

BACnet gateway



1. Overview

BACnet support for up to 4 units with double flow and heat recovery equipped with TAC5 control boards and SAT ETHERNET. The BACnet Standardized Device Profile (Annex L) of the BACnet device is: BACnet Application Specific Controller (B-ASC). The supported Data Link Layer Options are BACnet / IP and MS/TP slave.

2. Standard objects supported

Object Type	
Analog Input	Object_Identifier, Object_Name, Object_Type, Present_Value, Status_Flags, Event_State, Out_Of_Service, Units, Description.
Analog Value	Object_Identifier, Object_Name, Object_Type, Present_Value, Status_Flags, Event_State, Out_Of_Service, Units, Description.
Integer Value	Object_Identifier, Object_Name, Object_Type, Present_Value, Status_Flags, Event_State, Out_Of_Service, Units, Description.
Device	Object_Identifier, Object_Name, Object_Type, System_Status, Vendor_Name, Vendor_Identifier, Model_Name, Firmware_Revision, Application_Software_Version, Protocol_Version, Protocol_Revision, Protocol_Services_Supported, Protocol_Object_Types_Supported, Object_List, Max_APDU_Length_Accepted, Segmentation_Supported.

3.1 Analogue Input (RO): A1

Object Instance	Object Name	Min/Max
1	K2 Analog input	0-10,0 [V]
	Analog input on K2 contact	
2	K3 Analog input	0-10,0 [V]
	Analog input on K3 contact	
3	T° out	-99,9-99,9 [°C]
	Outside temperature measured on T1 sensor (-999=open, +999=short circuit)	
4	T° extract	-99,9-99,9 [°C]
	Extract temperature measured on T2 sensor (-999=open, +999=short circuit)	
5	T° exhaust	-99,9-99,9 [°C]
	Exhaust temperature measured on T3 sensor (-999=open, +999=short circuit)	
6	T° antifrost internal hydraulic postheater	-99,9-99,9 [°C]
	Temperature for the antifrost protection of the hydraulic postheater inside the unit measured on T4 sensor (-999=open, +999=short)	
7	T° supply	-99,9-99,9 [°C]
	Supply temperature measured on T5 sensor (-999=open, +999=short)	
8	T° antifrost external hydraulic postheater	-99,9-99,9 [°C]
	Temperature for the antifrost protection of the hydraulic postheater external to the unit measured on T7 sensor (-999=open, +999=short)	
9	T° antifrost external hydraulic postcooler	-99,9-99,9 [°C]
	Temperature for the antifrost protection of the hydraulic postcooler external to the unit measured on T8 sensor (-999=open, +999=short)	

3.1 Analogue Value (RO): AV R

Object Instance	Object Name	Min/Max
1	Setpoint – Preheat Temperature	-9,9-9,9 [°C]
	Preheat T° setpoint	
2	Setpoint – Comfort Temperature	0,1-99,9 [°C]
	Current Comfort T° setpoint (KWout/NV/BA+/BA-) (0=OFF)	
3	Current Postheat setpoint	0,1-99,9 [°C]
	Current Postheat setpoint (KWout/NV/BA+/KWext) (0=OFF)	
4	Current Postcool setpoint	0,1-99,9 [°C]
	Current PostCooling setpoint (BA-) (0=OFF)	
5	OUT INT HYDRAULIC POSTHEAT	0-10,0 [V]
	Output for the power control of the hydraulic postheater inside the unit	
6	OUT EXT HYDRAULIC POSTHEAT	0-10,0 [V]
	Output for the power control of the hydraulic postheater external to the unit	
7	OUT EXT HYDRAULIC POSTCOOL	0-10,0 [V]
	Output for the power control of the hydraulic postcooler external to the unit	

3.3 Integer Value (RO): IV R

Object Instance	Object Name	Min/Max
1	Working Mode	0-9
	Current Working mode (0=OFF 1=CA 2=LS 3=CPf 4=CPs (5=CAs) 6=TQ 9=InitPa)	
2	Speed Selection I II III	0-3
	Current speed (0=STOP 1=LOW/I 2=MEDIUM/II 3=HIGH/III)	
3	Type of unit for flow	0-4
	Current main Setpoint unit (0= m ³ /h 1=Pa 2=0,1V 3=torque% 4=l/s)	
4	Setpoint - Supply Flow	0-99999
	Current setpoint for the supply fan (unit defined in object "Type of unit for flow")	
5	Setpoint - Exhaust Flow	0-99999
	Current setpoint for the exhaust fan (unit defined in object "Type of unit for flow")	
6	Exhaust/Supply ratio	5-999
	% (F3F4/F1F2)	
7	Actual Supply Flow	0-99999
	Actual Supply Flow (unit defined in object "Type of unit for flow")	
8	Actual Exhaust Flow	0-99999
	Actual Exhaust Flow (unit defined in object "Type of unit for flow")	
9	Running Hours	0-999999 [H]
	Run time, working hours	
10	Antifrost Status	0-2
	0=OFF 1=REC ON 2=NV ON	
11	Bypass Status	0-2
	0=CLOSED/OFF 1=OPEN/ON 2=PARTIALLY OPEN	
12	Dampers Status	0-2
	0=CLOSED 1=OPENING/CLOSING 2=OPEN	
13	Postventilation	0-1
	Post ventilation status (0=NO 1=YES)	
14	Control Mode	0-10
	Control by (1=ERROR 2=FIREALARM 3=VIEWER 4=CBR 5=VIEWSCHED 6=MBSCHED 7=MB40201 8=BYPASS 9=BOOST 10=MB40204)	
15	External Batteries Antifreeze Status	0-3
	BA+ BA- Antifreeze status (0=OFF, 1=BA+ ON or BA+/- ON, 2=BA- ON, 3=BA+ and BA- ON)	
16	Filters Hours	0-999999 [H]
	Filters alarm: hours count	

3.3 Integer Value (RO): IV R

Object Instance	Object Name	Min/Max
17	Changeover Status	0-1
	Automatic changeover between heating and cooling (0=inactive, 1=heating, 2=cooling)	
18	Defrost Status	0-2
	0=IDLE, 1=ACTIVE, 2=STOP to drain water	
19	Digital Outputs Status	0-65536
	Contains a bit for each of the digital outputs: bit0="AL1 (alarm)" bit1="BYPASS 1 (For on/off bypass: 0=closed/off 1=open/on. For prop_bypass: 0=down 1=up)" bit2="BYPASS 2 (For on/off bypass: always on. For prop_bypass: 0=stop 1=run)" bit3="CT" bit4="KWIn" bit5="KWout" bit6="OR1 SAT "pressure alarm"" bit7="OR2 SAT "fan on"" bit8="OR3 SAT "water pump NV"" bit9="OR4 SAT "bypass on"" bit10="SATBA WP" bit11="SATBA OUT9 KWext"	
20	OUT INT ELECT PREHEAT	0-100
	Output percentage for the power control of the electrical preheater	
21	OUT INT ELECT POSTHEAT	0-100
	Output percentage for the power control of the electrical postheater inside the unit	
22	OUT EXT ELECT POSTHEAT	0-100
	Output percentage for the power control of the electrical postheater external to the unit	
23	CP SENSOR MODBUS SUPPLY	0-9999 [Pa]
	Pressure measured by the Modbus sensor located on the supply duct	
24	CP SENSOR MODBUS EXHAUST	0-9999 [Pa]
	Pressure measured by the Modbus sensor located on the exhaust duct	

3.4 Analogue Value (R/W): AV W

Object Instance	Object Name	Min/Max
1	Setpoint - T° Postheat	0-99,9 [°C]
	Postheating T° setpoint (0=OFF)	
2	CPs - Voltage reference 1	0-10,0 [V]
	CPs mode: setpoint voltage for [CPs on SUP] or [CPs on EXH]	
3	Setpoint - T° Postcool	0-99,9 [°C]
	Postcooling T° setpoint (0=OFF)	
4	CPs - Voltage reference 2	0-10,0 [V]
	CPs mode: setpoint voltage for [CPs on SUP + EXH]	
5	Setpoint - T° Freecool	0-99,9 [°C]
	Freecooling T° setpoint (0=OFF)	

3.3 Integer Value (R/W): IV W

Object Instance	Object Name	Min/Max
1	Speed Mode	0-3
	Communication determines speed (0=NO 1=Predefined Speed I-II-III 2=TIMETABLE 3=set values in objects)	
2	Speed Select - I II III	0-3
	Selection of predefined speed (0=OFF 1=LOW 2=MEDIUM 3=HIGH)	
3	MANU/AUTO	0-1
	MANUAL/AUTO mode (0=MANUAL 1=AUTO/Time scheduler)	
4	Set Speed Supply	0-99999
	Set supply Flow (m ³ /h or l/s) or Torque (%)	
5	Set Speed Exhaust	0-99999
	Set exhaust Flow (m ³ /h or l/s) or Torque (%)	
6	Force Bypass	0-2
	Override: force bypass ON or OFF, 0=normal, 1=force_on, 2=force_off	
7	BOOST	0-1
	force boost mode, 0/1	
8	Cool Stop	0-1
	Override: force cooling to stop if set to 1. Note that cooling will start if this object is set to 0 and if Heat Stop object is set to 1.	
9	Heat Stop	0-1
	Override: force heating to stop if set to 1.	
10	Control Board Reset	0-1
	Do RESET of controller, clear alarms (0=NO, 1=RESET). Autoreset	
11	Running Hours Reset	0-1
	Do reset of run time, working hours (0=NO, 1=RESET). Autoreset	
12	Filters Hours Reset	0-1
	Do reset of filters hours (0=NO, 1=RESET). Autoreset	

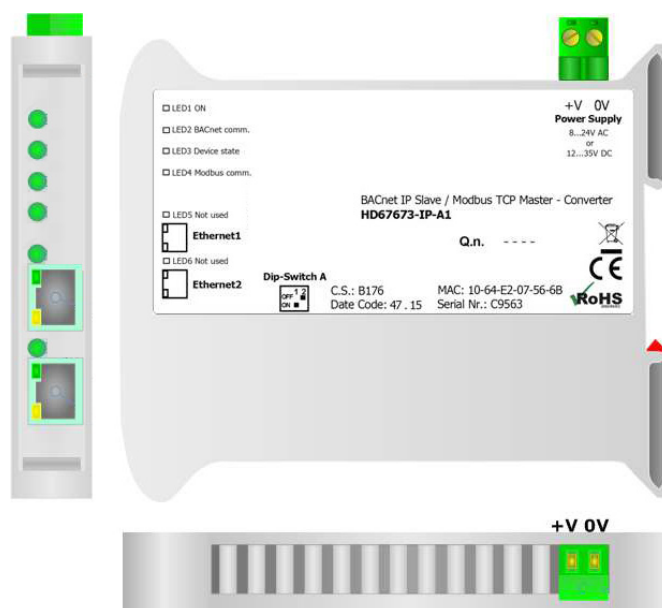
4. Installation

- LED 1 - GREEN: ON
- LED 2 - GREEN: BACnet comm.
- LED 3 - Device state
- LED 4 - GREEN: Modbus comm.
- LED 5 - GREEN: Not used
- LED 6 - GREEN: Not used
- Connector 3: Ethernet 1 Port (RJ45 Plug)
- Connector 4: Ethernet 2 Port (RJ45 Plug)

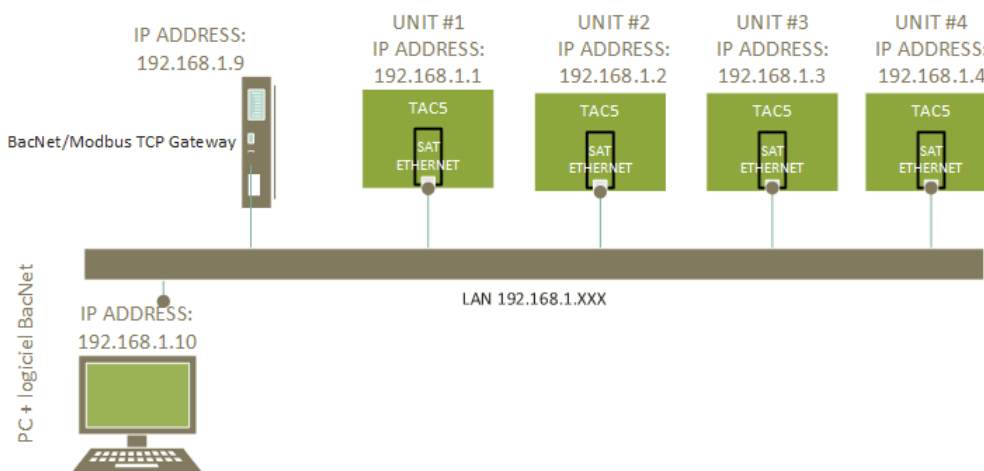
Power supply:

- 0V = Ground
- +V = Positive wire

- VAC : min 8V ; max 24V
- VDC : min 12V ; max 25V



4.1 Topology



5. Configuration

5.1 Default configuration

The default configuration is indicated in the following table:

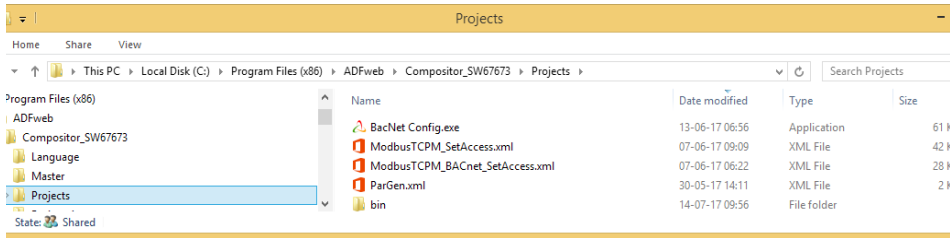
- | | | |
|-----------------------------------|---|-----------------------------------|
| BACnet gateway: | - | Unit n°1: IP ADDRESS: 192.168.1.1 |
| o IP ADDRESS gateway: 192.168.1.9 | - | Unit n°2: IP ADDRESS: 192.168.1.2 |
| o SUBNET MASK: 255.255.255.0 | - | Unit n°3: IP ADDRESS: 192.168.1.3 |
| o GATEWAY: 0.0.0.0 | - | Unit n°4: IP ADDRESS: 192.168.1.4 |
| o PORT: 47808 | | |
| o BACnet device name: Lemmens | | |
| o Device Identifier: 1 | | |

5.2 Custom configuration

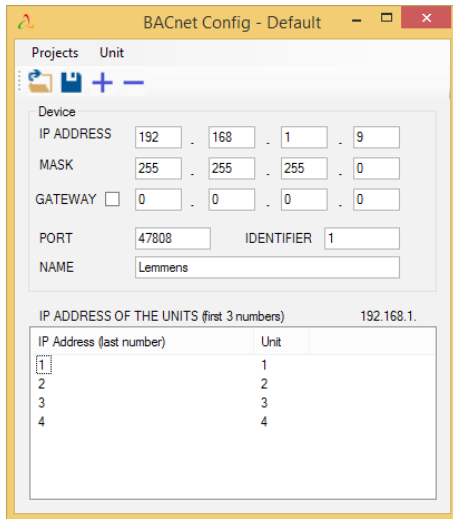
It is possible to reduce the number of units that will be controlled through the Bacnet gateway, or to change the IP address of the gateway and of the units as well.

- Download from www.lemmens.com website the configuration 2 files.
- Installation package of "Compositor SW67673".
- Package "Install BACnet Config".
- Install first the software "Compositor SW67673".
- Extract the package "Install BACnet Config" in the Project folder of Compositor.

Example of installation:



Start BACnet config.exe:



- With the interface it is possible to:
- o Remove a unit or add a unit
 - o Change the gateway IP configuration
 - o Change the gateway communication port
 - o Change the last number of the IP address of the units on the corresponding row inside the table.
- N.B.: for the units, only the last number of the IP address can be changed since it must be within the same range of the gateway IP address.
- o Save the configuration
 - o Open a previously saved configuration

5.3 Upload configuration

The module has a default configuration loaded, so there should be no need to make any changes if the default configuration can be used.

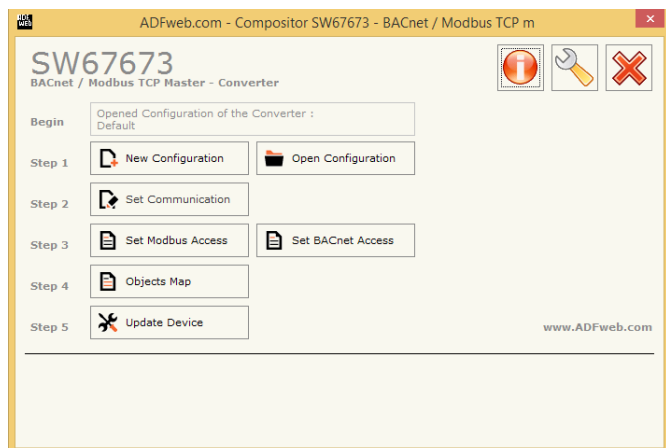
Procedure to change the configuration of the module:

1. Set up first the computer used for downloading in order to be able to communicate with the gateway:

Set IP address of the computer to 192.168.1.10.

The net mask will be 255.255.255.0.

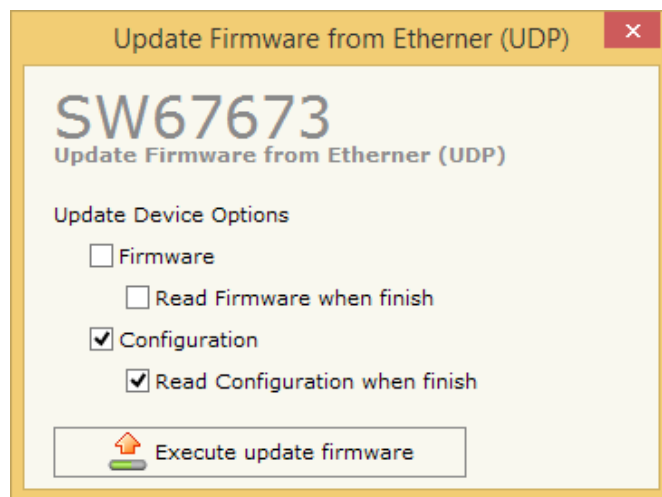
The gateway is not used so 0.0.0.0.



2. Press the button "Open Configuration" (on Step 1 row) and then choose the folder corresponding to the desired project for downloading.

3. Press the button "Update Device" (step 5). The following dialog box will appear where there is no need to change anything (the IP address may be different from the picture, according to the one configured in the project).

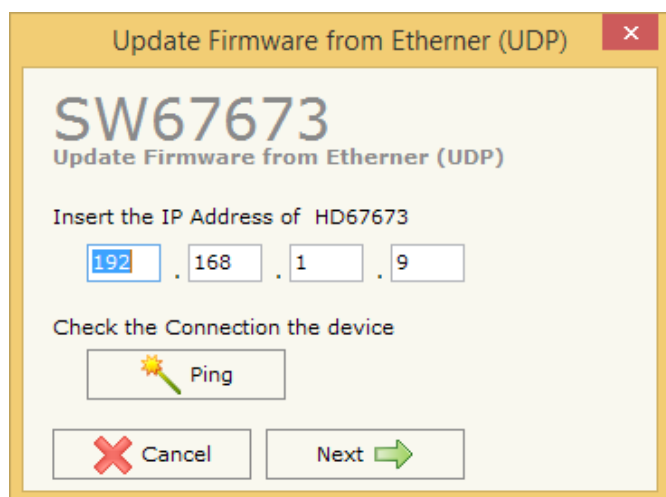
5. Press the button "Next", the following dialog box will appear where only "Configuration" and "Read the configuration when finish" must be checked:



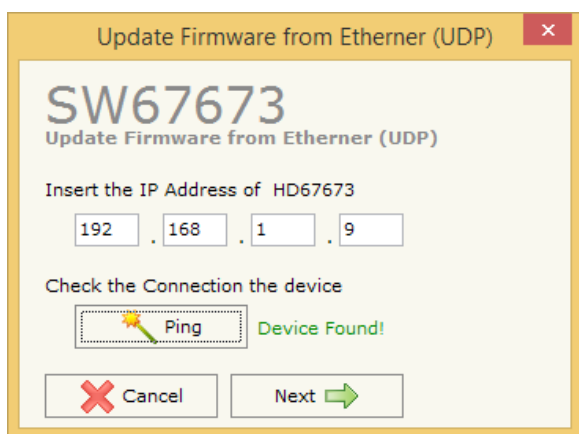
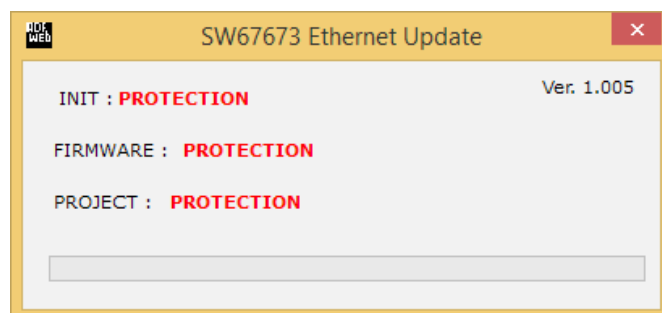
6. Press the button "Execute update firmware".

7. The status update window will appear to show the evolution of the downloading.

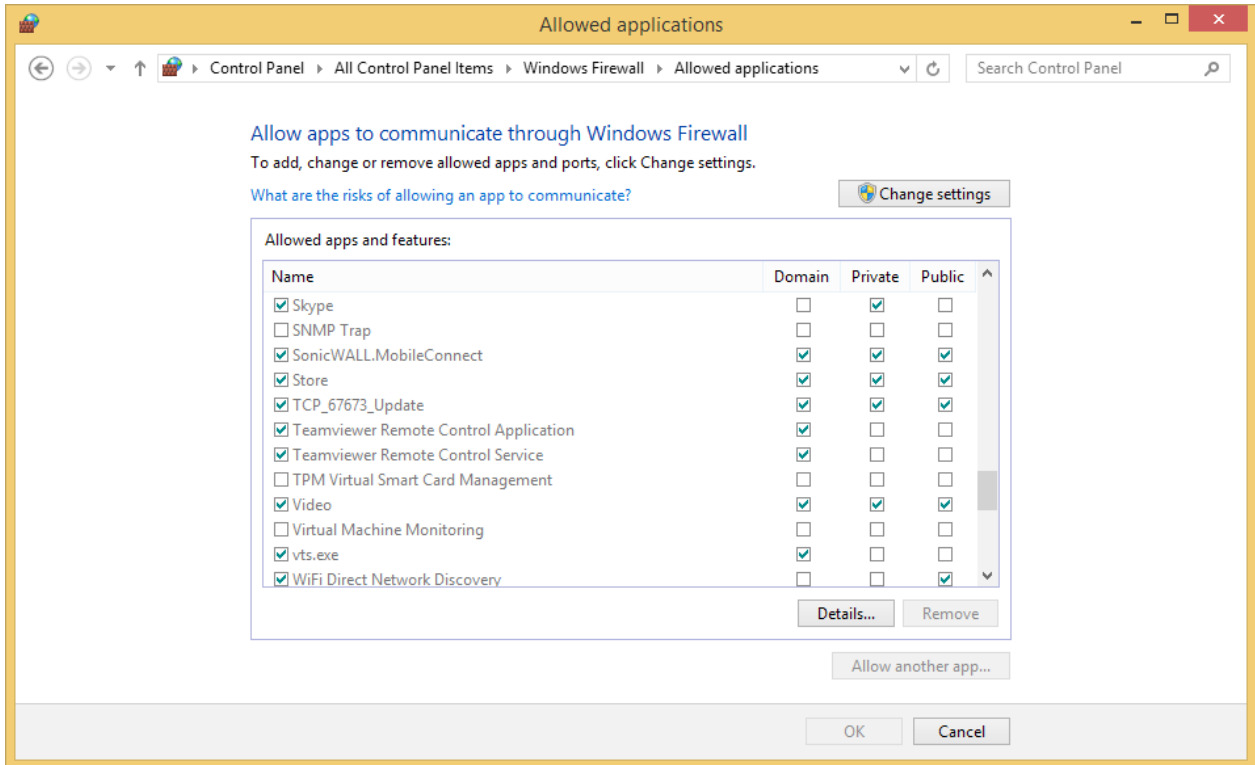
8. If error message, do the verifications as described in step 9:



4. Press the button "Ping", then the text "Device Found" will appear:



9. Check that the firewall allows the update software to go through it. Here is an example with Windows 10 ©:



10. Try to repeat the operations for the updating;
 Try to restart the PC;
 If using Windows Seven or Vista,7, 8 or 10, make sure to have the administrator privileges;
 Check the LAN settings.
 Try with another PC.

5.4 Resetting the IP address:

The gateway comes with default IP address 192.168.1.9. If this address has been changed later on and the address is not known anymore, follows this procedure to set the back the factory address.

1. Turn off the Device;
2. Put Dip2 of 'Dip-Switch A' at ON position (Fig.1)
3. Turn on the device
4. Connect the Ethernet cable;
5. Insert the IP "192.168.2.205";
6. Press the "Ping" button, must appear "Device Found!"
7. Press the "Next" button;
8. Check all operations;
9. Press the "Execute update firmware" button to start the upload;
10. When all the operations are "OK" turn off the Device;
11. Put Dip2 of 'Dip-Switch A' at OFF position (Fig.2)
12. Turn on the device.
13. Upload a configuration (see 5.2).



Fig.1



Fig.2

Data Link Layer Options:

BACnet IP, (Annex J)

MS/TP slave (Clause 9), baud rate(s): 9600, 19200, 38400, 57600, 76800, 115200

Point-To-Point, EIA 232 (Clause 10), baud rate(s): 9600, 115200

Character Sets Supported:

ISO 10646 (UTF-8)

Network Security Options:

Non-secure Device - is capable of operating without BACnet Network Security



Language_1