

GW-5492/GW-5493 User's Manual v1.0

ICP DAS BACnet to Modbus Gateway

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Warranty

All products manufactured by ICP DAS are under warranty regarding defective materials for a period of one year from the date of delivery to the original purchaser.

Warning

ICP DAS assumes no liability for damages resulting from the use of this product. ICP DAS reserves the right to change this manual at any time without notice. The information furnished by ICP DAS is believed to be accurate and reliable. However, no responsibility is assumed by ICP DAS for its use, or for any infringements of patents or other rights of third parties resulting from its use.

Copyright

All rights are reserved by ICP DAS Co., Ltd. 2012.

Trademark

The names used for identification only may be registered trademarks of their respective companies.

Document Revision

Version	Author	Date	Description of Changes
1.01	Eugene	2012/03/20	First Released Revision

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Table of Contents

1. General Information 4
1.1 BACnet Introduction 4
1.2 About GW-5492 4
1.3 About GW-5493 4
1.4 Hardware Specification 4
2. Hardware 6
2.1 Pin Assignment 6
2.2 LED Indication 7
2.2.1 Power LED 7
2.2.2 Module Status indicator LED 7
3. Web Based Configuration Tool 8
3.1 Overview 8
3.2 Device Selection 8
3.3 Using Web-based Configuration Tool 8
3.4 Tab menu of Configuration Tool 11
3.4.1 System 11
3.4.2 Modbus 11
3.4.3 BACnet 11
3.4.4 Modbus/BACnet Mapping 11
3.5 System tab 12
3.5.1 System Process 13
3.5.2 Network Settings 13
3.5.3 Serial Port Settings 13
3.5.4 Import/Export/Updating Firmware 14
3.5.5 Change User Name & Passsword 14
3.6 Modbus tab 15
3.6.1 Devices addition 15
3.6.2 Devices list 17
3.7 BACnet tab 19
3.7.1 BACnet basic information configuration 19
3.7.2 BACnet Object Types and instance settings 20
3.8 Modbus/BACnet Mapping tab 21

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1. General Information

1.1 BACnet Introduction

BACnet (Building Automation and Control Networking) protocol has been designed specifically to meet the communication needs of building automation and control systems for applications such as heating, ventilating, air-conditioning control…etc. The GW-549x gateways contains a large number of BACnet objects (AI, AO, AV, BI, BO, BV, MSI, MSO, MSV) gives you flexibility in mapping Modbus RTU registers to any combination of BACnet objects. Multiple BIBBs (DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM, DS-COV-B…etc.) are supported. All the data transfer is configurable using a standard Web browser.

1.2 About GW-5492

GW-5492 is a fully configurable universal Modbus RTU to BACnet/IP gateway. The GW-5492 includes BACnet/IP Server and Modbus RTU Master which is used to make Modbus RTU devices accessible on a BACnet network.

1.3 About GW-5493

GW-5493 is a fully configurable universal Modbus RTU to BACnet/IP gateway. The GW-5493 includes BACnet/IP Server and Modbus TCP Client which is used to make Modbus TCP devices accessible on a BACnet network.

1.4 Hardware Specification

	GW-5492	GW-5493
System		
CPU	32-bit	
SDRAM	64 MB	
Flash	64 MB	
COM1	RS-232 (RxD, TxD, GND); Non-isolation	
COM2	RS-485 (D+, D-)2500 VDC; isolated	Not use
Ethernet	10/100Base-TX Ethernet Controller	
Protocol		
Modbus	Modbus RTU Master	Modbus TCP Master
BACnet	BACnet/IP Slave	
BACnet Objects	AI, AO, AV, BI, BO, BV, MSI, MSO, MSV (Maximum: 200 each)	

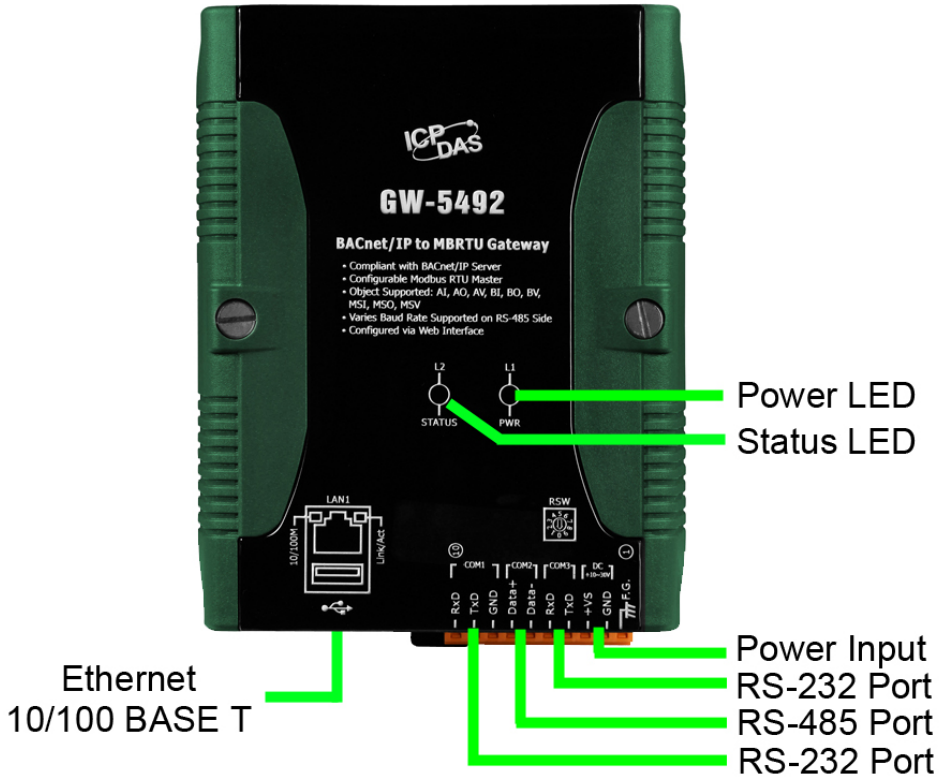
Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

BIBB	DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DS-COV-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-TS-B, DM-UTC-B, DM-RD-B
Environmental	
Dimensions (W x L x H)	91mm x132mm x 52mm
Operating Temp.	-25 ~ +75 °C
Storage Temp.	-30 ~ +85 °C
Humidity	5_90% PH, non-condesing
Power Input Range	+10V to +30+10V to +30VDC
Power Consumption	4.8W (0.2A @ 24VDC)

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2. Hardware

2.1 Pin Assignment



Pin	Name	Description
1	F.G.	Firm Ground
2	GND	Ground of power supply
3	+VS	V+ of power supply (+10V to +30VDC unregulated)
4	TxD	TxD of COM3 (RS-232)
5	RxD	RxD of COM3 (RS-232)
6	Data+	Data+ of COM2 (RS-485)
7	Data-	Data- of COM2 (RS-485)
8	GND	Ground of COM1 (RS-232)
9	TxD	TxD of COM1 (RS-232)
10	RxD	RxD of COM1 (RS-232)

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2.2 LED Indication

GW-5492/GW5493 provides two LEDs to indicate what situation is in the GW-5492/GW-5493. They are described as follows.

2.2.1 Power LED

The GW-5492/GW-5493 needs +10 ~ +30 VDC power input and consumes 4.8W. The Power LED will be turn on after applying power and it will be flashing two times per second.

2.2.2 Module Status indicator LED

The LED indicates the communication status of the GW-5492/GW-5493. The following description shoes the conditions of error status.

- Green light flashes: BACnet Client is communicating with GW-5492/GW-5493
- Red light flashes: Time out error on Modbus end

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3. Web Based Configuration Tool

This chapter is to describe the web structure, software operating interfaces, and configuration of BACnet and Modbus mapping.

GW-5492/GW-5493 provides Web-based configuration for the BACnet and Modbus settings. The functions include:

- System information and configuration
- Network and COMPort settings
- Management and settings of Device's Points (Address) for Modbus RTU Master and TCP Client
- BACnet configuration and management
- BACnet Instance and Modbus Device point Mapping management

3.1 Overview

This document is to describe the web structure, software operating interfaces, and configuration of BACnet and Modbus mapping.

GW-5492/GW-5493 provides Web-based configuration for the BACnet and Modbus settings. The functions include:

- System information and configuration
- Network and COM Port settings
- Management and settings of Device's Points (Address) for Modbus RTU Master and TCP Client
- BACnet configuration and management
- BACnet Instance and Modbus Device point Mapping management

3.2 Device Selection

- GW-5492: BACnet/IP (Server) to Modbus RTU (Client) Gateway
- GW-5493: BACnet/IP (Server) to Modbus TCP (Client) Gateway

3.3 Using Web-based Configuration Tool

Connect the GW-549x to network, and use standard web browser (Internet Explorer, Mozilla Firefox) to launch the user interface. The default link and network settings are as followed:

Web Address: http://192.168.255.1

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IP Address: 192.168.255.1

Subnet Mask: 255.255.0.0

Gateway: 192.168.0.254

For security reason, user will have to login with user name and password before entering the configuration pages. The default user name and password are **admin** and **admin**.

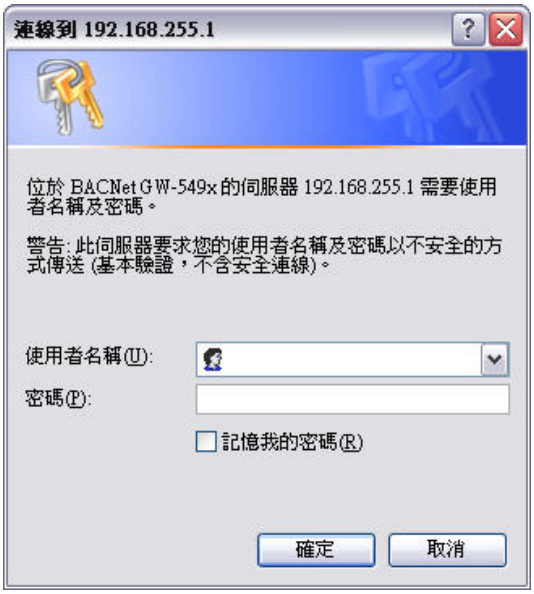


Figure 1. Logon screen

Screen opened as image shown in Figure 2, if success login. Select a hardware to enter a correspond page.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

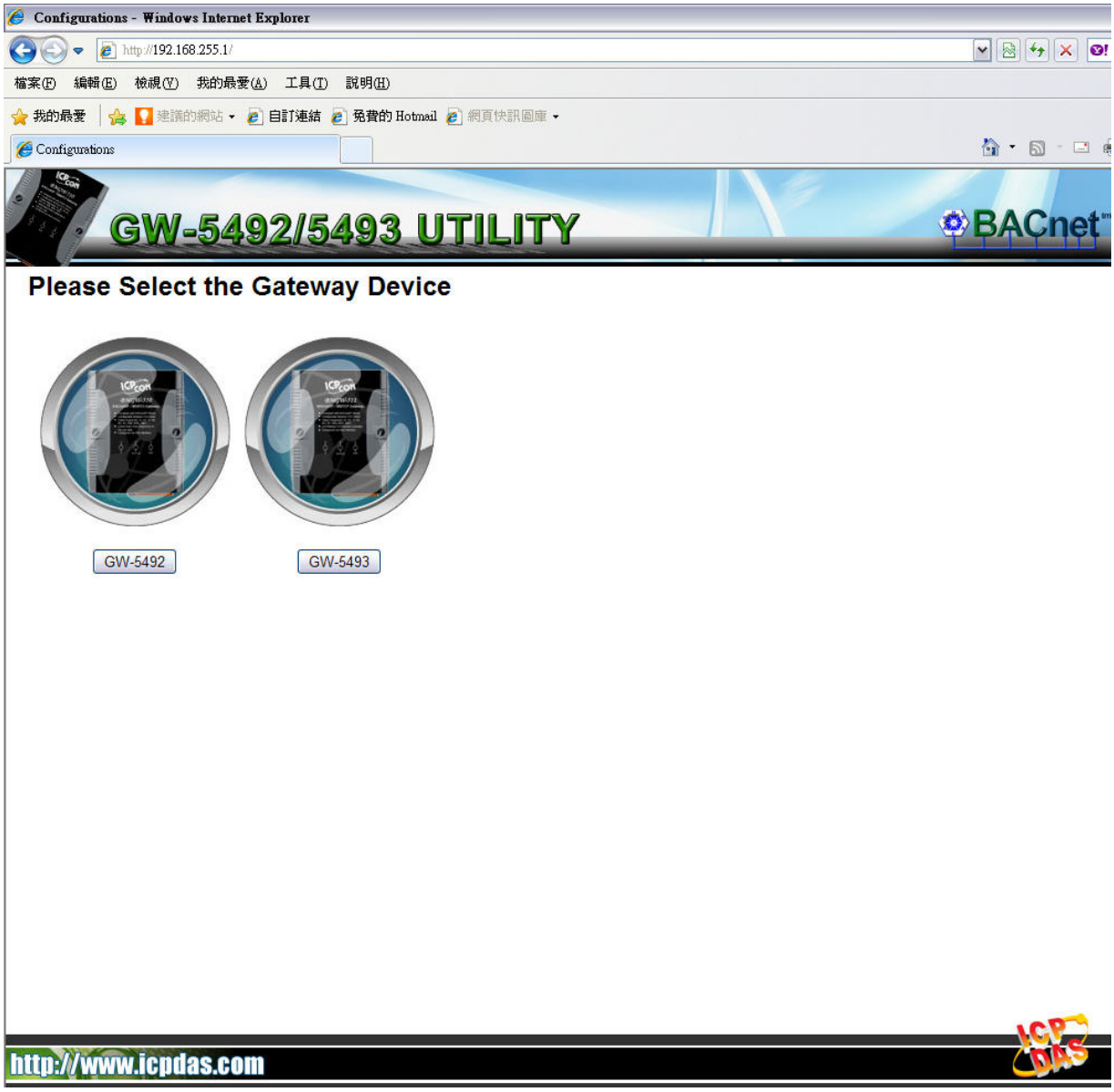


Figure 2. Gateway selection page

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.4 Tab menu of Configuration Tool

The configuration tool had divided into four sections System, Modbus, BACnet, and Modbus/BACnet Mapping. Please refer to the following clause for detail information.

3.4.1 System

System information and settings consist of

- Daemon (Modbus and BACnet) status and operations (start or stop)
- Import or export of configuration file
- Network settings
- COM Port: COM1 and COM2 serial ports settings (only for GW-5492).
- Firmware Updating
- User name and password configuration

3.4.2 Modbus

Modbus Master Configuration consists of

- Add or delete slave devices
- Modbus protocol mode settings (RTU mode for GW-5492 and TCP Mode for GW-5493)
- Add or delete device points
- Point settings, including slave device's address, data type and so on.

3.4.3 BACnet

BACnet Server Configuration consists of

- BACnet/IP Port Setting
- Management of the BACnet basic information
- Max Object Instance settings (support up to 200 objects each type)

3.4.4 Modbus/BACnet Mapping

Definition and management of the mapping table between Modbus Device's Address and BACnet Object Instance

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.5 System tab

As shown in Figure 3, the system tab provides an operation mode, a network setting, a serial port settings, import/export function, firmware updating, and user account settings.

1. System Process: Monitors the Modbus and BACnet Daemon running status, and operate its' state (start or stop)
2. Network Settings: LANs are provided for either BACnet/IP or Modbus TCP protocol.
3. Serial Port Settings: The configuration consists of two serial ports COM1 (RS-485) and COM2 (RS-232) settings. Two serial ports are provided for Modbus RTU protocol.
4. Import/Export/Updating Firmware: Import or export of configuration file and updating firmware.
5. Change User Names & Password: Modify the current user name and password.

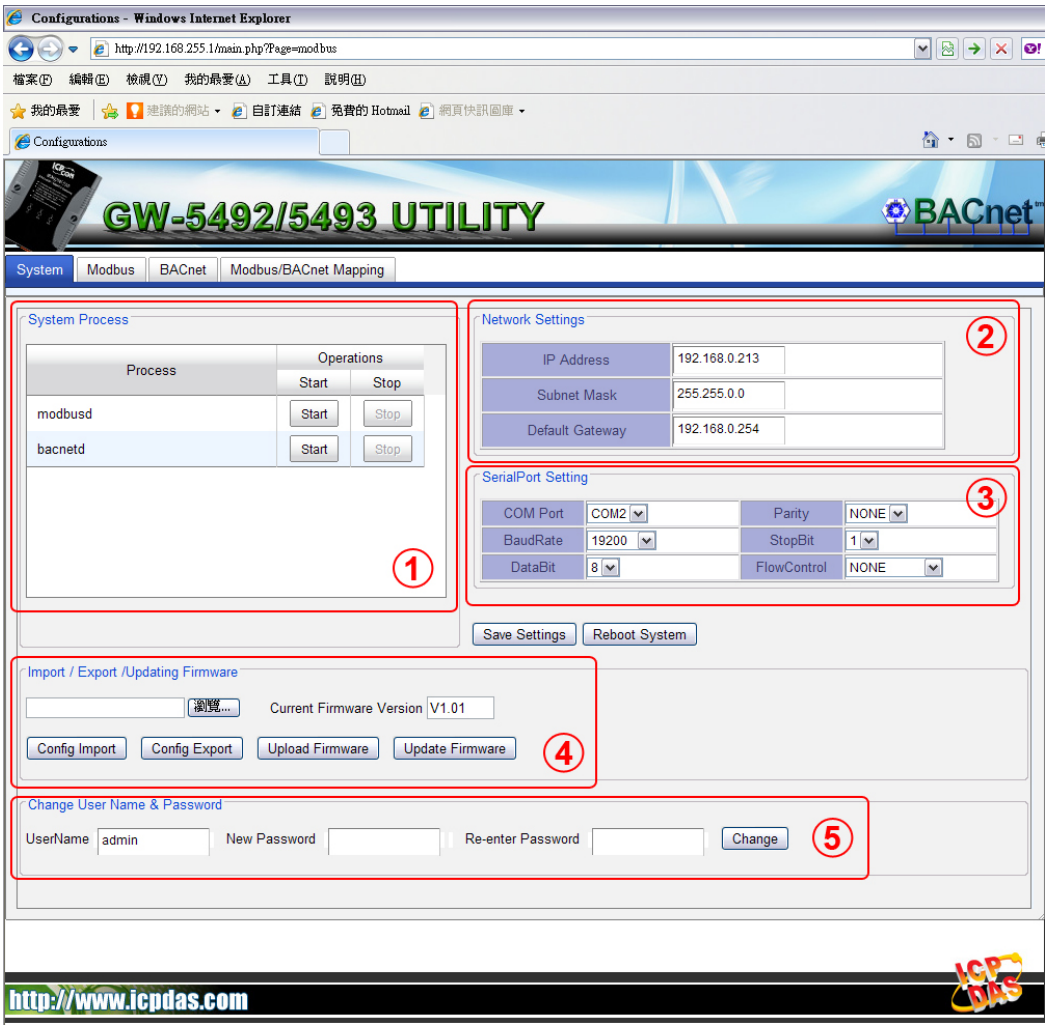


Figure 3. System tab

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.5.1 System Process

Figure 4 shows the System Process frame. The Process column is a list of supported Daemons' names and the Operations column shows each Daemon's status. The Start/Stop buttons are able to start/stop Daemon by clicking.

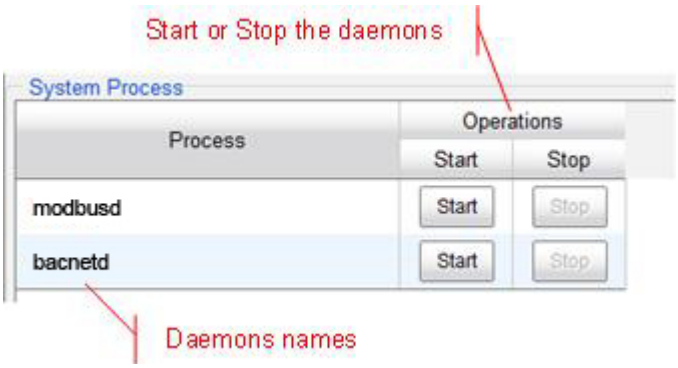


Figure 4. System Process

3.5.2 Network Settings

Network Settings consists an Ethernet LAN settings provided for either BACnet/IP or Modbus TCP protocol. All information isn't saved until clicking the **Save Settings** button.

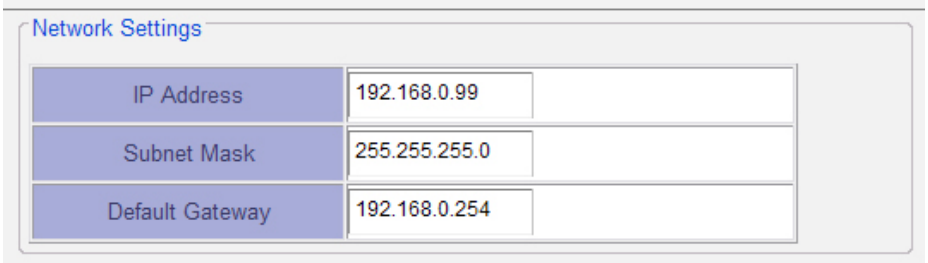


Figure 5. Network Settings

3.5.3 Serial Port Settings

The configuration consists of two serial ports COM2 (RS-485) and COM3 (RS-232) settings. Two serial ports are provided for Modbus RTU protocol. All information isn't saved until clicking the **Save Settings** button.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

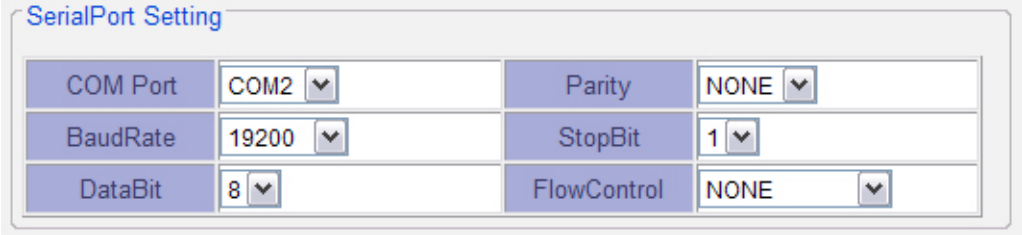


Figure 6. Network Settings

3.5.4 Import/Export/Updating Firmware

Figure 7 shows the Config Import / Config Export / Upload Firmware / Update Firmware configuration settings. The mapping configuration information is able to export and store to a .cvs file by clicking the "Config Export" button (the template of the .csv file as shown in the appendix). The configuration information is able to restore from a specific format of the .cvs file by choosing the file path and importing the file by clicking "Config Import" button.

The current firmware version is showed. The firmware can also be updated from a .fw file downloaded from ICP DAS by choosing the file path and click "Upload Firmware" to upload file to device. After .fw file uploaded, click "Update Firmware" button to update firmware. After firmware updated, please restart the GW-549x and User Interface.

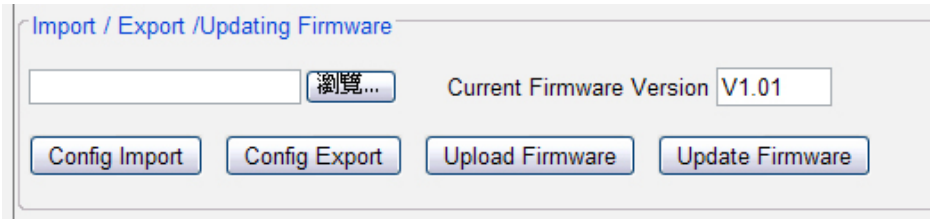


Figure 7. Import/Export/Updating Firmware

3.5.5 Change User Name & Password

The section provides an interface which allows user to modify the user name and password.



Figure 8. Change User Name & Password

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.6 Modbus tab

The Figure 9 shows the Modus operation and configuration. The detail description as follows:

1. Devices addition
2. Devices list
3. Modbus RTU (GW-5492) or Modbus TCP (GW-5493) settings
4. Point ID and address settings
5. Operation buttons

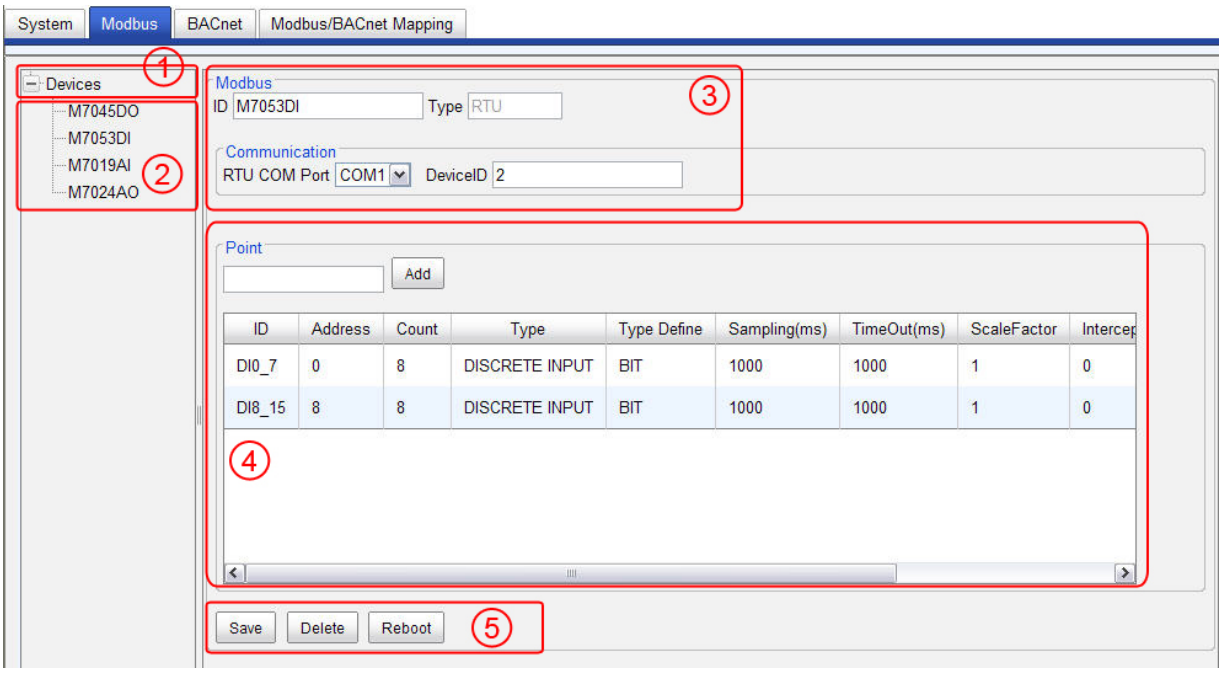


Figure 9. Modbus tab

3.6.1 Devices addition

a. Click Devices as shown in Figure 10.
b. The protocol type has already defined when selecting hardware. RTU for GW-5492 and TCP for GW-5493. Please refer to Figure 10 and 11.
c. Click Save button to add and save a new Modbus device.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

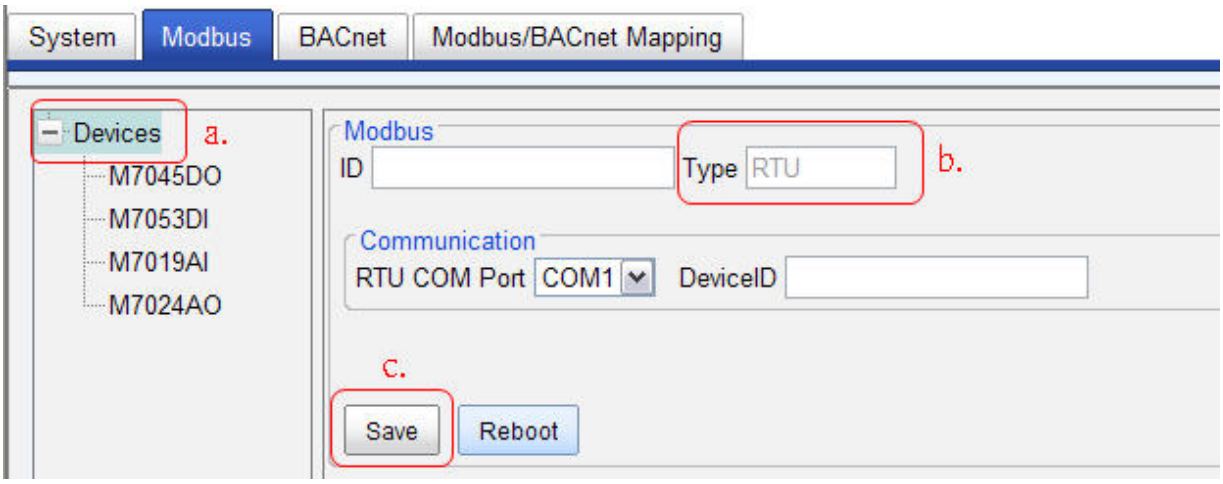


Figure 10. Devices addition and RTU configuration

Modbus RTU configuration as shown in Figure 10

- ID: Any valid string and number to represent a Modbus Device
- COM Port: COM2 or COM3
- DeviceID: This number is often referred to unit number or slave ID. The number must be equal to the remote slave device setting.

Modbus TCP configuration as shown in Figure 11

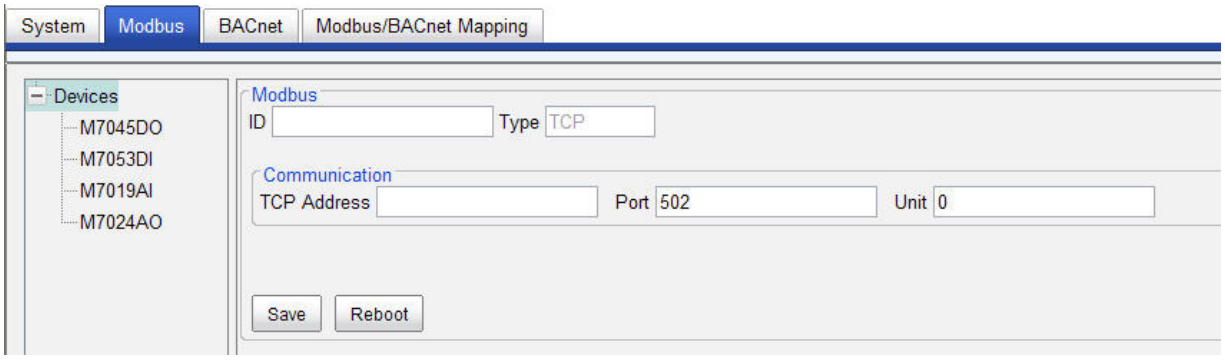


Figure 11. TCP configuration

- ID: Any valid string and number to represent a Modbus Device
- TCP Address: Remote slave Device IP address
- Port: Remote slave Device Port number. The default port number is 502.
- Unit: This number is often referred to unit number or slave ID

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.6.2 Devices list

a. Select a Device in the Devices list as shown in Figure 12 (the string with the shadow)
b. The sub frame on the right shows selected Device information.

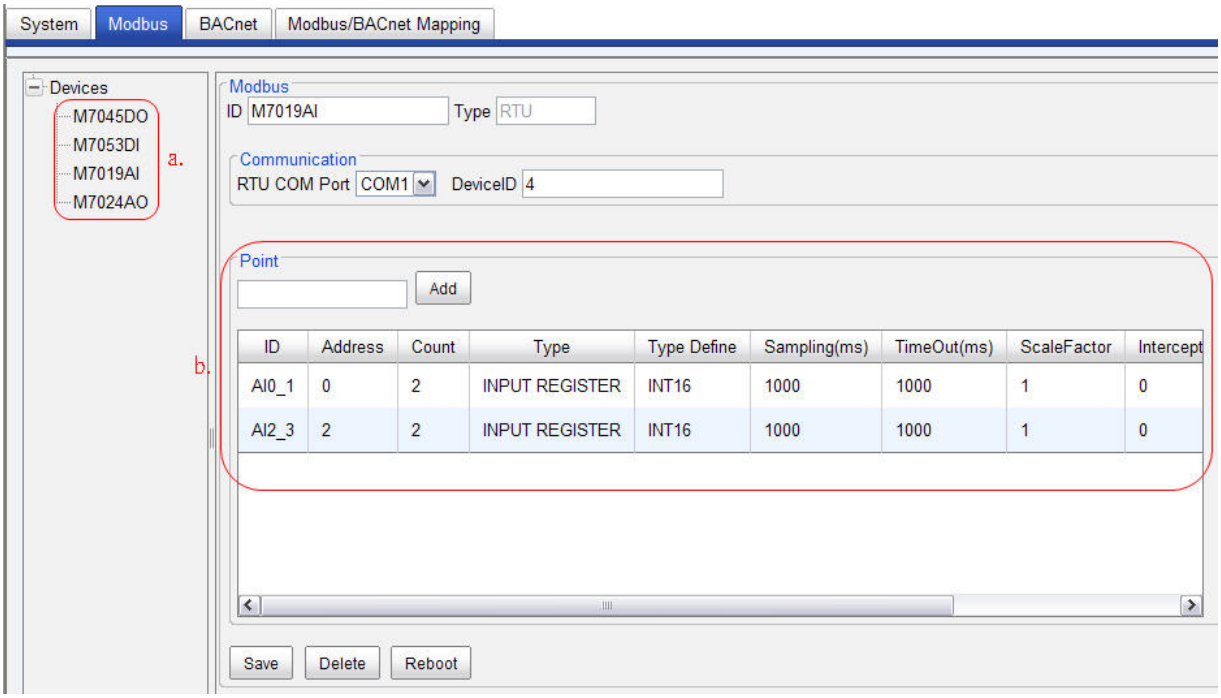


Figure 12. Device and point information

Point management

a. As shown in Figure 13, input a point name and click Add button to add a new point.
b. Fill this point information, the detail description as follows:

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

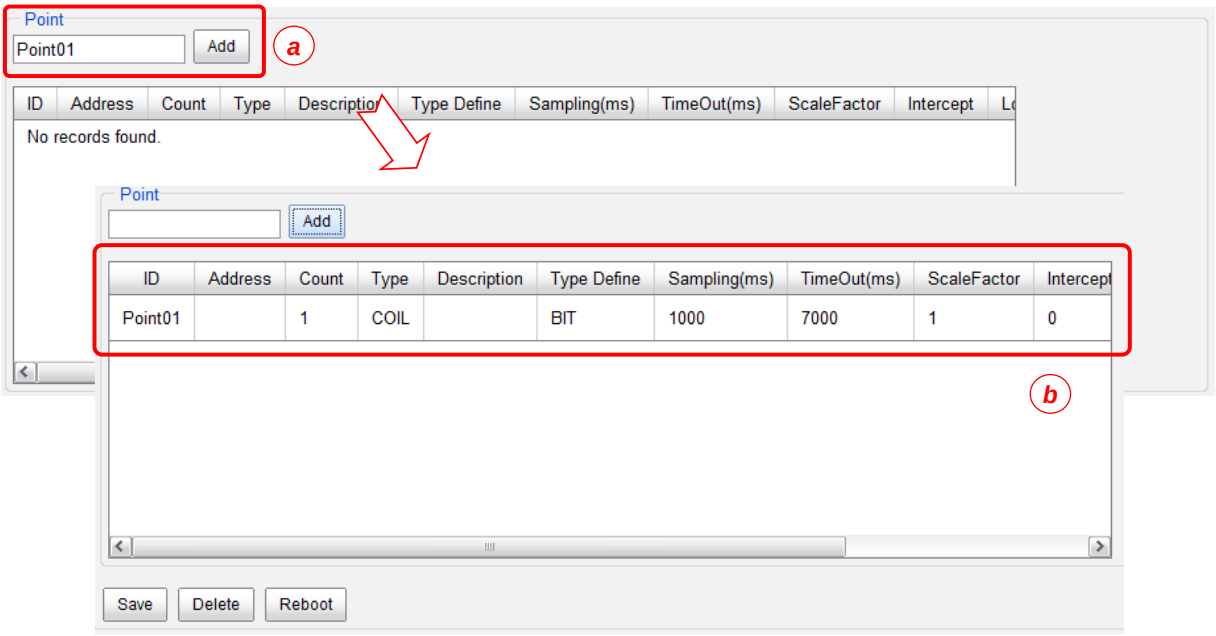


Figure 13. Point management

- Point Address: Remote device address is referred to the specific Modbus device
- Count: Address count. The number of address blocks are read/written at a time
- Type: The types of registers in Modbus devices include Coils, Discrete Input, Input Register and Holding Register
- Type Define: Data type of this point, including BIT, CHAR, UCHAR, INT16, UINT16, INT32, UINT32, FLOAT and DOUBLE.
- Sampling: Polling period for this point. The minimum unit is ms.
- TimeOut: Time out for waiting
- ScaleFactor and Intercept: Scaling applies the formula y=mx+b. When reading from the slave, the raw data as read is multiplied by the scale factor, and then the offset is added to produce the resulting Present Value. (Present Value = raw data value * ScaleFactor + Intercept)
- Low: The minimum threshold of present value
- Hi: The maximum threshold of present value
- Read/Write: Set this point as writable or read only
- Del：Delete current point

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.7 BACnet tab

The Figure 14 shows the BACnet Device configuration. The detail description as follows:

1. BACnet basic information and configuration
2. BACnet Object Types and max instance settings

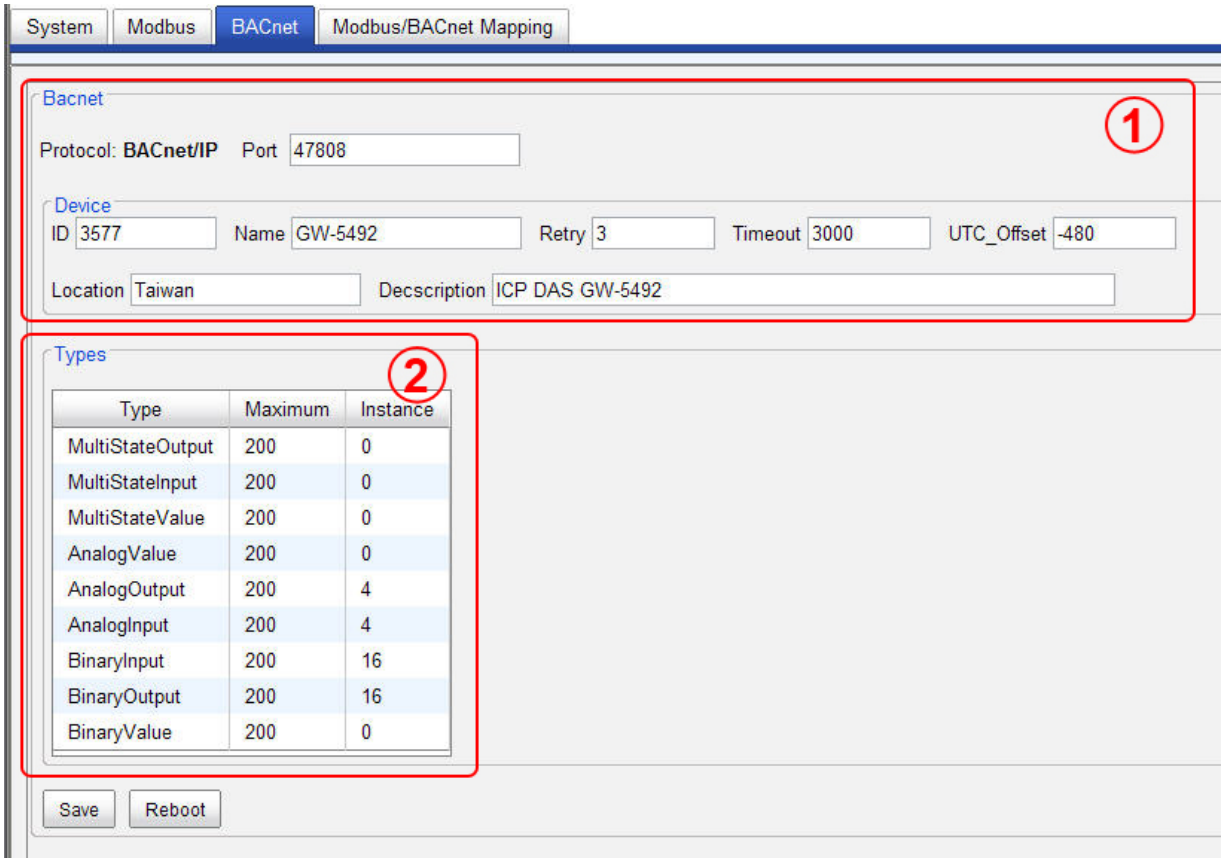


Figure 14. BACnet tab

3.7.1 BACnet basic information configuration

Figure 13 shows the BACnet basic information, consisting of Protocol, Communication and Device Object properties settings.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

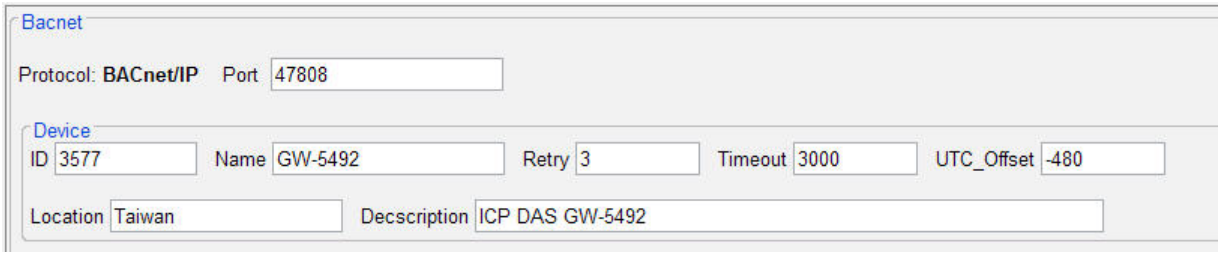


Figure 15. BACnet basic information

- Port: BACnet Port. Default port is 47808 (0xBAC0)
- ID: Device_Identifier property, range from 0 to 4194302
- Name: The device name showed on BACnet network.
- Retry: Number_Of_APDU_Retries property
- Timeout: APDU_Timeout property
- UTC_Offset: The time offset from Coordinated Universal Time
- Location: Location property
- Description: Object_ Description property

3.7.2 BACnet Object Types and instance settings

The BACnet Gateway supports 10 types of standard BACnet Objects including Analog Input, Analog Output, Analog Value, Binary Input, Binary Output, Binary Value, Multistate Input, Multistate Output, Multistate Value and Device. Figure 15 shows the 9 types of BACnet Objects, the 3-column sub fame consisting of Type, Maximum, and Instance number.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.8 Modbus/BACnet Mapping tab

The Modbus/BACnet Mapping tab provides a method to build the link between BACnet Objects and Modbus Device points, as shown in Figure 16.

1. BACnet Object type list
2. BACnet Object and Modbus Point Mapping list

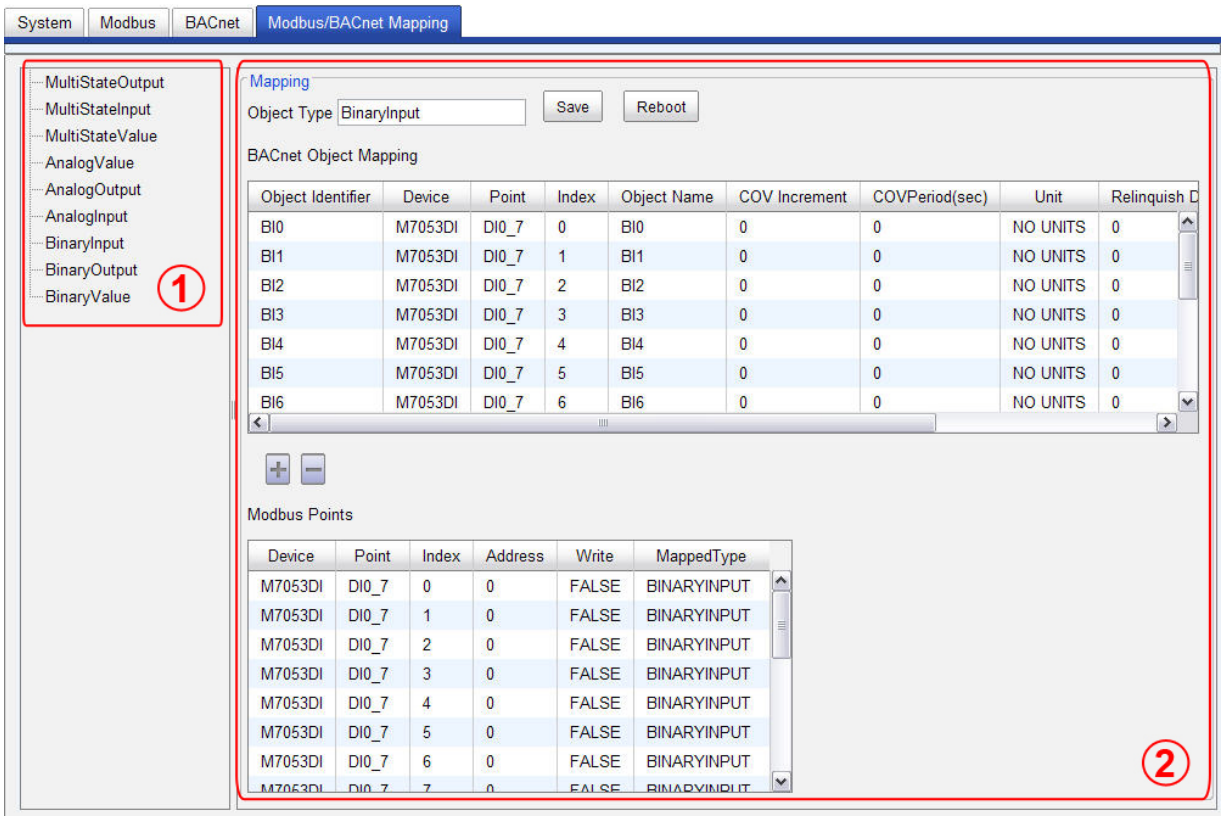


Figure 16. Modbus/BACnet Mapping tab

Process of Mapping a Modbus point to a BACnet Object:

As shown in Figure 17, the steps of adding a new BACnet Object into the mapping list as follows:

a. Select an Object from Object Type list
b. Selected Object type should be showed in the textbox
c. Select one of Modbus Point from the Modbus Points list
d. Add this Modbus Point to the BACnet Object Mapping list
e. Click Save button to save mapping information

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

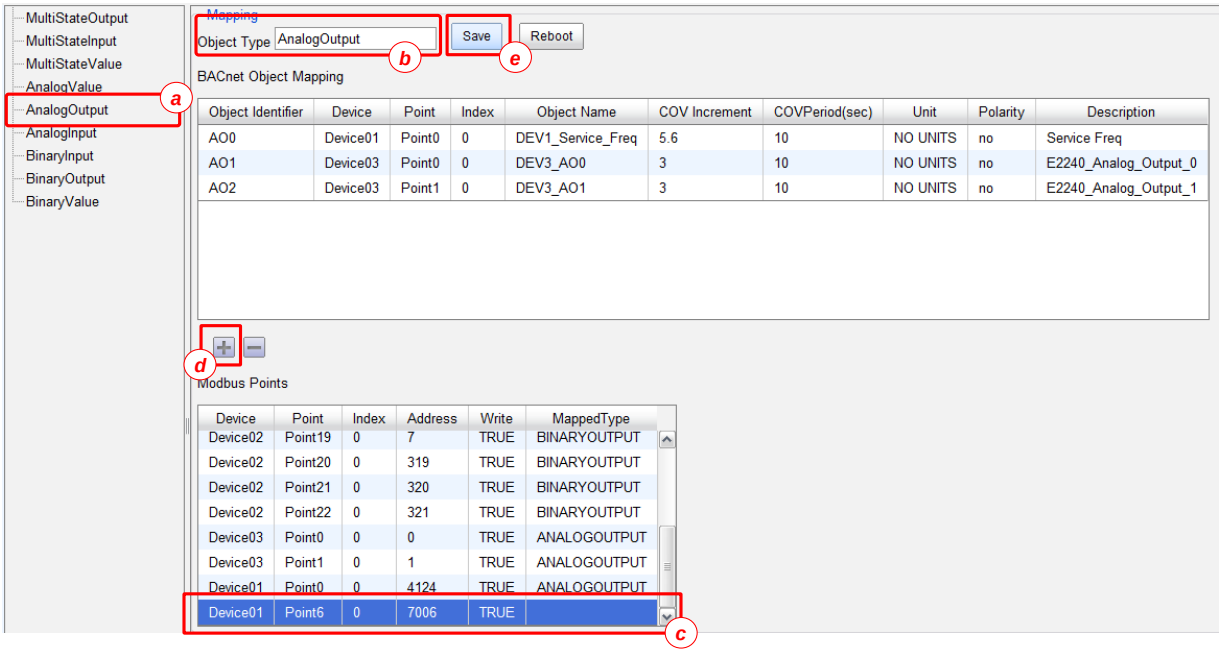


Figure 17. Add a BACnet Object

As shown in Figure 18, the steps of removing a new BACnet Object from mapping list as follows:

a. Select an Object from Object Type list

b. Selected Object type should be showed in the textbox

c. Select one of BACnet Object in the Mapping list

d. Remove this Object from the BACnet Object Mapping list

e. Click Save button to save mapping information

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

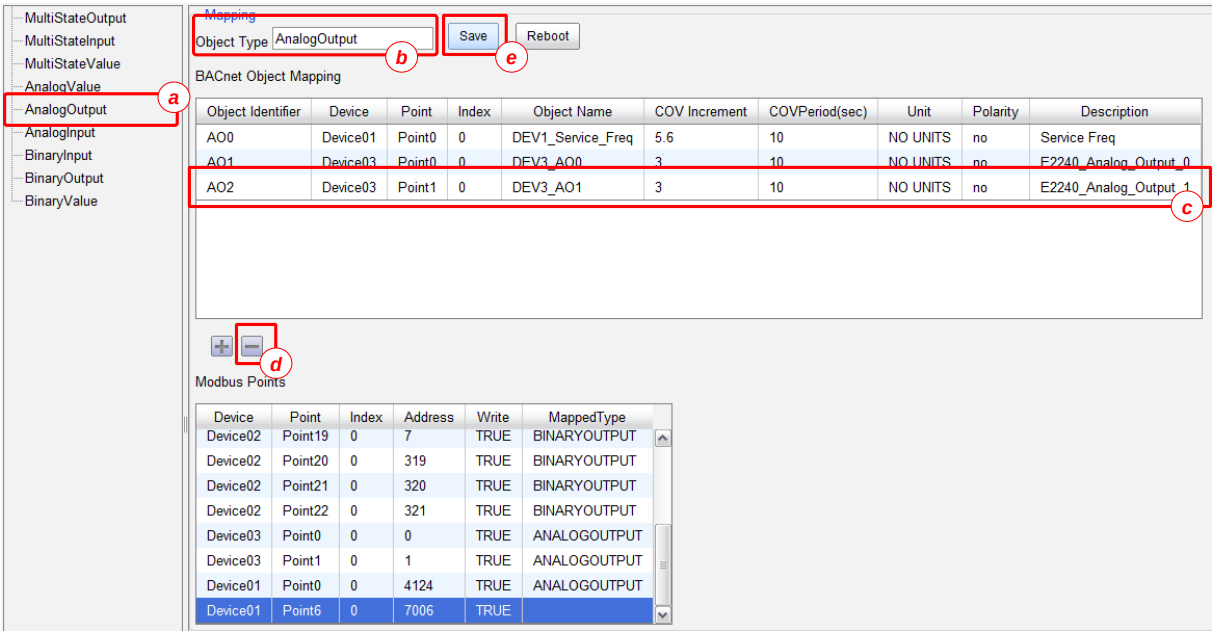


Figure 18. Remove a BACnet Object

Modbus Points:

- Device: Modbus Device name
- Point: Point ID, same as Modbus Point ID in the Modbus tab
- Address: Modbus Point initial address
- Index: Modbus Point index of the address blocks
- Write: The point is writable or read only
- Mapped Type: The type of BACnet objects that the point is mapped. If the point isn't mapped, the row is null.

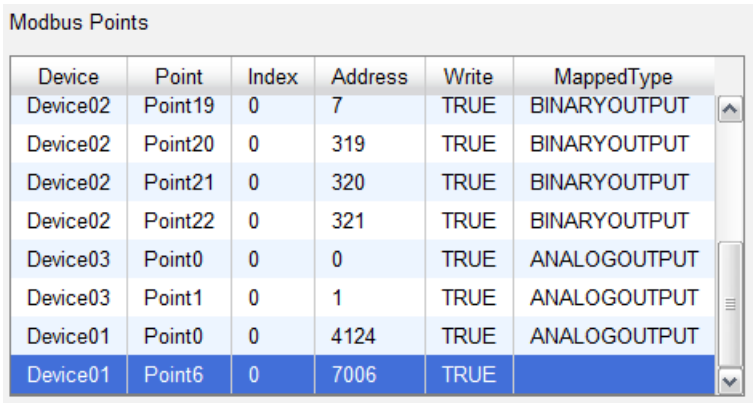
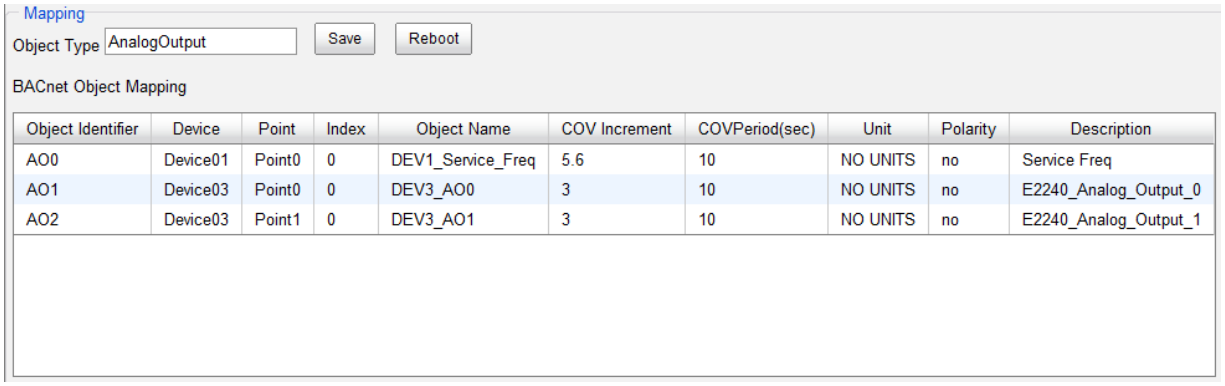


Figure 19. Modbus Points

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

BACnet Object Mapping:

- Object Identifier: BACnet Object_Identifier property
- Device: Modbus Device name
- Point: Point ID, as same as Modbus Point ID in the Modbus tab.
- Object Name: BACnet Object_Name property
- COV Increment: COV_Increment property. For the Analog object type only.
- COVPeriod: The period time of COVNotification required service.
- Unit: BACnet Unit property. For the Analog object type only.
- Polarity: BACnet Polarity property mode. For the Binary object type only.
- Description: BACnet Description property



Object Identifier	Device	Point	Index	Object Name	COV Increment	COVPeriod(sec)	Unit	Polarity	Description
AO0	Device01	Point0	0	DEV1_Service_Freq	5.6	10	NO UNITS	no	Service Freq
AO1	Device03	Point0	0	DEV3_AO0	3	10	NO UNITS	no	E2240_Analog_Output_0
AO2	Device03	Point1	0	DEV3_AO1	3	10	NO UNITS	no	E2240_Analog_Output_1

Figure 20. Mapping

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000