

# ASCII Server BACnet MSTP and BACnet/IP client

## **USER MANUAL**

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# **Important User Information**

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Gateway for the integration of BACnet MSTP and BACnet IP installations into ASCII IP or ASCII Serial enabled monitoring and control systems.

ORDER CODE	LEGACY ORDER CODE
INASCBAC600000	IBASCBAC6000000
INASCBAC3K00000	IBASCBAC3K00000



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## **1** Description

## 1.1 Introduction

This document describes the integration of BACnet MSTP and BACnet IP installations into ASCII serial (EIA232 or EIA485) or ASCII IP compatible devices and systems using the Intesis ASCII Server – BACnet Client gateway.

The aim of this integration is to make accessible BACnet system signals and resources from any system capable to be programmed to read and write simple text messages through EIA232 or EIA485 serial port or Ethernet TCP/IP port (for example Extron, LiteTouch systems).

The gateway acts as a BACnet IP Client device in its BACnet interface, reading/writing points of other BACnet IP device(s), and offering this point's values of BACnet device(s) through its ASCII interface using simple ASCII messages. The readings into the BACnet device(s) performed by the gateway can be by polling or by subscription (COV).

Configuration is carried out using the configuration software Intesis<sup>™</sup> MAPS.

This document assumes that the user is familiar with ASCII and BACnet technologies and their technical terms.



Integration of BACnet IP or BACnet MSTP server systems into ASCII TCP/IP or ASCII Serial control and monitoring systems



## 1.2 Functionality

From the BACnet system point of view, after the start up process, Intesis subscribes to configured BACnet points or reads them continuously from their respective BACnet server devices and updates in its memory the value of the present\_value property received from them.

From the ASCII system point of view, after the start up process of the gateway, Intesis waits for any query (ASCII messages requesting readings of points or ASCII messages requesting writings of points) and acts according to the message received. See ASCII interface section for details about this ASCII messages.

Each BACnet object from the BACnet server devices is associated to an ASCII, with this, all the configured points of the BACnet server devices are seen as a single ASCII device with many registers from the ASCII system point of view, each register corresponding to a present\_value of an object on a particular BACnet server device.

When a new value is read from BACnet for a given object/present\_value, the new value is updated in the gateway's memory and made accessible at ASCII Server interface.

In the continuous polling of the BACnet server, if an unresponsive BACnet server device is detected, the corresponding virtual signal inside Intesis will be activated indicating communication error with the BACnet server device. These virtual signals indicating communication status in real time with the BACnet devices are also accessible from ASCII, like the rest of the points of the gateway.

## 1.3 Gateway's capacity

Intesis capacity is listed below:

Element	600 3000 version version		Notes	
Type of BACnet devices	IP / MSTP		Communication with BACnet IP and MSTP	
Number of BACnet devices	256		Maximum number of different BACnet devices the Intesis can communicate to	
Number of ASCII Registers	600 3000		Maximum number of points that can be defined the virtual ASCII Server device inside the gatew	
ASCII link layers supported	Serial (EIA485/EIA485) TCP/IP		Communication with ASCII client with simple messages through a TCP/IP or serial connection	



## 2 BACnet interface

This section describes the BACnet part of the Intesis's configuration and functionality.

## 2.1 Description

BACnet server devices are represented in the form of *Devices* holding *Objects*, normally every physical device corresponds to a logical one. The *Objects* can be of different type depending on the data and functionality the represent: Analog Input, Analog output, Digital Input, etc. Up to 23 different types of objects. Note that Outputs are objects meant to be written in the direction BACnet network to the device, and the opposite for Inputs (they are meant to offer status information of the BACnet device). Value objects are bidirectional.

Every *Object* has different properties. The most meaningful one, and the one used to read and write values by Intesis is the *Present Value* property, which indicates the real value of the object. Every Object of the same type in a *Device* is identified with its associated *Object Instance*.

These are the possible BACnet objects supported by Intesis:

Object Type	Property	Description
Analog Input	Present Value	Analog signal. i.e. Ambient temperature.
Analog Output	Present Value	Analog signal.
Analog Value	Present Value	Analog signal. i.e. Temperature set point value.
Binary Input	Present Value	Digital signal. i.e. ON/OFF status.
Binary Output	Present Value	Digital signal. i.e. ON/OFF command.
Binary Value	Present Value	Digital signal. i.e. ON/OFF status/command.
Multistate Input	Present Value	Multistate signal. i.e. Working mode status.
Multistate Output	Present Value	Multistate signal.
Multistate Value	Present Value	Multistate signal. i.e. Working mode command.
Accumulator	Present Value	Analog signal.
Loop	Present Value	Analog signal.

Every signal is identified with its associated Device + Object Type + Object Instance.

Intesis simulates a virtual BACnet device inside the BACnet system acting as client device in the BACnet system. The communication with the rest of the BACnet devices is done via the Ethernet port of the gateway which implements the BACnet protocol.

Intesis implements a single BACnet object of its own: this is, its BACnet Device Object, containing its BACnet Device Identifier and basic properties of Intesis as BACnet device (name, firmware version, etc).

Using the configuration tool with Intesis it's possible to scan the BACnet network for available devices and their objects, which can later be directly added to your configuration. This facilitates the configuration process, avoiding entering them manually.

BACnet/IP and BACnet MSTP physical layers are supported. <u>Only one physical layer can be used at a time</u>. This is, if communicating to BACnet using BACnet/IP, BACnet MSTP cannot be used, and viceversa.



## 2.2 BACnet/IP

Main parameter to set up for BACnet/IP, additional to basic IP settings (IP, netmask, default gateway) is the communication port. Intesis uses port 47808 (0xBAC0) by default and it can be changed at configuration time.

When using BACnet/IP, device can also act as a Foreign Device (in order to be able to communicate with devices that are in another network domain), alternatively implement a BBMD itself (Bacnet/IP Broadcast Management Device). This functionality facilitates communication of devices in other networks with the devices in the network where Intesis is installed.

Communication with BACnet/IP excludes possibility of communicating with BACnet MSTP from Intesis.

## 2.3 BACnet MSTP

When choosing BACnet MSTP device needs to be associated with a MAC address (address within the MSTP network segment), to be configured with configuration software.

Following baud rates are supported for MSTP line: 9600, 19200, 38400, 76800, 115200 or Autobauding (autodetect).

Standard wiring guidelines for EIA485 apply for the BACnet MSTP line.

Communication with BACnet MSTP excludes possibility of communicating with BACnet/IP from Intesis.



## 2.4 Points definition

Every point defined in Intesis has the following BACnet features associated to it:

Feature	Description
BACnet Device	BACnet device to which belongs the point, from a list of BACnet devices that can be defined in Intesis (up to 16).
	For every BACnet device defined, a virtual signal is created automatically in Intesis to inform about the communication with the BACnet device, this signal is available also from the ASCII interface like the rest of points.
BACnet object type	BACnet object type for the point. It can be one of the following BACnet object types supported by Intesis:
	AI = Analog Input
	AO = Analog Output.
	AV = Analog Value.
	DI = Digital Input.
	DO = Digital Output.
	DV = Digital Value.
	MI = Multistate Input.
	MO = Multistate Output.
	MV = Multistate Value.
	LOOP = Loop
	ACCUM = Accumulator
	Consult documentation of BACnet device(s) to integrate for information about BACnet object types of the points desired to integrate.
BACnet object instance	BACnet object instance for the point on the external BACnet device.
	Consult documentation of BACnet device(s) to integrate for information about BACnet object instance of the points desired to integrate.

Note that configuration tool used with Intesis enables for discovery of existing BACnet devices in the network, as well as their BACnet objects and types, which can be later directly added in configuration. This facilitates the process of choosing suitable parameters above for every BACnet object on every BACnet device to integrate.



## 3 ASCII interface

This section describes the ASCII interface of the Intesis, its configuration and functionality.

## 3.1 Description

The gateway can be connected to any *ASCII enabled* device using its EIA232 interface (DB9 connector DTE), EIA485 interface or TCP/IP (Ethernet connector) and offers through this interface the possibility of supervision and control of its internal BACnet points using simple ASCII messages.

On receiving messages corresponding to write commands in its ASCII interface, the gateway sends the corresponding write command message to the associated BACnet device.

When a new value for a point is received from BACnet, the corresponding ASCII message indicating the new value will be sent through the ASCII interface, but only if the point is configured for sending this "spontaneous messages", if it is not configured to do so, then the new value will be available to be polled in any moment from the ASCII enabled device connected to this ASCII interface. This behaviour of sending or not through the ASCII interface the new values received from BACnet is configurable individually per point in the gateway.

## 3.2 ASCII Serial

Serial communication for the ASCII communication can be configured to match the ASCII master device.

Only the RX, TX and GND lines of the EIA232 connector are used (TX/RX+ and TX/RX- for EIA485).

## 3.3 ASCII TCP

The TCP port to use can be configured (by default 5000 is used).

The IP address, subnet mask and default router address to use by Intesis can be also configured.

## 3.4 Address Map

The ASCII address map is fully configurable; any point in the Intesis can be freely configured with the desired internal register address. Check the configuration tool manual for more information.

## 3.5 Points definition

Every point defined in the gateway has the following ASCII features associated to it, which can be configured:

Feature	Description
Signal	Signal or point description. Only for information purposes at user level.
ASCII string	<ul> <li>Defines the ASCII string that will be used to access this register</li> <li>Max length: 32 characters</li> </ul>



Defines the current to register. It can't be coordinate object.	function (read, write o configured as it is dire	or both) to be used fr ectly set when selecti	om the ASCII side wing the current BACn	ith this et type
Function	Read	Write	Read/Write	
BACnet Object	Analog Input Binary Input Multistate Input Loop Accumulator	Analog Output Binary Output Multistate Output	Analog Value Binary Value Multistate Value	
Determines if any change of value for the point received from BACnet will generate a spontaneous ASCII message to send through the ASCII interface informing about the new value.				
Defines the current v it is directly set when	variable type for this n selecting the currer	register from the ASC at BACnet type objec	CII side. It can't be co t. I	onfigured as
RACnot Object		Digital		
BAChet Object	Analog Input	Binary Input Binary Output		
	Analog Value	Binary Value		
	Multistate Input	Dinary value		
	Multistate Output			
	Multistate Value			
	Loop			
	Accumulator			
	Defines the current of register. It can't be co object. Function BACnet Object Determines if any ch spontaneous ASCII value. Defines the current it is directly set when Type BACnet Object	Defines the current function (read, write or register. It can't be configured as it is dire object.         Function       Read         BACnet Object       Analog Input Binary Input Multistate Input Loop Accumulator         Determines if any change of value for the spontaneous ASCII message to send thr value.       Defines the current variable type for this it is directly set when selecting the current Analog Output Analog Output Analog Value Multistate Input Multistate Input Loop Accumulator         Type       Analog Malog Neut Analog Value Multistate Output Analog Value Multistate Value Loop Accumulator	Defines the current function (read, write or both) to be used fr         Type         Analog Input         BACnet Object       Analog Input       Analog Output         Binary Input       Analog Output       Binary Output         Multistate Input       Multistate Output       Multistate Output         Determines if any change of value for the point received from spontaneous ASCII message to send through the ASCII intervalue.       Defines the current variable type for this register from the ASCII intervalue.         Type       Analog       Digital         BACnet Object       Analog Input       Binary Output         Multistate Input       Multistate Output       Binary Output         Determines if any change of value for the point received from spontaneous ASCII message to send through the ASCII intervalue.       Defines the current variable type for this register from the ASCII intervalue.         Defines the current variable type for this register grow the ASCII intervalue.       Binary Input         Multistate Input       Multistate Output       Binary Output         Analog Value       Multistate Output       Binary Value         Multistate Value       Loop       Accumulator       Binary Value	Defines the current function (read, write or both) to be used from the ASCII side w register. It can't be configured as it is directly set when selecting the current BACn object.         Function       Read       Write       Read/Write         BACnet Object       Analog Input Binary Input Multistate Input Loop Accumulator       Analog Output Multistate Output Multistate Value         Determines if any change of value for the point received from BACnet will generate spontaneous ASCII message to send through the ASCII interface informing about value.       Defines the current variable type for this register from the ASCII side. It can't be con't is directly set when selecting the current BACnet type object.         Type       Analog Input Analog Output Analog Output Binary Output Analog Output Acauge Output Acauge Output Analog Output Analog Output Analog Value Multistate Input Multistate Output Multistate Value       Binary Input Binary Input Binary Output Binary Value Multistate Input Multistate Output Multistate Value Loop Accumulator       Binary Output Binary Value Binary Value Binary Value Binary Value Multistate Value Binary Value Bin



## 3.6 ASCII messages

Communication from the ASCII side is carried out thanks to simple ASCII messages. Note that these messages can be configured from the configuration tool to match the ASCII master device.

The ASCII messages used to read/write points into the gateway through this interface have the following format

• Message to read a point's value:

#### ASCII\_String?\r

Where:

Characters	Description
ASCII_String	String indicating the point's address inside the gateway
?	Character use to indicate that this is a reading message (configurable from the configuration tool)
\r	Carriage return character (HEX 0x0D, DEC 13)

#### • Message to write a point's value:

#### ASCII\_String=vv\r

Where:

Characters	Description
ASCII_String	String indicating the point's address inside the gateway
=	Character use to indicate that this is a reading message (configurable from the configuration tool)
vv	Current point's value
\r	Carriage return character (HEX 0x0D, DEC 13)

• Message informing about a point's value (sent spontaneously by the gateway when receiving a change from BACnet or sent by the gateway in response to a previous poll for the point):

#### ASCII\_String=vv\r

Where:

Characters	Description
ASCII_String	String indicating the point's address inside the gateway
=	Character use to indicate where point's data starts
vv	Current point's value
\r	Carriage return character (HEX 0x0D, DEC 13)



## 4 Connections

Find below information regarding the Intesis connections available.

#### Ethernet Power Supply BACnet ASCII TCP MSTP **BACnet IP** 0000 0 0 0 Run / Error 0 0 0 0 PortA IXHO 00 PortB TXB Intesis Button A Button B . Console Port SW B USB B1 B2 B3 EIA 232 000 USB ASCI ASCII storage **EIA232 EIA485**

#### Power Supply

Must use NEC Class 2 or Limited Power Source (LPS) and SELV rated power supply.

#### If using DC power supply:

Respect polarity applied of terminals (+) and (-). Be sure the voltage applied is within the range admitted (check table below). The power supply can be connected to earth but only through the negative terminal, never through the positive terminal.

#### If using AC power supply:

Make sure the voltage applied is of the value admitted (24 Vac). Do not connect any of the terminals of the AC power supply to earth, and make sure the same power supply is not supplying any other device.

#### Ethernet / BACnet IP / ASCII TCP/IP

Connect the cable coming from the IP network to the connector ETH of the gateway. Use an Ethernet CAT5 cable. If communicating through the LAN of the building, contact the network administrator and make sure traffic on the port used is allowed through all the LAN path (check the gateway user manual for more information). Default IP is 192.168.100.246. DHCP is enabled by default.

#### PortA / BACnet MSTP

Connect the EIA485 bus to connectors A3 (A-), A4 (B+) and A1 or A2 (SNGD) of gateway's PortA. Respect the polarity.

#### PortB / ASCII Serial

Connect the EIA485 bus to connectors B1 (B+), B2 (A-) and B3 (SNGD) of gateway's PortB. Respect the polarity. Connect the serial cable EIA232 coming from the external serial device to the EIA232 connector of gateway's PortB. This is a DB9 male (DTE) connector in which only the lines TX, RX and GND are used. Respect the maximum distance of 15 meters.

**Note for PortA and PortB;** Remember the characteristics of the standard EIA485 bus: maximum distance of 1200 meters, maximum 32 devices connected to the bus, and in each end of the bus it must be a termination resistor of 120  $\Omega$ . The port includes a DIP-Switch for configuration of biasing circuit as well as termination:

SW1:

ON: 120 Ω termination active
 OFF: 120 Ω termination inactive (default)
 SW2-3:
 ON: Polarization active (default in BACnet MSTP port)
 OFF: Polarization inactive (default in ASCII serial port)

If the gateway is installed in one bus end make sure that termination is active.

#### Console Port

Connect a mini-type B USB cable from your computer to the gateway to allow communication between the Configuration Software and the gateway. Remember that Ethernet connection is also allowed. Check the user manual for more information.

#### USB

Connect a USB storage device (not a HDD) if required. Check the user manual for more information.

Ensure proper space for all connectors when mounted (see section 7).



## 4.1 Powering the device

A power supply working with any of the voltage range allowed is needed (check section 6). Once connected the RUN led (Figure above) will turn on.

**WARNING!** In order to avoid earth loops that can damage the gateway and/or any other equipment connected to it, we strongly recommend:

- The use of DC power supplies, floating or with the negative terminal connected to earth. **Never use a DC** power supply with the positive terminal connected to earth.
- The use of AC power supplies only if they are floating and not powering any other device.

## 4.2 Connection to ASCII

### 4.2.1 ASCII TCP/IP

Connect the communication cable coming from the network hub or switch to the ETH port of Intesis. The cable to be used shall be a straight Ethernet UTP/FTP CAT5 cable.

### 4.2.2 ASCII Serial

Connect the communication cable coming from the ASCII network to the port marked as Port B of Intesis. Connect the EIA485 bus to connectors to connectors B1 (B+), B2 (A-) and B3 (SNGD) of gateway's PortB. Respect the polarity.

Remember the characteristics of the standard EIA485 bus: maximum distance of 1200 meters, maximum 32 devices connected to the bus, and in each end of the bus it must be a termination resistor of 120  $\Omega$ . Set port switch SW1 to ON if gateway is installed on one bus end. SW2-3 will generally go OFF (no polarization), as polarization will typically be provided in the ASCII Serial master device.

### 4.3 Connection to BACnet

### 4.3.1 BACnet IP

Connect the communication cable coming from the network hub or switch to the ETH port (Figure above) of Intesis. The cable to be used shall be a straight Ethernet UTP/FTP CAT5 cable

In case there is no response from the BACnet devices to the frames sent by Intesis, check that they are operative and reachable from the network connection used by Intesis. Check the Intesis Ethernet interface sending *Pings* to its IP address using a PC connected to the same Ethernet network.

Check as well with the network admin that there are no limitations regarding UDP communication or ports blocked.



BACnet IP connection using switch/hub and straight cable



## 4.3.2 BACnet MSTP

Connect the EIA485 bus to connectors A3 (A-), A4 (B+) and A1 or A2 (SNGD) of gateway's PortA. Respect the polarity.

Remember the characteristics of the standard EIA485 bus: maximum distance of 1200 meters, maximum 32 devices connected to the bus, and in each end of the bus it must be a termination resistor of 120  $\Omega$ . Set port switch SW1 to ON if gateway is installed on one bus end. SW2-3 will generally go to ON (polarization active), unless there is another client / header device providing polarization in the same bus.

## 4.4 Connection to the configuration tool

This action allows the user to have access to configuration and monitoring of the device (more information can be found in the configuration tool User Manual). Two methods to connect to the PC can be used:

- Ethernet: Using the Ethernet port of Intesis.
- **USB:** Using the console port of Intesis, connect a USB cable from the console port to the PC.



## 5 Set-up process and troubleshooting

## 5.1 Pre-requisites

It is necessary to have an ASCII TCP/IP client or ASCII Serial master operative and well connected to the corresponding ASCII port of Intesis as well as the BACnet IP or BACnet MSTP server devices connected to their corresponding ports as well.

Connectors, connection cables, PC to use the configuration tool and other auxiliary material, if needed, are not supplied by HMS Networks SLU for this standard integration.

Items supplied by HMS Networks for this integration are:

- Intesis gateway.
- Mini-USB cable to connect to PC
- Link to download the configuration tool.
- Product documentation.

## 5.2 Intesis MAPS. Configuration & monitoring tool for Intesis ASCII series

#### 5.2.1 Introduction

Intesis MAPS is a Windows<sup>®</sup> compatible software developed specifically to monitor and configure Intesis ASCII series.

The installation procedure and main functions are explained in the *Intesis MAPS User Manual for ASCII*. This document can be downloaded from the link indicated in the installation sheet supplied with the Intesis device or in the product website at <u>www.intesis.com</u>

In this section, only the specific case of BACnet to ASCII systems will be covered.

Please check the Intesis MAPS user manual for specific information about the different parameters and how to configure them.

### 5.2.2 Connection

To configure the Intesis connection parameters press on the *Connection* button in the *menu bar*.

	IBOX-MBS-BAC.ibmaps * - IntesisBox MAPS				1 ×
Home Project Tools	Help				
ø	*		1	-M-	IntesisBox 🗐
Connection	Configuration *	Signals	Receive / Send	Diagnostic	MAPO
Connection Mode	9				
Connection Mode	IP     USB Port				
Discovered Gateways	HS-AC-BAC AVR	Description	Value		
	IBOX (no config)	Gateway Name			
	IBOX-MBS-BAC	Serial Number			
		Application Name			
		License	•		
		License Comments			
		Version			
		Last Configuration	Date -		
		MAC Address	•		
		IP Address			
		Netmask			
		Gateway			
		DHCP	•		
		Current Date Time			
		Gateway Operatin	g lime -		
	Refresh				
Selected Device	192.168.101.54	Pwd	Disc	Connect	
K Not Connected				BMS Protocol: Modbus	s Slave 🔳 Device Protocol: BACnet Client 📕 2018/04/16 18:21:23

Figure 5.1 MAPS connection



## 5.2.3 Configuration tab

Select the **Configuration** tab to configure the connection parameters. Three subsets of information are shown in this window: General (Gateway general parameters), ASCII (ASCII interface configuration) and BACnet Client (BACnet interface parameters).

ome Project Tools	: View Help	IBOX-ASCI	-BAC.ibmaps * - IntesisBox	: MAPS - 1.0.17.1	±_ = >
ø	*	=	107		IntesisBox®
Connection	Configuration *	Signals	Receive / Send	Diagnostic	MAPS
General	General Configurat	ion			
ASCII	Gateway Name	IBOX-ASCII-BAC			
	Project Description	IntesisBox BACnet	Client to ASCII		
BACnet Client		Gateway			
	Connection				
		Enable DHCP			
	IP Address	192.168.100.246			
	Netmask	255.255.255.0			
	Default Gateway				
	Password				
	Conversions				
	Edit Conversions	Edit			
	USB Host				
	Edit USB Configuration	USB			
Not Connected				BMS Protocol: ASCII 🛽 De	evice Protocol: BACnet Client 📱 2018/11/05 17:25:5

Figure 5.2 Intesis MAPS configuration tab

General parameters are explained in Intesis MAPS user manual for Intesis ASCII Server Series.

## 5.2.3.1 ASCII Configuration

Set the parameters for connection to ASCII device.

		IBOX-ASC	II-BAC.ibmaps * - IntesisB	ox MAPS - 1.0.17.1	± - □ ×
Home Project Tools	View Help				
ø	×			-M-	IntesisBox 🖬
Connection	Configuration *	Signals	Receive / Send	Diagnostic	MAPS
General					^
	ASCII Configuratio	n			
ASCII	Туре	Serial +	TCP ~		
-	Notification on ASCII Wr	ite 🔿 Alwa	ys 💿 On Change of Value		
BACnet Client	Answer required for v	vrite commands			
	Define custom string	commands			
	Read Command	?			
	Write Command	=			
	TCP Configuration				
	Port	5000			
	Keep Alive	10			
	Serial Configuratio	n			
	Connection Type	232	~		
	Baudrate	9600	~		
	Data Type	8bit / M	lone / 1 🛛 🗸		
					~
K Not Connected				BMS Protocol: A	SCII Device Protocol: BACnet Client 2018/11/05 17:42:05

Figure 5.3 Intesis MAPS configuration tab for BACnet Client



- **Communication type**: Select if ASCII communication will be through TCP/IP, serial (EIA232 or EIA485) or both.
- Notification on ASCII Value: Gateway will allow sending spontaneous messages to the ASCII bus when a change of value is received in the BACnet side.
- Answer required for write commands: If enabled, the gateway will send back an OK message to the ASCII master device.
- **Define custom string commands:** Define the special character to be used to read or write the internal gateway datapoint.
- **Port:** TCP port to be used for the ASCII communication. By default, it is set to 5000.
- Keep Alive: Time of inactivity before sending a keep alive message.
  - **0:** Disabled
  - o **1...1440:** Possible values expressed in minutes. By default, it is set to 10.
- Connection type: Physical connection, between EIA232 and EIA485 can be selected.
- Baud rate: Selectable from 1200, 2400, 4800, 9600, 19200, 38400, 56700 and 115200.
- Data type:
  - Data Bits: 8
  - Parity can be selected from: none, even, odd.
  - Stop Bits:1 and 2

### 5.2.3.2 BACnet Client Configuration

Set the parameters for connection to BACnet network / BACnet server devices in the network.

			IBOX-ASC	CII-BAC.ibmaps * - IntesisBo	x MAPS - 1.0.17.1	1 - 🗆 ×
н	ome Project Tools	View Help				
	ø	× -		127	-M-	IntesisBox 🗐
	Connection	Configuration *	Signals	Receive / Send	Diagnostic	MAPS
	General	General Configur	ation			
	ASCII	Device Name	Device IBOX-ASCII	-BAC		
		Device Instance	246			
	BACnet Client	Password	admin			
		Enable sequential c	omms			
		Devices Configura	ation			
		Scan BACnet Network	Scan			
		BACnet Device	IS (No devic	es created)		
			- Click on a device	Add for adding manually		
			- Click on the Bacne	SCAN to explore t Network		
		Add Device(s) 1	Add			
			Use template			
		Delete Device(s)	Delete			
		Gateway Mode				
		Mode	O IP   MSTP			
		Max. Masters	127			
		Raud rate	1 Auto and			
		MAC. Address	1			
4	Not Connected				BMS Protocol: ASCII	Device Protocol: BACnet Client 2018/11/05 17:38:13
- <b>/</b> 3	riot conficticu					

Figure 5.4 Intesis MAPS configuration tab for BACnet Client



Configuration for BACnet client has three sections: General Configuration, Devices Configuration and Gateway Mode.

• General Configuration

In this section, following parameters should be configured:

- 1. Device Name. Name of the device in the bacnet network ('object name' property of device object)
- 2. **Device Instance**. Instance number of the device in the bacnet network (instance number property of device object)
- 3. **Password**. BACnet password of the device to execute service 'Device Management Restart', sent by other device in the BACnet network.
- 4. Sequential comms. Enables sequential communication with other BACnet server devices. This is, no new request will be initiated from Intesis until response to last request has been received. This becomes necessary in case of communication with BACnet MSTP devices behind a BACnet IP to MSTP router, as no concurrent transactions are possible in MSTP.
- Gateway Mode

In this section, following parameters should be configured:

- 1. **Mode**. Select whether Intesis is going to connect with BACnet IP or BACnet MSTP. Rest of parameters in the section will be different depending on this.
- 2. (Mode IP) UDP Port. UDP port that will be used for BACnet IP communication. It defaults to 47808 (0xBAC0)
- (Mode IP) Network Role. Related to capability of the device of communicating with devices from other networks. Disabled, Foreign Device or BBMD are the possible choices. In case of Foreign Device, IP of the BBMD where it will connect needs to be entered, as well as TTL (time-to-live). In case of selecting BBMD, table of BBMD's in the BACnet network needs to be entered.
- 4. (Mode MSTP) Max Masters. Highest MAC address of BACnet MSTP master device in the MSTP line.
- 5. (Mode MSTP) Max Info Frames. Max number of frames that the device can send out to the network when it receives token in the MSTP line.
- 6. (Mode MSTP) Baudrate. Baudrate of the BACnet MSTP link.
- 7. (Mode MSTP) MAC Address. MAC address of Intesis as BACnet MSTP device in the MSTP line.
- Devices Configuration

In this section, a single entry for which BACnet server device the Intesis is to communicate with needs to be entered.

In Signals table, each signal will need to be associated with the device it will be read to/written from.

Devices Confi		
Scan BACnet Netv	vork	Scan
BACnet D	evices	(No devices created) - Click on Add for adding a device manually - Click on SCAN to explore the Bacnet Network
Add Device(s)	1 🚽 Add	
Delete Device(s)	Delete	





Devices can be added in three ways:

- **Manually**: With checkbox 'Use template' disabled, **Add** button should be clicked. Number of devices to add can be adjusted in the text field next to button **Add**.
- **From template**: Same as manual but based on a template file. This will add in Signals table all the signals specified in the template file for the device to be integrated.
- From scan: Gives functionality to scan the BACnet network for existing BACnet server devices and their objects, enabling to add them in the config. See section 'BACnet scan functionality' below for further detail.

Once a device is added, following fields must be filled in for each device:

Devices Configuration		
Scan BACnet Network	Scan	
BACnet Devices	Device Name Recipient Type Object Instance Reading Type Write priority Life Priority	Device 0 Device 0 Polling (none) 0 min
Add Device(s) 1 🚔 Add Use template		
Delete Device(s) Delete		

Figure 5.6 Devices configuration section

- 1. Device Name. Device identifier within MAPS. It will be used to reference the device from the signals table
- 2. **Recipient Type**. Way in which the device will be identified within the BACnet network. Options are Device (instance), Address, Address (MSTP). Depending on which option is chosen different parameters will appear to enter the details of the address.
- 3. (Recipient type: Device) Object Instance: Instance number of device object for the BACnet server device.
- 4. (Recipient type: Address) Network: Destination network, 0..65535. 0 for local network, 65535 for broadcast (all networks).
- 5. (Recipient type: Address) IP / Port: IP and Port of the BACnet server device.
- 6. (Recipient type: Address (MAC)) Network: Destination network, 0..65535. 0 for local network, 65535 for broadcast (all networks).
- 7. (Recipient type: Address (MAC)) MSTP MAC Address: MAC address 0..255 of the BACnet server device.
- 8. **Reading type**: Related to service that will be used to read the BACnet server device. Options are Polling (ReadProperty), COV, COV-unconf (unconfirmed COV), Polling Multiple (ReadPropertyMultiple).
- 9. Write priority: priority with which writes will be performed. Default is (none) (no priority), can be chosen from 1 (highest) to 16 (lowest) and none.
- 10. **COV Lifetime**: Periodic timeout at which COV subscription will be renewed.
- BACnet scan functionality

Devices 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.





Figure 5.7 BACnet Network scan button

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

		BACnet Explorer		
BACnet Explorer Configura Explore Mode Advanced Configuration	IP Config			
Explorer Results	Stop Explorin	ig		
BACnet Devices  Device SM-ACN-BAC (200)  (333)	Device Name Device Instance Network Number Vendor Discover Objects	Device SM-ACN-BAC 200 0 246 Discover	# Description	Instance Type
Discover Selected Devices			Replace Devices	Add Devices Apply Cancel

Figure 5.8 BACnet Network scan dialog

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

• Explore Mode: It can be either IP or MSTP, depending on last configuration downloaded to Intesis.



- 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** (only when Explore Mode is MSTP): Will enable scan of MSTP slave nodes (by default, only MSTP master nodes will be discovered). If enabled, **Start MAC**, **End MAC** and **Timeout** (in ms) for the scan can be adjusted.
- 5. **MSTP Slaves through IP** (only when Explore Mode is IP): In case that BACnet IP to MSTP routers are present in the BACnet/IP network, will enable scan of MSTP slaves through the corresponding BACnet/IP router (note that MSTP master nodes under a BACnet/IP router will always be scanned). If enabled, **Net Number**, **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.

		BACnet Explore	r	
BACnet Explorer Configurati xplore Mode advanced Configuration tart BACnet Explorer Explorer Results	ion IP Config Stop Explorin	g		
ACnet Devices Device SM-ACN-BAC (200) Device IBOX-BAC-DALI (246) ANYBUS-BAC-PRT coruz (111) Device IBOX-MBS-BAC (1005)	Device Name Device Instance Network Number Vendor Discover Objects	Device SM-ACN-BAC 200 0 246 Discover	# Description	Instance Type

Figure 5.9 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:



		BACnet Explorer							
BACnet Explorer Configurat	ion								
Explore Mode	IP								
Advanced Configuration	Config								
Start BACnet Explorer Exploring									
Explorer Results									
BACnet Devices									
Device SM-ACN-BAC (200)	Device Name	Device SM-ACN-BAC	#	Description	Instance	Туре			
ANYBUS-BAC-PRT ccruz (111)	Device Instance	200		Device SM-ACN-BAC	200	DEV			
Device IBOX-MBS-BAC (1005)	Derice instance			O01U00_Setpoint_S	100	AI			
Device IBOX-BAC-DALI (246)	Network Number	0		O01U00_Room_Temperature	101	AI			
	Vendor	246	<b>V</b>	001U00_Disch.Setpoint Co	102	AI			
	Discover Objects	Discover	<b>V</b>	O01U00_Disch.Setpoint He	103	AI			
	,		V	001U00_Disch. Current Te	104	AI			
			V	O01U00_Unit Error code	105	AI			
			<b>V</b>	001U02_Unit Error code	205	AI			
			<b>V</b>	O01U02_HotWater Setpoin	208	AI			
			<b>V</b>	001U02_HotWater Current	209	AI			
			<b>V</b>	001U02_WaterIn Temperat	210	AI			

Figure 5.10 BACnet Explorer showing objects found under a BACnet device

After objects have been discovered, it must be selected both the BACnet devices to be integrated, as well as the signals of each that are are desired in the project.

bachet Explorer Conligurati	011						
Explore Mode	IP						
Advanced Configuration	Config						
Start BACnet Explorer	Stop Explorin	ng					
Explorer Results							
BACnet Devices							
Device SM-ACN-BAC (200)	Device Name	Device SM-ACN-BAC	#	Description	Instance	Туре	
Device IBOX-BAC-DALI (246)	Device Instance	200		Device SM-ACN-BAC	200	DEV	
ANYBUS-BAC-PRT ccruz (111)	Dencembance			O01U00_Setpoint_S	100	AI	
Device IBOX-MBS-BAC (1005)	Network Number	0		O01U00_Room_Temperature	101	AI	
	Vendor	246		O01U00_Disch.Setpoint Cool I	102	AI	
	Discover Objects	Discover		O01U00_Disch.Setpoint Heat I	103	AI	
	,,,,,,,			001U00_Disch. Current Temp.	104	AI	
				O01U00_Unit Error code	105	AI	
				O01U02_Unit Error code	205	AI	
				O01U02_HotWater Setpoint H	208	AI	
				O01U02_HotWater Current Te	209	AI	
				O01U02_WaterIn Temperature	210	AI	
			4	III			P.

Figure 5.11 BACnet Explorer with a selection of objects and devices to integrate

In the example above, if Apply button is pressed, two devices will be integrated:

- Device INBACSAM---O000(200)
- Device INASCBAC---0000 (246)

The BACnet objects that will be integrated in configuration are O01U00\_Setpoint\_S and O01U00\_Room\_Temperature for Device INBACSAM---O000, and those selected for Device INASCBAC---O000 (can be seen when device is selected in the list at the left part of the window).

Next step is to transfer those objects to MAPS configuration. To do so, it must be first selected if those selected objects are meant to replace the entire configuration (**Replace Devices** – default) or added to existing signals configuration (**Add Devices**).



			3ACnet Explorer				
BACnet Explorer Configurat	tion						
Explore Mode	IP						
Advanced Configuration	Config						
Start BACnet Explorer	Stop	Exploring					
Explorer Results							
BACnet Devices							
Device SM-ACN-BAC (200)	Device Nam	Device SM-AG	N-BAC #	Description	Instance	Туре	
V Device IBOX-BAC-DALI (246)	Device Insta	ance 200		Device SM-ACN-BAC	200	DEV	
ANYBUS-BAC-PRT ccruz (111)				O01U00_Setpoint_S	100	AI	-
Device IBOX-MBS-BAC (1005)	Network Nu	umber 0		O01U00_Room_Temperature	101	AI	-
	Vendor	246		001U00_Disch.Setpoint Cool I	102	AI	-
	Discover Ot	Discover	[	001U00_Disch.Setpoint Heat I	103	AI	-
				001U00_Disch. Current Temp.	104	AI	-
				O01U00_Unit Error code	105	AI	-
				O01U02_Unit Error code	205	AI	-
				001U02_HotWater Setpoint H	208	AI	-
				001U02_HotWater Current Te	209	AI	-
				001U02_WaterIn Temperature	210	AI	-
			•				•
Discover Selected Devices			•	) Replace Devices 🔘 Add Devic	es Apply	Cance	31

Figure 5.12 Apply button and selection on whether Replace or Add Devices

**Apply** button must be pressed then to transfer the results to the signals tab of the configuration.

#### 5.2.4 Signals

All available objects, Object Instances, its corresponding ASCII register and other main parmaters are listed in the signals tab. More information on each parameter and how to configure it can be found in the Intesis MAPS user manual for ASCII.

Home																		
	\$	ø	*			11. 11.											Intesi	sBox®
(	Conn	nectio	n Configuration	Signals	F	eceive / Send	Diagnos	ic										NAPS
						Modbus Slave			BACnet Client									
	A	ctive	Description	# Bits	Format	Address B	it Read / Write	Device Name	Туре	Insta	nce							
	1	V	Comm Error	1		0	- 0: Read	PA-AC-BAC-1	3: 81									
	2	1	SetPoint_status	16	0: Unsigned	0	- 2: Read / Write	PA-AC-BAC-1	0: AI		0							
	3	1	SetPoint_command	16	0: Unsigned	1	- 0: Read	PA-AC-BAC-1	1: AO		0							
	4	1	OnTimeCounter	16	0: Unsigned	2	- 2: Read / Write	PA-AC-BAC-1	2: AV		0							
	5	1	OnOff_status	16	0: Unsigned	3	- 2: Read / Write	PA-AC-BAC-1	3: 81		0							
	6	V	OnOff_command	16	0: Unsigned	4	- 0: Read	PA-AC-BAC-1	4: 8O		0							
	7	4	OccupancyContinuousCheck	16	0: Unsigned	5	- 2: Read / Write	PA-AC-BAC-1	5: BV		0							
	8	1	Mode_status	16	0: Unsigned	6	- 2: Read / Write	PA-AC-BAC-1	13: MI		0							
	9	5	Mode_command	16	0: Unsigned	7	- 0: Read	PA-AC-BAC-1	14: MO		0							
	10	1	Occupancy	16	0: Unsigned	8	- 2: Read / Write	PA-AC-BAC-1	19: MV		0							
	11	1	RoomTemperature	16	0: Unsigned	9	- 2: Read / Write	PA-AC-BAC-1	0: AI		1							
	12	4	OccupiedCoolSetPoint	16	0: Unsigned	10	- 2: Read / Write	PA-AC-BAC-1	2: AV		1							
	13	1	ErrorActive	16	0: Unsigned	11	- 2: Read / Write	PA-AC-BAC-1	3: 81		1							
	14	1	Powerful_command	16	0: Unsigned	12	- 0: Read	PA-AC-BAC-1	4:80		1							
	15	4	UnoccupiedDeadbandAction	16	0: Unsigned	13	- 2: Read / Write	PA-AC-BAC-1	5: BV		1							
	16	1	FanSpeed_status	16	0: Unsigned	14	- 2: Read / Write	PA-AC-BAC-1	13: MI		1							
	17	4	FanSpeed_command	16	0: Unsigned	15	- 0: Read	PA-AC-BAC-1	14: MO		1							
	18	1	ErrorCode	16	0: Unsigned	16	- 2: Read / Write	PA-AC-BAC-1	0: AI		2							
	19	4	OccupiedHeatSetPoint	16	0: Unsigned	17	- 2: Read / Write	PA-AC-BAC-1	2: AV		2							
	20	5	Powerful_status	16	0: Unsigned	18	- 2: Read / Write	PA-AC-BAC-1	3: BI		2							
	21	4	Quiet_command	16	0: Unsigned	19	- 0: Read	PA-AC-BAC-1	4: BO		2							
	22	1	LockRemoteControl	16	0: Unsigned	20	- 2: Read / Write	PA-AC-BAC-1	5: BV		2							
	23	1	AirDirectionUD_status	16	0: Unsigned	21	- 2: Read / Write	PA-AC-BAC-1	13: MI		2							
	24	1	AirDirectionUD_command	16	0: Unsigned	22	- 0: Read	PA-AC-BAC-1	14: MO		2							
	25	1	PowerConsumption	16	0: Unsigned	23	- 2: Read / Write	PA-AC-BAC-1	0: Al		3							
	26	V	UnoccupiedCoolSetPoint	16	0: Unsigned	24	- 2: Read / Write	PA-AC-BAC-1	2: AV		3							
	27		Quiet_status	16	0: Unsigned	25	- 2: Read / Write	PA-AC-BAC-1	3: 81		3							
4cti	ve sig	gnals:	36 / •							Edit Columns	Import	Export	۸A	1	+ (	N) 1	<u>+</u>	Check tai

Figure 5.13 Intesis MAPS Signals tab

## 5.2.5 Sending the configuration to Intesis

When the configuration is finished, follow the next steps.

1.- Save the project (Menu option *Project->Save*) on your hard disk (more information in Intesis MAPS User Manual).

2.- Go to tab 'Receive / Send' of MAPS, and in Send section, press Send button. Intesis will reboot automatically once the new configuration is loaded.





Figure 5.14 Intesis MAPS Receive/Send tab

# After any configuration change, do not forget to send the configuration file to the Intesis using the Send button in the Receive / Send section.

### 5.2.6 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 Viewers.

#### • Tools

Use the tools section to check the current hardware status of the box, log communications into compressed files to be sent to the support, change the Diagnostic panels' view or send commands to the gateway.

• Viewers

In order to check the current status, viewer for the Internal and External protocols are available. It is also available a generic Console viewer for general information about communications and the gateway status and finally a Signals Viewer to simulate the BMS behavior or to check the current values in the system.

				IBOX-MBS-BAC.ibmaps - In	tesisBox MAPS				±-□×
Home Project Tools He									
ø	*	=	<b>建</b> 理	~~				h	ntesisBox 🗗
Connection	Configuration	Signals	Receive / Send	Diagnostic					MAPS
To @ Console		Modbus Slave Viewer		<ul> <li>Signals Viewer</li> </ul>					
Clear 🔲 En	abled 🔲 AutoScroll	Clear Enabled	AutoScroll	Clear Values C					
< INFO?		< 0MS:SPONS=1		# Description	Format	Add Read / Write	# Device Name	Type In., Modbu	s Slave BACnet Client *
> SK12 - UK > INFO:GMNAME	: IBOX-NBS-BAC	> OHS:UK		1 Comm Error		0 0: Read	1 PA-AC-BAC-1	3: 81 -	
> INFO:SN:999	K8825			2 SetPoint_status	0: Unsigned	0 2: Read / Write	2 PA-AC-BAC-1	0: AI 0	
INFO: APPNAM	E:IBOX-MBS-BAC			3 SetPoint_command	0: Unsigned	1 0: Read	3 PA-AC-BAC-1	1: AO 0	
> INFO:APPLIC > INFO:APPVER	:64 SION:0.0.0.2			4 OnTimeCounter	0: Unsigned	2 2: Read / Write	4 PA-AC-BAC-1	2: AV 0	
> INFO:CFGFIL	EDATE:18/04/2018 17			5 OnOff_status	0: Unsigned	3 2: Read / Write	5 PA-AC-BAC-1	3: BI 0	
> INFO:CFGFIL > INFO:MID:1	EXCHOIN			6 OnOff_command	0: Unsigned	4 0: Read	6 PA-AC-BAC-1	4:80 0	
> INFO:ETHMAC:CC:3F:10:00:0 > INFO:NETIP:192.168.101.29 > INFO:NETMASK:255.255.254.	:CC:3F:1D:00:00:25			7 OccupancyContinuo	usCheck 0: Unsigned	5 2: Read / Write	7 PA-AC-BAC-1	5: BV 0	
	K:255.255.254.0			8 Mode_status	0: Unsigned	6 2: Read / Write	8 PA-AC-BAC-1	13: MI 0	
> INFO:NETGW: > INFO:NETDHC	192.168.100.9 P:ON			9 Mode_command	0: Unsigned	7 0: Read	9 PA-AC-BAC-1	14: 0	
> INFO:UPTIME	INFO:UPTIME:0000d 18:31:22 INFO:DATETIME:19/04/2018 12:01 INFO:COMPID:19			10 Occupancy	0: Unsigned	8 2: Read / Write	10 PA-AC-BAC-1	19: 0	
> INFO:DATETI > INFO:COMPID				11 RoomTemperature	0: Unsigned	9 2: Read / Write	11 PA-AC-BAC-1	0: Al 1	
> INFO:STATUS	RUNNING			12 OccupiedCoolSetPoir	nt 0: Unsigned	10 2: Read / Write	12 PA-AC-BAC-1	2: AV 1	
> INFO:END		BACnet Client Viewer		<ul> <li>13 ErrorActive</li> </ul>	0: Unsigned	11 2: Read / Write	13 PA-AC-BAC-1	3: BI 1	
		Cleve Enabled	AutoScroll	14 Powerful_command	0: Unsigned	12 0: Read	14 PA-AC-BAC-1	4:80 1	
		< 1BC:SPONS=1		15 UnoccupiedDeadban	dAction 0: Unsigned	13 2: Read / Write	15 PA-AC-BAC-1	5: BV 1	
		> 18C:CK		16 FanSpeed_status	0: Unsigned	14 2: Read / Write	16 PA-AC-BAC-1	13: MI 1	
				17 FanSpeed_command	0: Unsigned	15 0: Read	17 PA-AC-BAC-1	14: 1	
				18 ErrorCode	0: Unsigned	16 2: Read / Write	18 PA-AC-BAC-1	0: AI 2	
				19 OccupiedHeatSetPoir	nt 0: Unsigned	17 2: Read / Write	19 PA-AC-BAC-1	2: AV 2	
				20 Powerful_status	0: Unsigned	18 2: Read / Write	20 PA-AC-BAC-1	3:81 2	
				21 Quiet_command	0: Unsigned	19 0: Read	21 PA-AC-BAC-1	4:BO 2	
				22 LockRemoteControl	0: Unsigned	20 2: Read / Write	22 PA-AC-BAC-1	5: BV 2	
				23 AirDirectionUD_statu	s 0: Unsigned	21 2: Read / Write	23 PA-AC-BAC-1	13: MI 2	
				24 AirDirectionUD_com	mand 0: Unsigned	22 0: Read	24 PA-AC-BAC-1	14: 2	
				25 PowerConsumption	0: Unsigned	23 2: Read / Write	25 PA-AC-BAC-1	0: AI 3	
<				26 UnoccupiedCoolSetP	oint 0: Unsigned	24 2: Read / Write	26 PA-AC-BAC-1	2: AV 3	
	<ul> <li>Send</li> </ul>			27 Quiet_status	0: Unsigned	25 2: Read / Write	27 PA-AC-BAC-1	3: 81 3	
Connected to: 192.168.10	1.29	-				BMS P	otocol: Modbus Slave	Device Protocol: BACne	t Client 2018/04/19 12:01:41

Figure 5.15 Diagnostic

More information about the Diagnostic section can be found in the Configuraion Tool manual.



## 5.3 Set-up procedure

- 1. Install Intesis MAPS on your laptop, use the setup program supplied for this and follow the instructions given by the Installation wizard.
- 2. Install Intesis in the desired installation site. Installation can be on DIN rail or on a stable not vibrating surface (DIN rail mounted inside a metallic industrial cabinet connected to ground is recommended).
- 3. If using, ASCII Serial, connect the communication cable coming from the EIA485 port or the EIA232 port of the ASCII installation to the port marked as Port B of Intesis (More details in section 2).

If using, ASCII TCP/IP, connect the communication cable coming from the Ethernet port of the ASCII installation to the port marked as Ethernet of Intesis (More details in section 2).

4. If using BACnet IP, connect the communication cable coming from the BACnet IP network to the port marked as Ethernet on Intesis (More details in section 2).

If using BACnet MSTP, connect the communication cables coming from the BACnet MSTP network to the port marked as Port A on Intesis (More details in section 2).

5. Power up Intesis. The supply voltage can be 9 to 30 Vdc or just 24 Vac. Take care of the polarity of the supply voltage applied.

**WARNING!** In order to avoid earth loops that can damage Intesis and/or any other equipment connected to it, we strongly recommend:

- The use of DC power supplies, floating or with the negative terminal connected to earth. **Never use a DC** power supply with the positive terminal connected to earth.
- The use of AC power supplies only if they are floating and not powering any other device.
- 6. If you want to connect using IP, connect the Ethernet cable from the laptop PC to the port marked as Ethernet of Intesis (More details in section 2). Using a hub or switch may be required.

If you want to connect using USB, connect the Ethernet cable from the laptop PC to the port marked as USB of Intesis (More details in section 2).

- 7. Open Intesis MAPS, create a new project selecting a template for **INASCBAC---0000**.
- 8. Modify the configuration as desired, save it and download the configuration file to Intesis as explained in the Intesis MAPS user manual.
- 9. Visit the Diagnostic section, enable COMMS and check that there is communication activity, some TX frames and some other RX frames. This means that the communication with the Centralized Controller and ASCII Master devices is OK. In case there is no communication activity between Intesis and the Centralized Controller and/or ASCII devices, check that those are operative: check the baud rate, the communication cable used to connect all devices and any other communication parameter.



Figure **5.16** Enable COMMS



#### **Electrical & Mechanical Features** 6



Enclosure	Plastic, type PC (UL 94 V-0) Net dimensions (dxwxh): 90x88x56 mm Recommended space for installation (dxwxh): 130x100x100mm Color: Light Grey. RAL 7035	Battery	Size: Coin 20mm x 3.2mm Capacity: 3V / 225mAh Type: Manganese Dioxide Lithium
Mounting	Wall. DIN rail EN60715 TH35.	Console Port	Mini Type-B USB 2.0 compliant 1500VDC isolation
Terminal Wiring (for power supply and low-voltage signals)	Per terminal: solid wires or stranded wires (twisted or with ferrule) 1 core: 0.5mm <sup>2</sup> 2.5mm <sup>2</sup> 2 cores: 0.5mm <sup>2</sup> 1.5mm <sup>2</sup> 3 cores: not permitted	USB port	Type-A USB 2.0 compliant Only for USB flash storage device ( <i>USB pen drive</i> ) Power consumption limited to 150mA ( <i>HDD connection not allowed</i> )
Power	1 x Plug-in screw terminal block (3 poles) 9 to 36VDC +/-10%, Max.: 140mA. 24VAC +/-10% 50-60Hz, Max : 127mA	Push Button	Button A: Will broadcast I-Am message in the BACnet network. Button B: Reserved for future use
	Recommended: 24VDC	Operation Temperature	0°C to +60°C
Ethernet	1 x Ethernet 10/100 Mbps RJ45 2 x Ethernet LED: port link and activity	Operational Humidity	5 to 95%, no condensation
	1 x Serial EIA485 Plug-in screw terminal block (2 poles)	Protection	IP20 (IEC60529)
Port A	A, B 1 x Plug-in screw terminal block green (2 poles) SGND (Reference ground or shield) 1500VDC isolation from others ports		10 x On board LED indicators 1 x Error LED 1 x Power LED 2 x Ethernet Link/Speed
Switch A (SWA)	1 x DIP-Switch for serial EIA485 configuration: Position 1: ON: 120 Ω termination active Off: 120 Ω termination inactive (default) Position 2-3: ON: Polarization active (default) Off: Polarization inactive	Indicators	2 x Port A TX/RX 2 x Port B TX/RX 1 x Button A indicator 1 x Button B indicator
PORT B	<ol> <li>x Serial EIA232 (SUB-D9 male connector) Pinout from a DTE device 1500VDC isolation from other ports (except PORT B: EIA485)</li> <li>x Serial EIA485 Plug-in screw terminal block (3 poles) A, B, SGND (Reference ground or shield) 1500VDC isolation from other ports (except PORT B: EIA232)</li> </ol>		
Switch B swb)	1 x DIP-Switch for serial EIA485 configuration: Position 1: ON: 120 Ω termination active Off: 120 Ω termination inactive (default) Position 2-3: ON: Polarization active Off: Polarization inactive (default)		



## 7 Dimensions



Recommended available space for its installation into a cabinet (wall or DIN rail mounting), with space enough for external connections



