar will change color and indicate that the gateway is connected.

Fig. 8   Footer bar

If the gateway does not appear in the list:

► Check the USB connections on the gateway and computer.

► Check that the gateway is powered on.

► Open the Windows Device Manager to check for issues with the COM ports.

5.3   Configuration Tab
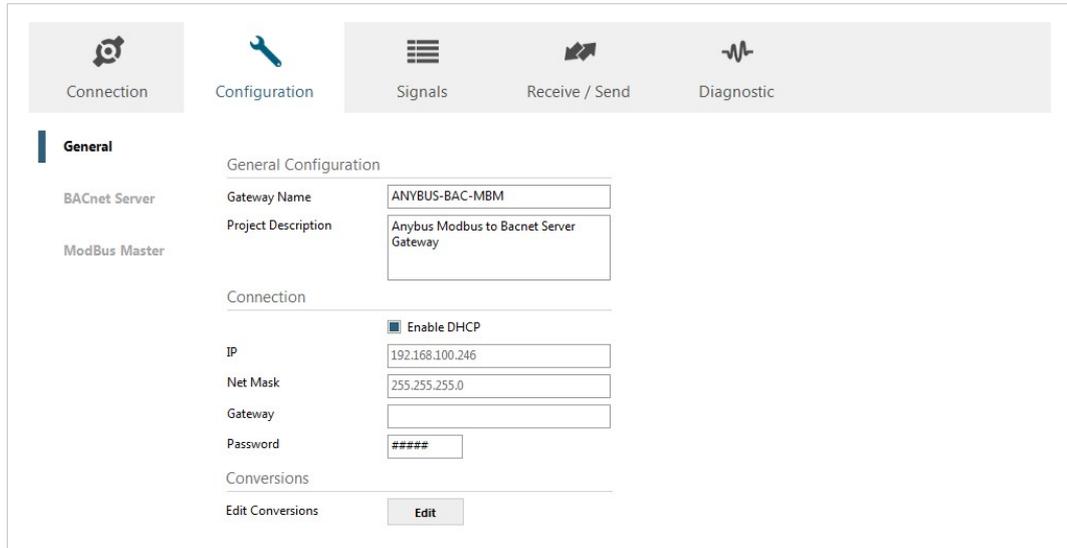
Fig. 9   Configuration tab

5.3.1   General

General Configuration	
Gateway Name	Used for easy identification of the unit in the project. This entry is only informational and can be edited freely.
Project Description	A brief description of the project. This entry is only informational and can be edited freely.

Connection	
Enable DHCP	Enables/disables dynamic IP addressing. DHCP is enabled as default.
IP	Static IP address for the unit when not using DHCP.
Netmask	Subnet mask when using static IP
Gateway	Default gateway when using static IP
Password	The password when connecting to the gateway via Ethernet. The default password is "admin". To change the password, enter a new password in the text box and download the configuration to the gateway.

ⓘ   *The IP address, netmask and default gateway will also be used for BACnet/IP communication.*

Conversions

Edit Conversions   Allows you to define customized unit conversions and value filters to be used in the integration project.

See also *Signals Tab, p. 31*.

Fig. 10   Conversions Manager

5.3.2   BACnet Server

This section contains settings related to BACnet communication.

Fig. 11   BACnet configuration

General Configuration	
Device Name	The BACnet *Device Name* property. Can be modified here and/or from BACnet.
Device Instance	The BACnet *Device Object Instance* property for this device. This is a unique ID for the BACnet device inside a single BACnet network segment.
Password	A password may be required to allow some BACnet commands. If not required or unsure, leave as default (admin).

Gateway Mode	
Mode	Select BACnet/IP or BACnet MSTP communication.
BACnet/IP settings:	
UDP Port	The UDP port to use for BACnet. Default = 47808 (BAC0 in hex notation)
Network Role	If you are not familiar with BACnet it is recommended to leave this to *Disabled*.
	• **Disabled**: The gateway will not provide any special service regarding network communication and settings.
	• **Foreign Device**: The gateway will act as a foreign device from the BACnet network point of view.
	• **BBMD**: The gateway will act as a BBMD on the BACnet network.
BACnet MSTP settings:	
Max. Masters	The maximum number of supported BACnet MSTP masters.
Max. Info Frames	The maximum number of Info frames.
Baudrate	The BACnet MSTP communication speed.
MAC Address	The BACnet MSTP MAC address for the gateway.

Advanced Configuration

Checking the **Show Advanced Configuration** checkbox will enable additional settings for the BACnet interface.

> **!** Changing the advanced configuration settings may cause problems with BACnet communication. Do not change these settings unless you have a good knowledge of the BACnet communication protocol.

Fig. 12   Advanced configuration

Notification Class

Up to 10 BACnet Notification Class objects can be created with the following parameters:

Fig. 13   Notification Class

NC Name	Name for the Notification Class
NC Instance	BACnet Object Instance for the Notification Class
Recipient List	Up to 8 different BACnet Destinations can be created. For each destination, the following parameters can be modified:

Destination name
- A descriptive name for the BACnet Destination

Transitions

Select which transitions will force the notification class to be active:

- **Off_normal**: When status changes from off to normal.

- **Fault**: When status changes to fault.

- **Normal**: When status changes from fault to normal.

Recipient Type
- **Device**: The recipient is a device. The Device **Instance Number** must be set.

- **Address**: The recipient is set using the specific address on BACnet/IP.

- **Address (MSTP)**: The recipient is set using the specific address on BACnet MSTP.

Advanced Options
- **Active Days**: The days when the Notification Class will be available for the recipient BACnet destination.

- **From**: The starting time for the Notifications Class to be available.

- **To**: The end time for the Notifications Class to be available.

- **Issue Confirmed Notifications**

Advanced	In this section, ACK for different transitions can be set as required. The priority of the transition ACK can be set from 0 to 255.

Binary Active/Inactive Text

Text string pairs for the Active/Inactive state of binary objects can be customized here. Up to 100 string pairs can be configured.

See *Signals Tab, p. 31* on how to apply string pairs to specific objects.
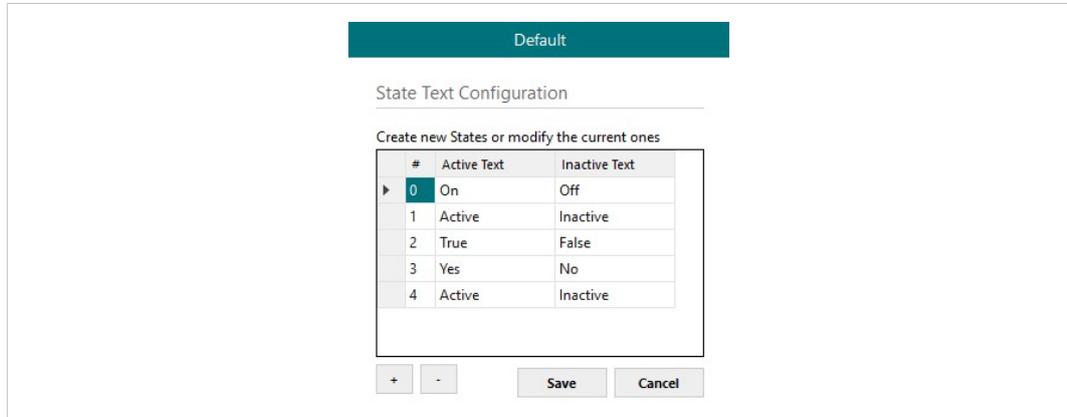
Fig. 14   Binary state text configuration

Multistate States

Use this menu to create state text lists to be applied on the Multistate Text of Multistate Objects. Up to 100 lists can be created. Each list can contain a maximum of 100 elements.

See *Signals Tab, p. 31* on how to apply lists to objects.
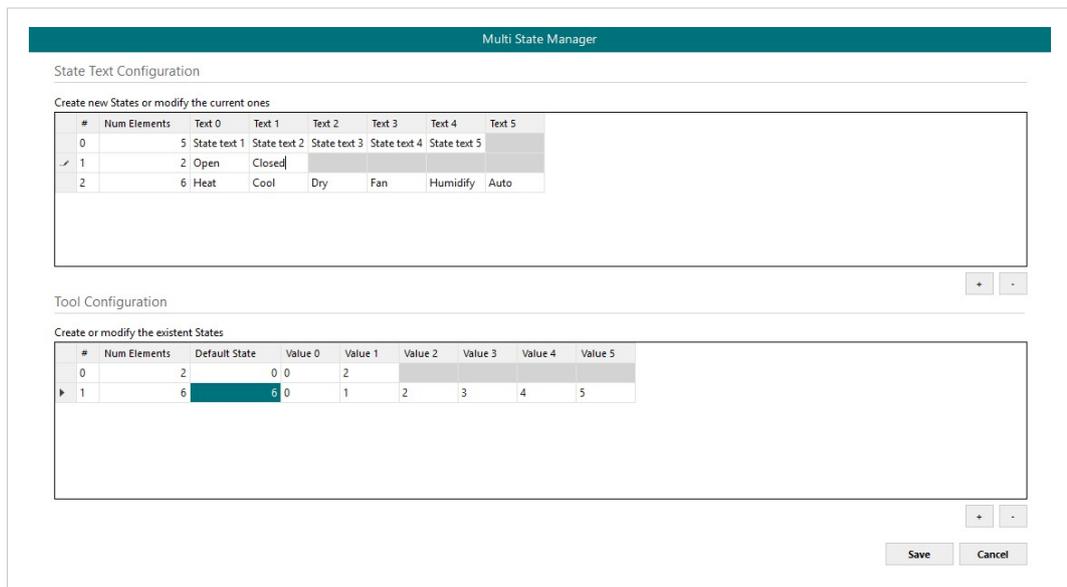
Fig. 15   Multi State Manager

State Text Configuration	Create new state text lists or modify existing lists.
Tool Configuration	Create a secondary mapping for the states to create custom conversions between the BACnet states received and the values that the gateway will transmit to the BMS protocol.

Calendars

In this section the user can create calendars to be applied on the BACnet side. Up to 10 calendars can be created.
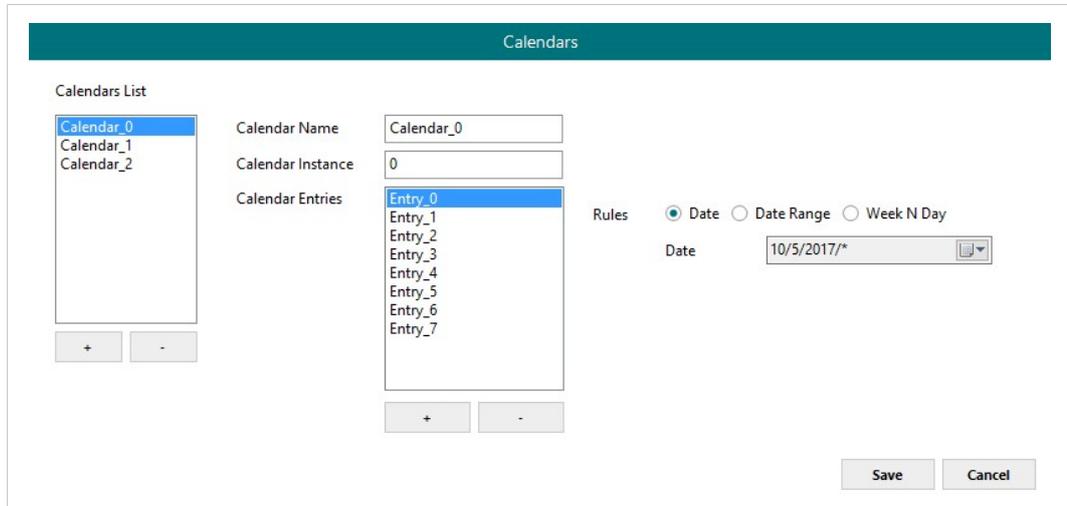
Fig. 16   Calendars

Calendar Name	The name of the calendar
Calendar Instance	BACnet Object Instance for the Calendar
Calendar Entries	Determines the number of calendar entries (patterns). Up to 32 different entries can be created for each calendar.
Rules	For each entry, different rules can be applied:

- **Date**: The rule is applied only on a specific date.

- **Date Range**: The rule is applied inside a date range.

- **Week N Day**: The rule is applied on specific months, weeks and/or week days. If an * is selected, the rule will apply for all cases.
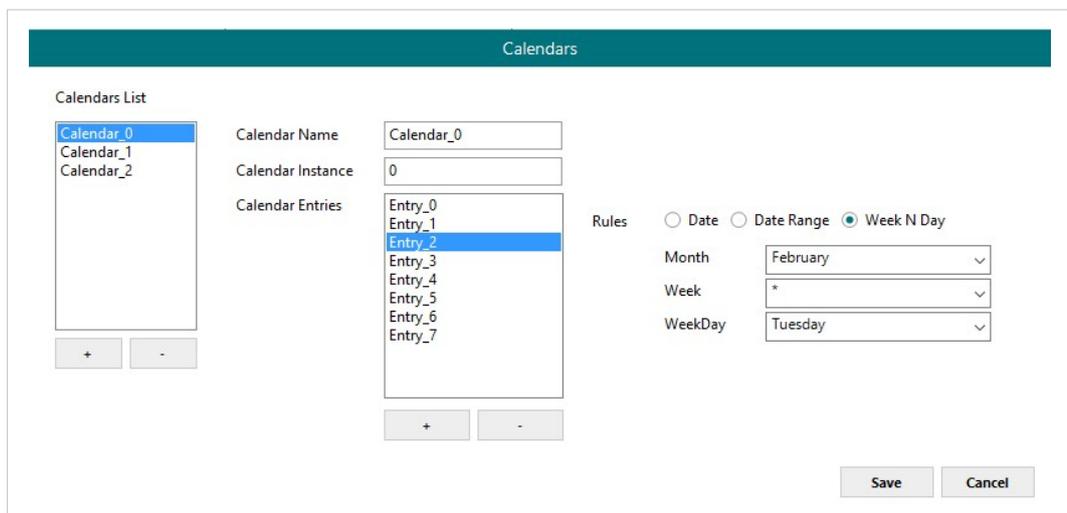
Fig. 17   Calendars (week and day rule)

Schedules

In this section, all configuration related with BACnet schedules can be done. Up to 10 schedules can be created.

Fig. 18   Schedules

Schedules – Main Tab

General settings for the schedule.

Name	A descriptive name for the schedule
Schedule Instance	BACnet Object Instance for the schedule
Schedule Type	Type of objects to apply on the schedule (Analog, Binary or Multistate). Multiple types cannot be selected.
Priority	BACnet priority to be set on this schedule. Default = 16.
Default Value	Default value to be applied on this schedule.
Effective Period	The time period when this schedule applies.

Schedules – Objects Tab

Selection of BACnet objects to be included in a specific schedule. The BACnet object type must match the schedule type selected in the **Main** tab.
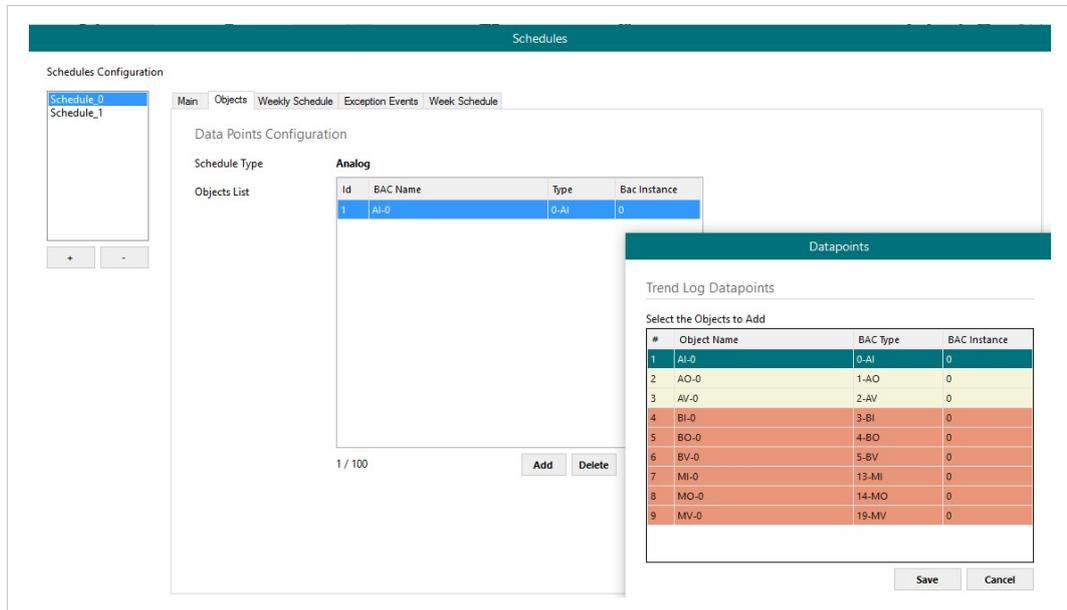
Fig. 19   Schedule object configuration

Schedules – Weekly Schedule Tab

Select one week day and the desired Time Values when the schedule should apply. Only 6 Time Values are allowed.
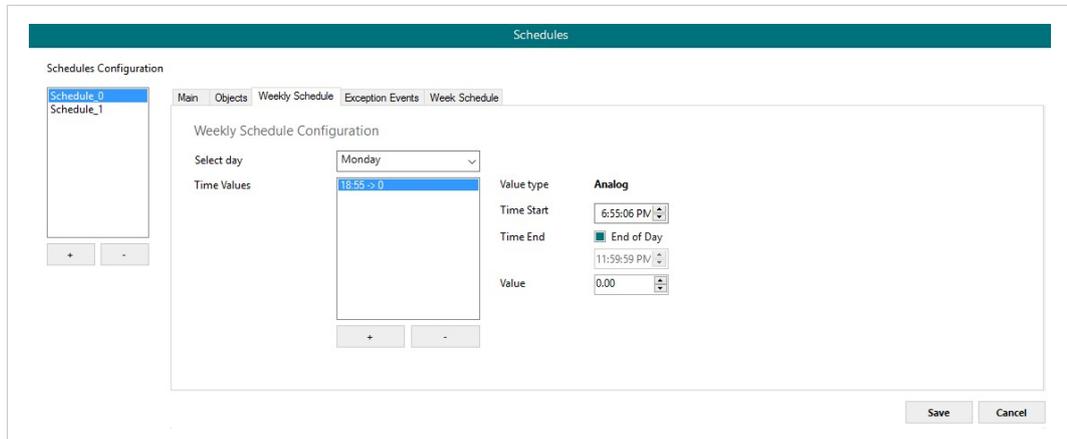
Fig. 20   Weekly schedule configuration

Schedules – Exception Events Tab

Create exceptions to the schedules. Up to 16 different expections can be created with up to 6 Time Values for each exception.
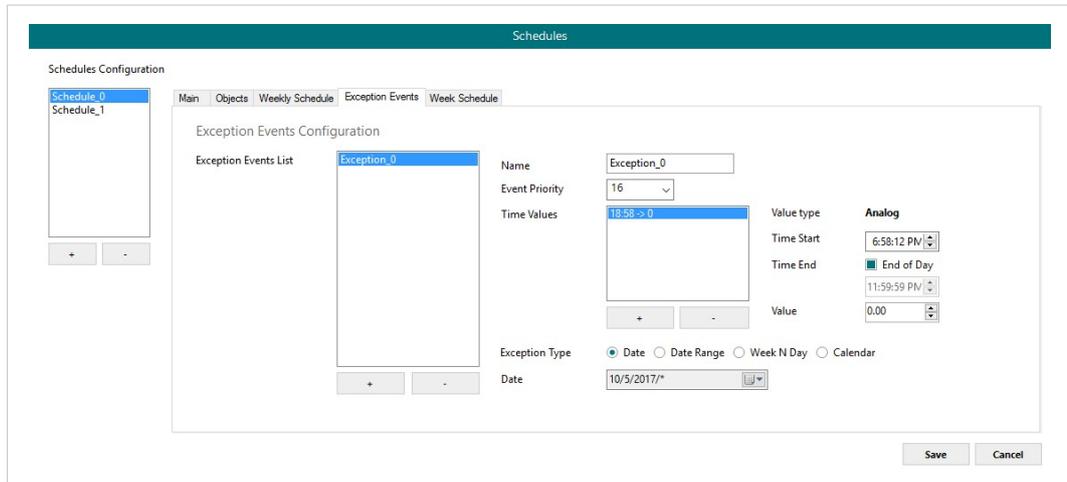
Fig. 21   Exception events

Schedules – Week Schedule Tab

Create and modify schedules graphically in a calendar view.
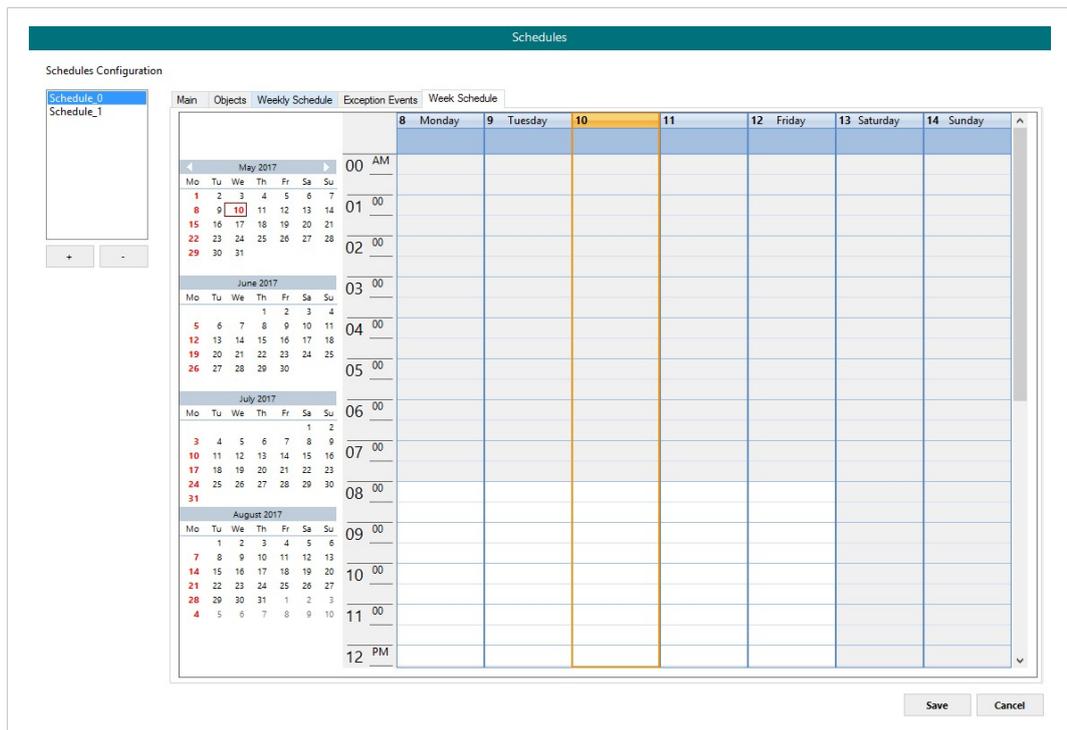
Fig. 22   Calendar view

Trend Logs

In this section, all trend logs related configuration can be carried out. Up to 5 Trend Logs can be created.

Fig. 23   **Trend Logs**

Name	Descriptive name for the trend log
Trend Log Instance	BACnet Object Instance for the trend log
Trend Mode	Select the type of trend mode to use:

- **Polled**: The poll cadence for this needs to be set in the Interval parameter.
- **COV**: The COV increment to be considered needs to be set in the COV Increment parameter.
- **Triggered**: The trend log will be triggered by the BACnet BMS system.

Interval	Applicable only if Trend Mode = Polled.
COV Increment	Applicable only if Trend Mode = COV.
Properties	Additional properties can be defined:

- **Enable**: It allows enabling or disabling the specific Trend Log even if the Trend Log is in the valid time range.
- **Stop Buffer Full**: If enabled, it will stop the Trend Log when the buffer is full.

  If disabled, it will roll up the Trend Log information keeping the last 2880 valid values.

Date Configuration	Set the period when Trend Logs will be active. It can be set as always or in a time frame or range
Selected Objects	Selection of objects to be included inside a Trend Log. Up to 10 different BACnet Objects can be selected.

5.3.3   Modbus Master

This section contains all settings related to Modbus communication.

Fig. 24   Modbus master configuration

Gateway Configuration

Select the type of Modbus communication required for the Modbus slave devices:

Modbus RTU	Modbus connection over the EIA-485 serial port.
Modbus TCP	Modbus connection over Ethernet.
	More than one Modbus master device can be active in this mode.
Both	Modbus RTU and Modbus TCP connections allowed simultaneously.

RTU Devices Configuration

Different device and node configuration options are available depending on if Modbus TCP or Modbus RTU communication is selected.

Modbus RTU

The following parameters must be configured for each RTU node:

Baudrate	The communication speed for RTU communication. Allowed values: 2400 to 115200 bps
Data type	Data bits (8 only) / Parity (Odd/Even/None) / Stop bits (1 or 2)
Time InterFrame	Minimum time between the received frame and sent frame. Allowed values: 0 to 2000 ms
Add Device(s)	Creates new devices to be included in the configuration.
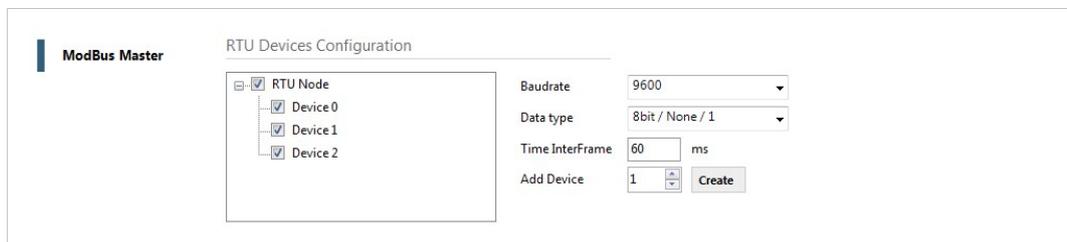
Fig. 25   Modbus RTU device configuration

For each slave device, the user can configure the following parameters:

Device Name	Descriptive name for the Modbus RTU slave device
Slave Number	Modbus slave address
Delete Device	Click on **Delete** to delete the selected device.
Device Timeout	Time to wait before sending a timeout message if there is no response from the slave device.
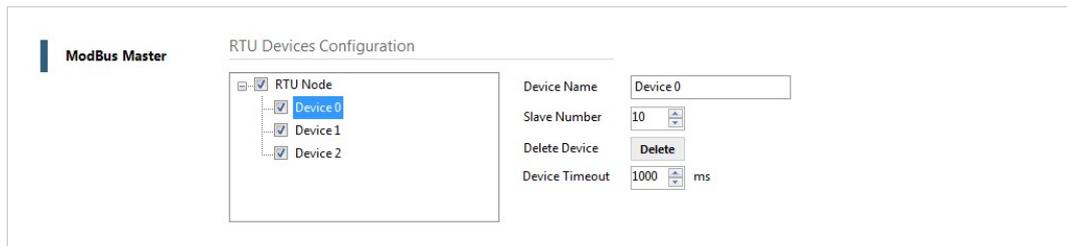
Fig. 26   Modbus RTU node configuration

Modbus TCP

For Modbus TCP the following standard parameters must be configured:

Fig. 27   Modbus TCP node configuration

TCP Node Name	Descriptive device name
TCP Node IP	IP address for the Modbus server to connect
TCP Node Port	Port for the Modbus server to connect (default = 502)
Add Device(s)	Adds the selected number of devices

Advanced Configuration

Additional settings are available when the **Advanced Configuration** checkbox is checked.

> **!** Do not change these settings unless you have a good knowledge of the Modbus TCP communication protocol.

Time Interframe	Minimum time between received frame and sent frame. Allowed values: 0 to 10000 ms.
Retry Timeout	Minimum time before launching a retry frame after no response on the TCP connection. Allowed values: 0 to 30000 ms
Conn. Timeout	Minimum time before launching an error message after no TCP connection. Allowed values: 0 to 30000 ms
Rx Timeout	Minimum time before launching an error message after no TCP frames received, but TCP connection is OK. Allowed values: 0 to 30000 ms
Time Slave Chg	Minimum time of silence when changing from one slave device to another. Allowed values: 0 to 10000 ms

Modbus Poll Records

The gateway allows the use of Modbus Poll Records.
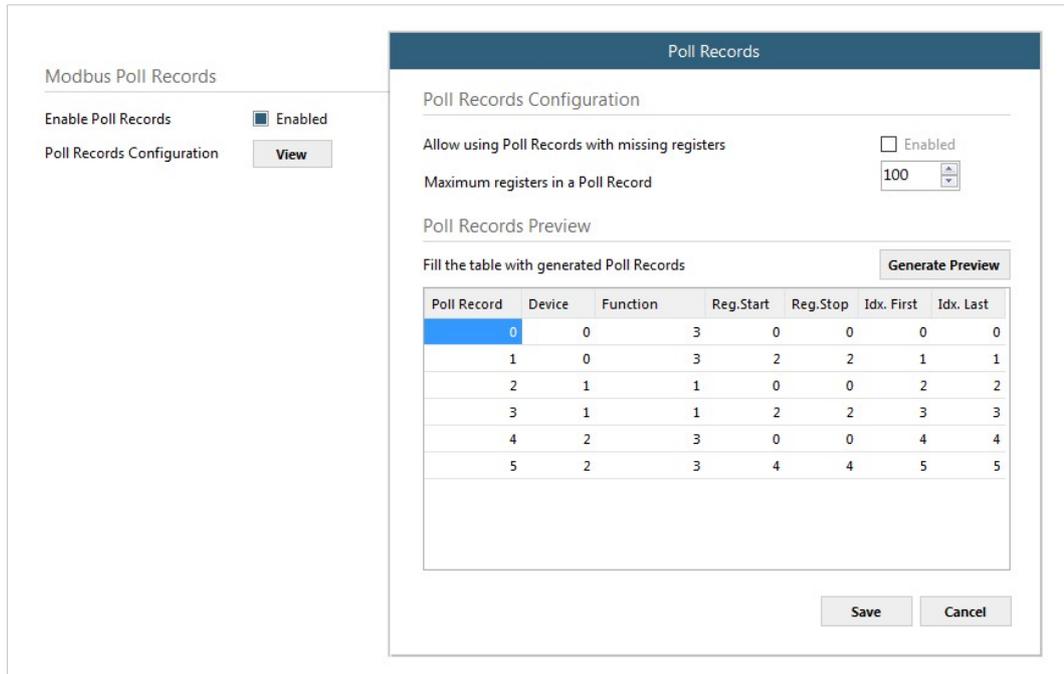
Fig. 28   Modbus poll records

Allow using Poll Records with missing registers	If enabled, it allows nonconsecutive registers to be grouped in the same Poll Record.
Maximum registers in a Poll Record	Sets the maximum number of registers to be grouped in a single Poll Record.
Poll Records Preview	Summary of the Poll Records to be used according to the current configuration present in the Signals table.

Allow using Poll Records with missing registers

If enabled, it allows nonconsecutive registers to be grouped in the same Poll Record.

Maximum registers in a Poll Record

Sets the maximum number of registers to be grouped in a single Poll Record.

Poll Records Preview

Summary of the Poll Records to be used according to the current configuration present in the Signals table.

5.4 Signals Tab

This section contains settings for the signals on both protocols.
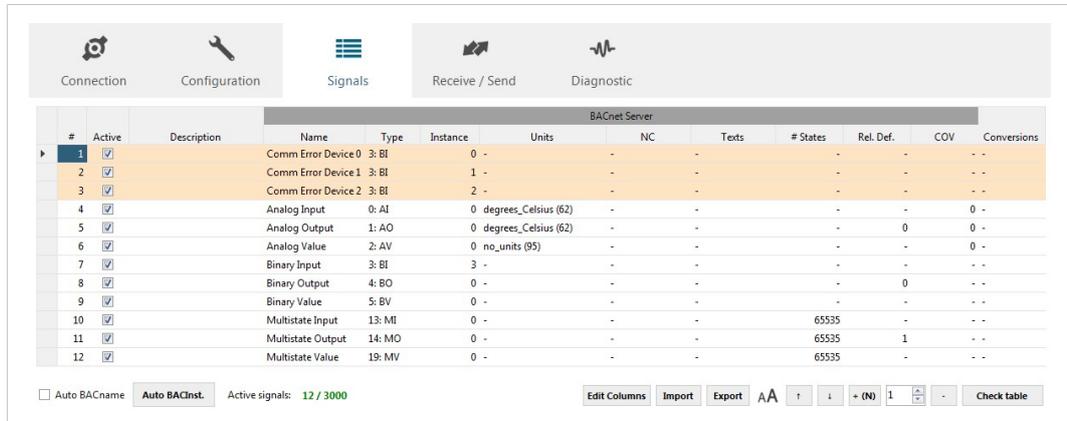
Fig. 29   Signals tab

5.4.1 Common and BACnet Signal Parameters

The following common and BACnet specific parameters can be configured for each signal.

Active	If checked, the signal will be considered in the configuration and will be downloaded to the Gateway as active.
Description	A short description of the signal.
Name	The BACnet Object Name to be applied to the signal
Type	The BACnet Object Type for the signal:

AI	Analog Input
AO	Analog Output
AV	Analog Value
BI	Binary Input
BO	Binary Output
BV	Binary Value
MI	Multistate Input
MO	Multistate Object
MV	Multistate Value

Instance	BACnet Object Instance
Units	If required, units for the signal can be defined (°C, Kg, kW, etc.).
NC	Notification Class to use with this signal. See *Advanced Configuration, p. 19*.
Texts	Binary or Multistate text lists to use. See *Advanced Configuration, p. 19*.
#States	The number of states for multistate objects. Only applies if **Texts** is not used.
Rel. Def.	Defines the Relinquish Default value.
COV	Defines the Change Of Value increment.
Conversions	Defines conversions to apply to the signal. See *Conversions, p. 17*.

5.4.2   Modbus Signal Parameters

The following parameters can be configured for Modbus communication:

Device	The name of the Modbus device.
Read Function	The Modbus function used to read, if allowed or required.
	Modbus functions 1, 2, 3 and 4 supported.
Write Function	The Modbus function used to write, if allowed or required
	Modbus functions 5, 6, 15 and 16 supported.
#bit	Signal size expressed in bits.
Format	Register information format.
	Unsigned, Signed C2, Signed C1 and
ByteOrder	The byte order used
Address	Register signal starting address
Bit	If using multiple bit (bit fields), indicate the bit you want to read

Fig. 30   Modbus signals

5.4.3   Signals View Settings

The controls at the bottom of the Signals view can be used to customize the column layout and when importing and exporting configurations.

Fig. 31   Signals view settings

Auto BACname	If this box is checked, a BACnet Object Name will be generated automatically for each signal using the following convention:
	
	`BACnetObjectType_BACnetObjectInstance_Custom_Name`
	
	Example:
	
	`BI_0_ONOFF`
	    └── BACnet Object Name = ONOFF
	    └── BACnet Object Instance = 0
	    └── BACnet Object Type = Binary Input
	
	If the box is unchecked the manually entered name will be used.

Auto BACinst.	Generates a unique BACnet Object Instance identifier for all signals.
Edit Columns	Allows you to select which columns to display in the list. At least one column must be enabled for each protocol.
Import	Imports previously exported Excel files back into the project. See the **Export** function below. • **Replace**: The current signals table will be completely replaced with the imported table. • **Add Signals**: The imported rows will be added to the current table.
Export	• **Excel**: Exports the signal table in Excel format. The file can then be modified in Excel (or another compatible spreadsheet application) and imported back into Modbus to BACnet Gateway. • **EDE**: Export BACnet information into an EDE file format. This can be useful for sharing BACnet information with the BACnet BMS integrator to speed up integration time.
ᴀA	Toggles the font size used in the signals table.
↑ ↓	Moves the currently selected row(s) up/down in the table.
+ (N) 1	Adds the selected number of signals to the table.
-	Deletes the currently selected row(s) from the table.
Check table	Verifies that the current configuration in the signals table is technically valid. This check will **not** include integration issues related to bad addresses or other mistakes by the integrator. It will only check that the standard defined conditions and properties are fulfilled.

5.5   Receive/Send Tab

5.5.1   Send

Send the current project configuration to the gateway. If the project has not been saved you will be prompted to save it before sending.
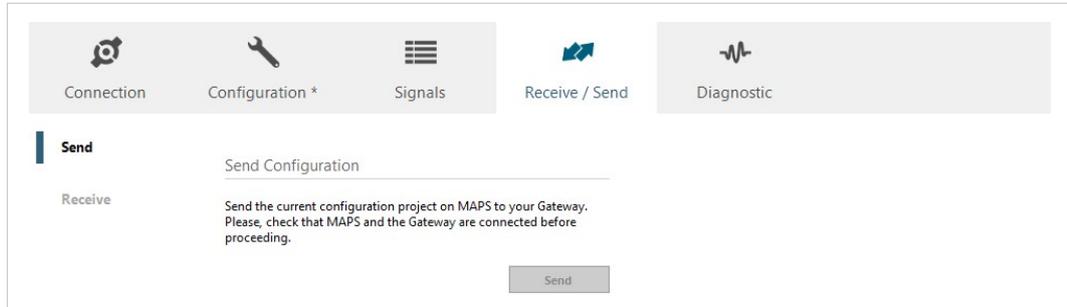
Fig. 32   Send configuration

5.5.2   Receive

Downloads the active configuration from the connected gateway to the Anybus Configuration Manager (MAPS).
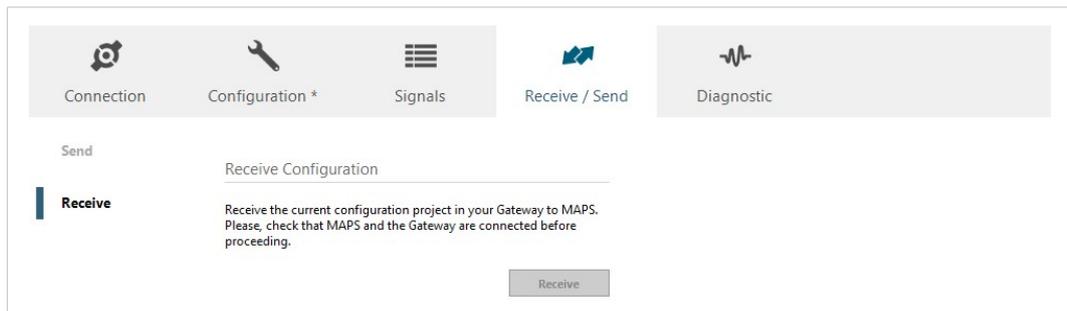
Fig. 33   Receive configuration

5.6   Diagnostic Tab

The Diagnostic view can be used for analysis and troubleshooting when building and implementing configuration projects. Multiple *Viewers* can be added to the interface to monitor communication on the protocols as well as general gateway information.
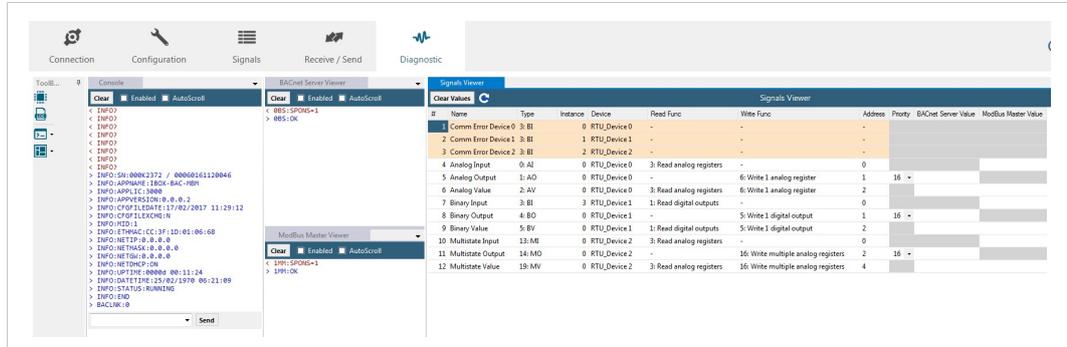
Fig. 34   Diagnostic tab

5.6.1   ToolBox

The ToolBox is located on the left side of the Diagnostic view.

Hardware Test

Initiates a hardware test on the gateway to identify possible hardware issues. During the hardware test normal communication with the protocols will stop.

Log

Records all information present in all viewers and saves it to a zip archive. This file can then be sent to Anybus support to assist troubleshooting.

Commands

Can be used to send specific commands to the gateway:

INFO?	Requests general information from the gateway.
RESET	Resets the gateway.
Enable COMMS	Enables communication in all viewers.
Disable COMMS	Disables communication in all viewers.

Panel Distribution

Preset window layouts for the Diagnostic view. The viewers can then be moved as required.

5.6.2 Viewers

The data in each viewer is updated in real time when the gateway is connected and active. If the gateway is disconnected, the last received data will remain in the viewer until cleared. The viewers can be rearranged in the window by clicking and dragging.

Three viewers are used to monitor communications: Console, BACnet Server, and Modbus Master. Each of these viewers has the following common options:

Clear	Clears all data from the viewer.
Enable	Enables/disables the viewer. This can be useful to reduce communication workload.
	To enable/disable all viewers simultaneously, use the ToolBox.
Autoscroll	Enables automatic scrolling of the viewer window as new data is added.

Console Viewer

This viewer displays general information about the gateway and the connection status.
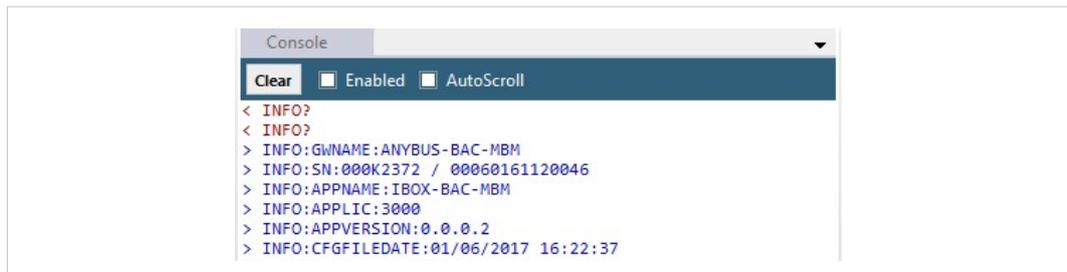
Fig. 35   Console viewer

BACnet Server Viewer

This viewer displays frames related to BACnet communication.
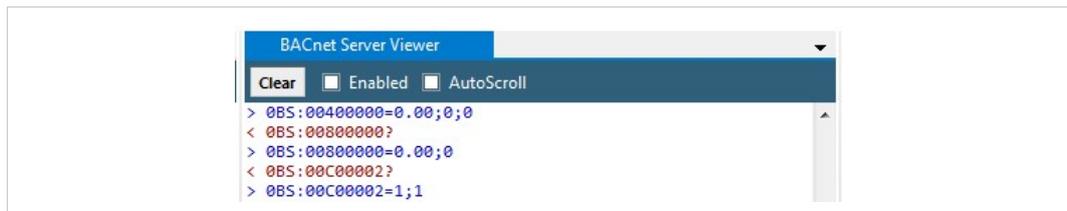
Fig. 36   BACnet Server viewer

Modbus Master Viewer

This viewer displays frames related to Modbus communication.

Fig. 37   Modbus Master viewer

Signals Viewer

The Signals viewer displays all active signals in the gateway with its main configuration parameters and its real-time value (if connected).

To manually refresh the values, click on [C]. This may be necessary if the gateway has already been running for some time.
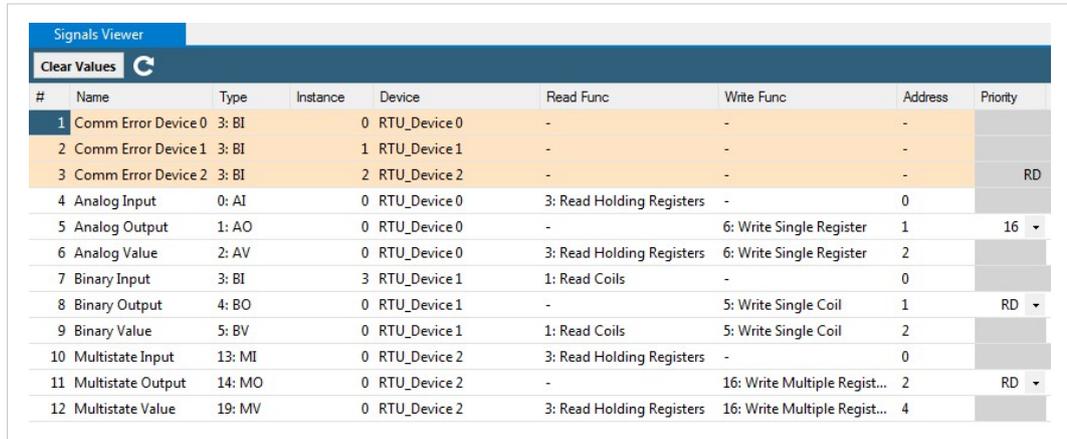
#	Name	Type	Instance	Device	Read Func	Write Func	Address	Priority
1	Comm Error Device 0	3: BI	0	RTU_Device 0	-	-	-	
2	Comm Error Device 1	3: BI	1	RTU_Device 1	-	-	-	
3	Comm Error Device 2	3: BI	2	RTU_Device 2	-	-	-	RD
4	Analog Input	0: AI	0	RTU_Device 0	3: Read Holding Registers	-	0	
5	Analog Output	1: AO	0	RTU_Device 0	-	6: Write Single Register	1	16 ▾
6	Analog Value	2: AV	0	RTU_Device 0	3: Read Holding Registers	6: Write Single Register	2	
7	Binary Input	3: BI	3	RTU_Device 1	1: Read Coils	-	0	
8	Binary Output	4: BO	0	RTU_Device 1	-	5: Write Single Coil	1	RD ▾
9	Binary Value	5: BV	0	RTU_Device 1	1: Read Coils	5: Write Single Coil	2	
10	Multistate Input	13: MI	0	RTU_Device 2	3: Read Holding Registers	-	0	
11	Multistate Output	14: MO	0	RTU_Device 2	-	16: Write Multiple Regist...	2	RD ▾
12	Multistate Value	19: MV	0	RTU_Device 2	3: Read Holding Registers	16: Write Multiple Regist...	4	

Fig. 38   Signals viewer

A   BACnet Interoperability Building Blocks

The following BACnet Interoperability Building Blocks (BIBBs) are supported by the Modbus to BACnet Gateway:

Data Sharing

BIBB Type		Active	BACnet Service	Initiate	Execute
DS-RP-A	Data Sharing-ReadProperty–A		ReadProperty	x	
DS-RP-B	Data Sharing-ReadProperty–B	x	ReadProperty		x
DS-RPM-A	Data Sharing-ReadPropertyMultiple–A		ReadPropertyMultiple	x	
DS-RPM-B	Data Sharing-ReadPropertyMultiple–B	x	ReadPropertyMultiple		x
DS-RPC-A	Data Sharing-ReadPropertyConditiona–A		ReadPropertyConditional	x	
DS-RPC-B	Data Sharing-ReadPropertyConditional–B		ReadPropertyConditional		x
DS-WP-A	Data Sharing-WriteProperty–A		WriteProperty	x	
DS-WP-B	Data Sharing-WriteProperty–B	x	WriteProperty		x
DS-WPM-A	Data Sharing-WritePropertyMultiple–A		WritePropertyMultiple	x	
DS-WPM-B	Data Sharing-WritePropertyMultiple–B	x	WritePropertyMultiple		x
DS-COV-A	Data Sharing-COV–A		SubscribeCOV	x	
			ConfirmedCOVNotification		x
			UnconfirmedCOVNotification		x
DS-COV-B	Data Sharing-COV–B	x	SubscribeCOV		x
		x	ConfirmedCOVNotification	x	
		x	UnconfirmedCOVNotification	x	
DS-COVP-A	Data Sharing-COVP–A		SubscribeCOVProperty	x	
			ConfirmedCOVNotification		x
			UnconfirmedCOVNotification		x
DS-COVP-B	Data Sharing-COVP–B		SubscribeCOVProperty		x
			ConfirmedCOVNotification	x	
			UnconfirmedCOVNotification	x	
DS-COVU-A	Data Sharing-COV-Unsubscribed–A		UnconfirmedCOVNotification		x
DS-COVU-B	Data Sharing-COV- Unsubscribed -B		UnconfirmedCOVNotification	x	

Alarm and Event Management

BIBB Type		Active	BACnet Service	Initiate	Execute
AE-N-A	Alarm and Event-Notification–A		ConfirmedEventNotification		x
			UnconfirmedEventNotification		x
AE-N-I-B	Alarm and Event-Notification Internal–B	x	ConfirmedEventNotification	x	
		x	UnconfirmedEventNotification	x	
AE-N-E-B	Alarm and Event-Notification External–B		ConfirmedEventNotification	x	
			UnconfirmedEventNotification	x	
AE-ACK-A	Alarm and Event-ACK–A		AcknowledgeAlarm	x	
AE-ACK-B	Alarm and Event-ACK–B	x	AcknowledgeAlarm		x
AE-ASUM-A	Alarm and Event-Alarm Summary–A		GetAlarmSummary	x	
AE-ASUM-B	Alarm and Event-Alarm Summary–B	x	GetAlarmSummary		x
AE-ESUM-A	Alarm and Event-Enrollment Summary-A		GetEnrollmentSummary	x	
AE-ESUM-B	Alarm and Event-Enrollment Summary-B		GetEnrollmentSummary		x
AE-INFO-A	Alarm and Event-Information–A		GetEventInformation	x	
AE-INFO-B	Alarm and Event-Information–B	x	GetEventInformation		x
AE-LS-A	Alarm and Event-LifeSafety–A		LifeSafetyOperation	x	
AE-LS-B	Alarm and Event-LifeSafety–B		LifeSafetyOperation		x

Scheduling

BIBB Type		Active	BACnet Service	Initiate	Execute
SCHED-A	Scheduling–A *(must support DS-RP-A and DS-WP-A)*				
SCHED-I-B	Scheduling-Internal–B (shall support DS-RP-B and DS-WP-B) *(shall also support ether DM-TS-B or DS-UTC-B)*	x			
SCHED-E-B	Scheduling-External–B *(shall support SCHED-I-B and DS-WP-A)*				

Trending

BIBB Type		Active	BACnet Service	Initiate	Execute
T-VMT-A	Trending - Viewing and Modifying Trends–A		ReadRange	x	
T-VMT-I-B	Trending - Viewing and Modifying Trends Inernal–B	x	ReadRange		x
T-VMT-E-B	Trending - Viewing and Modifying Trends External–B		ReadRange		x
T-ATR-A	Trending - Automated Trend Retrieval–A		ConfirmedEventNotification		x
			ReadRange	x	
T-ATR-B	Trending - Automated Trend Retrieval–B	x	ConfirmedEventNotification	x	
		x	ReadRange		x

Network Management

BIBB Type		Active	BACnet Service	Initiate	Execute
NM-CE-A	Network Management - Connection Establishment–A		Establish-Connection-To-Network	x	
			Disconnect-Connection-To-Network	x	
NM-CE-B	Network Management - Connection Establishment– B		Establish-Connection-To-Network		x
			Disconnect-Connection-To-Network		x
NM-RC-A	Network Management - Router Configuration–A		Who-Is-Router-To-Network	x	
			I-Am-Router-To-Network		x
			I-Could-Be-Router-To-Network		x
			Initialize-Routing-Table	x	
			Initialize-Routing-Table-Ack		x
NM-RC-B	Network Management - Router Configuration–B		Who-Is-Router-To-Network	x	x
			I-Am-Router-To-Network	x	x
			Initialize-Routing-Table		x
			Initialize-Routing-Table-Ack	x	

Device Management

BIBB Type		Active	BACnet Service	Initiate	Execute
DM-DDB-A	Device Management - Dynamic Device Binding–A	x	Who-Is	x	
		x	I-Am		x
DM-DDB-B	Device Management - Dynamic Device Binding–B	x	Who-Is		x
		x	I-Am	x	
DM-DOB-A	Device Management - Dynamic Object Binding–A		Who-Has	x	
			I-Have		x
DM-DOB-B	Device Management - Dynamic Object Binding–B	x	Who-Has		x
		x	I-Have	x	
DM-DCC-A	Device Management - DeviceCommuni-cationControl–A		DeviceCommunicationCon-trol	x	
DM-DCC-B	Device Management - DeviceCommuni-cationControl–B	x	DeviceCommunicationCon-trol		x
DM-PT-A	Device Management - PrivateTransfer–A		ConfirmedPrivateTransfer	x	
			UnconfirmedPrivateTransfer	x	
DM-PT-B	Device Management - PrivateTransfer–B		ConfirmedPrivateTransfer		x
			UnconfirmedPrivateTransfer		x
DM-TM-A	Device Management - Text Message–A		ConfirmedTextMessage	x	
			UnconfirmedTextMessage	x	
DM-TM-B	Device Management - Text Message–B		ConfirmedTextMessage		x
			UnconfirmedTextMessage		x
DM-TS-A	Device Management - TimeSynchroniza-tion–A		TimeSynchronization	x	
DM-TS-B	Device Management - TimeSynchroniza-tion–B	x	TimeSynchronization		x
DM-UTC-A	Device Management - UTCTimeSynchro-nization–A		UTCTimeSynchronization	x	
DM-UTC-B	Device Management - UTCTimeSynchro-nization–B		UTCTimeSynchronization		x
DM-RD-A	Device Management - ReinitializeDe-vice–A		ReinitializeDevice	x	
DM-RD-B	Device Management - ReinitializeDe-vice–B	x	ReinitializeDevice		x
DM-BR-A	Device Management - Backup and Re-store–A		AtomicReadFile	x	
			AtomicWriteFile	x	
			CreateObject	x	
			ReinitializeDevice	x	
DM-BR-B	Device Management - Backup and Re-store–B		AtomicReadFile		x
			AtomicWriteFile		x
			ReinitializeDevice		x
DM-R-A	Device Management - Restart–A		UnconfimedCOVNotification		x
DM-R-B	Device Management - Restart–B		UnconfimedCOVNotification	x	
DM-LM-A	Device Management - List Manipulation–A		AddListElement	x	
			RemoveListElement	x	
DM-LM-B	Device Management - List Manipulation–B		AddListElement		x
			RemoveListElement		x
DM-OCD-A	Device Management - Object Creation and Deletion–A		CreateObject	x	
			DeleteObject	x	
DM-OCD-B	Device Management - Object Creation and Deletion–B		CreateObject		x
			DeleteObject		x
DM-VT-A	Device Management - Virtual Terminal–A		VT-Open	x	
			VT-Close	x	x
			VT-Data	x	x
DM-VT-B	Device Management - Virtual Terminal–B		VT-Open		x
			VT-Close	x	x
			VT-Data	x	x

B BACnet Service Types

The following BACnet Service Types are supported by the Modbus to BACnet Gateway:

Service type	Service name	Supported
Alarm and Event Services	AcknowledgeAlarm	Yes
	ConfirmedCOVNotification	
	ConfirmedEventNotification	
	GetAlarmSummary	Yes
	GetEnrollmentSummary	
	SubscribeCOV	Yes
File Access Services	AtomicReadFile	
	AtomicWriteFile	
Object Access Services	AddListElement	
	RemoveListElement	
	CreateObject	
	DeleteObject	
	ReadProperty	Yes
	ReadPropertyConditional	
	ReadPropertyMultiple	Yes
	ReadRange	Yes
	WriteProperty	Yes
	WritePropertyMultiple	Yes
Remote Device Management Services	DeviceComminicationControl	Yes
	ConfirmedPrivateTransfer	
	ConfirmedTextMessage	
	ReinitializeDevice	Yes
Virtual Terminal Services	VtOpen	
	VtClose	
	VtData	
Security Services	Authenticate	
	RequestKey	
Unconfirmed Services	I-Am	Yes
	I-Have	
	UnconfirmedCOVNotification	
	UnconfirmedEventNotification	
	UnconfirmedPrivateTransfer	
	UnconfirmedTextMessage	
	TimeSynchronization	Yes
	UtcTimeSynchronization	
	Who-Has	Yes
	Who-Is	Yes
	LifeSafetyOperation	
	SubscribeCOVProperty	
	GetEventInformation	Yes

C BACnet Objects

The following BACnet Objects are supported by the Modbus to BACnet Gateway:

Object Type	ID	Supported
Analog-Input	0	Yes
Analog-Output	1	Yes
Analog-Value	2	Yes
Averaging	18	
Binary-Input	3	Yes
Binary-Output	4	Yes
Binary-Value	5	Yes
Calendar	6	Yes
Command	7	
Device	8	Yes
Event-Enrollment	9	
File	10	
Group	11	
Life-Safety-Point	21	
Life-Safety-Zone	22	
Loop	12	
Multistate-Input	13	Yes
Multistate-Output	14	Yes
Multistate-Value	19	Yes
Notification-Class	15	Yes
Program	16	
Schedule	17	Yes
Trend-Log	20	Yes
Trend-Log-Multiple	27	Yes

Device Object Type

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Object_Identifier	BACnetObjectIdentifier	(Device, 246000)	R	R
Object_Type	BACnetObjectType	DEVICE (8) (Device Object Type)	R	R
System_Status	BACnetDeviceStatus	OPERATIONAL (0)	R	R
Protocol_Version	Unsigned	1	R	R
Protocol_Revision	Unsigned	12	R	R
Protocol_Services_ Supported	BACnetServiceSupported	Refer to section x [Service Types]	R	R
Protocol_Object_Types_ Supported	BACnetObjectTypes Supported	Refer to section x [Object Types]	R	R
Object_List	BACnetArray[N] of BACnetObjectIdentifier	BACnetARRAY[N]	R	R
Structured_Object_List	BACnetArray[N] of BACnetObjectIdentifier	-	O	-
Max_APDU_Length_ Accepted	Unsigned	480 when MSTP 1476 when BACnet/IP	R	R
Segmentation_Supported	BACnetSegmentation	SEGMENTED-BOTH (0)	R	R
Max_Segments_accepted	Unsigned	16	O	R
VT_Classes_Supported	List of BACnetVTClass	-	O	-
Active_VT_Sessions	List of BACnetVTSession	-	O	-
Local_Date	Date	Current date	O	R
Local_Time	Time	Current time	O	R
UTC_Offset	INTEGER	-	O	-
Daylight_Savings_Status	BOOLEAN	-	O	-
APDU_Segment_Timeout	Unsigned	3000	R	R
APDU_Timeout	Unsigned	3000	R	R
Number_of_APDU_ Retries	Unsigned	3	R	R
List_Of_Session_Keys	List of BACnetSessionKey	-	O	-
Time_Synchronization_ Recipients	List of BACnetRecipient	-	O	-
Max_Master * **	Unsigned	127	R	W
Max_Info_Frames *	Unsigned	1	O	R
Device_Address_Binding	List of BACnetAddressBinding	NULL (empty)	R	R
Database_Revision	Unsigned	0	R	R
Configuration_Files	BACnetArray[N] of BACnetObjectIdentifier	-	O	-
Last_Restore_Time	BACnetTimeStamp	-	O	-
Backup_Failure_Timeout	Unsigned16	-	O	-
Active_COV_ Subscriptions	List of BACnetCOVSubscription	List of BACnetCOVSubscription	O	R
Slave_Proxy_Enable	BACnetArray[N] of BOOLEAN	-	O	-
Manual_Slave_Address_ Binding	List of BACnetAddressBinding	-	O	-
Auto_Slave_Discovery	BACnetArray[N] of BOOLEAN	-	O	-
Slave_Address_Binding	BACnetAddressBinding	-	O	-
Last_Restart_Reason	BACnetRestartReason	-	O	-
Time_Of_Device_Restart	BACnetTimeStamp	-	O	-
Restart_Notification_ Recipients	List of BACnetRecipient	-	O	-
UTC_Time_ Synchronization_ Recipients	List of BACnetRecipient	-	O	-
Time_Synchronization_ Interval	Unsigned	-	O	-

Device Object Type (continued)

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Align_Intervals	BOOLEAN	-	O	-
Interval_Offset	Unsigned	-	O	-
Profile_Name	CharacterString	-	O	-

* Only available when MSTP is used   ** Configurable through the configuration tool

Analog Input Object Type

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Object_Identifier	BACnetObjectIdentifier	(Analog Input, 0)	R	R
Object_Name	CharacterString	*Configurable through BACnet and Config Tool*	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	x	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE/TRUE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0), UNRELIABLE_OTHER (7)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	*Configurable through BACnet and Config Tool*	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	0	O	R
Time_Delay	Unsigned	-	O	R*
Notification_Class	Unsigned	-	O	R*
High_Limit	REAL	-	O	R*
Low_Limit	REAL	-	O	R*
Deadband	REAL	-	O	R*
Limit_Enable	BACnetLimitEnable	-	O	R*
Event_Enable	BACnetEventTransitionBits	-	O	R*
Acked_Transitions	BACnetEventTransitionBits	-	O	R*
Notify_Type	BACnetNotifyType	-	O	R*
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	R*
Profile_Name	CharacterString	-	O	-

* Only available when specific object has a Notification Class configured

Analog Output Object Type

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Object_Identifier	BACnetObjectIdentifier	(Analog Output, 0)	R	R
Object_Name	CharacterString	*Configurable through BACnet and Config Tool*	R	R
Object_Type	BACnetObjectType	ANALOG_OUTPUT (1)	R	R
Present_Value	REAL	x	W	W
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-

Analog Output Object Type (continued)

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	*Configurable through BACnet and Config Tool*	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	0	O	R
Priority_Array	BACnetPriorityArray	BACnetPriorityArray	R	R
Relinquish_Default	Unsigned	*Configurable through BACnet and Config Tool*	R	R
Time_Delay	Unsigned	-	O	R*
Notification_Class	Unsigned	-	O	R*
High_Limit	REAL	-	O	R*
Low_Limit	REAL	-	O	R*
Deadband	REAL	-	O	R*
Limit_Enable	BACnetLimitEnable	-	O	R*
Event_Enable	BACnetEventTransitionBits	-	O	R*
Acked_Transitions	BACnetEventTransitionBits	-	O	R*
Notify_Type	BACnetNotifyType	-	O	R*
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	R*
Profile_Name	CharacterString	-	O	-

* Only available when specific object has a Notification Class configured

Analog Value Object Type

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Object_Identifier	BACnetObjectIdentifier	(Analog Value, 0)	R	R
Object_Name	CharacterString	*Configurable through BACnet and Config Tool*	R	R
Object_Type	BACnetObjectType	ANALOG_VALUE (2)	R	R
Present_Value	REAL	x	R	W
Description	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	*Configurable through BACnet and Config Tool*	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	0	O	R
Time_Delay	Unsigned	-	O	R*
Notification_Class	Unsigned	-	O	R*

Analog Value Object Type (continued)

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
High_Limit	REAL	-	O	R*
Low_Limit	REAL	-	O	R*
Deadband	REAL	-	O	R*
Limit_Enable	BACnetLimitEnable	-	O	R*
Event_Enable	BACnetEventTransitionBits	-	O	R*
Acked_Transitions	BACnetEventTransitionBits	-	O	R*
Notify_Type	BACnetNotifyType	-	O	R*
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	R*
Profile_Name	CharacterString	-	O	-

* Only available when specific object has a Notification Class configured

Binary Input Object Type

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Object_Identifier	BACnetObjectIdentifier	(Binary Input, 0)	R	R
Object_Name	CharacterString	*Configurable through BACnet and Config Tool*	R	R
Object_Type	BACnetObjectType	BINARY_INPUT (3)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE/TRUE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0), UNRELIABLE_OTHER (7)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Polarity	BACnetPolarity	NORMAL (0)	R	R
Inactive_Text	CharacterString	*Configurable through BACnet and Config Tool*	O	R
Active_Text	CharacterString	*Configurable through BACnet and Config Tool*	O	R
Change_Of_State_Time	BACnetDatetime	-	O	R
Change_Of_State_Count	Unsigned	-	O	R
Time_Of_State_Count_Reset	BACnetDatetime	-	O	R
Elapsed_Active_Time	Unsigned	-	O	R
Time_Of_Active_Time_Reset	BACnetDatetime	-	O	R
Time_Delay	Unsigned	-	O	R*
Notification_Class	Unsigned	-	O	R*
Alarm_Value	BACnetBinaryPV	-	O	R*
Event_Enable	BACnetEventTransitionBits	-	O	R*
Acked_Transitions	BACnetEventTransitionBits	-	O	R*
Notify_Type	BACnetNotifyType	-	O	R*
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	R*
Profile_Name	CharacterString	-	O	-

* Only available when specific object has a Notification Class configured

Binary Output Object Type

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Object_Identifier	BACnetObjectIdentifier	(Binary Output, 0)	R	R
Object_Name	CharacterString	*Configurable through BACnet and Config Tool*	R	R
Object_Type	BACnetObjectType	BINARY_OUTPUT (4)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	W	W
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Polarity	BACnetPolarity	NORMAL (0)	R	R
Inactive_Text	CharacterString	*Configurable through BACnet and Config Tool*	O	R
Active_Text	CharacterString	*Configurable through BACnet and Config Tool*	O	R
Change_Of_State_Time	BACnetDatetime	-	O	R
Change_Of_State_Count	Unsigned	-	O	R
Time_Of_State_Count_Reset	BACnetDatetime	-	O	R
Elapsed_Active_Time	Unsigned	-	O	R
Time_Of_Active_Time_Reset	BACnetDatetime	-	O	R
Minimum_Off_Time	Unsigned32	-	O	-
Minimum_On_Time	Unsigned32	-	O	-
Priority_Array	BACnetPriorityArray	BACnetPriorityArray	R	R
Relinquish_Default	BACnetBinaryPV	INACTIVE (0)	R	R
Time_Delay	Unsigned	-	O	R*
Notification_Class	Unsigned	-	O	R*
Feedback_Value	BACnetBinaryPV	-	O	W
Event_Enable	BACnetEventTransitionBits	-	O	R*
Acked_Transitions	BACnetEventTransitionBits	-	O	R*
Notify_Type	BACnetNotifyType	-	O	R*
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	R*
Profile_Name	CharacterString	-	O	-

* Only available when specific object has a Notification Class configured

Binary Value Object Type

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Object_Identifier	BACnetObjectIdentifier	(Binary Value, 0)	R	R
Object_Name	CharacterString	*Configurable through BACnet and Config Tool*	R	R
Object_Type	BACnetObjectType	BINARY_VALUE (5)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	W	W
Description	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R

Binary Value Object Type (continued)

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Inactive_Text	CharacterString	*Configurable through BACnet and Config Tool*	O	R
Active_Text	CharacterString	*Configurable through BACnet and Config Tool*	O	R
Change_Of_State_Time	BACnetDatetime	-	O	R
Change_Of_State_Count	Unsigned	-	O	R
Time_Of_State_Count_Reset	BACnetDatetime	-	O	R
Elapsed_Active_Time	Unsigned	-	O	R
Time_Of_Active_Time_Reset	BACnetDatetime	-	O	R
Minimum_Off_Time	Unsigned32	-	O	-
Minimum_On_Time	Unsigned32	-	O	-
Priority_Array	BACnetPriorityArray	BACnetPriorityArray	R	R
Relinquish_Default	BACnetBinaryPV	INACTIVE (0)	R	R
Time_Delay	Unsigned	-	O	R*
Notification_Class	Unsigned	-	O	R*
Alarm_Value	BACnetBinaryPV	-	O	R*
Event_Enable	BACnetEventTransitionBits	-	O	R*
Acked_Transitions	BACnetEventTransitionBits	-	O	R*
Notify_Type	BACnetNotifyType	-	O	R*
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	R*
Profile_Name	CharacterString	-	O	-

* Only available when specific object has a Notification Class configured

Multistate Input Object Type

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Object_Identifier	BACnetObjectIdentifier	(Multi-state Input, 0)	R	R
Object_Name	CharacterString	*Configurable through BACnet and Config Tool*	R	R
Object_Type	BACnetObjectType	MULTISTATE_INPUT (13)	R	R
Present_Value	Unsigned	x	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE/TRUE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0), UNRELIABLE_OTHER (7)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Number_Of_States	Unsigned	*Configurable through BACnet and Config Tool*	R	R
State_Text	BACnetArray[N] of CharacterString	-	O	R
Time_Delay	Unsigned	-	O	R*
Notification_Class	Unsigned	-	O	R*
Alarm_Values	List of Unsigned	-	O	R*
Fault_Values	List of Unsigned	-	O	R*
Event_Enable	BACnetEventTransitionBits	-	O	R*
Acked_Transitions	BACnetEventTransitionBits	-	O	R*
Notify_Type	BACnetNotifyType	-	O	R*

Multistate Input Object Type (continued)

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	R*
Profile_Name	CharacterString	-	O	-

* Only available when specific object has a Notification Class configured

Multistate Output Object Type

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Object_Identifier	BACnetObjectIdentifier	(Multi-state Output, 0)	R	R
Object_Name	CharacterString	*Configurable through BACnet and Config Tool*	R	R
Object_Type	BACnetObjectType	MULTISTATE_OUTPUT (14)	R	R
Present_Value	Unsigned	x	W	W
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Number_Of_States	Unsigned	*Configurable through BACnet and Config Tool*	R	R
State_Text	BACnetArray[N] of CharacterString		O	R
Priority_Array	BACnetPriorityArray	BACnetPriorityArray	R	R
Relinquish_Default	Unsigned	1	R	R
Time_Delay	Unsigned	-	O	R*
Notification_Class	Unsigned	-	O	R*
Feedback_Value	Unsigned	-	O	W
Event_Enable	BACnetEventTransitionBits	-	O	R*
Acked_Transitions	BACnetEventTransitionBits	-	O	R*
Notify_Type	BACnetNotifyType	-	O	R*
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	R*
Profile_Name	CharacterString	-	O	-

* Only available when specific object has a Notification Class configured

Multistate Value Object Type

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Object_Identifier	BACnetObjectIdentifier	(Multi-state Output, 0)	R	R
Object_Name	CharacterString	*Configurable through BACnet and Config Tool*	R	R
Object_Type	BACnetObjectType	MULTISTATE_VALUE (19)	R	R
Present_Value	Unsigned	x	W	W
Description	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Number_Of_States	Unsigned	*Configurable through BACnet and Config Tool*	R	R

Multistate Value Object Type (continued)

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
State_Text	BACnetArray[N] of CharacterString		O	R
Priority_Array	BACnetPriorityArray	-	R	R
Relinquish_Default	Unsigned	-	R	R
Time_Delay	Unsigned	-	O	R*
Notification_Class	Unsigned	-	O	R*
Alarm_Values	Unsigned	-	O	R*
Fault_Values	Unsigned		O	R*
Event_Enable	BACnetEventTransitionBits	-	O	R*
Acked_Transitions	BACnetEventTransitionBits	-	O	R*
Notify_Type	BACnetNotifyType	-	O	R*
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	R*
Profile_Name	CharacterString	-	O	-

* Only available when specific object has a Notification Class configured

Calendar Object Type

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Object_Identifier	BACnetObjectIdentifier	(Calendar, 6)	R	R
Object_Name	CharacterString	*Configurable through BACnet and Config Tool*	R	R
Object_Type	BACnetObjectType	CALENDAR (6)	R	R
Description	CharacterString	-	O	-
Present_Value	BOOLEAN	-	R	R
Date_List	BACnetLIST of BACnetCalendarEntry	-	R	W
Profile_Name	BACnetARRAY[N] of BACnetPropertyIdentifier	-	O	-

Schedule Object Type

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Object_Identifier	BACnetObjectIdentifier	(Schedule, 17)	R	R
Object_Name	CharacterString	*Configurable through BACnet and Config Tool*	R	R
Object_Type	BACnetObjectType	SCHEDULE (17)	R	R
Present_Value	Any	-	R	R
Description	CharacterString	-	O	-
Effective_Period	BACnetDateRange	-	R	W
Weekly_Schedule	BACnetARRAY[7] of BACnetDailySchedule	-	R	W
Exception_Schedule	BACnetARRAY[N] of BACnetSpecialEvent	-	R	W
Schedule_Default	Any	-	R	W
List_Of_Object_Property_References	BACnetLIST of BACnetDeviceObjectPropertyReference	-	R	R
Priority_For_Writing	Unsigned(1..16)	-	R	W
Status_Flags	BACnetStatusFlags	-	R	R
Reliability	BACnetReliability	-	R	R
Out_Of_Service	BOOLEAN	-	R	R
Event_Detection_Enable	BOOLEAN	-	O	-
Notification_Class	Unsigned	-	O	-

Schedule Object Type (continued)

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Event_Enable	BACnetEventTransitionBits	-	O	-
Event_State	BACnetEventState	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	-	O	-
Event_Message_Texts	BACnetARRAY[3] of CharacterString	-	O	-
Event_Message_Texts_Config	BACnetARRAY[3] of CharacterString	-	O	-
Reliability_Evaluation_Inhibit	BOOLEAN	-	O	-
Profile_Name	CharacterString	-	O	-

Notification Class Object Type

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Object_Identifier	BACnetObjectIdentifier	(Notification_Class, 15)	R	R
Object_Name	CharacterString	*Configurable through BACnet and Config Tool*	R	R
Object_Type	BACnetObjectType	NOTIFICATION_CLASS (15)	R	R
Description	CharacterString	-	O	-
Notification_Class	Unsigned	-	R	R
Priority	BACnetARRAY[3] of Unsigned	-	R	R
Ack_Required	BACnetEventTransitionBits	-	R	R
Recipient_List	BACnetLIST of BACnetDestination	-	R	R
Profile_Name	CharacterString	-	O	-

Trend Log Object Type

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Object_Identifier	BACnetObjectIdentifier	(Trend_Log, 20)	R	R
Object_Name	CharacterString	*Configurable through BACnet and Config Tool*	R	R
Object_Type	BACnetObjectType	TREND_LOG (20)	R	R
Description	CharacterString	-	O	-
Enable	BOOLEAN		R	W
Start_Time	BACnetDateTime		O	W
Stop_Time	BACnetDateTime		O	W
Log_DeviceObjectProperty	BACnetDeviceObject PropertyReference		O	-
Log_Interval	Unsigned		O	-
COV_Resubscription_Interval	Unsigned		O	-
Client_COV_Increment	BACnetClientCOV		O	-
Stop_When_Full	BOOLEAN		R	R
Buffer_Size	Unsigned		R	R
Log_Buffer	List of BACnetLogRecord		R	R
Record_Count	Unsigned		R	W
Total_Record_Count	Unsigned		R	R
Notification_Threshold	Unsigned		O	R*
Records_Since_Notification	Unsigned		O	R*
Last_Notify_Record	Unsigned		O	R*
Event_State	BACnetEventState		R	R

Trend Log Object Type (continued)

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Notification_Class	Unsigned		O	R*
Event_Enable	BACnetEventTransitionBits		O	R*
Acked_Transitions	BACnetEventTransitionBits		O	R*
Notify_Type	BACnetNotifyType		O	R*
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp		O	R*
EventMessageTexts	BACnetARRAY[3] of CharacterString		O	R*
Profile_Name	CharacterString		O	-
Logging_Type	BACnetLoggingType		R	R
Status_Flags	BACnetStatusFlags		R	R

* Only available when specific object has a Notification Class configured

Trend Log Multiple Object Type

Property Identifier	Property Datatype	Value	ASHRAE	Anybus
Object_Identifier	BACnetObjectIdentifier	(Trend_Log_Multiple, 27)	R	R
Object_Name	CharacterString	*Configurable through BACnet and Config Tool*	R	R
Object_Type	BACnetObjectType	TREND_LOG_MULTIPLE (27)	R	R
Description	CharacterString	-	O	-
Enable	BOOLEAN		R	W
Start_Time	BACnetDateTime		O	W
Stop_Time	BACnetDateTime		O	W
Log_DeviceObjectProperty	BACnetARRAY[10] of BACnetDeviceObject PropertyReference		O	R
Log_Interval	Unsigned		O	-
COV_Resubscription_Interval	Unsigned		O	-
Client_COV_Increment	BACnetClientCOV		O	-
Stop_When_Full	BOOLEAN		R	R
Buffer_Size	Unsigned		R	R
Log_Buffer	List of BACnetLogRecord		R	R
Record_Count	Unsigned		R	W
Total_Record_Count	Unsigned		R	R
Notification_Threshold	Unsigned		O	R*
Records_Since_Notification	Unsigned		O	R*
Last_Notify_Record	Unsigned		O	R*
Event_State	BACnetEventState		R	R
Notification_Class	Unsigned		O	R*
Event_Enable	BACnetEventTransitionBits		O	R*
Acked_Transitions	BACnetEventTransitionBits		O	R*
Notify_Type	BACnetNotifyType		O	R*
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp		O	R*
EventMessageTexts	BACnetARRAY[3] of CharacterString		O	R*
Profile_Name	CharacterString		O	-
Logging_Type	BACnetLoggingType		R	R
Status_Flags	BACnetStatusFlags		R	R

* Only available when specific object has a Notification Class configured

D   BACnet PICS

BACnet Protocol Implementation Conformance Statement (PICS)

Date: *2016-11-22*
Vendor Name: *HMS Industrial Networks AB*
Product Name: *Anybus Modbus to BACnet Gateway*
Product Model Number: *AB9900*
Application Software Version: *1.0*
Firmware Revision: *1.0.0.0*
BACnet Protocol Revision: *12*

Product Description:

Modbus – BACnet MS/TP & BACnet IP Gateway

Abstraction of Modbus Registers as BACnet Objects.

BACnet Standardized Device Profile (Annex L):

☐   BACnet Operator Workstation (B-OWS)
☐   BACnet Building Controller (B-BC)
☒   BACnet Advanced Application Controller (B-AAC)
☐   BACnet Application Specific Controller (B-ASC)
☐   BACnet Smart Sensor (B-SS)
☐   BACnet Smart Actuator (B-SA)

Additional BACnet Interoperability Building Blocks Supported (Annex K):
Reference of BIBBs List

Segmentation Capability:

Segmented request supported   ☐ No   ☒ Yes   Window Size · *16*   ·
Segmented responses supported   ☐ No   ☒ Yes   Window Size · *16*   ·

Data Link Layer Options:

☒   BACnet IP, (Annex J)
☒   BACnet IP, (Annex J), Foreign Device
☐   ISO 8802-3, Ethernet (Clause 7)
☐   ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
☐   ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), baud rate(s) ____
☒   MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☐   MS/TP slave (Clause 9), baud rate(s):
☐   Point-To-Point, EIA 232 (Clause 10), baud rate(s):
☐   Point-To-Point, modem, (Clause 10), baud rate(s):
☐   LonTalk, (Clause 11), medium: _____
☐   Other:

Device Address Binding:

Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.) ☐ Yes   ☒ No

Networking Options:

☐   Router, Clause 6 - List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.
☐   Annex H, BACnet Tunneling Router over IP
☒   BACnet/IP Broadcast Management Device (BBMD)

Does the BBMD support registrations by Foreign Devices? ☒ Yes   ☐ No

Character Sets Supported

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

☒ ISO 10646 (UTF-8)   ☐ IBM /Microsoft DBCS   ☐ ISO 8859-1
☐ ISO 10646 (UCS-2)   ☐ ISO 10646 (UCS-4)   ☐ JIS X 0208

Gateway

If this product is a communication gateway, describe the types of non-BACnet equipment/network(s) that the gateway supports:
Modbus RTU (EIA485) and TCP networks.

E Technical Data

General

Model name	Anybus Modbus to BACnet Gateway
Order code	AB9900-nnnn (nnnn = number of datapoints)
Dimensions (L x W x H)	90 x 88 x 56 mm
Operating temperature	0 to +60 °C
Storage temperature	-40 to +85 °C
Humidity range	5 to 95 % non-condensing
Mechanical rating	IP20
Mounting	DIN rail or screw mount
Power supply	Must be NEC Class 2 or LPS and SELV rated AC: 24 VAC ±10 %, max. 127 mA DC: 9 to 36 VDC ±10 %, max. 140 mA (Recommended: 24 VDC)
Terminal wiring	Use solid or stranded wires (twisted or with ferrule) 1 core: 0.5 to 2.5 mm² 2 cores: 0.5 to 1.5 mm² 3 cores: not permitted
Certifications	CE and RoHS compliant, BTL certification See www.anybus.com/support for more information.

Communication

Interface	Ethernet Port	EIA-485 (Port A)	EIA-485 (Port B)
Compliance	IEEE 802.3	Modbus V1.02	BACnet Rev 12
Protocols	Modbus TCP, BACnet/IP	Modbus RTU	BACnet MS/TP
Data rate	10/100 Mbit/s	2.4, 4.8, 9.6, 19.2, 38.4, 57.6, 115.2 kbps	Auto, 9.6, 19.2, 38.4, 57.6, 76.8, 115.2 kbps
Physical layer	10BASE-T, 100BASE-TX	EIA-485, 3-wire isolated	EIA-485, 3-wire isolated
Maximum cable length	100 m	2.4 to 57.6 kbps: 1200 m 115.2 kbps: 1000 m	2.4 to 76.8 kbps: 1200 m 115.2 kbps: 1000 m
Port connector	Shielded RJ-45	2 x 2-pin pluggable terminal blocks	3-pin pluggable terminal block
Isolation	1500 VDC	1500 VDC	1500 VDC (except from D-sub connector)

BACnet

Order Code AB9900 –	100	250	600	1200	3000
Maximum number of BACnet Objects	100	250	600	1200	3000
Maximum number of BACnet Subscriptions (COV) request:	200	500	1200	2400	6000
Supported BACnet device types	IP, MSTP				
Supported Modbus slave device types	Modbus RTU (EIA485), Modbus TCP				
Maximum number of Modbus Slave devices	Up to 255 devices per node (RTU and TCP) Up to 5 TCP connections				