



Intesis MAPS

Configuration & Monitoring software of Intesis BACnet series

USER'S MANUAL

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HMS Industrial Networks S.L.U

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1. Introduction

Intesis MAPS is a Windows compatible software tool developed specifically to monitor and configure the Intesis BACnet Server series (Intesis BACnet Server integrating an *External Protocol*). In this document, its use and how to configure the Intesis is explained.

Following nomenclatures are used in this document:

- *External Protocol*: Protocol that the Intesis integrates besides BACnet. i.e: if using the INBACKNX***0000, KNX would be the *External Protocol*.
- Intesis or gateway: the words "gateway" or "Intesis" are used instead of the full product name (Intesis BACnet/IP Server integrating an *External Protocol*). Any other use of the word "gateway" not meaning that will be specifically indicated.
- Configuration Tool: Intesis MAPS

2. Installation

The tool is supplied in the shape of a self-extracting setup utility. Supported operating systems are Windows 7 and onwards versions of the Windows OS.

The configuration tool can be downloaded from:

<https://www.intesis.com/docs/software/intesis-maps-installer>

The web browser will ask for saving the file. Select **Save File** and wait for the file to download.

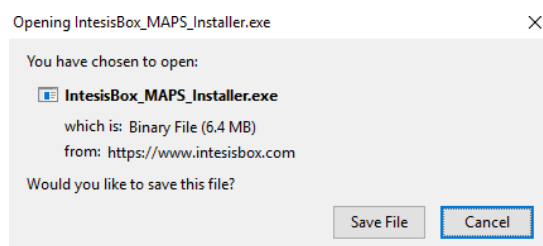


Figure 2.1 Downloading Intesis MAPS

Once downloaded, double click on the **Intesis_maps_installer.exe** file and follow instructions provided by the installation wizard.

3. Welcome page

After starting the Intesis MAPS, by clicking its program entry under Windows Start menu (or any other established link), the welcome page will prompt.

This window is used to show general information, latest news and the project management and creation. All these sections are explained in the detail in the following sections.

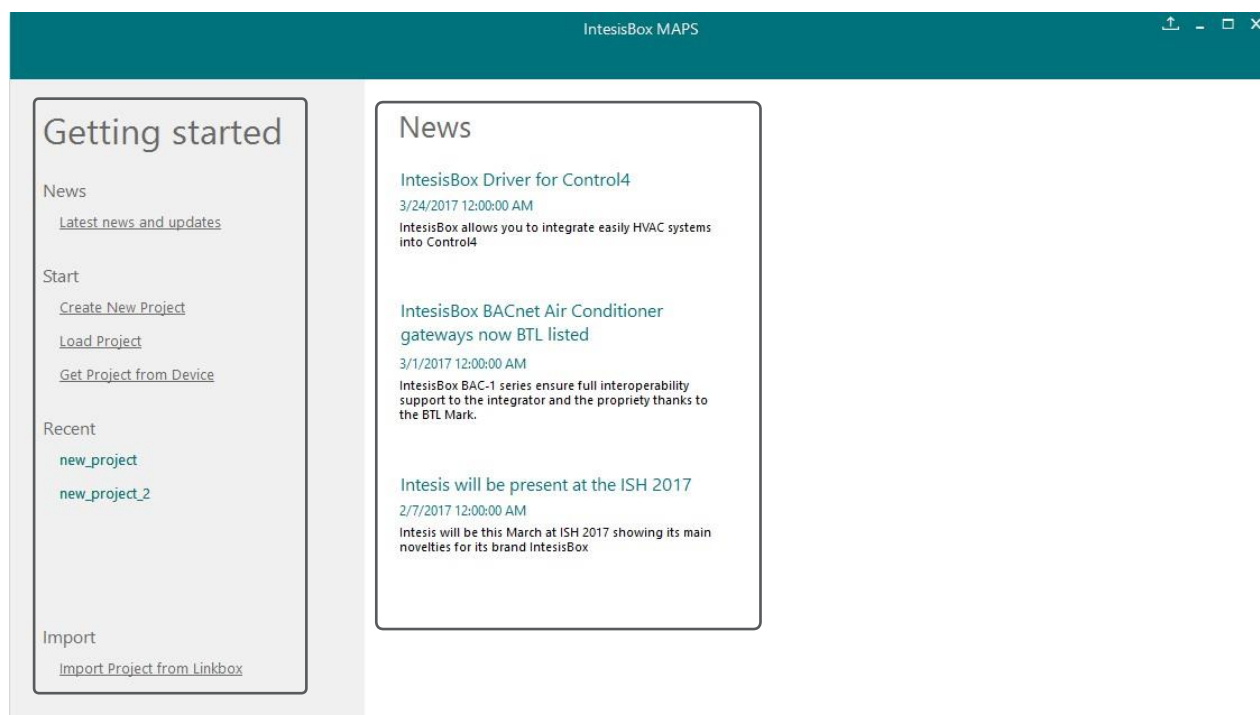


Figure 3.1 Welcome page

3.1 News

This link provides access to the welcome page to check the latest news related to the Intesis gateways and MAPS configuration tool.

Use this section to get the latest information related with our products.

3.2 Create New Project

Create a new project from an existing template. In order to start a specific integration project, simply select one of the available templates from the list.

Note: The template is an example of an integration and may be used under this scope. Depending on the type of integration, some parameters may not be left as by default and shall be modified. Please check your Intesis gateway user manual for more information on some of the specific parameter's configuration.

Click on the BACnet logo to list all available project templates for the BACnet Server gateway series.

Make sure that you select the right template according to the external protocol of the gateway.

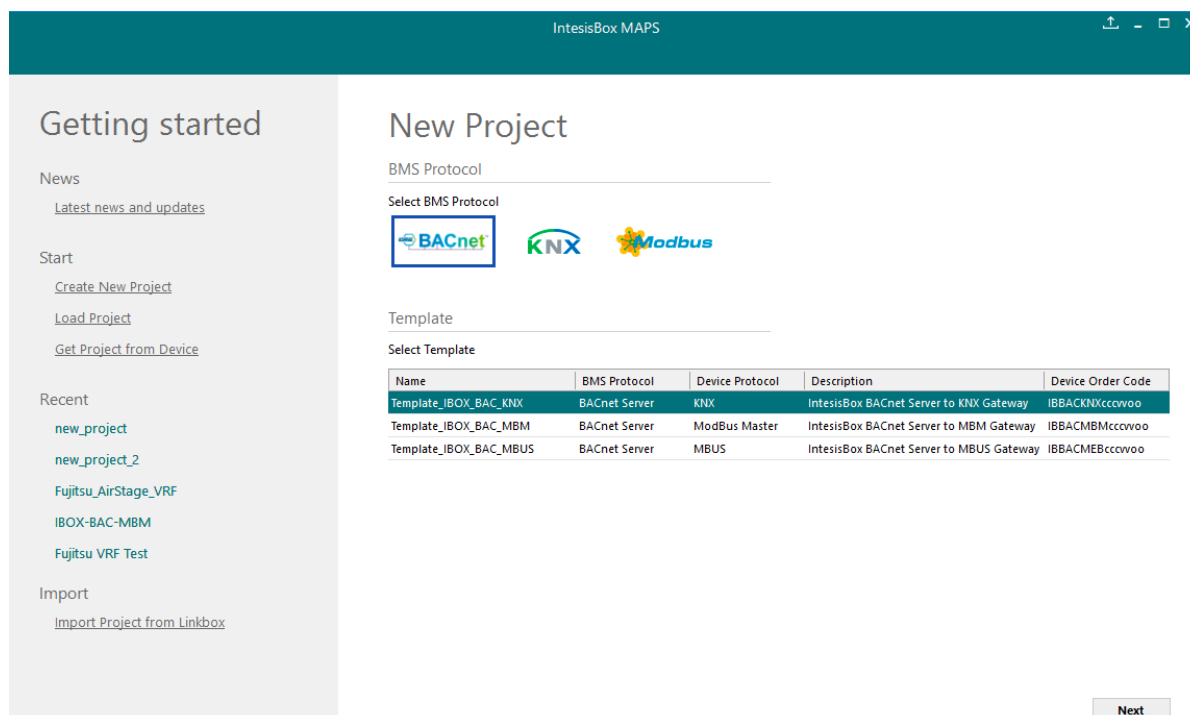


Figure 3.2 Project template selection

3.3 Load Project

Load an already existing project to the configuration tool. In order to import an existing project already programmed, use the **Load Project** option and select the project from the PC or external storage device where the project is stored.

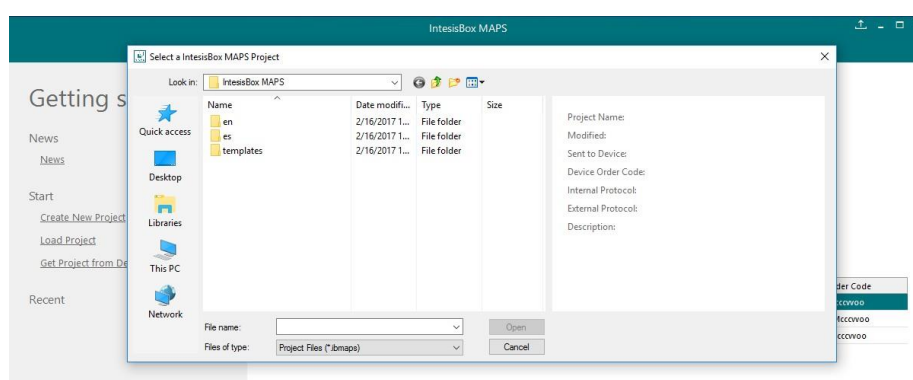


Figure 3.3 Project selection window

After selection, the project will be loaded and configuration can be started as if using a brand-new project, but with all previous work in the project present.

3.4 Get Project from Device

Use this function to download the current configuration running in the gateway and to import it to the configuration tool. Notice that connection from the configuration tool to the gateway is required.

Depending on your firewall configuration, a warning message like the one below may appear:

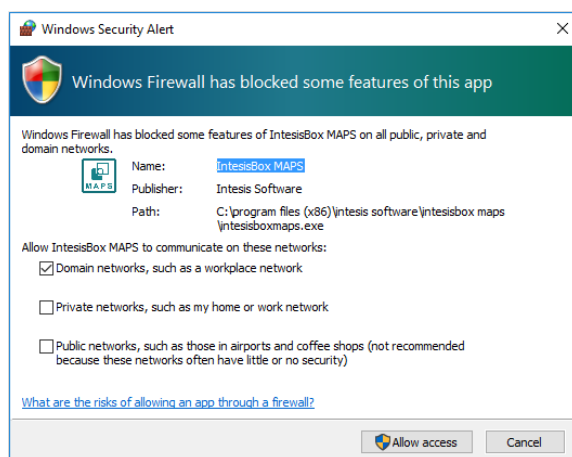


Figure 3.4 Firewall warning message

After that, the tool will ask you where to download the project. Please select the location and press the save button.

3.5 Recent

In this section, the last edited projects in this installation will be shown. It can be used for fast checking of the last projects updated.

3.6 Import Project from LinkBox

This special function allows the use of old LinkBox projects on the configuration tool. To import the project, simply select the folder and click on the “Select Folder” button.

4. Navigation

To work with the configuration tool, the menu and the tool bar (Figure 4.1) need to be used. In the following lines a brief explanation and links to the corresponding sections can be found.

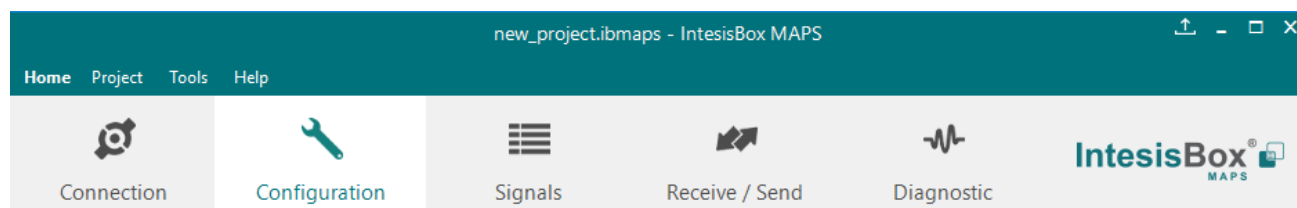


Figure 4.1 Menu and Tool Bar

4.1 Home

This option brings you back to the Welcome page. Check section 3 for more information.

4.2 Project

This option let the user apply basic functions to the project, such as create new projects, load an already existing project, save the project and close the configuration tool.

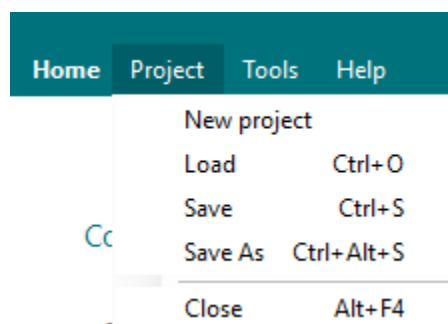


Figure 4.2 Project options

- **New project:** Moves back to the Welcome page and let you select a new project.
- **Load:** Opens a selection window to pick up the project you wanted to load.
- **Save:** Saves the current project changes in the same file. If it is the first time, it will ask for the project location. Otherwise, it will automatically update the current project file.
- **Save As:** Saves the current project into a different location or with a different name from the current one.
- **Close:** Closes the configuration tool.

4.3 Tools

This option provides access to language settings and Gateway firmware update.

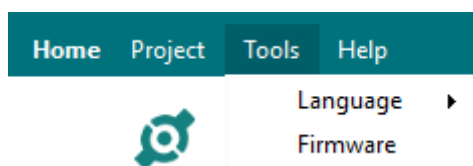


Figure 4.3 Tools options

- **Language:** This option allows the user to select one of the available languages. Once the language is selected, you need to reboot the software for the new language configuration to be applied.

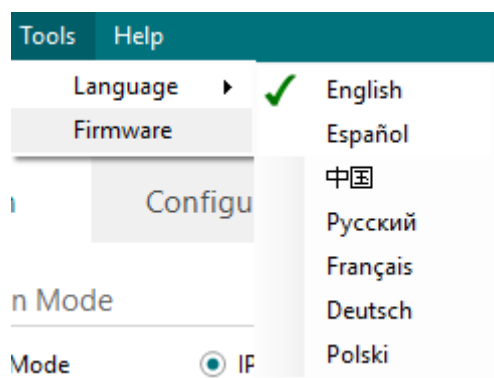


Figure 4.4 Language selection

- **Firmware:** By default, information shown is only the one coming from the current gateway status. In case the user is interested in checking for new firmware updates, the “Check for Update” button needs to be pressed.

In case there is any update available, a summary for the new update information will be shown in the “Firmware Update Information” side of the window. If the user is interested, the “send” button should be pressed to update the box.

IMPORTANT: Please notice that the firmware update process shall not be interrupted. Make sure that you go for the update process while in a safe location (no risk of power blackouts or similar).

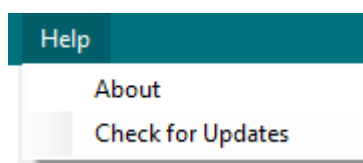
NOTE: If the Gateway is already working as expected, the update may not be advisable. Please, make sure that you update the gateway only when required.

Gateway Current Status (Before the Update)		Firmware Update Information	
Device Name:	-	Filename:	-
Gateway Model:	-	Gateway Model:	-
License Type:	-	License Type:	-
Firmware Version:	-	Firmware Version:	-

Figure 4.5 Firmware Manager view

4.4 Help

Extra information about the software is shown in this section.

**Figure 4.6** Help menu

- **About:**

It prompts information about the current configuration tool version.

**Figure 4.7** About information

- **Check for Updates**

Periodically, new free versions of Configuration Tool are released. Those new releases include improvements, fixes, support for new firmware versions of Intesis or support for newer Intesis products.

This option automatically checks if there is any newer version and in case it exists, it offers the possibility to download and update the software. Notice that this requires Internet connection.

4.5 Footer

In the footer, relevant information about the connection status and protocols used can be found.



Figure 4.8 Footer

- **Connection Status:** It indicates if the Configuration Tool is connected or not with the Gateway.

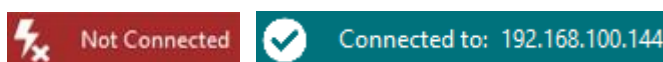


Figure 4.9 Connection status options

It can also be used to connect or disconnect clicking directly on the icons  

- **Internal Protocol:** It indicates the current Internal Protocol (BACnet in this case).
- **External Protocol:** It indicates the current External Protocol (it will depend on the specific Gateway model).
- **Date:** Current time and date.

NOTE: Footer color may change from red to any other when there is connection between the gateway and the configuration tool.

5. Connection

In this section, it is detailed how to set the communication and monitor the Intesis.

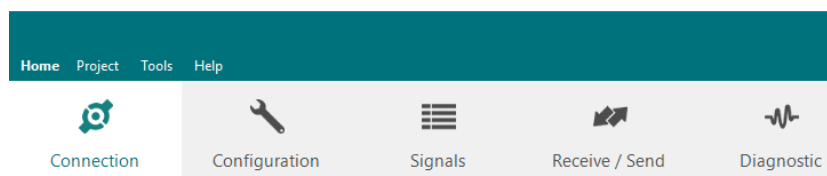


Figure 5.1 Connection section

There are two different ways of communicating the Configuration Tool with the Intesis (check the Connection section in your Intesis User Manual): using the USB port or the Ethernet network. In the following lines the configuration of both is explained as well as the functionalities of the Configuration Tool when connected or not.

When there is no connection with the Intesis, Intesis MAPS allows the creation and edition of configuration projects. That includes setting the linked signals, protocol parameters ...

When the Configuration Tool is connected to the Intesis, it can perform other functionalities such as monitoring the communication and sending the configuration files to the device (sections 9.4 and 8.1 respectively).

5.1 IP connection

If connection with the Gateway shall be done by Ethernet IP network, select IP as the *connection mode*. The software will automatically scan the current network where the PC is connected looking for Intesis gateways.

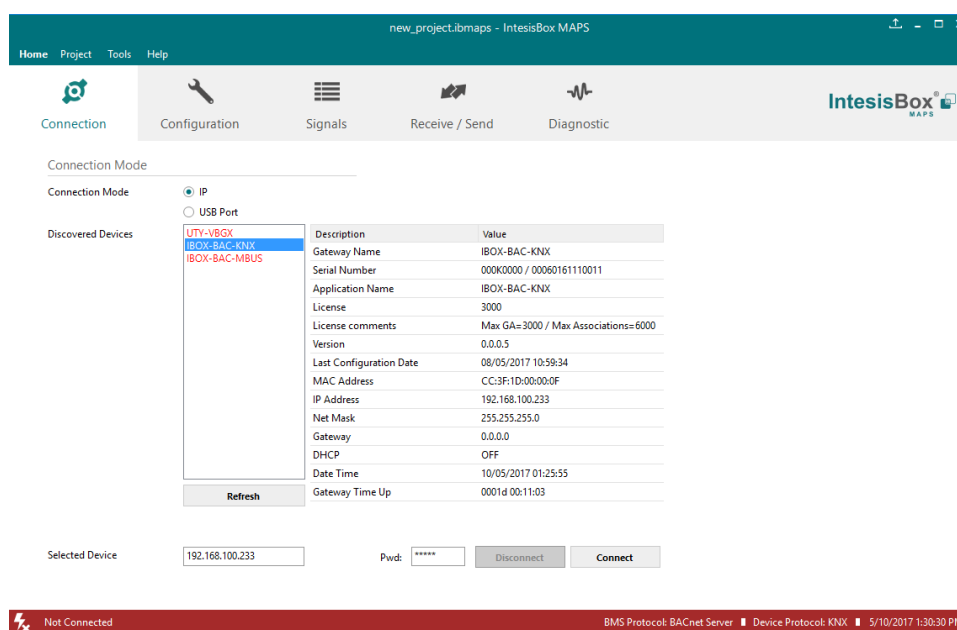



Figure 5.2 IP connection

In the *Discovered Devices* list, all gateways found will be listed. In black, gateways that match the current project selected. In red, gateways that do not match the current project selected.

If no gateways are shown, please check your network connection parameters and make sure that the gateway is powered and connected.

Notice that relevant information can be checked by clicking on each gateway (Figure 5.3).

Once the device is selected, connection will be started by pressing the connect button , on the bottom left corner, or clicking on the **Connect** button.

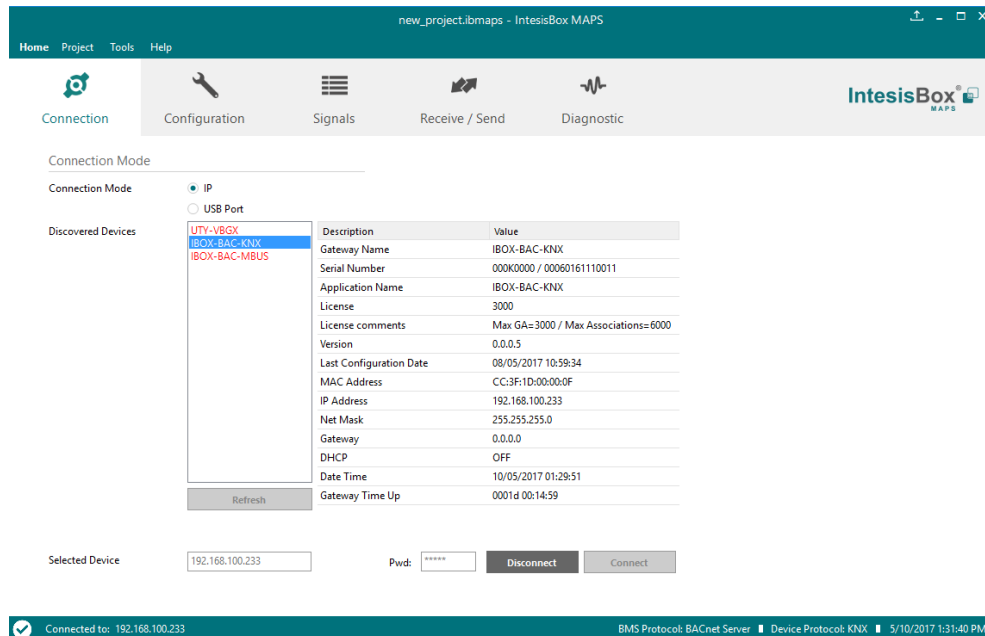


Figure 5.3 IP connection

If connection has been successful, the footer will turn from red to any other color prompting the current IP of the gateway where the configuration tool is connected to.

To disconnect, simply click on the connect button again.

IMPORTANT: Notice that if connecting through IP, a password is required. By default, the password is “admin”. Find more information on how to change the password on section 6.

NOTE: By default, the gateway is offered with DHCP enabled. If you want to change this setting, please check section 6.

5.2 USB connection

If Ethernet IP connection is not possible or if USB is preferred, select USB port in the *Connection Mode*. A list of available COM ports on the PC will be listed. Select the COM port where the USB cable is connected.

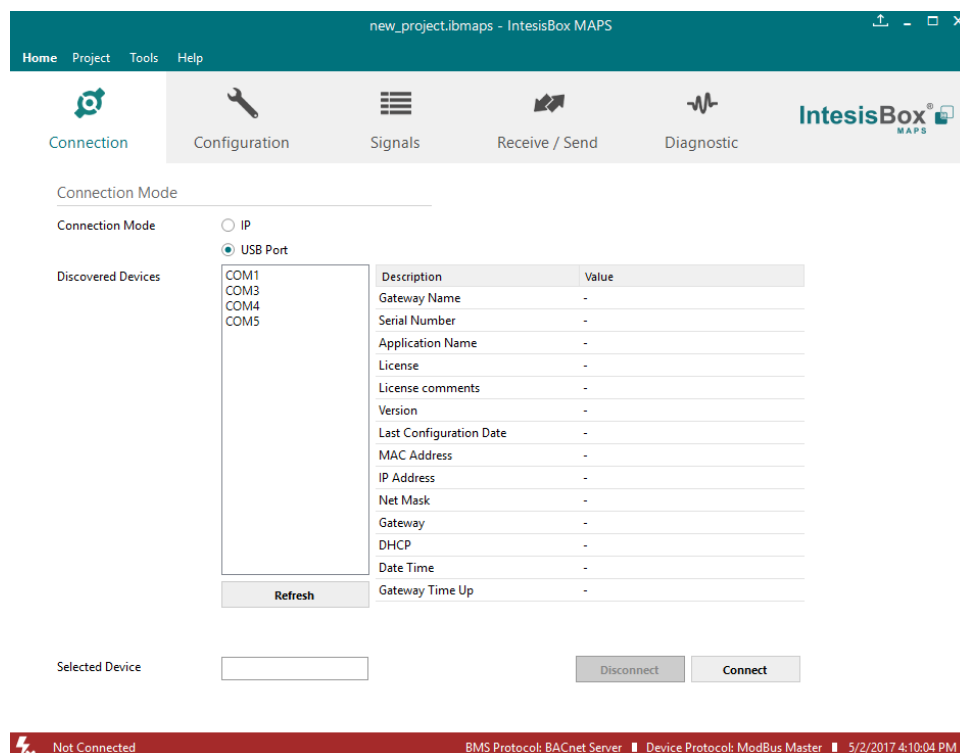


Figure 5.4 USB connection

If the device does not appear or if the COM port list is empty, please check the USB connection on both sides (gateway and PC) and check the Windows Device Manager to check if there is any issue regarding COM ports.

To disconnect simply click on the *Connect* button again.

6. Configuration

In this section, main configuration parameters for the gateway and both, internal and external protocols, can be modified to match the project requirements.

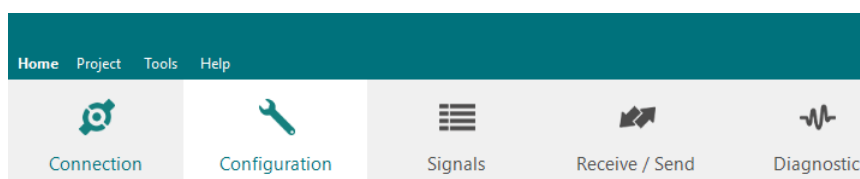


Figure 6.1 Configuration

6.1 General

In the general section, all options related to generic gateway parameters can be defined.

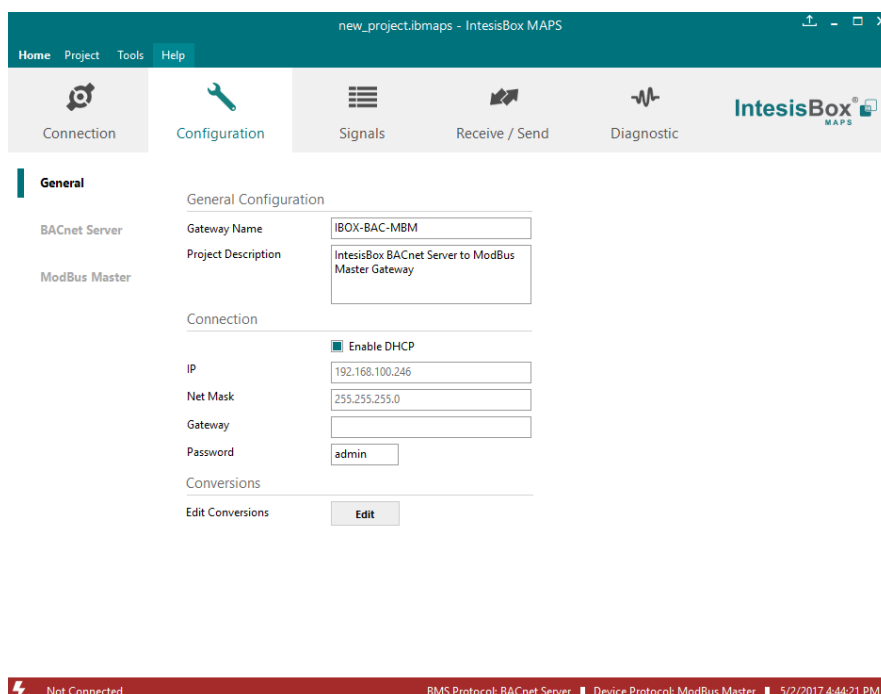


Figure 6.2 General configuration

1. Gateway name

Name of device. It can be modified by the user to simplify its identification inside the project. This name is not related to neither the external or internal protocol.

2. Project description

Short description of the project. It can be modified by the user to simplify its identification inside the project. This name is not related to neither the external or internal protocol.

3. IP ¹

IP address associated to the gateway. It can be modified by the user to match the project requirements. This IP will be the same one to be used on the BACnet/IP side in case of using BACnet/IP communication.

4. Netmask ¹

Network mask to be applied on the IP communication. It can be modified by the user to match the project requirements. This netmask will be the same one to be used on the BACnet/IP side in case of using BACnet/IP communication.

5. Gateway ¹

Default gateway to be applied on the IP communication. It can be modified by the user to match the project requirements. This default gateway will be the same one to be used on the BACnet/IP side in case of using BACnet/IP communication.

6. Password

This is the password to allow connection to the Gateway when using IP connection (see section 5.1). By default, the password is set as “admin”, but can be modified by the user at any time.

In order to change the password, simply set the desired password in this field and download the configuration to the Gateway. You can find more information on how to download the configuration in section 8.1.

IMPORTANT: Please, in case of changing the default password, please keep it posted or noted in a safe place to be used in the future.

7. Conversions

In this section, different conversions can be defined on the MAPS so values from the Internal to the External protocol or vice versa can be modified to help the integrator matching the project requirements.

The screenshot shows the 'Conversions Manager' window. It is divided into two main sections: 'Filters' and 'Operations'.

Filters Section:

- Filters List:** A list of filter types including 'Limit to 0-100', 'Limit to 0-255', 'Is not 0', 'Is higher than 100', and 'Only positive values'. 'Limit to 0-100' is selected.
- Operation Name:** 'Limit to 0-100'
- Type:** 'Limited Filter' (dropdown)
- Comp. type:** 'InRange' (dropdown)
- Range:** A visual representation of the range: $0 \leq X \leq 100$

Operations Section:

- Operations List:** A list of conversion types including 'Celsius to Fahrenheit', 'Fahrenheit to Celsius', 'x10', '/10', 'x100', '/100', 'x1000', '/1000', '0-100 to 0-255', and '0-255 to 0-100'. 'Celsius to Fahrenheit' is selected.
- Filter Name:** 'Celsius to Fahrenheit'
- Type:** Radio buttons for 'Scale' and 'Arithmetic'. 'Arithmetic' is selected.
- Definition:** The formula $y = x * B * (10 \wedge A) + C$
- Values:** Input fields for A, B, and C. A is '-1', B is '18', and C is '32'.

At the bottom right, there are 'Save' and 'Cancel' buttons.

Figure 6.3 Conversions

¹ This setting does not apply if the “Enable DHCP” option is selected. In that case, this parameter will be automatically set by the DHCP server.

6.2 BACnet Server

In the BACnet Server section, all parameters related to the BACnet side can be configured.

6.2.1 Standard Configuration

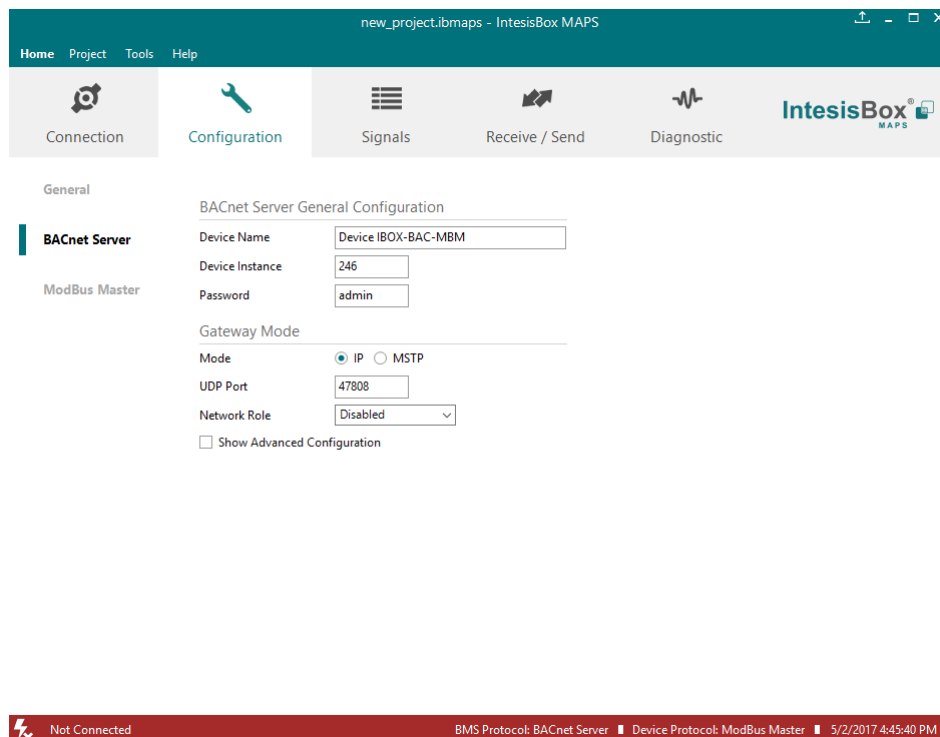


Figure 6.4 Menu and button Bar

1. Device Name

This stands for the BACnet Device Name property. It can be modified by the user using the configuration tool and from BACnet itself.

2. Device Instance

This stands for the BACnet Device Object Instance property related to this specific device. It is a unique ID for the BACnet device inside of a single BACnet network segment.

3. Password

Password required by some BACnet commands to be allowed. This needs to be checked along with the BMS integrator. If not required or not sure, it can be left as default (admin).

4. Mode

Select the type of BACnet communication to be used: BACnet/IP or BACnet MSTP.

a. BACnet/IP

i. UDP Port

Select the UDP port for the BACnet/IP communications. By default, it is set to 47808 (BAC0 in HEX notation).

ii. Network Role

Define how the gateway will act regarding network elements.

IMPORTANT: If not familiar with these options, please left the parameter as **Disabled** to avoid issues on the BACnet communication.

- **Disabled:** The gateway will not provide any special service regarding network communication or settings.
- **Foreign Device:** The gateway will act as a foreign device from the BACnet network point of view.

Network Role Foreign Device ▾

BBMD IP 192.168.100.247

TTL Registration 300

Figure 6.5 Foreign Device configuration

- **BBMD:** The gateway will act as a BBMD in the BACnet network.

Network Role BBMD ▾

Enable	IP	Port	Network Mask	Description
<input checked="" type="checkbox"/>	192.168.100.246	47808	255.255.255.255	BBMD-1
<input type="checkbox"/>		47808	255.255.255.255	BBMD-2
<input type="checkbox"/>		47808	255.255.255.255	BBMD-3
<input type="checkbox"/>		47808	255.255.255.255	BBMD-4
<input type="checkbox"/>		47808	255.255.255.255	BBMD-5
<input type="checkbox"/>		47808	255.255.255.255	BBMD-6
<input type="checkbox"/>		47808	255.255.255.255	BBMD-7
<input type="checkbox"/>		47808	255.255.255.255	BBMD-8

Figure 6.6 BBMD configuration

b. BACnet MSTP

i. Max. Masters

Define the maximum number of BACnet MSTP masters supported

ii. Max. Info Frames

Define the maximum number of Info frames.

iii. Baud Rate

Select the BACnet MSTP communication speed. Possible values are:

Auto | 9600 | 19200 | 38400 | 57600 | 76800 | 115200

iv. MAC address

Define the gateway MAC address for BACnet MSTP communication.

6.2.2 Advanced Configuration

Once the Advanced configuration is activated, the user will have access to BACnet advanced settings.

The screenshot shows the 'new_project.ibmaps - IntesisBox MAP' interface. The top navigation bar includes 'Home', 'Project', 'Tools', and 'Help'. Below this is a menu with four icons: 'Connection', 'Configuration' (selected), 'Signals', and 'Receive / Send'. The main content area is divided into 'General' and 'BACnet Server' sections. The 'BACnet Server' section is active, showing 'BACnet Server General Configuration'. Fields include 'Device Name' (Device IBOX-BAC-MBM), 'Device Instance' (246), and 'Password' (admin). The 'Gateway Mode' section has 'Mode' set to 'IP' (selected over 'MSTP'), 'UDP Port' (47808), and 'Network Role' (Disabled). A red box highlights the 'Show Advanced Configuration' checkbox, which is currently unchecked.

Figure 6.7 Advanced settings selection

NOTE: If you are not familiar with these functions, please do not use them as it may cause problems in the BACnet communication/configuration.

6.2.2.1 Notification Class

In this section, Notification Classes can be created and configured. Up to **10** Notification Class objects can be created.

Figure 6.8 Menu and button Bar

Per each Notification Class, the user will be able to configure:

1. **NC Name**

Name for the Notification Class

2. **NC Instance**

BACnet Object Instance for the Notification Class

3. **Recipient List**

Up to **8** different BACnet Destinations can be created.

For each destination, the following parameters can be modified:

- a) **Destination name**

Descriptive name for the BACnet Destination

- b) **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.

- c) **Recipient Type**

Select the type of recipient from:

- **Device:** The recipient is a device. The Device Instance Number for this device needs to be selected in the **Instance Number** text box.
- **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.

- d) **Advanced Options**

- **Active Days:** Select the days when the Notification Class will be available for the specific recipient BACnet destination.

- **From:** Defines the starting time for the Notifications Class to be available during the day.
- **To:** Defines the end time for the Notifications Class to be available during the day.
- **Issue Confirmed Notifications**

4. Advanced

In this section, ACK for different transitions can be set as required and the priority of this transitions ACK too. Values for priority in this case may vary from 0 to 255.

6.2.2.2 Binary Text Configuration

Use this advanced setting section to configure the Active and Inactive text for the Binary objects. In this section the user is only creating the different available pairs for texts. Check section 0 for more information on how to apply this to a specific Binary Object. Up to **100** pairs of states can be configured.

#	Active Text	Inactive Text
0	On	Off
1	Active	Inactive
2	True	False
3	Yes	No
4	Active	Inactive

Figure 6.9 Active/Inactive text definition

6.2.2.3 Multistate Configuration

Use this menu to create lists to be applied on the Multistate Text of the Multistate Objects.

#	Num Elements	Text 0	Text 1	Text 2	Text 3	Text 4	Text 5
0	5	State text 1	State text 2	State text 3	State text 4	State text 5	
1	2	Open	Closed				
2	6	Heat	Cool	Dry	Fan	Humidify	Auto

#	Num Elements	Default State	Value 0	Value 1	Value 2	Value 3	Value 4	Value 5
0	2	0	0	2				
1	6	0	1	2	3	4	5	

Figure 6.10 State Text Manager

1. State Text Configuration

Use this section to create new state text lists or to modify the current ones available.

2. Tool Configuration

Use this section to 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 external protocol.

Check section 7.2 for more information on how to apply this to a specific Multistate Object. Up to **100** State Text Lists can be configured with a maximum of **100** elements (status) per State Text List.

6.2.2.4 Calendars

In this section, the user will be able to create calendars to be applied on the BACnet side. Up to **10** calendars can be created.

The screenshot shows the 'Calendars' configuration window. On the left, a 'Calendars List' contains 'Calendar_0', 'Calendar_1', and 'Calendar_2'. The main area is for 'Calendar_0'. It has a 'Calendar Name' field with 'Calendar_0', a 'Calendar Instance' field with '0', and a 'Calendar Entries' list with 'Entry_0' through 'Entry_7'. To the right, 'Rules' are configured with 'Date' selected, and a 'Date' field showing '10/5/2017/*'. 'Save' and 'Cancel' buttons are at the bottom right.

Figure 6.11 State Text Manager

For each calendar, the following parameters can be configured:

1. Calendar Name

Determines the name for the calendar.

2. Calendar Instance

Sets the BACnet Object Instance for this specific calendar.

3. Calendar Entries

Determines the number of calendar entries (patterns). Up to **32** different entries can be created per each calendar.

4. Rules

For each entry, different rules can be applied. Configuration for these rules can be done using either Date, Date Range or Week N Day.

- a. **Date:** The rule is related only to a specific date.

Calendars

Calendars List

Calendar Name: Calendar_0

Calendar Instance: 0

Calendar Entries: Entry_0, Entry_1, Entry_2, Entry_3, Entry_4, Entry_5, Entry_6, Entry_7

Rules: ☒ Date ☐ Date Range ☐ Week N Day

Date: 10/5/2017/*

Save Cancel

Figure 6.12 Rule – Date Selection

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

Calendars

Calendars List

Calendar Name: Calendar_0

Calendar Instance: 0

Calendar Entries: Entry_0, Entry_1, Entry_2, Entry_3, Entry_4, Entry_5, Entry_6, Entry_7

Rules: ☐ Date ☒ Date Range ☐ Week N Day

From: 10/5/2017/*

To: 10/5/2017/*

Save Cancel

Figure 6.13 Rule – Date Range Selection

c. **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.

Calendars

Calendars List

Calendar Name: Calendar_0

Calendar Instance: 0

Calendar Entries: Entry_0, Entry_1, Entry_2, Entry_3, Entry_4, Entry_5, Entry_6, Entry_7

Rules: ☐ Date ☐ Date Range ☒ Week N Day

Month: February

Week: *

WeekDay: Tuesday

Save Cancel

Figure 6.14 Rule – Week N Day Selection

6.2.2.5 Schedules

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

Schedules Configuration

Schedule_0
Schedule_1

+

-

Main Objects Weekly Schedule Exception Events Week Schedule

Schedule General Configuration

Name Schedule_0

Schedule Instance 0

Schedule Type Analog

Priority 16

Default Value 0.00

Effective Period 10/5/2017/*

10/5/2017/*

Figure 6.15 Schedules main view

1. Main

Main configuration for the schedule including:

- a. **Name**
Schedule name
- b. **Schedule Instance**
BACnet Object Instance for this specific schedule
- c. **Schedule Type**
Type of objects to apply on the schedule (Analog, Binary or Multistate). Multiple types cannot be selected.
- d. **Priority**
BACnet priority to be set on this schedule. By default, it is set to 16.
- e. **Default value**
Default value to be applied on this schedule
- f. **Effective Period**
Determine the period where the schedule applies.

2. Objects

Selection of BACnet objects to be included in a specific schedule. Notice that object types are selected in the main menu, so only the BACnet object that match the schedule type selected in the main section will be allowed.

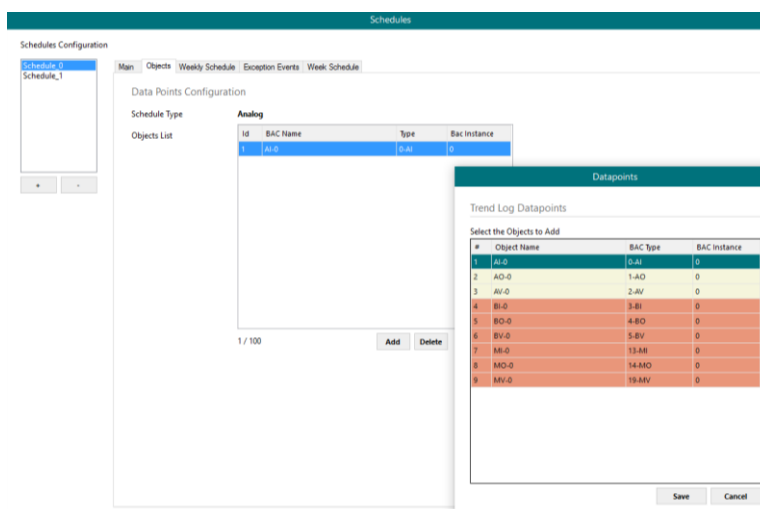


Figure 6.16 Schedules Object selection

3. Weekly Schedule

Select one-week day and the desired Time Values when the schedule needs to apply. Only 6 Time Values are allowed.

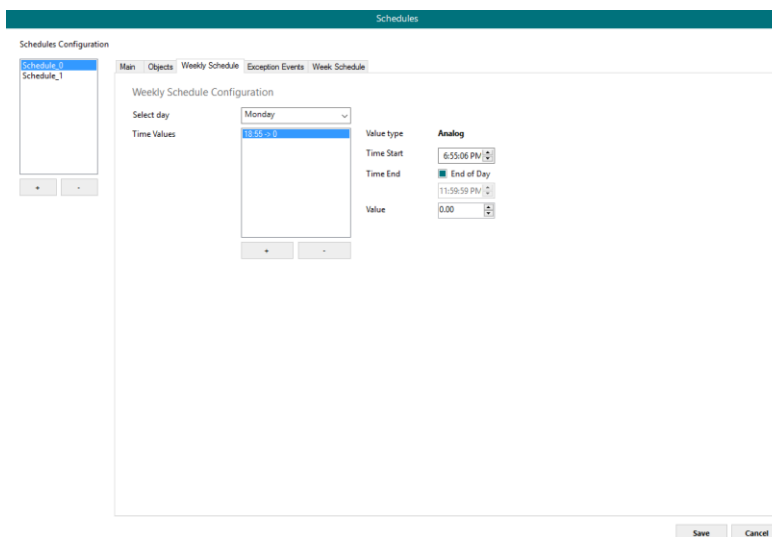


Figure 6.17 Weekly schedule configuration

4. Exception Events

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

Schedules Configuration

Exception Events Configuration

Exception Events List

Name: Exception_0

Event Priority: 16

Time Values: 18:58 -> 0

Value type: Analog

Time Start: 6:58:12 PM

Time End: End of Day

Value: 0.00

Exception Type: ☒ Date ☐ Date Range ☐ Week N Day ☐ Calendar

Date: 10/5/2017*

Save Cancel

Figure 6.18 Rule – Week N Day Selection

5. Week Schedule

Create schedules directly on a friendlier user interface modifying or creating them directly on the calendar.

Schedules Configuration

Week Schedule

Calendar view showing days of the week and times from 00 AM to 12 PM. The 10th of May is highlighted in orange.

Save Cancel

Figure 6.19 Rule – Week N Day Selection

6.2.2.6 Trend Logs

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

Trend Log Configuration

General Configuration

Name: Trend Log 0

Trend Log Instance: 715

Trend Mode: Polled

Interval: 300 sec

COV Increment: 0.00

Properties: ☒ Enabled ☒ Stop Buffer Full

Date Time Configuration

Valid TimeRange: ☐ Always ☒ Range

Start Time: 11/05/2017 17:05:58

End Time: 12/05/2017 17:05:58

Selected Objects (max 10)

Id	BAC Name	Type	BAC Instance
5	Comm Error Device 0	3-BI	2
11	Status M-BUS Device 0	0-AI	0

Buttons: Add, Delete, Save, Cancel

Figure 6.20 Trend Logs

1. **Name**
Name for the Trend Log
2. **Trend Log Instance**
BACnet Object Instance for the specific Trend Log
3. **Trend Mode**
Selection of the type of Trend mode to be used:
 - a. **Polled**
The poll cadence for this needs to be set in the Interval parameter
 - b. **COV**
The COV increment to be considered needs to be set in the COV Increment parameter
 - c. **Triggered**
It will be triggered by the BACnet BMS system
4. **Interval**
It will only apply if Trend Mode Polled is selected.
5. **COV Increment**
It will only apply if Trend Mode COV is selected.
6. **Properties**
Extra properties can be defined:
 - a. **Enable**
It allows enabling or disabling the specific Trend Log even if the Trend Log is in the valid time range.

b. 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.

7. Date Configuration

Set the period when Trend Logs will be active. It can be set as always or in a time frame or range

8. Selected Objects

Selection of objects to be included inside a Trend Log. Up to 10 different BACnet Objects can be selected.

6.3 BACnet Router

In the BACnet Router section, all parameters related to the BACnet MS/TP and IP networks can be configured.

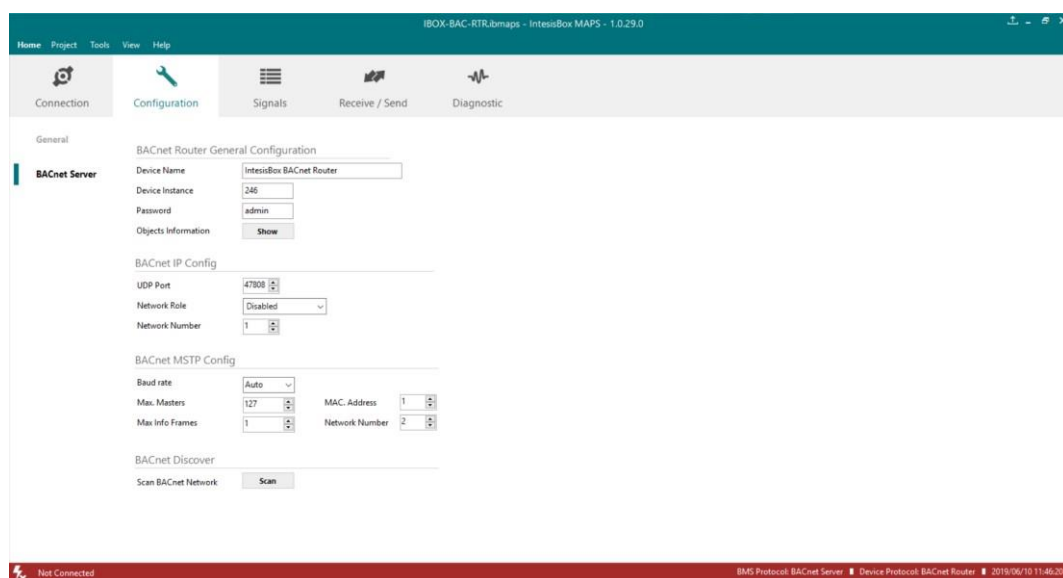


Figure 6.211 Menu and button Bar

1. Device Name

This stands for the BACnet Device Name property. It can be modified by the user using the configuration tool and from BACnet itself.

2. Device Instance

This stands for the BACnet Device Object Instance property related to this specific device. It is a unique ID for the BACnet device inside of a single BACnet network segment.

3. Password

Password required by some BACnet commands to be allowed. This needs to be checked along with the BMS integrator. If not required or not sure, it can be left as default (admin).

4. UDP Port

Select the UDP port for the BACnet/IP communications. By default, it is set to 47808 (BAC0 in HEX notation).

5. Network Role

Define how the gateway will act regarding network elements.

IMPORTANT: If not familiar with these options, please left the parameter as **Disabled** to avoid issues on the BACnet communication.

- **Disabled:** The gateway will not provide any special service regarding network communication or settings.
- **BBMD:** The gateway will act as a BBMD in the BACnet network.

Network Role BBMD

Enable	IP	Port	Network Mask	Description
<input checked="" type="checkbox"/>	192.168.100.246	47808	255.255.255.255	BBMD-1
<input type="checkbox"/>		47808	255.255.255.255	BBMD-2
<input type="checkbox"/>		47808	255.255.255.255	BBMD-3
<input type="checkbox"/>		47808	255.255.255.255	BBMD-4
<input type="checkbox"/>		47808	255.255.255.255	BBMD-5
<input type="checkbox"/>		47808	255.255.255.255	BBMD-6
<input type="checkbox"/>		47808	255.255.255.255	BBMD-7
<input type="checkbox"/>		47808	255.255.255.255	BBMD-8

Figure 6.22 BBMD configuration

6. Network Number

Define the network number for IP Network. This must be non-repeated number.

7. Baud Rate

Select the BACnet MSTP communication speed. Possible values are:

Auto | 9600 | 19200 | 38400 | 57600 | 76800 | 115200

8. Max. Masters

Define the highest master MAC address in the MS/TP network.

9. Max. Info Frames

Define the maximum number of messages that can be sent onto MS/TP network per token pass.

10. MAC address

Define the MAC address of the device in the MS/TP network.

11. Network Number

Define the network number for MS/TP Network. This must be non-repeated number.

12. BACnet Explorer

Configuration section includes functionality to scan the BACnet network for existing BACnet servers and their objects.

To access this Scan functionality window, make sure that you're online/connected with the device and click on **Scan** button.

If properly connected to the Intesis, following dialog will appear:

Figure 6.23 BACnet Explorer dialog

In top section of the window **BACnet Explorer Configuration**, following parameters are available:

- **Advanced Configuration:** In this section the way the scan is performed is configured. Following parameters can be setup:
 1. **Start and End Instance:** Search will be based on Device object instance number of present devices in the network. Search can be done on all possible Instances (0 to 4194302) or narrowed down (until even a single device) if the Device instance is known a priori, or within a certain range. Narrowing the value between start and end instance will speed up the search for BACnet devices
 2. **Step:** Number of BACnet devices queried at once.
 3. **Scan timeout:** Timeout that will wait for answer after request from a BACnet device.
 4. **Discover MSTP slaves:** Will enable scan of MSTP slave nodes (by default, only master nodes will be discovered). If enabled, **Start MAC**, **End MAC** and **Timeout** (in ms) for the scan can be adjusted.
- **Start BACnet Explorer:** Exploration of the BACnet network will start once the window **BACnet Explorer** itself is open. You can Stop and restart it (button **Stop** becomes **Start**), in order to stop scanning traffic in the BACnet network. BACnet devices found in the network will appear in **Explorer Results** section as they respond.

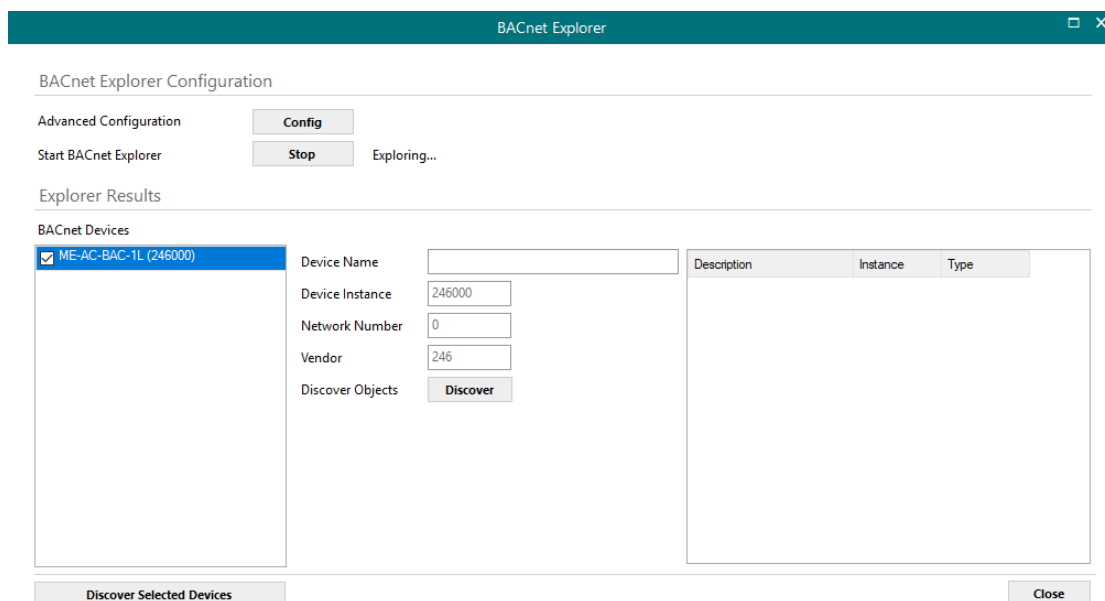


Figure 6.24 BACnet Explorer sample results on scan dialog

By clicking each of the devices, its Device Name, Instance, Network Number and Vendor Id will be given in the center of the dialog.

Once list of devices is shown, next step is obtaining their list of objects. This can be done in two ways:

- Selecting a particular device and clicking at **Discover** button
- Checking all devices whose objects are to be scanned and clicking at **Discover Checked Devices** button. This must be used with care when many devices are checked at once. Resulting scan time can become very large.

Either way, when having discovered objects under a BACnet device, they are shown in the list at the right part of the window:

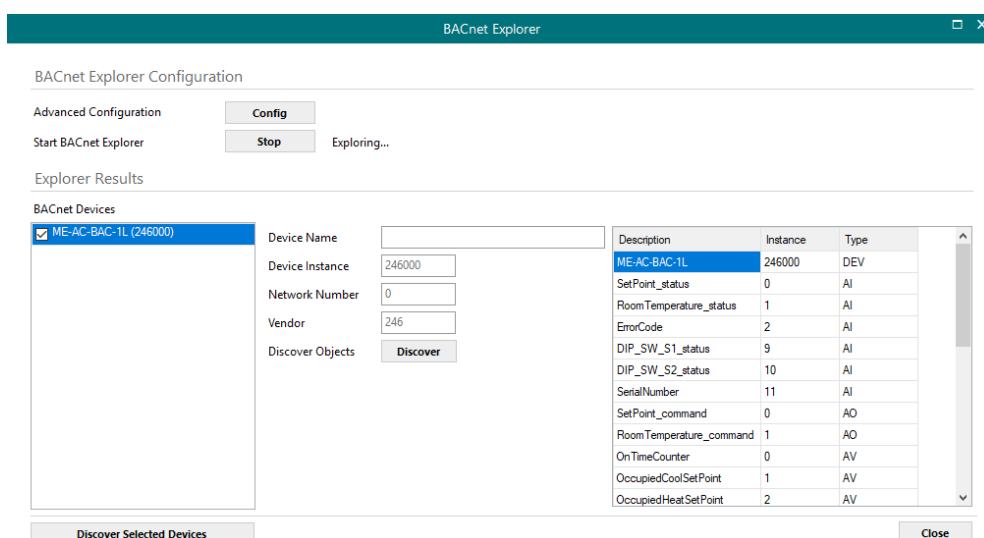


Figure 6.25 BACnet Explorer showing objects found under a BACnet device

6.4 External protocol

Please, check the Annex section and your Gateway User Manual for more information on the specific configuration of the external protocol parameters.

7. Signals

In this section, the main configuration for the signals on both external and internal protocols will be set.

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BACnet Server						Modbus Master							
#	Active	Name	Type	Instance	Units	Device	Read Func	Write Func	# Bits	Format	ByteOrder	Address	Bit
1	<input checked="" type="checkbox"/>	Comm Error Device 0	3: BI	0	-	RTU_Device 0	-	-	1	99: Error comm	-	-	-
2	<input checked="" type="checkbox"/>	Comm Error Device 1	3: BI	1	-	RTU_Device 1	-	-	1	99: Error comm	-	-	-
3	<input checked="" type="checkbox"/>	Comm Error Device 2	3: BI	2	-	RTU_Device 2	-	-	1	99: Error comm	-	-	-
4	<input checked="" type="checkbox"/>	Analog Input	0: AI	0	degrees_Celsius (62)	RTU_Device 0	3: Read analog registers	-	16	0: Unsigned	0: Big En...	0	-
5	<input checked="" type="checkbox"/>	Analog Output	1: AO	0	degrees_Celsius (62)	RTU_Device 0	-	6: Write 1 analog register	16	0: Unsigned	0: Big En...	1	-
6	<input checked="" type="checkbox"/>	Analog Value	2: AV	0	no_units (95)	RTU_Device 0	3: Read analog registers	6: Write 1 analog register	16	0: Unsigned	0: Big En...	2	-
7	<input checked="" type="checkbox"/>	Binary Input	3: BI	3	-	RTU_Device 1	1: Read digital outputs	-	1	-	-	0	-
8	<input checked="" type="checkbox"/>	Binary Output	4: BO	0	-	RTU_Device 1	-	5: Write 1 digital output	1	-	-	1	-
9	<input checked="" type="checkbox"/>	Binary Value	5: BV	0	-	RTU_Device 1	1: Read digital outputs	5: Write 1 digital output	1	-	-	2	-
10	<input checked="" type="checkbox"/>	Multistate Input	13: MI	0	-	RTU_Device 2	3: Read analog registers	-	32	0: Unsigned	0: Big En...	0	-
11	<input checked="" type="checkbox"/>	Multistate Output	14: MO	0	-	RTU_Device 2	-	16: Write multiple analo...	32	0: Unsigned	0: Big En...	2	-
12	<input checked="" type="checkbox"/>	Multistate Value	19: MV	0	-	RTU_Device 2	3: Read analog registers	16: Write multiple analo...	32	0: Unsigned	0: Big En...	4	-

☐ Auto BACname

Auto BACInst.

Active signals: 12 / -

Edit Columns

Import

Export

AA

↑

↓

+ (N)

1

⌵

-

Check table

Not Connected

BMS Protocol: BACnet Server

Device Protocol: Modbus Master

5/2/2017 4:43:32

Figure 7.1 Default view

7.1 Extra functions

Find below a list of extra functions or tools available in the Signals view.

7.1.1 Auto BACName

☒ Auto BACName

This option generates the BACnet Object Name for each signal automatically. It uses the following format to create this name automatically:

BACnetObjectType_BACnetObjectInstance_Custom_Name

Ex:

BI_0_ONOFF

└── BACnet Object Name => ONOFF
 └── BACnet Object Instance => 0
 └── BACnet Object Type => Binary Input

7.1.2 Auto BACInst.

☒ Auto BACInst.

Generates automatically all BACnet Object Instances to grant a unique identifier.

7.1.3 Edit Columns

Edit Columns

It shows/hides columns on the Signal table to help the integration tasks.

Common	BACnet Server	ModBus Master
<input checked="" type="checkbox"/> #	<input checked="" type="checkbox"/> Name	<input type="checkbox"/> #
<input checked="" type="checkbox"/> Active	<input checked="" type="checkbox"/> Type	<input checked="" type="checkbox"/> Device
<input type="checkbox"/> Conversions	<input checked="" type="checkbox"/> Instance	<input checked="" type="checkbox"/> Read Func
	<input checked="" type="checkbox"/> Units	<input checked="" type="checkbox"/> Write Func
	<input type="checkbox"/> NC	<input checked="" type="checkbox"/> # Bits
	<input type="checkbox"/> State Text	<input checked="" type="checkbox"/> Format
	<input type="checkbox"/> # States	<input checked="" type="checkbox"/> ByteOrder
	<input type="checkbox"/> Rel. Def.	<input checked="" type="checkbox"/> Address
	<input type="checkbox"/> COV	<input checked="" type="checkbox"/> Bit

Save Cancel

Figure 7.2 Edit Columns view

7.1.4 Import

Import

Import previous exported Excel files to the project. This can be useful in case you want to manage some special configuration on Excel to speed up the signals list creation. Notice that this will need to be used in very few scenarios as the Configuration Tool already offers lots of options and tips to create the signal's table in a fast and easy way.

Import

Excel Filename: Browse

☒ Replace signals ☐ Add signals

Import Cancel

Notice that there are two Import options: **Replace** and **Add Signals**.

- **Replace:** This will replace (overwrite) current signals in the Signal table.
- **Add Signals:** This will add the imported signals to the Signal table without replacing the

current ones.

7.1.5 Export



This function will allow two different types of exportations: **Excel** and **EDE**.

- **Excel:** This will export the Signal table into Excel format to allow extra manipulation or consultation from Excel. This may be helpful to share integration information with other integrators that do not have the Configuration Tool.
- **EDE:** This will export BACnet information into an EDE file format. This is useful to share BACnet information with the BACnet BMS integrator to speed up the integration time.

7.1.6 Font size



It changes the font size to help on the visualization. It is a toggle function: on each click it will change from big to small and vice versa.

7.1.7 Move Up/Down



It moves one row Up or Down the selected signal inside the Signal table on each click.

7.1.8 Add Multiple Rows



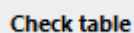
It adds new signals to the Signal table. The number of new signals can be selected in the text box.

7.1.9 Delete Rows



It deletes the selected rows. If it is required to erase more than one signal (row), select them previously and then press the **Delet Rows** button to erase all selected rows.

7.1.10 Check Table



These options verify that the current configuration in the Signal Table is OK from a theoretical point of view. That means that this check will not include integration issues related to bad addresses, mistakes or confusions of the integrator's information. It will only check that the standard defined


conditions and properties are fulfilled.


7.2 Signals configuration


Next, there is the description for common and BACnet specific parameters to be configured on each signal.


new_project.ibmaps * - IntesisBox MAPS


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			BACnet Server								
	#	Active	Name	Type	Instance	Units	NC	State Text	# States	Rel. Def.	COV
	1	<input checked="" type="checkbox"/>	Comm Error Device 0	3: BI	0	-	-	-	-	-	-
	2	<input checked="" type="checkbox"/>	Comm Error Device 1	3: BI	1	-	-	-	-	-	-
	3	<input checked="" type="checkbox"/>	Comm Error Device 2	3: BI	2	-	-	-	-	-	-
▶	4	<input checked="" type="checkbox"/>	Analog Input	0: AI	0	degrees_Celsius (62)		...	-	-	0
	5	<input checked="" type="checkbox"/>	Analog Output	1: AO	0	degrees_Celsius (62)	-	-	-	0	0
	6	<input checked="" type="checkbox"/>	Analog Value	2: AV	0	no_units (95)	-	-	-	-	0
	7	<input checked="" type="checkbox"/>	Binary Input	3: BI	3	-	-	-	-	-	-
	8	<input checked="" type="checkbox"/>	Binary Output	4: BO	0	-	-	-	-	0	-
	9	<input checked="" type="checkbox"/>	Binary Value	5: BV	0	-	-	-	-	-	-
	10	<input checked="" type="checkbox"/>	Multistate Input	13: MI	0	-	-	-	65535	-	-
	11	<input checked="" type="checkbox"/>	Multistate Output	14: MO	0	-	-	-	65535	1	-
	12	<input checked="" type="checkbox"/>	Multistate Value	19: MV	0	-	-	-	65535	-	-

1. Active

If selected, the signal will be considered in the configuration and will be downloaded to the Gateway as active.

2. Name

BACnet Object Name to be applied to the signal

3. Type

It can be selected depending on the different BACnet Object Types

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

4. Instance

BACnet Object Instance.

5. Units

If required, units for this signal can be defined (°C, Kg, kW...)

6. NC

It is used to select which Notification Class from the ones defined in section 6.2.2.1 will be used.

7. State Text

For Multistate Objects, it is used to select which State Text List from the ones defined in section 6.2.2.3 will be used.

For Binary Objects, it is used to select which State Text List from the ones defined in section 6.2.2.2 will be used.

8. #States

It sets the number of states for the Multistate Objects. It only applies if the State Text is not selected.

9. Rel. Def.

It is used to define the Relinquish Default value.

10. Cov.

It is used to define the COV (Change Of Value) increment.

11. Conversion

It is used to define the conversion that you want to apply. This conversion can be checked or selected as stated in section 6.1.

7.3 Tips and tricks

7.3.1 Text Edit

On editable cells, click on the cell. The text is going to be highlighted and it can then be modified.

7.3.2 Multiple Values selection

1. Select using the left mouse button (clicking and dragging), the field of all the rows in the list which you want to change the values (must be consecutive rows). In case you want to use non-consecutive rows, use the CTRL+click option.
2. Click in the cell options icon.
3. A contextual menu with the possible values will show up (Figure 7.3)
4. Select the desired value.
5. All the selected cells are going to be changed to the chosen value

-	16	0: Unsigned	0: Big En...	0
6: Write 1 analog register	16	1: Signed (C2)	0: Big En...	1
6: Write 1 analog register	16	1: Signed (C2)	0: Big En...	0
6: Write 1 analog register	16	1: Signed (C2)	0: Big En...	0
6: Write 1 analog register	16	1: Signed (C2)	0: Big En...	2
16: Write multiple analo...	32	1: Signed (C2) ▾	0: Big En...	4

-
 0: Unsigned
 1: Signed (C2)
 2: Signed (C1)
 3: Float
 4: BitFields

Figure 7.3 Multiple value selection

7.3.3 Auto numeration

In some cells values, can be either modified one by one or auto numerated. To do so follow the steps below:

1. Select using the left mouse button (clicking and dragging), the field of all the rows in the list which you want to automatically assign values (must be consecutive rows). In case you want to use non-consecutive rows, use the CTRL+click option.
2. Click right mouse button over the selected fields and select *Auto Enumeration* option from the pop-up menu that will appear.

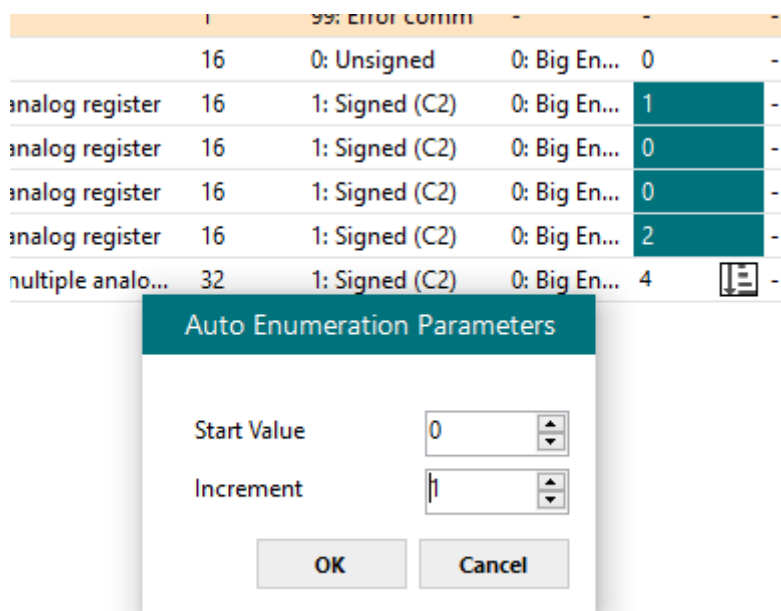


Figure 7.4 Auto numeration selection

3. Enter the Start Value.

4. Enter the increment between consecutive assignments.

For example selecting 100 for the first value and an increment of 1, the values generated will be 100, 101, 102, 103, 104.. and so on. To assign the same value to all the rows (useful to assign the same Device number in the column *Dev* for some consecutive rows) just select the desired value and an increment of 0.

5. The values are changed accordingly.

16	1: Signed (C2)	0: Big En...	100	-
16	1: Signed (C2)	0: Big En...	101	-
16	1: Signed (C2)	0: Big En...	102	-
16	1: Signed (C2)	0: Big En...	103	-
32	1: Signed (C2)	0: Big En...	104	-

Figure 7.5 Values auto numerated

8. Send/Receive

8.1 Send

This option will send the current configuration to the Gateway.

If the project was not saved, it will ask you first to save the changes and afterwards starts the download.

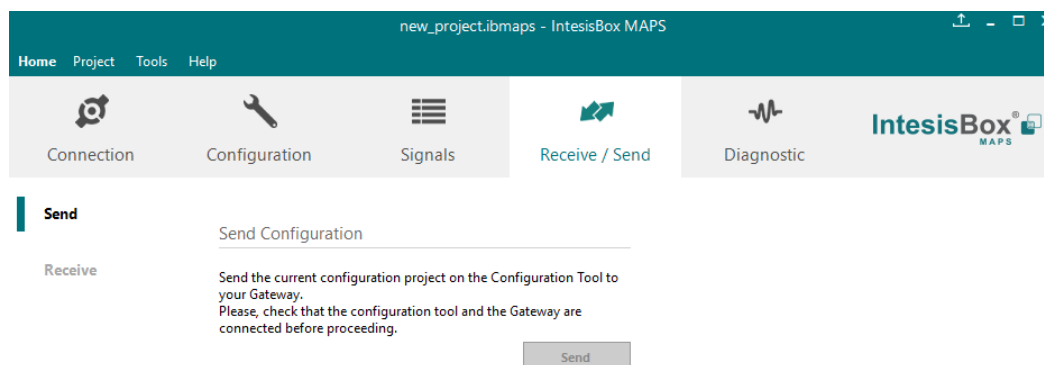


Figure 8.1 Button Bar

8.2 Receive

This option will download the current configuration from the Gateway to be stored in the PC.

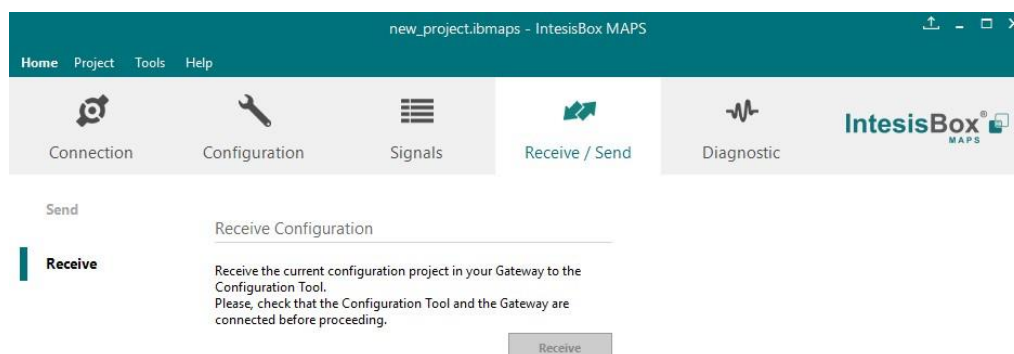


Figure 8.2 Button Bar

9. Diagnostic

To help integrators in the commissioning tasks and troubleshooting, the Configuration Tool offers some specific tools and viewers.

In order to start using the diagnostic tools, connection with the Gateway is required.

The Diagnostic section is composed by two main parts: Tools and Viewer.

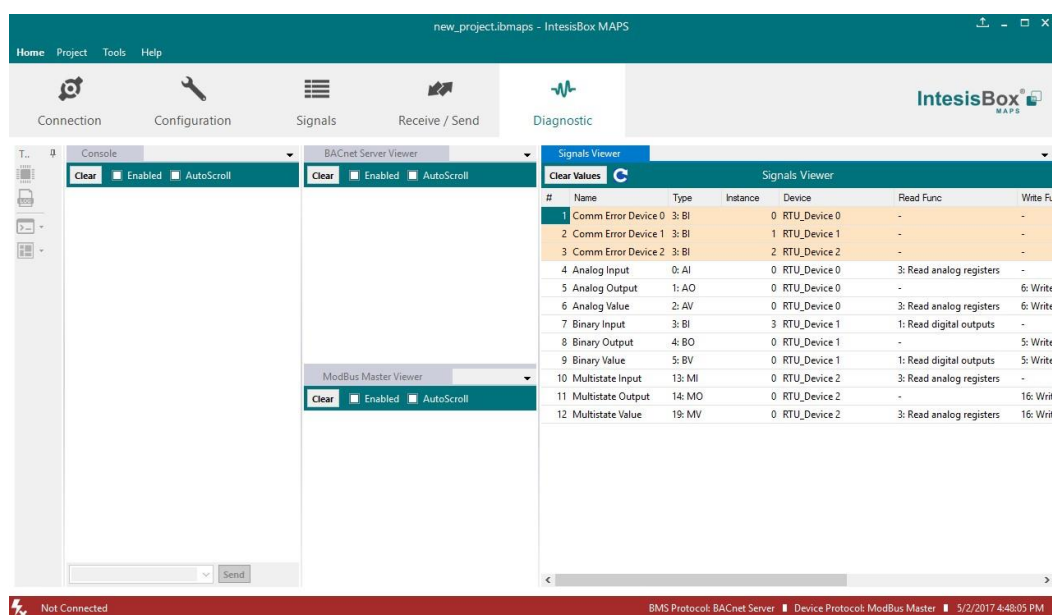


Figure 9.1 Diagnostic

9.3 Tools

The tool bar located in the left side of the window.



Figure 9.2 Tool bar

It offers 4 main tools:

9.3.1 Hardware Test

It initiates a hardware test on the gateway to identify possible hardware issues. During the hardware test, standard communications with external and internal protocols will stop.

9.3.2 Log

It sets the Configuration Tool into *logging mode*. This will record all information present in all viewers and zip it in a compressed file. This file can be then sent to the support team to help in any issue you may have.

9.3.3 Commands

It is used to send specific commands to the Gateway, such as:

- INFO?: Requests general information from the Gateway
- RESET: Resets the Gateway
- Enable COMMS: Enable communications in all viewers
- Disable COMMS: Disables communications in all viewers

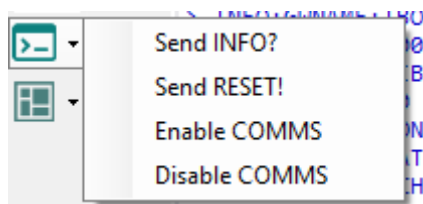


Figure 9.3 Available commands

9.3.4 View preferences

It offers several viewers layouts to help the integrator checking the required information on each moment.

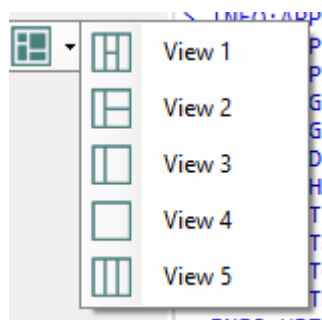


Figure 9.4 View selection

Notice that apart from the predefined options, the user will be able to place the different viewers according to its own needs manually.

9.4 Viewers

The Configuration Tool offers 3 different viewers to monitor communications: **Console**, **Internal Protocol (BACnet Server)** and **External Protocol**.

On each viewer, there are some common options:

- **Clear**
It clears all information in the viewer.
- **Enable**
It enables/disables the information to be shown in the viewer. It may be helpful if information from a specific viewer is not required and communication payload is required to be reduced to improve another viewers' performance.
- **Autoscroll**
It enables/disables autoscroll on the specific viewer so when new information is received the viewer automatically will scroll down to allow last information to be visible.

9.4.1 Console

It is used to display general information of the gateway not related to specific Internal or External protocol communication. Remember that the Gateway needs to be connected in order to get the logs.

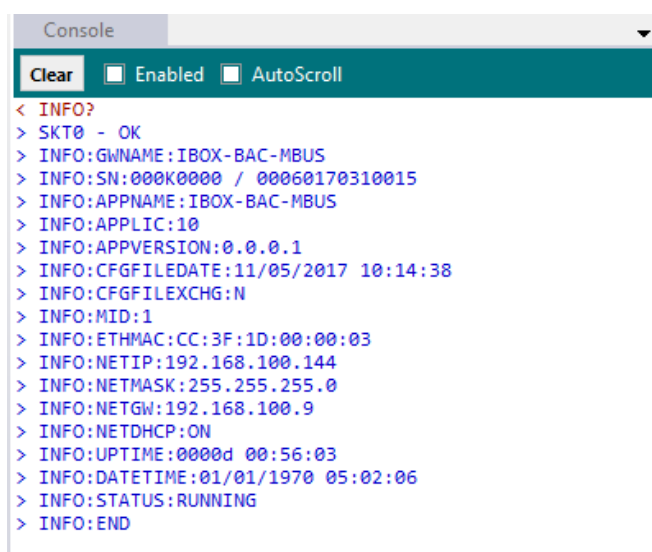


Figure 9.5 Console View

9.4.2 BACnet Server Viewer

To monitor the BACnet bus, the software needs to be connected to the Gateway. It shows frames related to the BACnet communication.

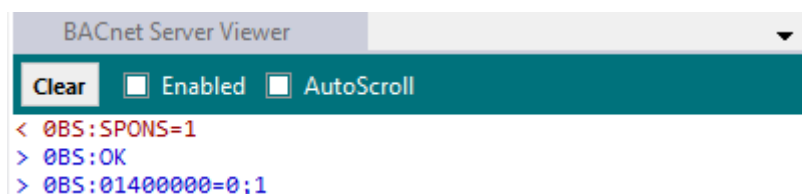


Figure 9.6 Console View

9.4.3 External Protocol Viewer

To monitor the External protocol bus, the software needs to be connected to the Gateway. It shows frames related to the External protocol communication.

9.4.4 Signals Viewer

To supervise the configured signals, either being connected to the Gateway or not, check the Signals Viewer window. This window shows all active signals within the gateway with its main configuration parameters and its real-time value (if connected to the Gateway).

Signals Viewer										
Signals Viewer										
#	Name	Type	Instance	Device	Read Func	Write Func	Address	Priority	BACnet Serve...	ModBus Mast...
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	-	-	-			
4	Analog Input	0: AI	0	RTU_Device 0	3: Read analog registers	-	0			
5	Analog Output	1: AO	0	RTU_Device 0	-	6: Write 1 analog register	1	16 ▾		
6	Analog Value	2: AV	0	RTU_Device 0	3: Read analog registers	6: Write 1 analog register	2			
7	Binary Input	3: BI	3	RTU_Device 1	1: Read digital outputs	-	0			
8	Binary Output	4: BO	0	RTU_Device 1	-	5: Write 1 digital output	1	16 ▾		
9	Binary Value	5: BV	0	RTU_Device 1	1: Read digital outputs	5: Write 1 digital output	2			
10	Multistate Input	13: MI	0	RTU_Device 2	3: Read analog registers	-	0			
11	Multistate Output	14: MO	0	RTU_Device 2	-	16: Write multiple analo...	2	16 ▾		
12	Multistate Value	19: MV	0	RTU_Device 2	3: Read analog registers	16: Write multiple analo...	4			

Figure 9.7 Signal Viewer

If you connect to the Intesis when it's been running for a certain time, you should press the *Refresh* button to get updated values.

In order to force a specific value to a signal, double-click its *Value* field. This will display a dialog in which the desired value can be entered. This change will be transferred to the internal and External Protocol depending on their configurations (more information in the signals configuration of the User Manual of the Used Intesis).

9.4.5 Filtering

To improve the visualization in the diagnostic section, a filtering mode is available. This filtering mode is selectable right clicking on the bus viewer.

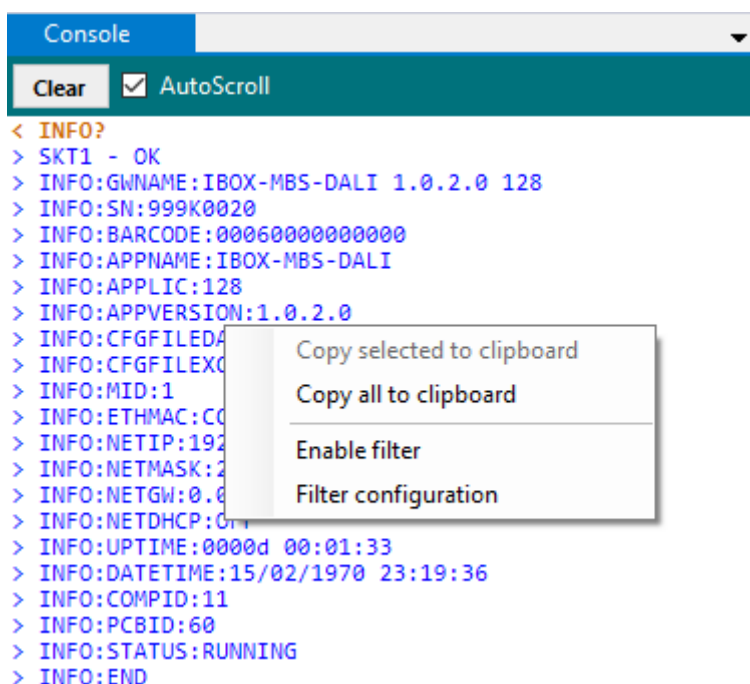


Figure 9.8 Filter contextual menu

- **Copy selected to clipboard**

It copies to clipboard the selected information.

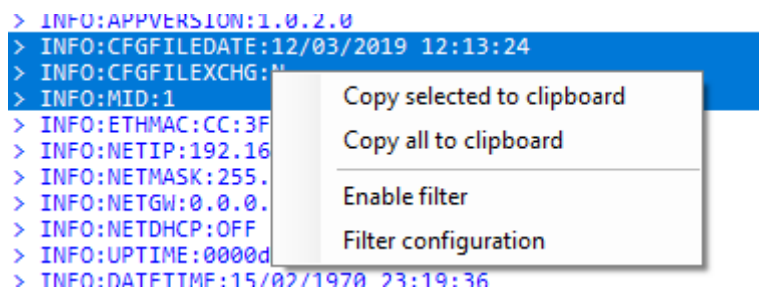


Figure 9.9 Copy selected to clipboard

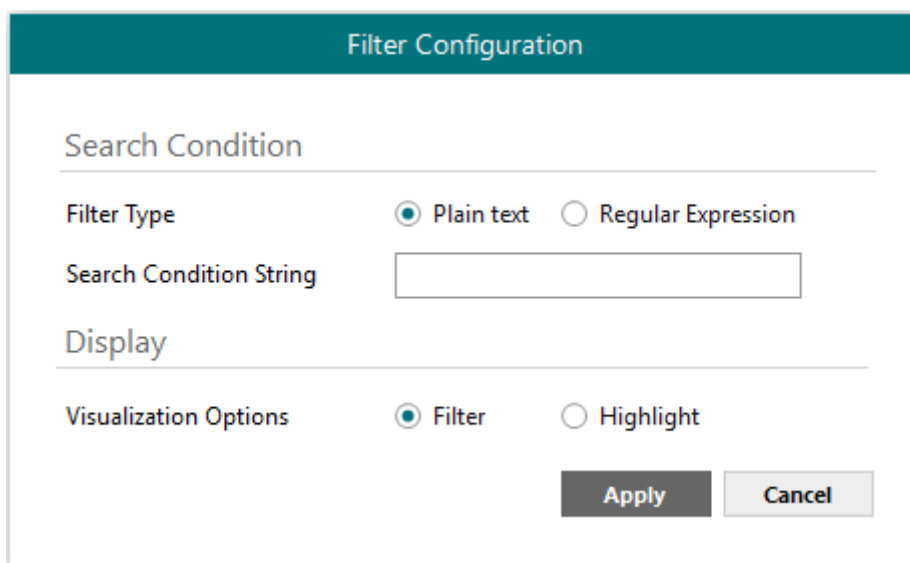
If no lines are selected, the option **Copy selected to clipboard** is grayed out.

- **Copy all to clipboard**

It copies all information in the bus viewer to the clipboard.

- **Enable filter**

It enables/disables the configured filters. Click on the **Filter configuration** option to properly configure the filter.



The image shows a 'Filter Configuration' dialog box with a teal header. It is divided into two sections: 'Search Condition' and 'Display'. In the 'Search Condition' section, there are two radio buttons for 'Filter Type': 'Plain text' (selected) and 'Regular Expression'. Below this is a text input field for 'Search Condition String'. In the 'Display' section, there are two radio buttons for 'Visualization Options': 'Filter' (selected) and 'Highlight'. At the bottom right, there are 'Apply' and 'Cancel' buttons.

- **Search condition**

The software offers two different types of filter:

- a) **Plain Text**

It searches all communication frames including the plain text introduced in the *Search Condition String*.

- b) **Regular expressions**

It searches all communication frames fulfilling the regular expression in the *Search Condition String*. If you are not familiar with regular expressions, we recommend the use of the Plain Text option.

- **Display**

There are two options regarding on how to show the filtered frames:

- a) **Filter**

It removes all communication frames that do not fulfill the filter condition selected in the **Search Condition**.

- b) **Highlight**

It only highlights the communication frames that fulfill the filter condition selected in the **Search Condition**.

10. External protocols

10.1 KNX

10.1.1 Standard configuration

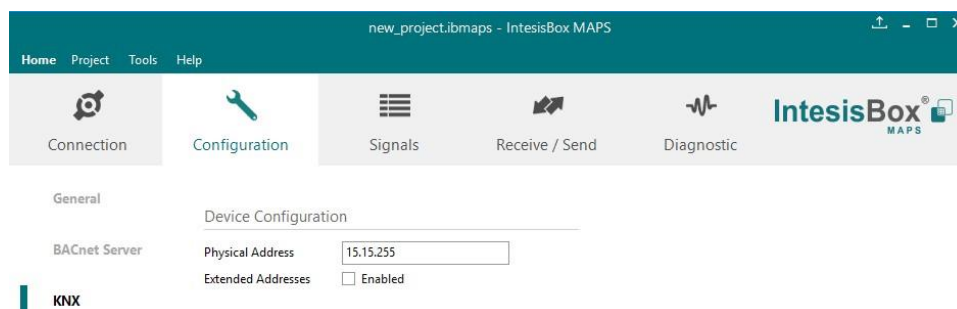


Figure 10.1 KNX configuration

1. Physical Address

This parameter is used to set the KNX Physical Address (Individual Address) to set to the gateway. This is a unique identifier for the gateway inside a single KNX TP-1 segment. Max value is 15.15.255.


2. Extended Addresses

This parameter is used to enable the use of KNX Extended Addresses. By enabling this setting, the range of KNX group addresses available increases from the standard 15/7/255 to 31/7/255.


IMPORTANT: Please, do not enable this feature unless required or under clear control of the integrator.

10.1.2 Signals configuration


Next, there is the description for common and KNX specific parameters to be configured on each signal.




figuration




Signals



Receive / Send



Diagnostic



KNX										
Data Ty...	DPT	Sending	Listening	U	T	Ri	W	R	Priority	
0	1.005: alarm	0/0/100			T			R	3: Low	
0	1.005: alarm	0/0/101			T			R	3: Low	
0	1.005: alarm	0/0/102			T			R	3: Low	
0	1.001: switch	0/0/1			T			R	3: Low	
0	1.001: switch	0/0/2		U			W		3: Low	
0	1.001: switch	0/0/3		U	T		W	R	3: Low	
8	9.001: temperature (C)	0/0/4			T			R	3: Low	
8	9.001: temperature (C)	0/0/5		U			W		3: Low	
8	9.001: temperature (C)	0/0/6		U	T		W	R	3: Low	
7	5.010: counter pulses (0..255)	0/0/7			T			R	3: Low	
7	5.010: counter pulses (0..255)	0/0/8		U			W		3: Low	
7	5.010: counter pulses (0..255)	0/0/9		U	T		W	R	3: Low	

Figure 10.2 KNX signals

1. Data Type

EIS data type corresponding to the selected DPT column. Not editable, just for information.

2. DPT

Select the KNX Data Point Type (DPT) to be used for each signal or KNX communication object.

3. Sending

KNX sending group address associated to the communication object. 2 (P/S) and 3 (P/I/S) level format is supported.

4. Listening

KNX listening group address associated to the communication object. 2 (P/S) and 3 (P/I/S) level format is supported. More than one group address can be used, comma separated.

5. U

If selected, the KNX Communication Object will be updated after a KNX bus failure.

6. T

If selected, the KNX Communication Object will be updated when a transmit telegrams are sent from KNX.

7. Ri

If selected, the KNX Communication Object will be updated on initialization.

8. W

If selected, the KNX Communication Object is ready to be written from KNX.

9. R

If selected, the KNX Communication Object is ready to be read from KNX.

10. Priority

Define the KNX priority for each KNX Communication Object. Values go from 0 to 3, being the '0' the one with the highest priority and 3 the one with the lowest priority.

10.2 Modbus Master

10.2.1 Standard Configuration

Figure 10.3 Modbus Master configuration

1. Modbus Type

Select the type of Modbus communication required with the Modbus Slave devices:

1. Modbus RTU

Modbus connection through EIA485.

2. Modbus TCP

Modbus connection through Ethernet. More than one Modbus master device allowed.

3. Both

Modbus RTU and Modbus TCP connections active and allowed simultaneously.

2. RTU devices configuration

Depending on selection made on Modbus type parameter, different options will be available.

1. Modbus RTU

There are two main sections to configure: the node and the device itself.

For the node, the user can configure the following parameters:

- **Baud rate**
Defines the communication speed for the RTU communication.
Values from 2400 to 115200 bps
- **Data Type**
8 bits of data / Parity / Stop bits
- **Time Interframe**
Minimum time between received frame and sent frame.
Values from 0 to 2000 ms.
- **Add Device**
Creates new devices to be included in the configuration.

Modbus Type ☒ RTU ☐ TCP ☐ Both

RTU Devices Configuration

RTU Node

Device 0

Device 1

Device 2

Baudrate

9600

Data type

8bit / None / 1

Time InterFrame

60

ms

Add Device

1

Create

Figure 10.4 Modbus RTU node configuration

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

RTU Devices Configuration

RTU Node

Device 0

Device 1

Device 2

Device Name

Device 0

Slave Number

10

Delete Device

Delete

Device Timeout

1000

ms

Figure 10.5 Modbus RTU device configuration

- **Device Name**
Descriptive name for the Modbus RTU slave device
- **Slave Number**
Modbus slave address
- **Delete Device**
This option deletes the current selected device
- **Device Timeout**
Time to wait before sending a timeout message if there is no response from the slave device.

2. Modbus TCP

For the Modbus TCP, the following standard parameters can be configured:

- **Name**
Descriptive device name
- **IP**
IP for the Modbus TCP server to connect
- **Port**
Port for the Modbus TCP server to connect. By default, it is 502 (standard)
- **Add Device**
Adds as many devices as the ones set in the combo box.

Modbus Type ☐ RTU ☒ TCP ☐ Both

RTU Devices Configuration

☐ RTU Node

☐ Node 0 (192.168.100.65:502)

Add Node

Delete Node

Name

Node 0

IP

192.168.100.65

Port

502

Add Device

1

Create

☒ Advanced Configuration

Time InterFrame

10

ms

Retry Timeout

5000

ms

Conn. Timeout

10000

ms

Rx Timeout

5000

ms

Time Slave Chg

100

ms

Figure 10.6 Modbus TCP node configuration

Moreover, the following advanced settings can be configured too:

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

3. Both

In this case, simply both options are active and enabled.

Modbus Type ☐ RTU ☐ TCP ☒ Both

RTU Devices Configuration

☐ RTU Node

- ☐ Device 0
- ☐ Device 1
- ☐ Device 2
- ☒ Node 0 (192.168.100.65:502)

NameNode 0

IP192.168.100.65

Port502

Add Device1

☒ Advanced Configuration

Time InterFrame10 ms

Retry Timeout5000 ms

Conn. Timeout10000 ms

Rx Timeout5000 ms

Time Slave Chg100 ms

Figure 10.7 Modbus TCP node configuration

3. Modbus Poll Records

The gateway allows the use of Modbus Poll Records.

Available options for poll records will be shown in the Poll Records window according to the current Modbus configuration.

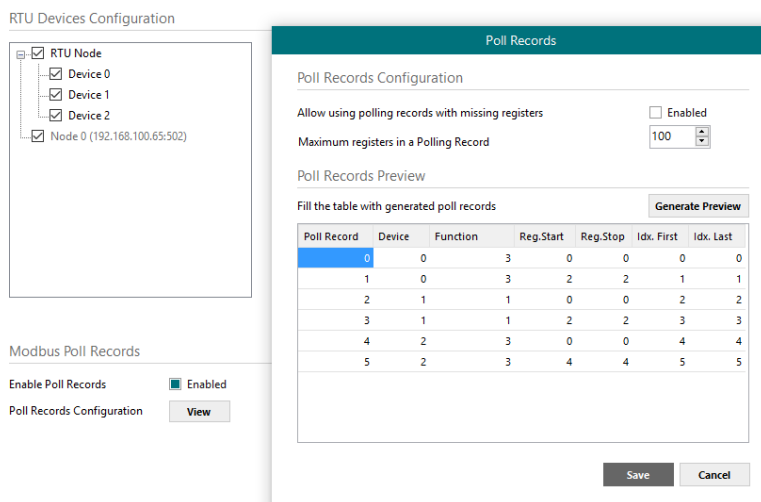


Figure 10.8 Modbus Poll Records configuration

1. Allow using polling records with missing registers

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

2. Maximum registers in a Polling Record

Max number of registers to be grouped in a single Poll Record.

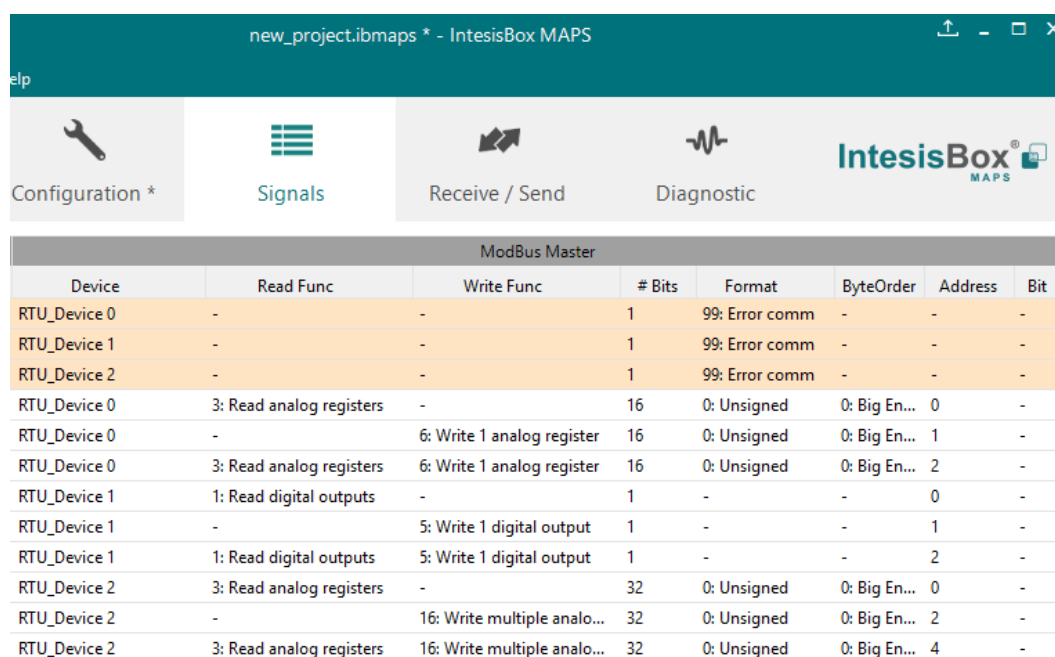
3. Poll Records Preview

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

10.2.2 Signals configuration

For the Modbus configuration as an external protocol, the following parameters need to be considered:

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



The screenshot shows the 'new_project.ibmaps * - IntesisBox MAPS' window. The 'Configuration *' tab is active, displaying a table titled 'ModBus Master'. The table has 8 columns: Device, Read Func, Write Func, # Bits, Format, ByteOrder, Address, and Bit. The table lists configurations for three RTU devices (RTU_Device 0, RTU_Device 1, and RTU_Device 2) with various read and write functions and bit fields.

Device	Read Func	Write Func	# Bits	Format	ByteOrder	Address	Bit
RTU_Device 0	-	-	1	99: Error comm	-	-	-
RTU_Device 1	-	-	1	99: Error comm	-	-	-
RTU_Device 2	-	-	1	99: Error comm	-	-	-
RTU_Device 0	3: Read analog registers	-	16	0: Unsigned	0: Big En...	0	-
RTU_Device 0	-	6: Write 1 analog register	16	0: Unsigned	0: Big En...	1	-
RTU_Device 0	3: Read analog registers	6: Write 1 analog register	16	0: Unsigned	0: Big En...	2	-
RTU_Device 1	1: Read digital outputs	-	1	-	-	0	-
RTU_Device 1	-	5: Write 1 digital output	1	-	-	1	-
RTU_Device 1	1: Read digital outputs	5: Write 1 digital output	1	-	-	2	-
RTU_Device 2	3: Read analog registers	-	32	0: Unsigned	0: Big En...	0	-
RTU_Device 2	-	16: Write multiple analo...	32	0: Unsigned	0: Big En...	2	-
RTU_Device 2	3: Read analog registers	16: Write multiple analo...	32	0: Unsigned	0: Big En...	4	-

Figure 10.9 Modbus signals configuration

10.3 M-Bus

10.3.1 Standard configuration

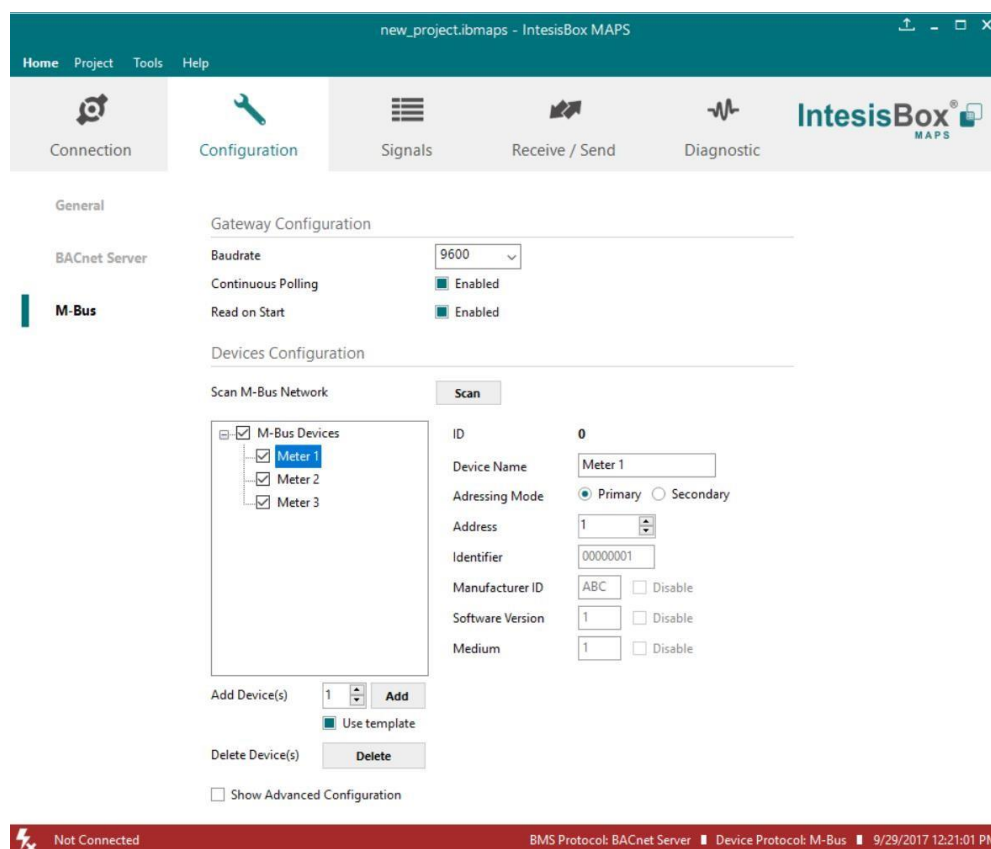


Figure 10.10 M-Bus configuration

1. Gateway configuration

Select the type of Modbus communication required with the Modbus Slave devices:

A. Baudrate

Determines the baudrate connection for the M-Bus gateway. Values may be set to:

- 300 bps
- 600 bps
- 1200 bps
- 2400 bps
- 4800 bps
- 9600 bps

B. Inter-Polling Gap

Delay between two consecutive polling cycles.

C. Continous Polling

Enables/Disables continuous polling from the gateway to the connected M-Bus meters and or devices.

2. Devices configuration

A. Scan M-Bus Network

This option forces the box to scan the M-Bus network, searching for devices.

Scan M-Bus Network

Scan Configuration

M-Bus Scan Mode: ☒ Primary Address ☐ Secondary Address ☐ Single Device

Primary Address Config: Start Address 0 End Address 143

Baudrates: ☐ 300 bps ☐ 600 bps ☐ 1200 bps ☐ 2400 bps ☐ 4800 bps ☒ 9600 bps

Advanced Configuration: **Advanced**

Scan Status: **Scan** **Stop**

Scan Results

Meters Newly Detected

- ☒ Device 0
- ☒ Device 1

Address: 143 Version: 29

Identifier: 68614143 Medium: 22

Manufacturer ID: KAM Export to File: **Export**

Available Baudrates: 9600

Available Registers

Add	Description	Scale	Unit	Reg
<input checked="" type="checkbox"/>	VOLUME	-3	m3	0
<input checked="" type="checkbox"/>	VOLUME	-3	m3	1
<input checked="" type="checkbox"/>	ON TIME	0	h	2
<input checked="" type="checkbox"/>	VOLUME FLOW	-3	m3/h	3
<input checked="" type="checkbox"/>	FLOW TEMP	0	C	4

☒ Replace Meters / Signals ☐ Replace Meters ☐ Add Meters **Save** **Cancel**

Figure 10.11 M-Bus scan options

- **Scan configuration:**

- **M-Bus Scan Mode:**

- 1. Primary Address**

If this option is selected, the scan will be done using primary address. **Start Address** and the **End Address** can be adjusted to minimize the scan period. Value ranges may vary from 0 to 254.

- 2. Secondary Address**

If this option is selected, the scan will be done using the secondary address.

- 3. Single Device**

If this option is selected, the scan will be done using a broadcast message sent to the M-Bus bus. If this option is used, only one single M-Bus device must be connected to the bus.

- **Primary Address Config:**
 - a) **Start Address**
Indicates the M-Bus meter starting address for the Scan process.
 - b) **End Address**
Indicates the M-Bus meter ending address for the Scan process.
- **Baudrates:**
It is used to select the different baudrates to be used during the scan process of the M-Bus bus. Multiple selection can be used.
- **Advanced Configuration:**

Baudrate	Timeout
300 bps	10500
600 bps	5500
1200 bps	3000
2400 bps	1500
4800 bps	1000
9600 bps	500

Figure 10.12 M-Bus advanced scan options

Select a general Time Interframe and a specific timeout for each individual baudrate. If not sure about these parameters, please let them as by default.

- **Scan status:**
 - **Start scan:**
 - a) **Start**
It initiates the scan process for the M-Bus network.
 - b) **Stop**
It stops the scan process in case it has not finished yet and the user needs to stop it.

- **Scan results:**
 - **Meters newly detected**
List of the new meters found after the scan process is finished or stopped by the user.
 - **Address**
It shows the current M-Bus address of the selected device.
 - **Version**
It shows the current M-Bus program version of the selected device.
 - **Identifier**
It shows the current M-Bus identifier of the selected device.
 - **Medium**
It shows the current M-Bus medium used by the selected device.
 - **Manufacturer ID**
It shows the current M-Bus Manufacturer ID of the selected device.
 - **Export to file**
This option exports the M-Bus information from the meter in a file with a pre-defined template format. This file can be imported to add new devices in the configuration easily.
 - **Available Registers**
List of all the available registers for each M-Bus meter.
 - **Replace Meters/Signals**
If this option is active, the current meters and signals (registers) present in the configuration will be erased and imports the meters and signals (registers) selected in the Scan Results section.
 - **Replace Meters**
If this option is active, the current meters present in the configuration will be erased and imports the meters and signals (registers) selected in the Scan Results section. The current meters signals will be kept in the configuration.
 - **Add Meters**
If this option is active, the current meters and signals (registers) present in the configuration will be kept and imports the meters and signals (registers) selected in the Scan Results section.

Scan Results

Meters Newly Detected

☒ Device 0
☒ Device 1

Address: 143 Version: 29
Identifier: 60614143 Medium: 22
Manufacturer ID: KAM Export to File: **Export**
Available Baudrates: 9600

Available Registers

Add	Description	Scale	Unit	Reg
<input checked="" type="checkbox"/>	VOLUME	-3	m3	0
<input checked="" type="checkbox"/>	VOLUME	-3	m3	1
<input checked="" type="checkbox"/>	ON TIME	0	h	2
<input checked="" type="checkbox"/>	VOLUME FLOW	-3	m3/h	3
<input checked="" type="checkbox"/>	FLOW TEMP	0	C	4

☒ Replace Meters / Signals ☐ Replace Meters ☐ Add Meters **Save** **Cancel**

Figure 10.13 Scan Results information

10.3.2 Advanced configuration

☒ Show Advanced Configuration

Advanced Configuration

Manage Timeouts Advanced

Reset Values on Start ☐ Enabled

Inter-Polling Gap s

Figure 10.14 Scan Results information

- **Manage Timeouts**

This section allows specific configurations for each baud rate during standard communication.

If you are not familiar with these values, please left it as default.

Timing Management

Time Interframe ms

Specify the timeout for each Baudrate. This timeout will be used once the baudrate is selected

	Timeout Reset Response (ms)	User Data Response (ms)
300 bps	<input type="text" value="10500"/>	<input type="text" value="10500"/>
600 bps	<input type="text" value="5500"/>	<input type="text" value="5500"/>
1200 bps	<input type="text" value="3000"/>	<input type="text" value="3000"/>
2400 bps	<input type="text" value="1500"/>	<input type="text" value="1500"/>
4800 bps	<input type="text" value="1000"/>	<input type="text" value="1000"/>
9600 bps	<input type="text" value="500"/>	<input type="text" value="500"/>

Apply Cancel

Figure 10.15 Scan Results information

- **Reset Values on read**

If active, before reading any M-Bus register, the gateway will force the meter to update the register value to its last valid known value. This ensures updated values on the BACnet side.

- **Inter-Polling Gap**

This parameter is used to determine the time left between the two consecutive polling cycles.

10.3.3 Signals configuration

M-Bus			
#	Device	M-Bus Code	Register
1	-	0: Comm Error	-
2	-	1: Force bus reading	-
3	-	2: Continuous Polling	-
4	-	3: Bus Activity	-
5	Meter 1	0: Comm Error	-
6	Meter 2	0: Comm Error	-
7	Meter 3	0: Comm Error	-
8	Meter 1	4: Force Device reading	-
9	Meter 2	4: Force Device reading	-
10	Meter 3	4: Force Device reading	-
11	Meter 1	5: M-BUS Status	-
12	Meter 2	5: M-BUS Status	-
13	Meter 3	5: M-BUS Status	-
14	Meter 1	6: Measure	0
15	Meter 1	6: Measure	1
16	Meter 1	6: Measure	2
17	Meter 2	6: Measure	0
18	Meter 2	6: Measure	1
19	Meter 2	6: Measure	2
20	Meter 3	6: Measure	0
21	Meter 3	6: Measure	1
22	Meter 3	6: Measure	2

Figure 10.16 Scan Results information

1. Device

Indicates the M-Bus meter or device the signal is referred to.

2. M-Bus Code

Indicates the M-Bus type of signal:

- **0: Com Error**

This type only applies for the virtual signal used to indicate a communication error. It may apply to communication errors between the gateway and the M-BUS installation or devices or between the gateway and the BACnet installation.

- **1: Force bus reading**

This type indicates that this signal can only be applied to force a bus reading in a single moment.

- **2: Continuous Polling**

This type indicates that this signal is used to activate the M-Bus continuous polling. That means that the gateway will poll continuously the M-Bus devices.

NOTE: Keep in mind that some meters use batteries, so continuous polling may reduce the battery life significantly.

- **3: Bus Activity**

This type indicates that this signal is used to show the M-Bus activity.

- **4: Force Device reading**

This type indicates that this signal is used to force a device reading in a certain moment.

- **5: M-BUS Status**

This type indicates that this signal is used to show the current status of the M-Bus device.

- **6: Measure**

This type indicates that this signal is used to show measures provided by the M-Bus meter or device.

3. Register

Indicates the corresponding register address of the value that's going to be read from the meter.

10.4 PROFINET

10.4.1 Standard configuration

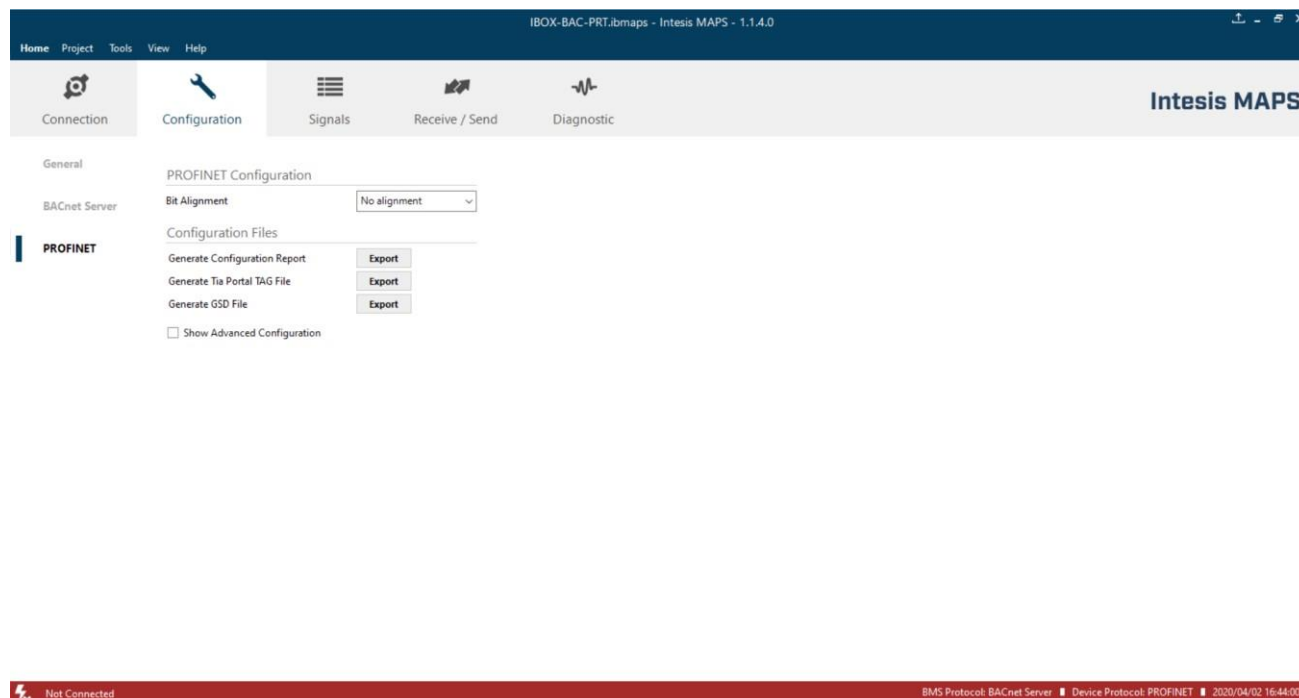


Figure 10.17 PROFINET configuration

1. PROFINET Configuration

A. Bit Alignment

Select the bit alignment for the IO Data structures. Values may be set to:

- **No alignment**
No alignment is applied to IO Input/Output data blocks.
- **16-bit alignment**
It aligns signals in 16-bit data blocks. After a data block smaller than 16-bit a padding will be added to align the value to a 16-bit data block.
- **32-bit alignment**
It aligns signals in 32-bit data blocks. After a data block smaller than 32-bit a padding will be added to align the value to a 32-bit data block.

2. Configuration Files

A. Configuration Report

It is a template for PLC programmer to get all information required to set up the PROFINET communication in the IO Controller device. It is generated in Excel file format and it includes all tags, both acyclic and cyclic.

B. TIA Portal TAG File

It is a list of all TAGs available in the gateway and their configuration, ready to import in the TIA Portal software.

C. GSD File

The GSD file (General Station Description) contains a description of the Intesis PROFINET device. It provides a way for an open configuration tool to automatically get the device characteristics (what the device is and the I/O configuration).

10.4.2 Advanced configuration

1. Enable ABCC 40 Default WebServer

It enables the default WebServer on the PROFINET network interface.

2. Enable ABCC 40 HICP

It enables the HICP protocol on the PROFINET network interface.

3. Enable ABCC 40 FTP Service

It enables the FTP service on the PROFINET network interface.

10.4.3 Signals configuration

#	Active	Description	BACnet Server				PROFINET						
			Name	Type	Instance	Units	Data Type	Direction	Cyclic	Inp. Byte O...	Inp. Bit O...	Outp. Byte O...	Outp. Bit O...
1	<input checked="" type="checkbox"/>	Analog Input	AI-0	0: AI	0	percent (98)	18: Floating point/real number	1: Output	<input checked="" type="checkbox"/>	-	-	0	-
2	<input checked="" type="checkbox"/>	Binary Input	BI-0	3: BI	0	-	65: 1 bit boolean	1: Output	<input checked="" type="checkbox"/>	-	-	4	0
3	<input checked="" type="checkbox"/>	Multistate Input	MI-0	13: MI	0	-	5: Unsigned 16 bit integer	1: Output	<input checked="" type="checkbox"/>	-	-	5	-
4	<input checked="" type="checkbox"/>	Analog Output	AO-0	1: AO	0	no_units (95)	18: Floating point/real number	0: Input	<input checked="" type="checkbox"/>	0	-	-	-
5	<input checked="" type="checkbox"/>	Binary Output	BO-0	4: BO	0	-	65: 1 bit boolean	0: Input	<input checked="" type="checkbox"/>	4	0	-	-
6	<input checked="" type="checkbox"/>	Multistate Output	MO-0	14: MO	0	-	5: Unsigned 16 bit integer	0: Input	<input checked="" type="checkbox"/>	5	-	-	-

1. Data Type

It indicates the PROFINET data type used. This is a Read-Only field and it is configured automatically based on BACnet configuration. Possible values are:

- **5: Unsigned 16-bit integer**
16-bit signals used to represent multistate signals.
- **18: Floating point/real number**
32-bits signals used to represent analog signals.
- **65: 1-bit Boolean**
1-bit signals used to represent binary signals.

2. Direction

It indicates the direction of signal (Input or Output). This is a Read-Only field and it is configured automatically based on BACnet configuration.

3. Cyclic

It indicates if the signal will be periodically sent in the IO Data blocks using cyclic communications. If this parameter isn't enabled, the signal will be sent when the IO Controller requests it.

4. Input Byte Offset

It indicates the Byte Offset of this signal in the Input data block. It will have a value only if this signal is configured as a Cyclic and it's an input.

5. Input Bit Offset

It indicates the Bit Offset of this signal in their Byte. Only for binary values.

6. Output Byte Offset

It indicates the Byte Offset of this signal in the Output data block. It will have a value only if this signal is configured as a Cyclic and it's an output.

7. Output Bit Offset

It indicates the Bit Offset of this signal in their Byte. Only for binary values.

11. Additional protocols

In some of our products, we do offer additional internal protocols.

11.1 Modbus Slave


It only supports Modbus TCP connections


The screenshot shows the 'Configuration' tab in the Intesis MAPS software. The 'General' section is active, displaying 'General Configuration' with fields for 'Gateway Name' (IBOX-BAC-KNX) and 'Project Description' (IntesisBox KNX to BACnet Server Gateway). To the right, the 'Internal Extra' section contains buttons for 'Manage Extra Protocols' and 'Extra Protocol MAP'.


The screenshot shows the 'Extra Protocol Management' dialog box. It features a 'Select Extra Protocol' dropdown menu with 'Modbus Slave' selected. Below the dropdown are 'Apply' and 'Cancel' buttons.


Extra protocol Map Summary														
This is the generated Modbus table to use by the integrator of the Extra Protocol														
<input type="checkbox"/> View Internal Columns <input type="checkbox"/> View External Columns <input type="checkbox"/> View Extra Protocol Columns														
	BACnet Server					KNX					MBS			
#	Name	Type	Instance	Units	DPT	Sending	Listening	U	T	Ri	W	R	Format	Address
1	AI-0	0: AI	0	percent (98)	9.001: temperature (C)	0/0/1	0/0/10	U			W	R	0: Unsigned	0
2	AO-0	1: AO	0	degrees_Celsius (62)	9.001: temperature (C)	0/0/2			T			R	0: Unsigned	1
3	AV-0	2: AV	0	no_units (95)	9.001: temperature (C)	0/0/3	0/0/10,0...	U	T		W	R	0: Unsigned	2
4	BI-0	3: BI	0	-	1.001: switch	0/0/4	0/0/20	U			W		0: Unsigned	3
5	BO-0	4: BO	0	-	1.001: switch	0/0/5			T			R	0: Unsigned	4
6	BV-0	5: BV	0	-	1.001: switch	0/0/6	0/0/20,0...	U	T		W	R	0: Unsigned	5
7	MI-0	13: MI	0	-	5.010: counter pulses (0..255)	0/0/7	0/0/30	U			W		0: Unsigned	6
8	MO-0	14: MO	0	-	5.010: counter pulses (0..255)	0/0/8			T			R	0: Unsigned	7
9	MV-0	19: MV	0	-	5.010: counter pulses (0..255)	0/0/9	0/0/30,0...	U	T		W	R	0: Unsigned	8


HomeProjectToolsViewHelp

Connection

Configuration

Signals

Receive / Send

Diagnostic

General

BACnet Server

KNX

MBS

Modbus Configuration

TypeTCP

Byte Order 32 bits registersBig Endian

Notification on MB Write☐ Always ☒ On Change of Value

TCP Configuration

Port502

Keep Alive10

MBS Summary

View MBS Extra Protocol SummaryView

Select analog format16 bit unsigned