

Start-up Guide for the gateway MODBUS RTU / BACnet



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Code NA10520

INSTRUCTION SHEET



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1. CERTIFICATIONS AND TECHINCAL SPECIFICATIONS

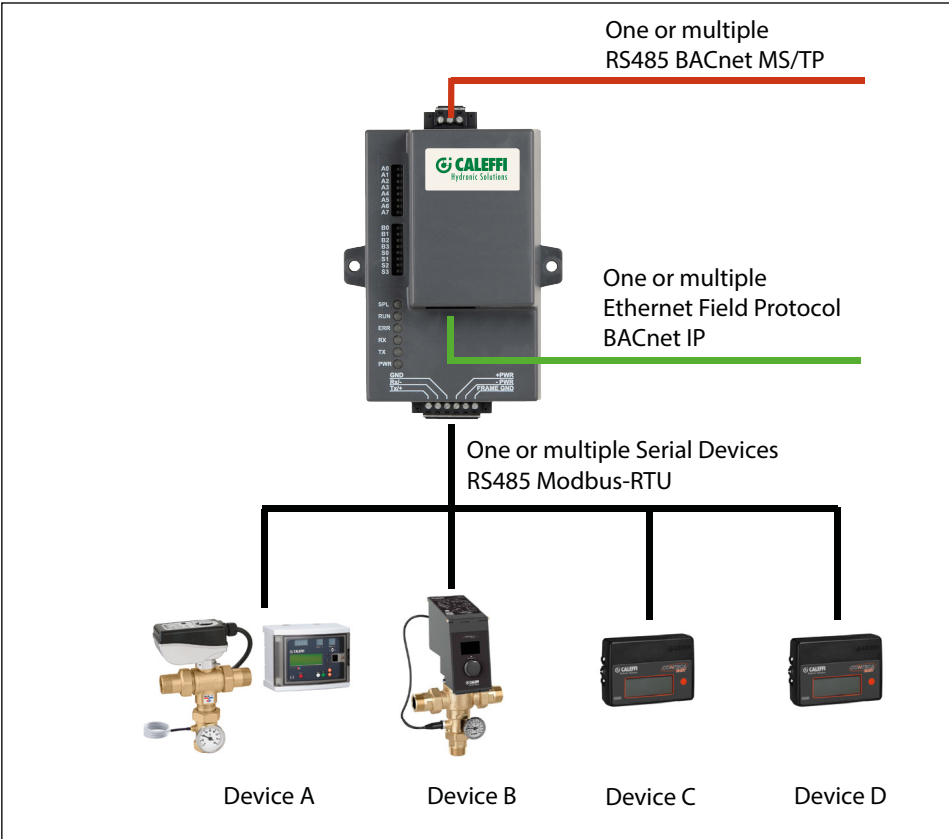
The BTL Mark on gateway is a symbol that indicates that a product has passed a series of rigorous tests conducted by an independent laboratory which verifies that the product correctly implements the BACnet features claimed in the listing. The mark is a symbol of a high-quality BACnet product. Go to www.BACnetInternational.net for more information about the BACnet Testing Laboratory.



	Gateway FPC-N34
Electrical Connections	One 6-pin Phoenix connector with: RS-485 port (+ / - / gnd) Power port (+ / - / Frame-gnd) One 3-pin Phoenix connector with: RS-485 port (+ / - / gnd) One Ethernet 10/100 BaseT port
Approvals	CE Certified; TUV approved to UL 916, EN 60950-1, EN 50491-3 and CSA C22-2 standards; FCC Class A Part 15; DNP 3.0 Conformance Tested; RoHS Compliant; CSA 205 Approved BTL Marked
Power Requirements	Multi-mode power adapter: 9-30V DC or 12 - 24V AC
Physical Dimensions	11.5 cm L x 8.3 cm W x 4.1 cm H (4.5 x 3.2 x 1.6 in.)
Weight	0.2 kg (0.4 lbs)
Operating Temperature	-40°C to 75°C (-40°F to 167°F)
Surge Suppression	EN61000-4-2 ESD EN61000-4-3 EMC EN61000-4-4 EFT
Humidity	5 - 90% RH (non-condensing)
(Specifications subject to change without notice)	

2. INTRODUCTION

The gateway is an external, high performance Building Automation multi-protocol gateway that is preconfigured to auto-discover any of Caleffi's products (hereafter called "device") connected to the the gateway and automatically configures them for BACnet MS/TP, BACnet/IP. It is not necessary to download any configuration files to support the required applications.
The gateway is pre-loaded with tested Profiles/Configurations for the supported devices.



3. SETUP FOR THE GATEWAY

Record identification data

Each gateway has a unique part number located on the side or the back of the unit. This number should be recorded, as it may be required for technical support. The numbers are as follows:

Model	Caleffi code
FPC-N34-1618	NA10520

The gateway have the following 3 ports: RS-485 + Ethernet + RS-485

Point count capacity and registers per device

The total number of registers presented by all of the devices attached to the gateway cannot exceed:

Model	Caleffi code	Total Registers
FPC-N34-1618	NA10520	1,500

Devices	Registers Per Device
Legiomix_6000_Series	108
Legiomix_2_0_6000_Series	86
Conteca_Easy_750_Series	28

Configuring device communications

Input COM Settings on all Devices Connected to the gateway:

- All the connected serial devices must have the same Baud Rate, Data Bits, Stop Bits, and Parity settings as the gateway.
- The table specifies the device serial port settings required to communicate with the gateway.

Port Setting	Device	Device	Device
Protocol	Modbus RTU	Modbus RTU	Modbus RTU
Baud Rate	9600	9600	9600
Parity	None	Even* / None	Even* / None
Data Bits	8	8	8
Stop Bits	1	1	1
	Legiomix 24V	Legiomix 2.0	Conteca Easy

*Factory default setting = Even

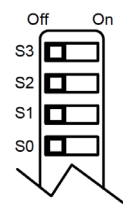
Set Modbus Node-ID for each device attached to the gateway

- Set Modbus Node-ID for each of the devices attached to gateway. The Node-ID's need to be uniquely assigned between 1 and 255.
- The Node-ID that is assigned for each device needs to be documented.
- The Node-ID's assigned are used for deriving the device instance for BACnet/IP and BACnet MS/TP.

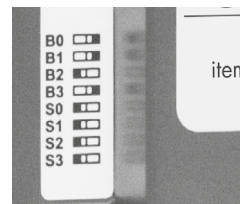
Selecting the desired field Protocol

Gateway units use the "S" bank of DIP switches (S0 – S3) to select the field protocol.

- See the table below for the switch settings to select.
- The OFF position is when the DIP switches are set closest to the outside of the box.



S0 – S3 DIP Switches



S Bank DIP Switch Location

Gateway FPC-N34	S Bank DIP Switches			
Profile	S0	S1	S2	S3
BACnet/IP*	Off	Off	Off	Off
BACnet MS/TP (single node)	On	Off	Off	Off

*Factory default setting = BACnet/IP

Profile Settings for gateway

NOTE: When setting DIP switches, ensure that power to the board is OFF.

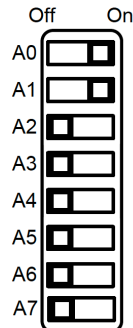
BMS Network settings: MAC address, device instance and Baud rate

BACnet MS/TP: Setting the MAC Address for BMS Network

- Only 1 MAC Address is set for gateway regardless of how many devices are connected to gateway.
- Set the BACnet MS/TP MAC Address of the gateway to a value between 1 to 127 (Master MAC Address); this is so that the BMS front end can find gateway via BACnet Auto-Discovery.

NOTE: Never set a BACnet MS/TP MAC Address of the gateway to a value from 128 to 255. Addresses from 128 to 255 are Slave Addresses and can not be discovered by BMS front ends that support Auto-Discovery of BACnet MS/TP devices.

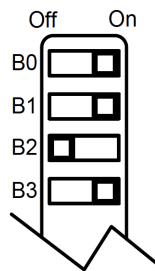
- Set "A" bank DIP switches A0 – A7 to assign a MAC Address to the gateway for BACnet MS/TP.
- Refer to Appendix 1 for the complete range of MAC Addresses and DIP switch settings.



NOTE: When setting DIP switches, ensure that power to the board is OFF.

BACnet MS/TP: Setting the Baud rate for BMS network

DIP switches B0 – B3 can be used to set the field Baud rate of the gateway to match the Baud rate required by the BMS for BACnet MS/TP.



NOTE: When setting DIP switches, ensure that power to the board is OFF

Baud Rate DIP Switch Selection

Baud	B0	B1	B2	B3
9600	On	On	On	Off
19200	Off	Off	Off	On
38400*	On	On	Off	On
57600	Off	Off	On	On
76800	On	Off	On	On

* Factory default setting = 38400

BACnet: Calculating the default device instance

The device instance value is automatically generated using the following formula:

BACnet device instance = (Device Node ID) + (Default Node Offset)

NOTE: The default node offset is 50,000.

For example, if device A has a node ID of 1 and device B has a node ID of 2, then:

BACnet device instance A = (1) + (50000) = 50001

BACnet device instance B = (2) + (50000) = 50002

To reach a specific BACnet device instance result, refer to the chapter 6.

Enabling Auto-Discovery

NOTE: if Modbus TCP/IP was selected for the field/BMS protocol, skip this section.
Auto-Discovery is not used for MODBUS TCP/IP.

The S3 DIP switch is used to both enable Auto-Discovery of known devices attached to the gateway and save the recently discovered configuration. If the gateway is being installed for the first time, set the S3 to the ON position to enable Auto-Discovery. The ON position is when the DIP switches are set closest to the inside of the box.

S3 DIP Switch Auto-Discovery Mode	S3
Auto-Discovery ON - Build New Configuration	On
Auto-Discovery OFF - Save current Configuration	Off

Auto-Discovery: After completion - Turn Off to save configuration

NOTE: if Modbus TCP/IP was selected for the field/BMS protocol, skip this section.
Auto-Discovery is not used for MODBUS TCP/IP.

The S3 DIP Switch for enabling Auto-Discovery should have been set in the previous chapter before applying power to the gateway.

NOTE: Do not enable Auto-Discovery when the unit is powered.

When power is applied to a gateway that is set to enable Auto-Discovery, it will take about 3 minutes to complete the discovery of all the RS-485 attached to the gateway (the "TX" led will flash during the Auto-Discovery). Once completed, the "TX" and "RX" leds should flash rapidly, indicating good communication between discovered devices.

Once the gateway has discovered all the RS485 devices, set the S3 DIP switch to the OFF position to save the current configuration.

S3 DIP Switch Auto-Discovery Mode	S3
Auto-Discovery ON - Build New Configuration	On
Auto-Discovery OFF - Save current Configuration	Off

4. POWER AND RS485 CONNECTIONS

Device connections to gateway

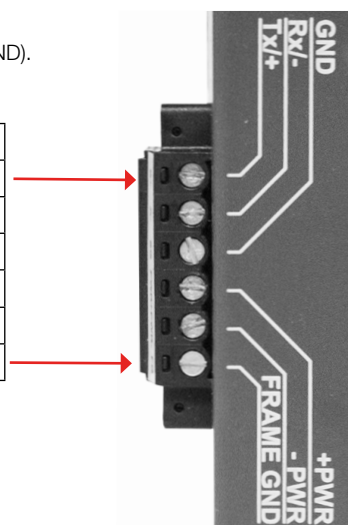
Gateway 6 Pin Phoenix connector for RS-485 Devices:

- Pins 1 through 3 are for RS-485 devices (Use standard grounding principles for RS-485 GND).

- Pins 4 through 6 are for power.

NOTE: Do not connect power until next chapter.

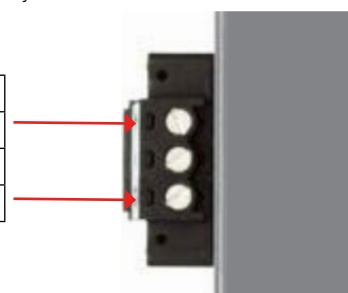
Pins	Device Pins	Gateway Pins
1	Pin RS-485 +	B +
2	Pin RS-485 -	A -
3	Pin GND	SG
4	Power In (+)	PWR +
5	Power In (-)	PWR -
6	Frame Ground	FG



BACnet MS/TP: Wiring field port to RS-485 Network

Connect the BACnet MS/TP RS-485 network wires to the 3-pins RS-485 connector on gateway as shown below (use standard grounding principles for RS-485 GND):

Pins	Device Pins	Gateway Pins
1	Pin RS-485 +	+
2	Pin RS-485 -	-
3	Pin RS-485 GND	G



See the section 5 for information on connecting to BACnet/IP network.

Power-Up gateway

Check power requirements in the table below:

Power Requirement for gateway External			
Gateway Family	Current Draw Type		
	12V DC/AC	24V DC/AC	30V DC
FPC – N34 (Typical)	170mA	100mA	80mA
FPC – N34 (Maximum)	240mA	140mA	100mA
NOTE: These values are 'nominal' and a safety margin should be added to the power supply of the host system. A safety margin of 25% is recommended.			

NOTE: When setting DIP switches, ensure that power to the board is OFF

Apply power to gateway as shown below. Ensure that the power supply used complies with the specifications provided in chapter 1.

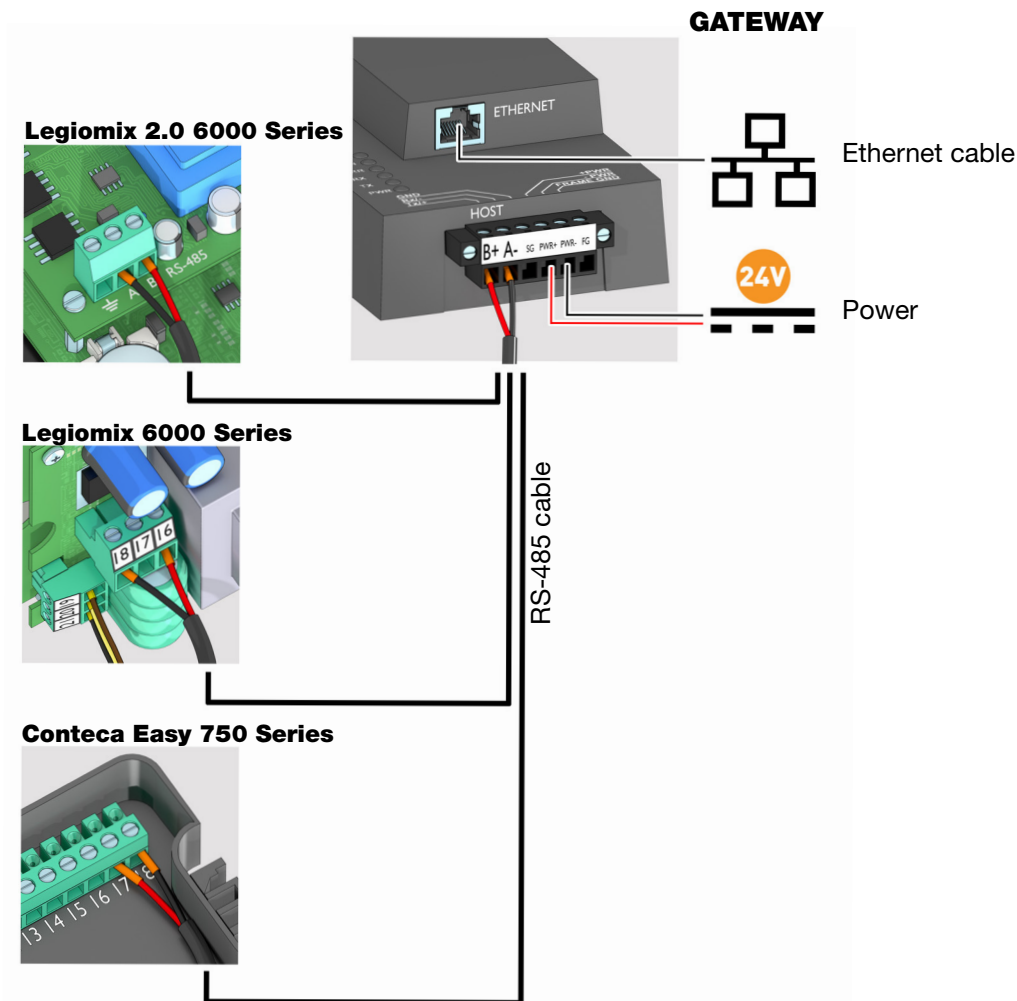
- Gateway accepts either 9-30V DC or 12-24V AC on pins 4 and 5.

- Frame GND should be connected.

Wiring diagrams: from devices (MODBUS-RTU) to Gateway (Ethernet)

Device - Gateway connections		
	Gateway Pins	
Devices	B +	A -
Legiomix_6000_Series	B (16)	A (18)
Legiomix_2_0_6000_Series	B	A
Conteca_Easy_750_Series	B (17)	A (18)

See the diagrams below for the connection for the different devices (from MODBUS to BACnet network).



5. USE WEB CONFIGURATOR TO SETUP THE GATEWAY

Connect the PC to gateway via the Ethernet Port



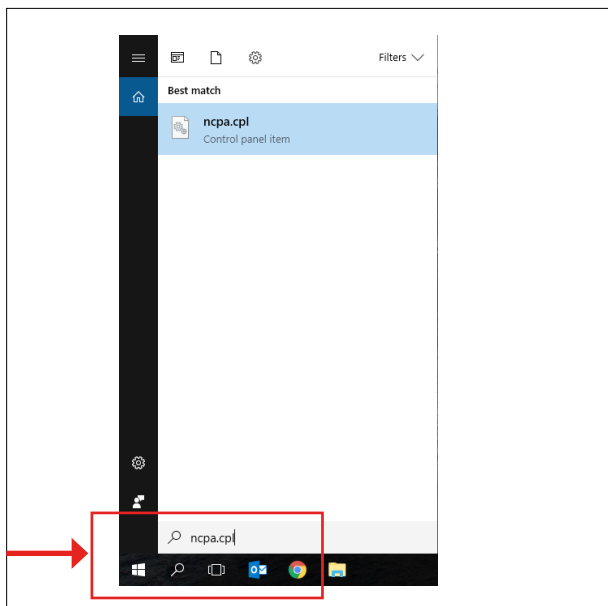
Connect a CAT5 Ethernet cable (Straight through or Cross-Over) between the local PC and gateway.

NOTE: The Default IP Address of gateway is 192.168.1.24, subnet mask is 255.255.255.0. If the PC and gateway are on different IP Networks, assign a static IP Address to the PC on the 192.168.1.1 network.

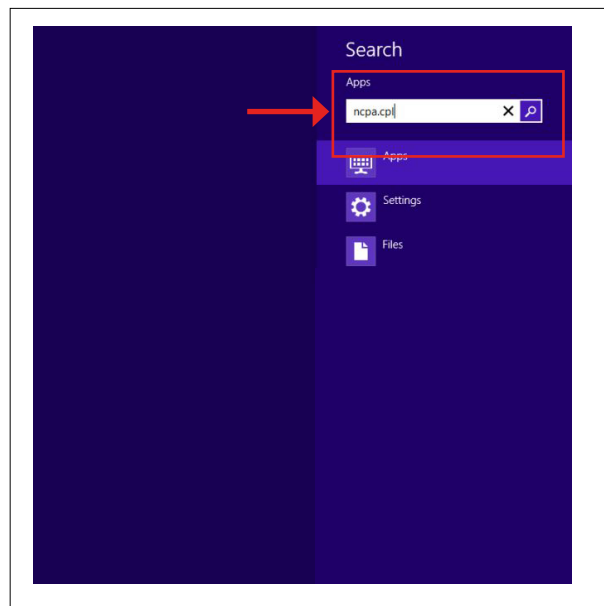
To set up the gateway by different Operating System (Windows) follow the instruction below:

1 - Go to the start button and digit the following code: **ncpa.cpl**

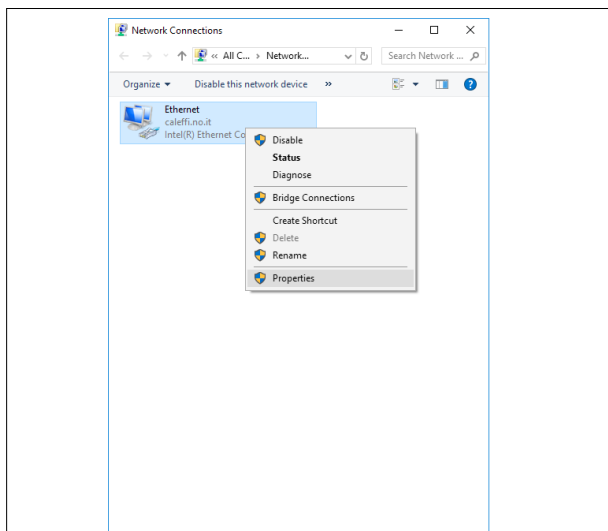
- For Windows 10



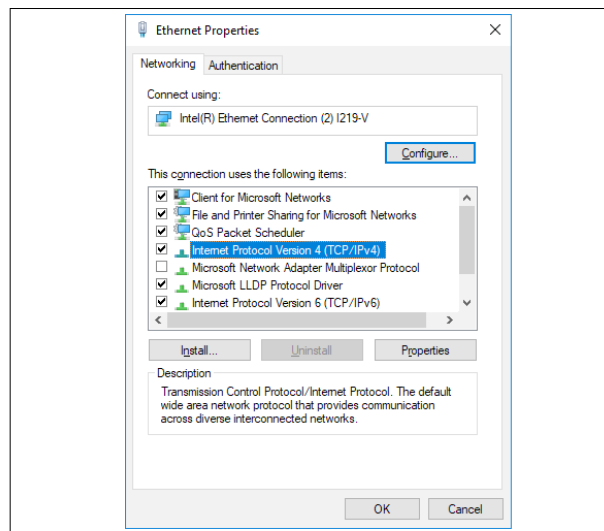
- For Windows 8



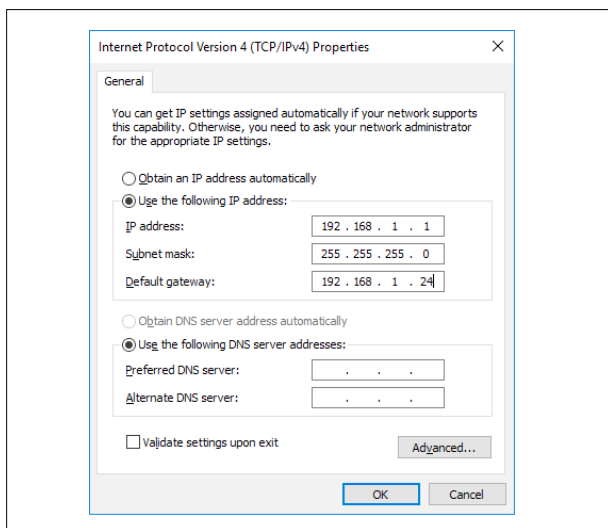
2 - Select "Properties" by the right button of the mouse.



3 - Select "Internet Protocol Version 4" and confirm.

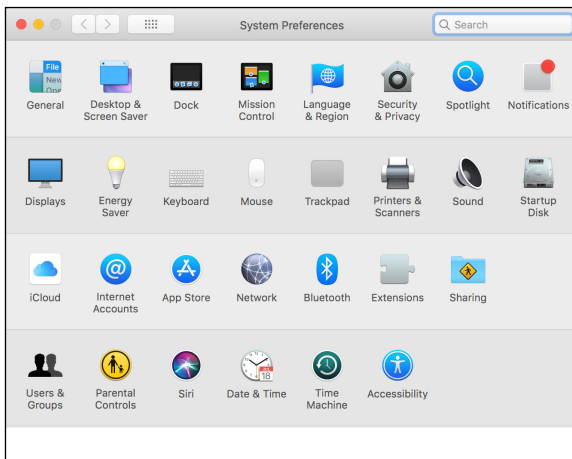


4 - Fill the correct setting for the IP BACnet gateway address.

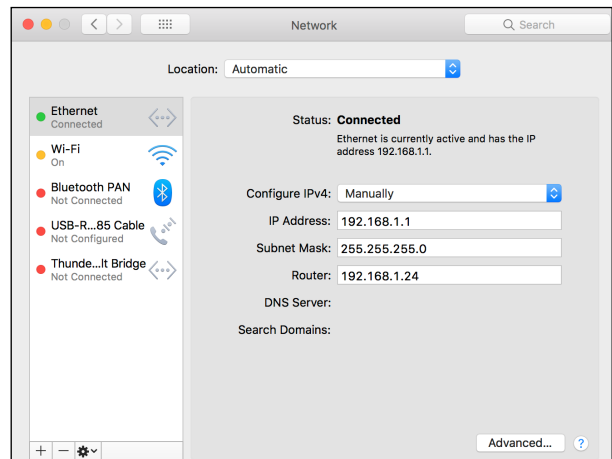


To set up the gateway for MAC systems follow the instruction below:

1 - Open "System Preferences"



2 - Go to "Network" and choose the Ethernet system connected, fill the correct setting for the IP BACnet gateway address



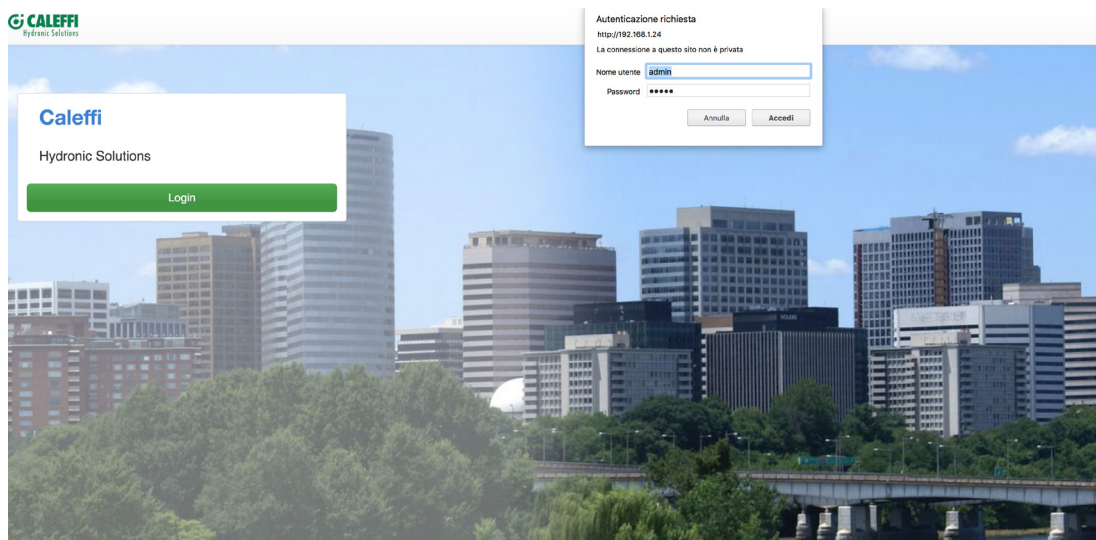
Connecting to gateway Web Configurator

After setting a local PC on the same subnet as the gateway (previous chapter), open a web browser on the PC and enter the IP Address of the gateway; the default address is 192.168.1.24.

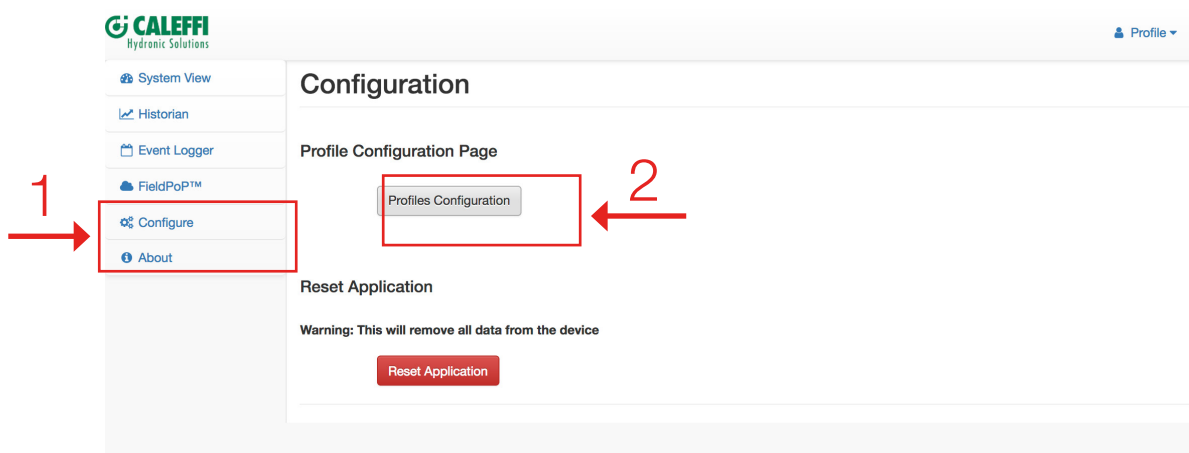
NOTE: Below the "Active profiles" heading, the profiles for connected devices are listed. If no profiles are present, then wiring, baud rate and DIP switch settings must be checked, because there is a problem with device communications. All the active profiles must show the correct Node-ID's before proceeding.

NOTE: If multiple devices are connected to the gateway, set the Virtual Server Nodes field to "YES"; otherwise leave the field on the default "No" setting.

After setting the local IP address of the gateway, to show the parameters of the connected device, following the screens below.



Select the command "Configure" (1) and the command "Profiles Configuration" to enter on the "Configuration Parameters" menù.



Configuration Parameters

Parameter Name	Parameter Description	Value	
mod_baud_rate	Modbus RTU Baud Rate This sets the Modbus RTU baud rate. (9600/19200/38400/57600)	9600	Submit
mod_parity	Modbus RTU Parity This sets the Modbus RTU parity. (None/Even/Odd)	None	Submit
mod_data_bits	Modbus RTU Data Bits This sets the Modbus RTU data bits. (7 or 8)	8	Submit
mod_stop_bits	Modbus RTU Stop Bits This sets the Modbus RTU stop bits. (1 or 2)	1	Submit
network_nr	BACnet Network Number This sets the BACnet network number of the Gateway. (1 – 65535)	50	Submit
node_offset	BACnet Node Offset This is used to set the BACnet device instance. The device instance will be sum of the Modbus device address and the node offset. (0 – 4194303)	50000	Submit
bac_ip_port	BACnet IP Port This sets the BACnet IP port of the Gateway. The default is 47808. (1 – 65535)	47808	Submit
bac_cov_option	BACnet COV This enables or disables COVs for the BACnet connection. Use COV_Enable to enable. Use COV_Disable to disable. (COV_Enable/COV_Disable)	COV_Disable	Submit
bac_bbmd_option	BACnet BBMD This enables BBMD on the BACnet IP connection. Use BBMD to enable. Use – to disable. The bdt.ini files also needs to be downloaded. (BBMD/-)	–	Submit
3 bac_virt_nodes	BACnet Virtual Server Nodes Set to NO if the unit is only converting 1 device to BACnet. Set to YES if the unit is converting multiple devices. (No/Yes)	yes	Submit

Active profiles

Nr	Node ID	Current profile	Parameters
Add			
HELP (?) Network Settings Clear Profiles and Restart System Restart Diagnostics & Debugging			

The Active profiles section lists the currently active device profiles, including previous Web Configurator additions. This list is empty for new installations, or after clearing all configurations. To add an active profile to support a device, click the Add button under the Active Profiles heading. This will present a drop-down box underneath. The Current profile column that lists all the available profiles.

Active profiles

Nr	Node ID	Current profile	Parameters
		☐ BAC_IP_CONTECA_EASY_750_Series	Submit Cancel

For every device that is added, assign a unique Modbus Node-ID. This specification must match the device's network settings.

Active profiles

Nr	Node ID	Current profile	Parameters
		☐ ✓ BAC_IP_CONTECA_EASY_750_Series BAC_IP_LEGIOMIX_2_0_6000_Series BAC_IP_LEGIOMIX_6000_Series	Submit Cancel

NOTE: If multiple devices are connected to the gateway, set the BACnet Virtual server nodes field to “Yes”; otherwise leave the field on the default “No” setting (3).

Once the Profile for the device has been selected from the drop-down list, enter the value of the device's Modbus Node-ID which was assigned in set modbus node - ID. Then press the “Submit” button to add the Profile to the list of devices to be configured.

Repeat this process until all the devices have been added. Completed additions are listed under “Active Profiles” as shown in the following figure.

Active profiles

Nr	Node ID	Current profile	Parameters
1	1	BAC_IP_CONTECA_EASY_750_Series	Remove
2	2	BAC_IP_LEGIOMIX_6000_Series	Remove
3	3	BAC_IP_LEGIOMIX_2_0_6000_Series	Remove
Add			

6. BACNET MS/TP AND BACNET/IP: SETTING NODE_OFFSET TO ASSIGN SPECIFIC DEVICE INSTANCES

After setting a local PC to the same subnet as the gateway, open a web browser on the PC and enter the IP Address of the gateway; the default address is 192.168.1.24. If the IP Address of the gateway has been changed by previous configuration, the assigned IP Address must be gathered from the network administrator (The Web Configurator is shown in the chapter 5). Node_offset field shows the current value (default = 50,000).

NOTE: The values allowed for a BACnet Device Instance can range from 1 to 4,194,303

To assign a specific device instance (or range); change the Node_offset value as needed using the calculation below:

Device instance (desired) = Node_offset + Modbus Node_ID

For example, if the desired Device Instance for the device 1 is 50,001 and the following is true:

- Device 1 has a Modbus Node-ID of 1
- Device 2 has a Modbus Node-ID of 2
- Device 3 has a Modbus Node-ID of 3

Then plug the device 1's information into the formula to find the desired Node_offset:

- 50,001 = Node_offset + 1
- 50,000 = Node_offset

Once the Node_offset value is input, it will be applied to all devices as shown below:

- Device 1 Instance = 50,000 + Modbus Node_ID = 50,000 + 1 = 50,001
- Device 2 Instance = 50,000 + Modbus Node_ID = 50,000 + 2 = 50,002
- Device 3 Instance = 50,000 + Modbus Node_ID = 50,000 + 3 = 50,003

Click "Submit" once the desired value is entered.

node_offset

BACnet Node Offset

This is used to set the BACnet device instance.
The device instance will be sum of the Modbus device address and the node offset.
(0 - 4194303)

50000

Submit

BACnet: Setting Network_Number for more than one gateway on Subnet

For both BACnet MS/TP and BACnet/IP, if more than on gateway is connected to the same subnet, they must be assigned unique Network_Number values. On the main Web Configurator screen, update the BACnet Network Number field and click submit. The default value is 50.

network_nr

BACnet Network Number

This sets the BACnet network number of the Gateway.
(1 - 65535)

50

Submit

7. HOW TO START THE INSTALLATION OVER: CLEARING PROFILES

After setting a local PC to the same subnet as the gateway, open a web browser on the PC and enter the IP Address of the gateway; the default address is 192.168.1.24.

If the IP Address of the gateway has been changed by previous configuration, the assigned IP Address must be gathered from the network administrator (the Web Configurator is shown in the chapter 5).

At the bottom-left of the page, click the "Clear Profiles and Restart" button. Once restart is complete, all past profiles discovered and/or added via Web configurator are deleted. The unit can now be reinstalled.

8. EXAMPLE: LEGIOMIX 6000 DATA AND PARAMETERS

To show the parameters of the connected devices, following the screens below. Select the profile of the connected device (1).

CALEFFI

Hydronic Solutions

System View

Historian

Event Logger

FieldPoP™

Configure

About

System View

Sensors

Address

Location

1

2

3

The parameters of the select device are shown in the screen below.

CALEFFI

Hydronic Solutions

System View

Historian

Event Logger

FieldPoP™

Configure

About

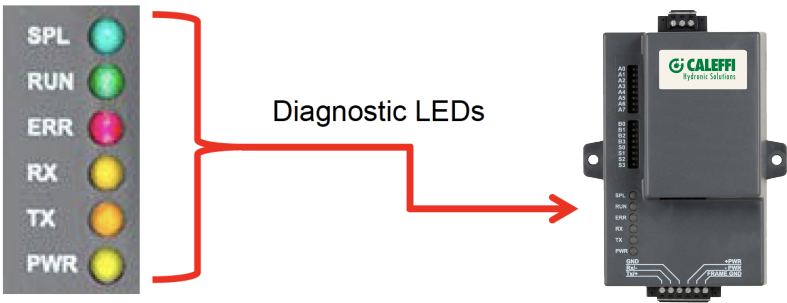
Back

Normal

Location		Save
Program ID	0	Save
Current Day	0	Save
Current Month	0	Save
Current Year	0	Save
Current Hour	0	Save
Current Minute	0	Save
Time ON (h)	0	Save
Time ON (m)	0	Save
Time OFF (h)	0	Save
Time OFF (m)	0	Save
Time min		Save
Time Shock	0	Save
Set Reg Deg_C	0	Save
Set Dis Deg_C	0	Save
Set Ric Deg_C	0	Save
Set Shock Deg_C	0	Save
Set Tmax Deg_C	0	Save
Set Reg Deg_F	0	Save

9. LED DIAGNOSTICS FOR COMMUNICATIONS BETWEEN GATEWAY AND DEVICES

See the diagram below for gateway led locations.



Tag	Description
SPL	The SPL LED will light if the unit is not getting a response from one or more of the configured devices
RUN	The RUN LED will start flashing 20 seconds after power indicating normal operation.
ERR	The SYS ERR LED will go on solid 15 seconds after power up. It will turn off after 5 seconds. A steady red light will indicate there is a system error on the unit. If this occurs, immediately report the related "system error" .
RX	The RX LED will flash when a message is received on the serial port on the 6-pin connector. If the serial port is not used, this LED is non-operational.
TX	The TX LED will flash when a message is sent on the serial port on the 6-pin connector. If the serial port is not used, this LED is non-operational.
PWR	This is the power light and should show steady green at all times when unit is powered.

Appendix 1. “A” BANK DIP SWITCH SETTINGS

Address	A0	A1	A2	A3	A4	A5	A6	A7
1	On	Off	Off	Off	Off	Off	Off	Off
2	Off	On	Off	Off	Off	Off	Off	Off
3	On	On	Off	Off	Off	Off	Off	Off
4	Off	Off	On	Off	Off	Off	Off	Off
5	On	Off	On	Off	Off	Off	Off	Off
6	Off	On	On	Off	Off	Off	Off	Off
7	On	On	On	Off	Off	Off	Off	Off
8	Off	Off	Off	On	Off	Off	Off	Off
9	On	Off	Off	On	Off	Off	Off	Off
10	Off	On	Off	On	Off	Off	Off	Off
11	On	On	Off	On	Off	Off	Off	Off
12	Off	Off	On	On	Off	Off	Off	Off
13	On	Off	On	On	Off	Off	Off	Off
14	Off	On	On	On	Off	Off	Off	Off
15	On	On	On	On	Off	Off	Off	Off
16	Off	Off	Off	Off	On	Off	Off	Off
17	On	Off	Off	Off	On	Off	Off	Off
18	Off	On	Off	Off	On	Off	Off	Off
19	On	On	Off	Off	On	Off	Off	Off
20	Off	Off	On	Off	On	Off	Off	Off
21	On	Off	On	Off	On	Off	Off	Off
22	Off	On	On	Off	On	Off	Off	Off
23	On	On	On	Off	On	Off	Off	Off
24	Off	Off	Off	On	On	Off	Off	Off
25	On	Off	Off	On	On	Off	Off	Off
26	Off	On	Off	On	On	Off	Off	Off
27	On	On	Off	On	On	Off	Off	Off
28	Off	Off	On	On	On	Off	Off	Off
29	On	Off	On	On	On	Off	Off	Off
30	Off	On	On	On	On	Off	Off	Off
31	On	On	On	On	On	Off	Off	Off
32	Off	Off	Off	Off	Off	On	Off	Off
33	On	Off	Off	Off	Off	On	Off	Off
34	Off	On	Off	Off	Off	On	Off	Off
35	On	On	Off	Off	Off	On	Off	Off
36	Off	Off	On	Off	Off	On	Off	Off
37	On	Off	On	Off	Off	On	Off	Off
38	Off	On	On	Off	Off	On	Off	Off
39	On	On	On	Off	Off	On	Off	Off
40	Off	Off	Off	On	Off	On	Off	Off
41	On	Off	Off	On	Off	On	Off	Off
42	Off	On	Off	On	Off	On	Off	Off
43	On	On	Off	On	Off	On	Off	Off
44	Off	Off	On	On	Off	On	Off	Off
45	On	Off	On	On	Off	On	Off	Off
46	Off	On	On	On	Off	On	Off	Off
47	On	On	On	On	Off	On	Off	Off
48	Off	Off	Off	Off	On	On	Off	Off
49	On	Off	Off	Off	On	On	Off	Off
50	Off	On	Off	Off	On	On	Off	Off

Address	A0	A1	A2	A3	A4	A5	A6	A7
51	On	On	Off	Off	On	On	Off	Off
52	Off	Off	On	Off	On	On	Off	Off
53	On	Off	On	Off	On	On	Off	Off
54	Off	On	On	Off	On	On	Off	Off
55	On	On	On	Off	On	On	Off	Off
56	Off	Off	Off	On	On	On	Off	Off
57	On	Off	Off	On	On	On	Off	Off
58	Off	On	Off	On	On	On	Off	Off
59	On	On	Off	On	On	On	Off	Off
60	Off	Off	On	On	On	On	Off	Off
61	On	Off	On	On	On	On	Off	Off
62	Off	On	On	On	On	On	Off	Off
63	On	On	On	On	On	On	Off	Off
64	Off	Off	Off	Off	Off	Off	On	Off
65	On	Off	Off	Off	Off	Off	On	Off
66	Off	On	Off	Off	Off	Off	On	Off
67	On	On	Off	Off	Off	Off	On	Off
68	Off	Off	On	Off	Off	Off	On	Off
69	On	Off	On	Off	Off	Off	On	Off
70	Off	On	On	Off	Off	Off	On	Off
71	On	On	On	Off	Off	Off	On	Off
72	Off	Off	Off	On	Off	Off	On	Off
73	On	Off	Off	On	Off	Off	On	Off
74	Off	On	Off	On	Off	Off	On	Off
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93	On	Off	On	On	On	Off	On	Off
94	Off	On	On	On	On	Off	On	Off
95	On	On	On	On	On	Off	On	Off
96	Off	Off	Off	Off	Off	On	On	Off
97	On	Off	Off	Off	Off	On	On	Off
98	Off	On	Off	Off	Off	On	On	Off
99	On	On	Off	Off	Off	On	On	Off
100	Off	Off	On	Off	Off	On	On	Off

Address	A0	A1	A2	A3	A4	A5	A6	A7
101	On	Off	On	Off	Off	On	On	Off
102	Off	On	On	Off	Off	On	On	Off
103	On	On	On	Off	Off	On	On	Off
104	Off	Off	Off	On	Off	On	On	Off
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148	Off	Off	On	Off	On	Off	Off	On
149	On	Off	On	Off	On	Off	Off	On
150	Off	On	On	Off	On	Off	Off	On

Address	A0	A1	A2	A3	A4	A5	A6	A7
151	On	On	On	Off	On	Off	Off	On
152	Off	Off	Off	On	On	Off	Off	On
153	On	Off	Off	On	On	Off	Off	On
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161	On	Off	Off	Off	Off	On	Off	On
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163	On	On	Off	Off	Off	On	Off	On
164	Off	Off	On	Off	Off	On	Off	On
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166	Off	On	On	Off	Off	On	Off	On
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178	Off	On	Off	Off	On	On	Off	On
179	On	On	Off	Off	On	On	Off	On
180	Off	Off	On	Off	On	On	Off	On
181	On	Off	On	Off	On	On	Off	On
182	Off	On	On	Off	On	On	Off	On
183	On	On	On	Off	On	On	Off	On
184	Off	Off	Off	On	On	On	Off	On
185	On	Off	Off	On	On	On	Off	On
186	Off	On	Off	On	On	On	Off	On
187	On	On	Off	On	On	On	Off	On
188	Off	Off	On	On	On	On	Off	On
189	On	Off	On	On	On	On	Off	On
190	Off	On	On	On	On	On	Off	On
191	On	On	On	On	On	On	Off	On
192	Off	Off	Off	Off	Off	Off	On	On
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194	Off	On	Off	Off	Off	Off	On	On
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197	On	Off	On	Off	Off	Off	On	On
198	Off	On	On	Off	Off	Off	On	On
199	On	On	On	Off	Off	Off	On	On
200	Off	Off	Off	On	Off	Off	On	On

Address	A0	A1	A2	A3	A4	A5	A6	A7
201	On	Off	Off	On	Off	Off	On	On
202	Off	On	Off	On	Off	Off	On	On
203	On	On	Off	On	Off	Off	On	On
204	Off	Off	On	On	Off	Off	On	On
205	On	Off	On	On	Off	Off	On	On
206	Off	On	On	On	Off	Off	On	On
207	On	On	On	On	Off	Off	On	On
208	Off	Off	Off	Off	On	Off	On	On
209	On	Off	Off	Off	On	Off	On	On
210	Off	On	Off	Off	On	Off	On	On
211	On	On	Off	Off	On	Off	On	On
212	Off	Off	On	Off	On	Off	On	On
213	On	Off	On	Off	On	Off	On	On
214	Off	On	On	Off	On	Off	On	On
215	On	On	On	Off	On	Off	On	On
216	Off	Off	Off	On	On	Off	On	On
217	On	Off	Off	On	On	Off	On	On
218	Off	On	Off	On	On	Off	On	On
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245	On	Off	On	Off	On	On	On	On
246	Off	On	On	Off	On	On	On	On
247	On	On	On	Off	On	On	On	On
248	Off	Off	Off	On	On	On	On	On
249	On	Off	Off	On	On	On	On	On
250	Off	On	Off	On	On	On	On	On

Address	A0	A1	A2	A3	A4	A5	A6	A7
251	On	On	Off	On	On	On	On	On
252	Off	Off	On	On	On	On	On	On
253	On	Off	On	On	On	On	On	On
254	Off	On	On	On	On	On	On	On
255	On	On	On	On	On	On	On	On

Appendix 2. COMPLIANCE WITH UL REGULATIONS

For UL compliance, the following instructions must be met when operating gateway.

The units shall be powered by listed LPS or Class 2 power supply suited to the expected operating temperature range. The interconnecting power connector and power cable shall:

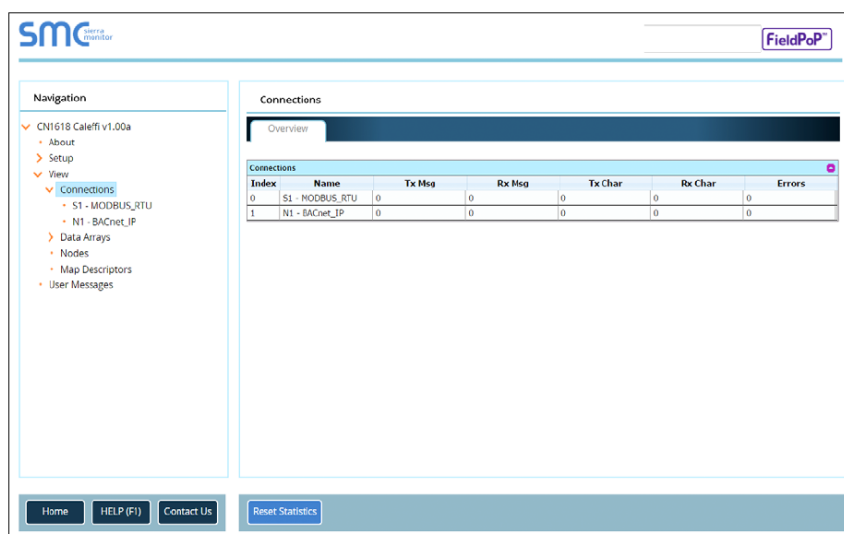
- Comply with local electrical code.
- Be suited to the expected operating temperature range.
- Meet the current and voltage rating for gateway.

Furthermore, the interconnecting power cable shall:

- Be of length not exceeding 3.05m (118.3")
- Be constructed of materials rated VW-1, FT-1 or better.
- If the unit is to be installed in an operating environment with a temperature above 65 °C, it should be installed in a Restricted Access Area requiring a key or a special tool to gain access.
- This device must not be connected to a LAN segment with outdoor wiring.

Appendix 3. VIEWING DIAGNOSTIC INFORMATION

- Type the IP Address of the gateway into the web browser to connect to the gateway.
- Click on Diagnostics and Debugging Button, then click on view, and then on connections.
- If there are any errors showing on the Connection page, refer to Appendix A.4 for the relevant wiring and settings.



Appendix 4. CHECK WIRING AND SETTINGS

No COMS on Modbus RTU side. If the Tx/Rx LEDs are not flashing rapidly then there is a COM issue. To fix this, check the following:

- Visual observations of LEDs on gateway
- Check baud rate, parity, data bits, stop bits
- Check device address
- Verify wiring
- Verify device is connected to the same subnet as the gateway
- Verify the Modbus device was discovered in Web Configurator (Chapter 5)
- Field COM problems:
 - If Ethernet protocols are used, observe Ethernet leds on the gateway
 - Check dipswitch settings (using correct baud rate and device instance)
 - Verify IP Address setting
 - Verify wiring

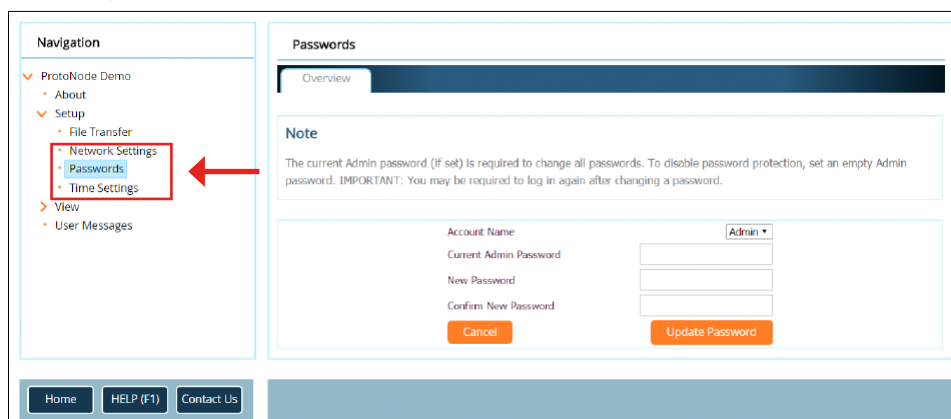
Appendix 5. SECURING GATEWAY WITH PASSWORDS

Access to the gateway can be restricted by enabling a password on the FS-GUI Passwords page – click Setup and then Passwords in the navigation panel. There are 2 access levels defined by 2 account names:

- The Admin account has unrestricted access to the gateway.
- The User account can view any gateway information, but cannot make any changes or restart the gateway.

The password needs to be a minimum of eight characters and is case sensitive. If the password is lost, click cancel on the password authentication popup window, and email the password recovery token to support to receive a temporary password from the support team.

Access the gateway to set a new password.



Appendix 6. LEGIOMIX_6000_SERIES MODBUS RTU MAPPINGS TO BACNET

Point Name	BACnet Object Type	BACnet Object ID	Description
Product type	AV	1	6001
ID Modbus	AV	2	1...247
Tmix Deg_C (Mixing temp.)	AV	3	°C
Trec Deg_C (Recirculation temp.)	AV	4	°C
Tmix Deg_F (Mixing temp.)	AV	5	°F
Trec Deg_F (Recirculation temp.)	AV	6	°F
State	AV	7	1 - Regulation 2 - Disinfection 3 - Flushing 4 - Thermal shock 5 - Alarm
Program ID	AV	8	0 - 0 1 - 1a 2 - 1b 3 - 2
Current Day	AV	9	1...31
Current Month	AV	10	1...12
Current Year	AV	11	2017...
Current Hour	AV	12	0...23
Current Minute	AV	13	0...59
Language	AV	14	0 - IT 1 - EN 2 - FR 3 - DE 4 - ES 5 - PT 6 - NL 7 - SL 8 - HR 9 - SR 10 - RO
Time ON (Start dis.)	AV	15	0...23 (h)
Time ON (m) (Start dis.)	AV	16	0...59 (min)
Time OFF (h) (Stop dis.)	AV	17	0...23 (h)
Time OFF (Stop dis.)	AV	18	0...59 (min)
Time Wait (before reading rec.)	AV	19	1...255 (min)
Time min (to have correct dis.)	AV	20	0...254 (min)
Time Flux (Time of closing relay 4 after ending the dis.)	AV	21	0...2550 (sec)
Time Shock (Time of duration)	AV	22	1...4320 (min)
Set Reg Deg_C (Set Mix temp)	AV	23	20...85 (°C)
Set Dis Deg_C (Set Dis temp)	AV	24	40...85 (°C)
Set Ric Deg_C (Set Rec temp)	AV	25	40...85 (°C)
Set Shock Deg_C (Set Shock temp)	AV	26	30...85 (°C)
Set Tmax Deg_C (Set max temp)	AV	27	50...90 (°C)
Set Reg Deg_F (Set Mix temp)	AV	28	68...185 (°F)
Set Dis Deg_F (Set Dis temp)	AV	29	104...185 (°F)
Set Ric Deg_F (Set Rec temp)	AV	30	104...185 (°F)
Set Shock Deg_F (Set Shock temp)	AV	31	86...185 (°F)
Set Tmax Deg_F (Set max temp)	AV	32	122...194 (°F)
Daily Disinfection	AV	33	bit 0 : Monday bit 1 : Tuesday bit 2 : Wednesday bit 3 : Thursday bit 4 : Friday bit 5 : Saturday bit 6 : Sunday

Presence of Recirculation Probe	BV	34	1 = Presence of Rec probe
Anticlog	BV	35	1 = Anticlog
Legal Hour	AV	36	bit 2:0 bit 3:1 = Disabled bit 2:1 bit 3:0 = EUR bit 2:0 bit 3:1 = USA bit 2:1 bit 3:1 = Custom
International System of Unit	BV	37	0 = °C , 1 = °F
LED Display Enable	BV	38	1 = LED display enable
Shock Activation	BV	39	0 = Shock Activation
Pin-code Reset	BV	40	1 = Pin-code Reset
Disinfection Reset	BV	41	2 = Disinfection Reset
Alarm Reset	BV	42	3 = Alarm Reset
Historical Data	BV	43	4 = Historical Data
Time Motor (Time to move actuator from close to open position)	AV	44	8...320 (sec)
Time Play (Delay of time in movement of actuator while changing direction)	AV	45	1...255 (sec)
Start Sunday Legal Hour *	AV	46	-3, -2, -1, 1, 2, 3
Start Month Legal Hour	AV	47	1...12
End Sunday Legal Hour *	AV	48	-3, -2, -1, 1, 2, 3
End Month Legal Hour	AV	49	1...12

* It's possible to choose the day of the hour change by setting the parameter #36 (Legal Hour) to "Custom":

set: **-1** for the last Sunday of the month;
set: **-2** for the second to last Sunday of the month;
set: **-3** for the third last Sunday of the month;
set: **1** for the first Sunday of the month;
set: **2** for the second Sunday of the month;
set: **3** for the third Sunday of the month.

Appendix 7. LEGIOMIX_2.0_6000_SERIES MODBUS RTU MAPPINGS TO BACNET

Point Name	BACnet Object Type	BACnet Object ID	Description
Model	AI	1	6002
ID Modbus	AI	2	1...250
T1	AI	3	°C/10 - °F/10
T2	AI	4	°C/10 - °F/10
ID Number	AI	5	1701...9952
Serial Number	AI	6	0001...9999
Status	AI	7	0 = Motor test 1 = Zero acquisition 2 = Full scale acquisition 3 = Water mixing status 4 = Thermal shock status 5 = Thermal disinfection status
Alarms AL01	BI	8	1 = AL01
Alarms AL03	BI	9	1 = AL03
Alarms AL04	BI	10	1 = AL04
Alarms AL05	BI	11	1 = AL05
Alarms AL06	BI	12	1 = AL06
Alarms AL07	BI	13	1 = AL07
Alarms AL08	BI	14	1 = AL08
Alarms AL09	BI	15	1 = AL09
Alarms AL10	BI	16	1 = AL10
Alarms AL11	BI	17	1 = AL11
IN1 Status	BI	18	1 = disabled ; 0 = enabled
IN2 Status	BI	19	1 = disabled ; 0 = enabled
OUT1 Status	BI	20	1 = enabled ; 0 = disabled
OUT2 Status	BI	21	1 = enabled ; 0 = disabled
OUT3 Status	BI	22	1 = enabled ; 0 = disabled
Adjustment Status	AI	23	0 = Not in progress 1 = On max temperature limit 2 = T1 enabled control 3 = T2 enabled control with d2 type 4 = T2 enabled control with d1 type 5 = ΔT measurement in progress
Motor Status	AI	24	0 = Motor stopped 1 = Motor opening 2 = Motor closing
Device Adjustment Status	AI	25	0 = Without adjustment 1 = Adjustment on band 1 2 = Adjustment on band 2 3 = Adjustment on band 3 4 = Adjustment in position
DN	AI	26	0 = DN15 1 = DN20 2 = DN25 3 = DN32 4 = DN40 5 = DN50
Seconds	AI	27	0...59
Current Day	AI	28	1...7
Firmware	AI	29	Firmware
Software	AI	30	Software
Checksum	AI	31	Checksum
Encoder Position	AI	32	Encoder Position
Day	AV	33	1...31
Month	AV	34	1...12
Year	AV	35	0...99
Hour	AV	36	0...23

Point Name	BACnet Object Type	BACnet Object ID	Description
Minute	AV	37	0...59
Check Battery	BV	38	1 = confirmed ; 0 = not confirmed
Day-hour	BV	39	1 = confirmed ; 0 = not confirmed
Daylight Saving Time	BV	40	1 = enabled ; 0 = not disabled
Time Format	BV	41	1 = 12H ; 0 = 24H
Temperature Unit	BV	42	1 = °F ; 0 = °C
U.S. daylight Saving Time	BV	43	1 = enabled ; 0 = disabled
Disinfection Control	BV	44	1 = on T2 ; 0 = on T1
Encoder Steps Acquisition	BV	45	1 = encoder steps acquisition
Set Point Temperature	AV	46	350...650 (°C/10)
Disinfection Type Mode	BV	47	00 = In1 ; 01 = In2 ; 10 = In3
Disinfection Type Propagation Time	BV	48	1 = fixed ; 0 = calculated
Disinfection Type ECO Function	BV	49	1 = enabled ; 0 = disabled
Disinfection Type Control on Temp	BV	50	1 = d1 ; 0 = d2
Minimum Disinfection Temperature	AV	51	500...850 (°C/10)
Minimum Disinfection Time	AV	52	1...600
Maximum Disinfection Time	AV	53	3...900
Disinfection Start Day Monday	BV	54	1 = enabled ; 0 = disabled
Disinfection Start Day Tuesday	BV	55	1 = enabled ; 0 = disabled
Disinfection Start Day Wednesday	BV	56	1 = enabled ; 0 = disabled
Disinfection Start Day Thursday	BV	57	1 = enabled ; 0 = disabled
Disinfection Start Day Friday	BV	58	1 = enabled ; 0 = disabled
Disinfection Start Day Saturday	BV	59	1 = enabled ; 0 = disabled
Disinfection Start Day Sunday	BV	60	1 = enabled ; 0 = disabled
Monday Disinfection Starting Minute	AV	61	0...59
Monday Disinfection Starting Hour	AV	62	0...23
Tuesday Disinfection Starting Minute	AV	63	0...59
Tuesday Disinfection Starting Hour	AV	64	0...23
Wednesday Disinfection Starting Minute	AV	65	0...59
Wednesday Disinfection Starting Hour	AV	66	0...23
Thursday Disinfection Starting Minute	AV	67	0...59
Thursday Disinfection Starting Hour	AV	68	0...23
Friday Disinfection Starting Minute	AV	69	0...59
Friday Disinfection Starting Hour	AV	70	0...23
Saturday Disinfection Starting Minute	AV	71	0...59
Saturday Disinfection Starting Hour	AV	72	0...23
Sunday Disinfection Starting Minute	AV	73	0...59
Sunday Disinfection Starting Hour	AV	74	0...23
Time Bands 1 Ric Start	BV	75	1 = enabled ; 0 = disabled
Time Bands 2 Ric Start	BV	76	1 = enabled ; 0 = disabled
Time Bands 3 Ric Start	BV	77	1 = enabled ; 0 = disabled
Time Bands 4 Ric Start	BV	78	1 = enabled ; 0 = disabled
Time Bands 5 Ric Start	BV	79	1 = enabled ; 0 = disabled
Time Bands 6 Ric Start	BV	80	1 = enabled ; 0 = disabled
Minimum Thermal Shock Temperature	AV	81	650...850 (°C/10)
Minimum Thermal Shock Time	AV	82	0...4320
Maximum Thermal Shock Time	AV	83	0...4320
Maximum Temperature Limit	AV	84	650...850 (°C/10)
Thermal Schock	BV	85	1 = Start ; 0 = Stop
Disinfection	BV	86	1 = Start ; 0 = Stop

Appendix 8. CONTECA_EASY_750_SERIES MODBUS RTU MAPPINGS TO BACNET

Point Name	BACnet Object Type	BACnet Object ID	Description
Product	AI	1	7500
ID Modbus	AI	2	1...250
Heating Energy	AI	3	kWh
Cooling Energy	AI	4	kWh
Pulse Input 1	AI	5	m ³ (DHW)
Pulse Input 2	AI	6	m ³ (DCW)
Pulse Input 3	AI	7	m ³ / kWh
Pulse Input 4	AI	8	m ³ / kWh
Instantaneous Power	AI	9	kW
Flow Rate	AI	10	m ³ / h
Flow Temperature	AI	11	°C
Return Temperature	AI	12	°C
Delta Temperature	AI	13	Flow - Return Temperature
Alarm/Status	AI	14	bit 0 : T Flow error bit 1 : T Return error bit 2 : No flow rate bit 3 : Valve internal leakage bit 4 : - bit 5 : - bit 6 : Battery error bit 7 : No credit bit 8 : Measurement unit error C0 bit 9 : Measurement unit error C1 bit 10 : Measurement unit error C2 bit 11 : Measurement unit error C3 bit 12 : Measurement unit error C4 bit 13 : - bit 14 : - bit 15 : -
Product (Imperial Units)	AI	15	7500
ID (Imperial Units)	AI	16	1...250
Heating Energy (Imperial Units)	AI	17	kBTU
Cooling Energy (Imperial Units)	AI	18	kBTU
Pulse Input 1 (Imperial Units)	AI	19	kgal (DHW)
Pulse Input 2 (Imperial Units)	AI	20	kgal (DCW)
Pulse Input 3 (Imperial Units)	AI	21	kgal / kBTU
Pulse Input 4 (Imperial Units)	AI	22	kgal / kBTU
Power (Imperial Units)	AI	23	kBTU / h
Flow Rate (Imperial Units)	AI	24	GPM
Flow Temperature (Imperial Units)	AI	25	°F
Return Temperature (Imperial Units)	AI	26	°F
Delta Temperature (Imperial Units)	AI	27	Flow - Return Temperature
Alarm/Status (Imperial Units)	AI	28	bit 0 : T Flow error bit 1 : T Return error bit 2 : No flow rate bit 3 : Valve internal leakage bit 4 : - bit 5 : - bit 6 : Battery error bit 7 : No credit bit 8 : Measurement unit error C0 bit 9 : Measurement unit error C1 bit 10 : Measurement unit error C2 bit 11 : Measurement unit error C3 bit 12 : Measurement unit error C4 bit 13 : - bit 14 : - bit 15 : -