



User Manual

Version 1.1.0 January 2023

GW-2493M

BACnet/IP Server to Modbus TCP Client Gateway



Written by Johney

Table of Contents

1. General Information	4
1.1 BACnet/IP	4
1.2 Modbus	4
1.3 About GW-2493M	5
1.4 Features.....	6
1.5 Specifications.....	7
1.5.1 GW-2493M (BACnet/IP Server to Modbus TCP Client Gateway).....	7
2. Hardware.....	8
2.1 Size (Unit : mm)	8
2.2 Appearance.....	9
2.3 LED Indicator	10
3. Getting Started With GW-2493M.....	11
3.1 Wiring Preparation	11
3.2 GW-2493M Web Configuration	12
3.3 Import/Export Configuration	20
3.4 How to restore default Account/Password.....	22
3.5 How to update the firmware	23

Important Information

Warranty

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

Warning

ICP DAS assumes no liability for any damage 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, not for any infringements of patents or other rights of third parties resulting from its use.

Copyright

Copyright © 2021 by ICP DAS Co., Ltd. All rights are reserved.

Trademark

Names are used for identification purpose only and may be registered trademarks of their respective companies.

Contact us

If you encounter any problems while operating this device, feel free to contact us via mail at: service@icpdas.com .

1. General Information

1.1 BACnet/IP

BACnet is a communications protocol for building automation and control networks. It is an ASHRAE, ANSI, and ISO standard protocol. BACnet was designed to allow communication of building automation and control systems for applications such as heating, ventilating, and air-conditioning control, lighting control, access control, and fire detection systems and their associated equipment. The protocol provides mechanisms for computerized building automation devices to exchange information, regardless of the particular building service they perform.

BACnet/IP is based on Ethernet and used UDP to transmit BACnet network packets (NPDU). Messages are transmitted such as Who-is and Who-has through broadcast feature of UDP. The feature allows that the user could search for device information without knowing the actual location of the device.

1.2 Modbus

Modbus protocol mainly has two versions RTU and TCP. RTU can be realized through COM interface and TCP can be realized through Ethernet. These two protocols are commonly used in industrial control and automation industry.

Modbus RTU is used to transmit and exchange data via RS-485. It's a serial communication between master and slave. Every slave has a unique address to identify. Users could implement communication through using different function codes.

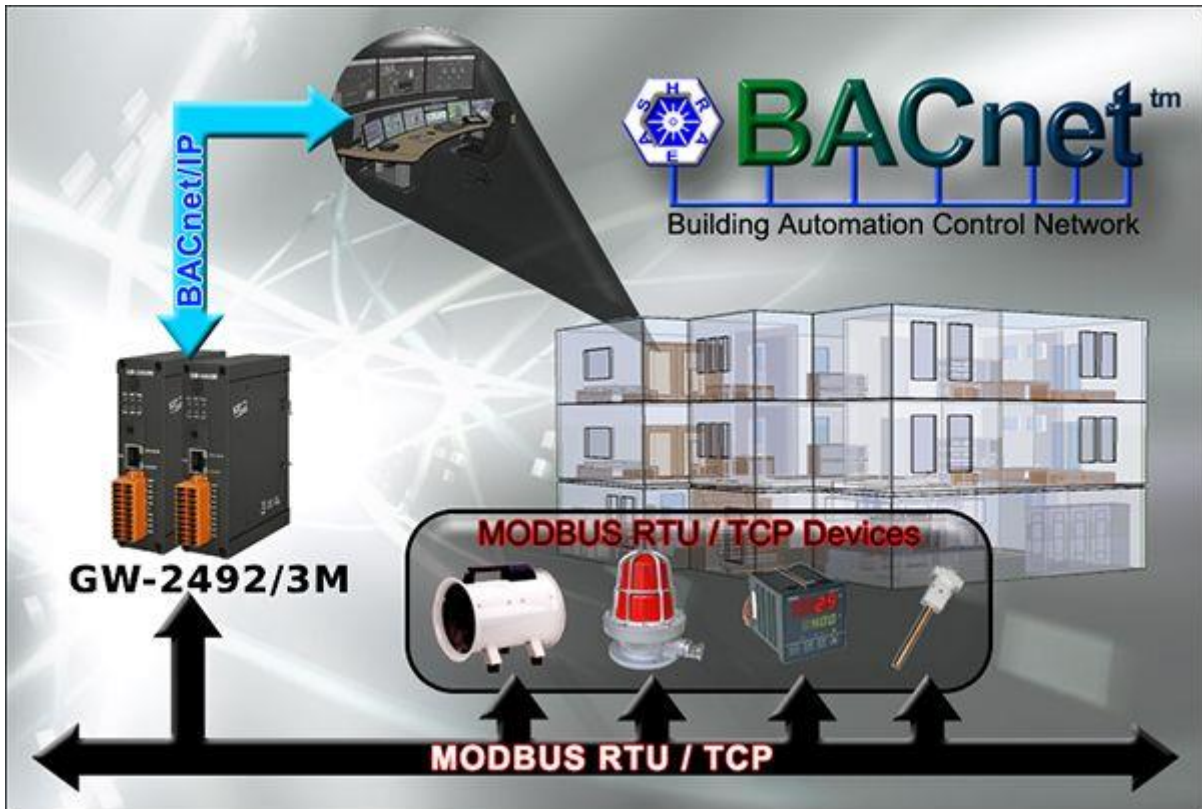
MODBUS TCP is a variant of MODBUS RTU. MODBUS messages are passed in an "Intranet" or "Internet" environment by using the TCP/IP protocol. The most common use of this protocol is to connect PLCs and gateways to other simple fieldbus or I/O networks via Ethernet.

1.3 About GW-2493M

GW-2493M is a BACnet/IP Server to Modbus TCP Client Gateway. It allows BACnet client application to access Modbus TCP devices via GW-2493M module. The BACnet/IP protocol is used to relay and exchange information between building devices. GW-2493M contains a large number of BACnet objects (AI, AO, AV, BI, BO, BV, MSI, MSO, MSV) gives you flexibility in mapping Modbus TCP registers to any combination of BACnet objects. Multiple BIBBs (DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B,...etc.) are supported. All the data transfer is configurable using a standard web browser.

1.4 Features

- Read/Write Modbus registers via BACnet objects
- Configurable BACnet/IP Server
- Configurable Modbus TCP Client
- Supports BACnet AI, AO, AV, BI, BO, BV, MSI, MSO, MSV Object Types
- Supports Modbus discrete inputs, coils, input registers and holding registers
- Supports up to 180* DI, 180* DO, 180* AI and 180* AO to transfer to BACnet Objects
- Simple data translation allows you to manipulate data as it passes between protocol



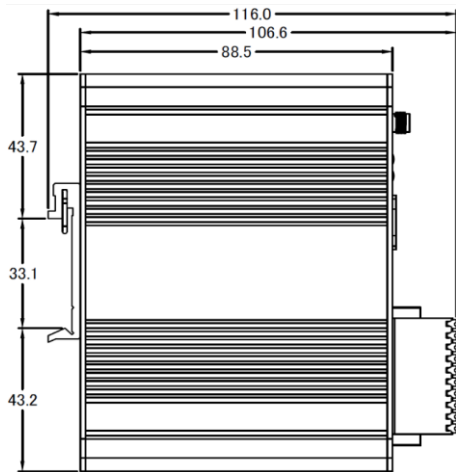
1.5 Specifications

1.5.1 GW-2493M (BACnet/IP Server to Modbus TCP Client Gateway)

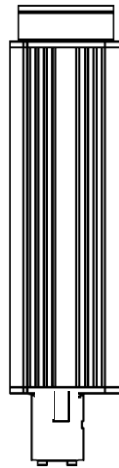
Ethernet	
Controller	10/100Base-TX Ethernet Controller (Auto-negotiating, Auto_MDIX)
Connector	RJ-45 with Ethernet indictor
Protocol	BACnet/IP Server
Max. Connections	8
BIBBS	DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-RD-B
Modbus	Modbus TCP Clients (Max. 32)
Power	
Protection	Power reverse polarity protection
EMS Protection	ESD, Surge, EFT
Supply Voltage	+10 VDC ~ +30 VDC
Consumption	5 W @ 24 VDC
LED Indicator	
LED (Round)	Power (1), BACnet MS/TP Status (1), BACnet MS/TP Net(1), Modbus TCP TxD / RxD / Link (3)
Ethernet LED	Ethernet LED Ethernet Status (RJ-45) (2)
Mechanism	
Installation	DIN-Rail
Casing	Metal
Dimensions	33 x 120 x 116 mm (W x L x H)
Environment	
Operating Temp.	-25°C ~ +75°C
Storage Temp.	-30°C ~ +85°C
Humidity	10 ~ 90% RH, non-condensing

2. Hardware

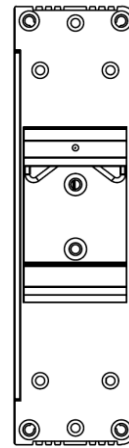
2.1 Size (Unit : mm)



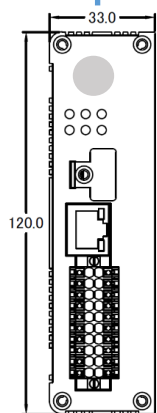
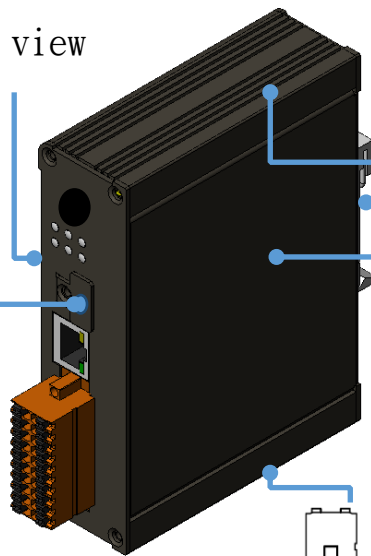
Left view



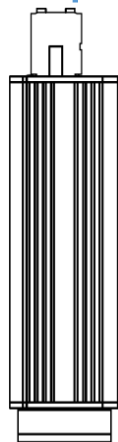
Top view



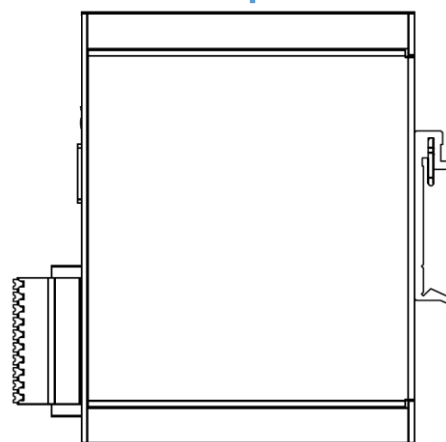
Post view



Front view



Bottom view



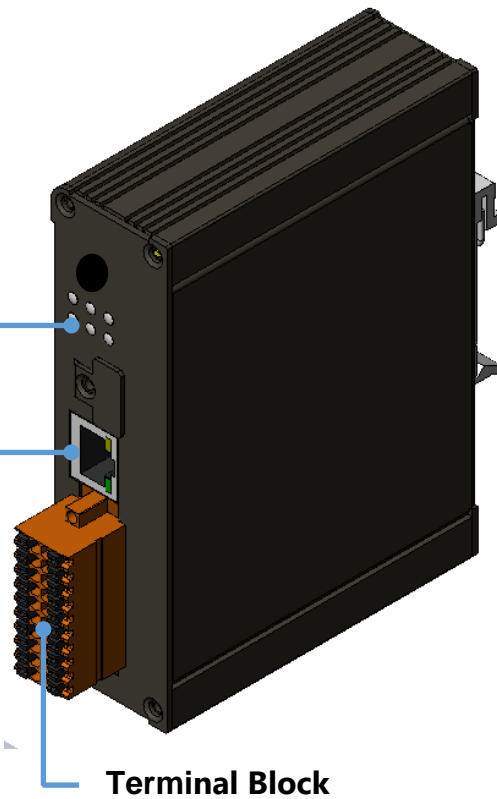
Right view

2.2 Appearance

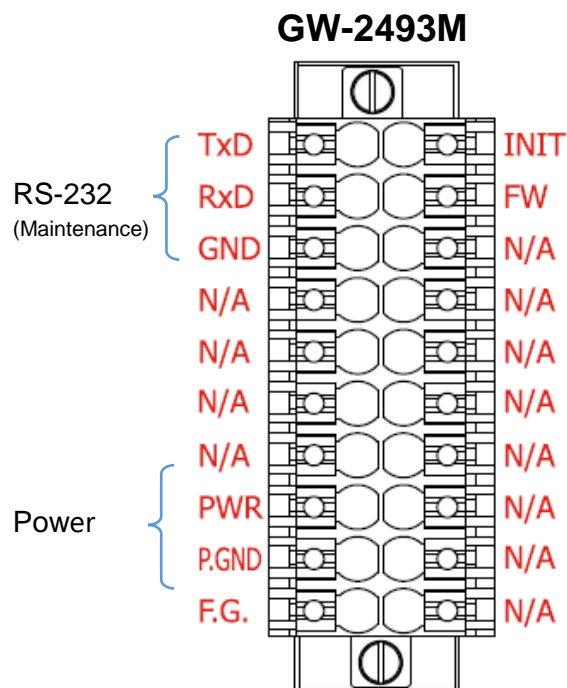
LED Indicator

Ethernet Port

The GW-2493M is equipped with a RJ45 port for Ethernet LAN connection. When 100BASE-TX is operating, the 10/100M LED is lit orange. When an Ethernet link is detected and an Ethernet packet is received, the Link/Act LED is lit green. The Modbus TCP use the same RJ45 port with difference TCP port from BACnet/IP.



Terminal Block



2.3 LED Indicator

There are six LEDs to indicate the various states of the GW-2493M. The following is the illustration of these six LEDs.

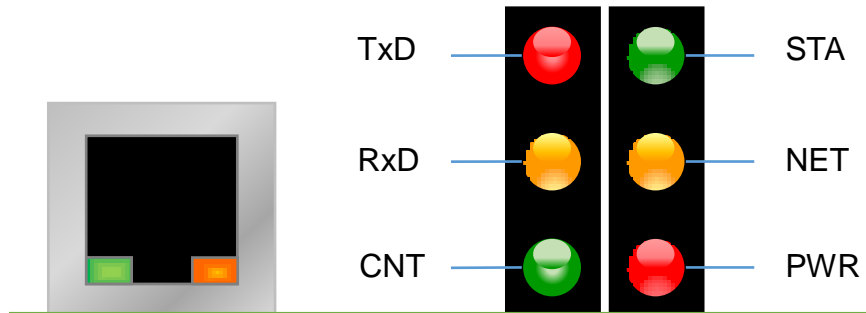


Figure 2.1 LED position of the GW-2493M

LED Name	GW-2493M Status	LED Status
ALL LEDs	FW Updating Mode	LED will be twinkled sequentially.
	FW Initial Mode	LED will be twinkled per 500ms.
PWR (Module)	Power On	On
	Power Failure	Off
NET (BACnet/IP)	Connected by least one client	On
	No clients connect	Blink per 200 ms
STA (BACnet/IP)	Communication OK	On
	Communication Failure	Blink per 200 ms
CNT (Modbus)	Connect to least one device	On
	No devices are connected	Blink per 200 ms
RxD (Modbus)	Data reception	On
	No Data reception	Off
TxD (Modbus)	Data transmission	On
	No Data reception	Off

Table 2.1 LED indication of the GW-2493M

3. Getting Started With GW-2493M

This chapter mainly describes the operation process of the GW-2493M.

3.1 Wiring Preparation

Before setting up the GW-2493M, please complete the necessary preparation about wiring.

Please follow Figure 2.1 wiring diagram, to wire the following items:

1. Power Supply : +10 VDC ~ +30 VDC
2. Ethernet : Connect the GW-2493M with PC directly. Or let the GW-2493M and PC connect with the same Ethernet Switch/Hub.
3. INIT : Special purpose. Don't care it this time.
4. FW : Special purpose. Don't care it this time.

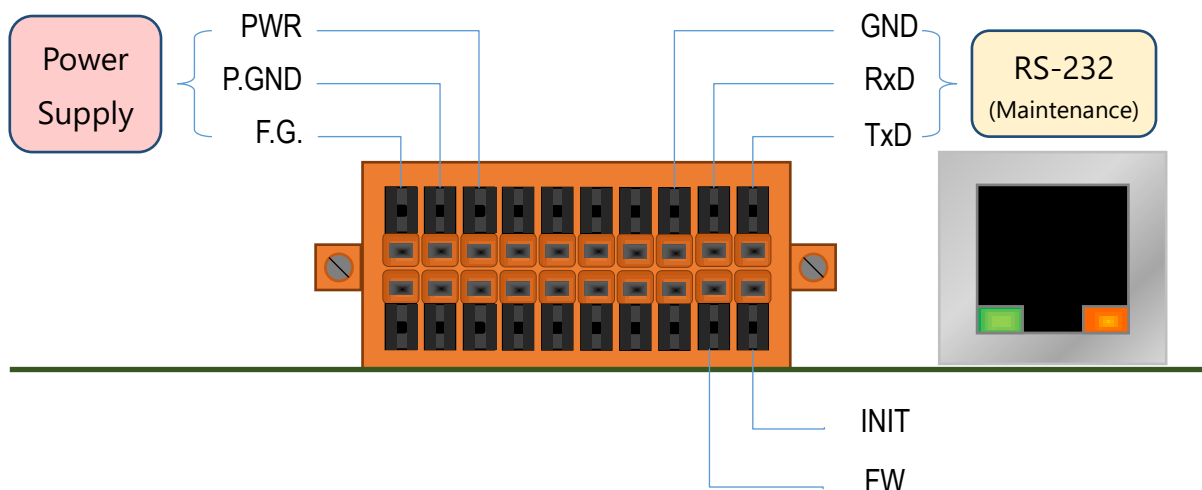


Figure 3.1 GW-2493M Wiring Diagram

3.2 GW-2493M Web Configuration

Please follow those steps to configure the GW-2493M via web browser.

Step0 :

Use the default account “admin” and the password “admin” to enter the main setting page.



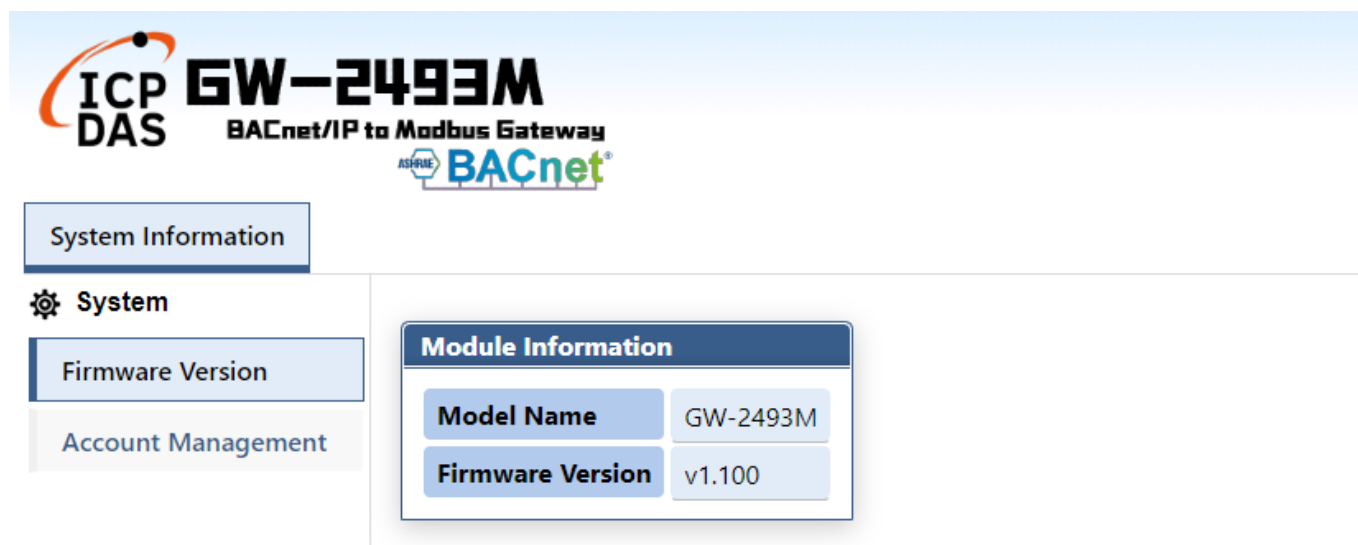
Account:

Password:

Login

Step1 :

The firmware version is shown on the web.



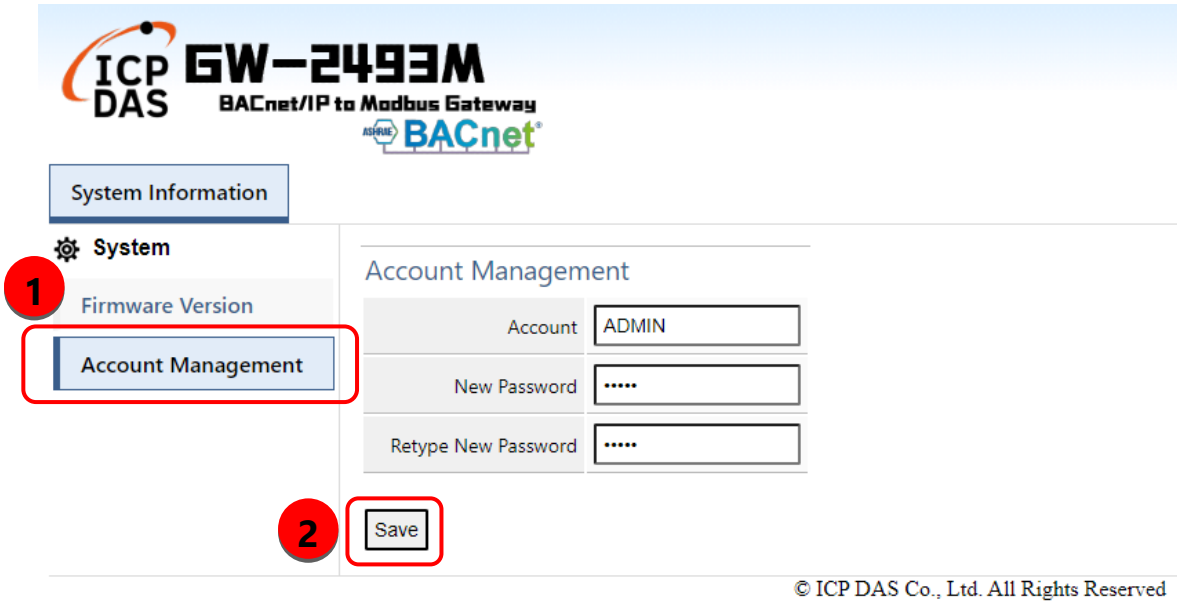
The screenshot shows the web configuration interface for the ICP DAS GW-2493M. The main header displays the product name and logo. Below the header, there is a navigation menu with options: System Information, System, Firmware Version, and Account Management. The 'System' menu is expanded, showing a 'Module Information' box with the following details:

Module Information	
Model Name	GW-2493M
Firmware Version	v1.100

© ICP DAS Co., Ltd. All Rights Reserved

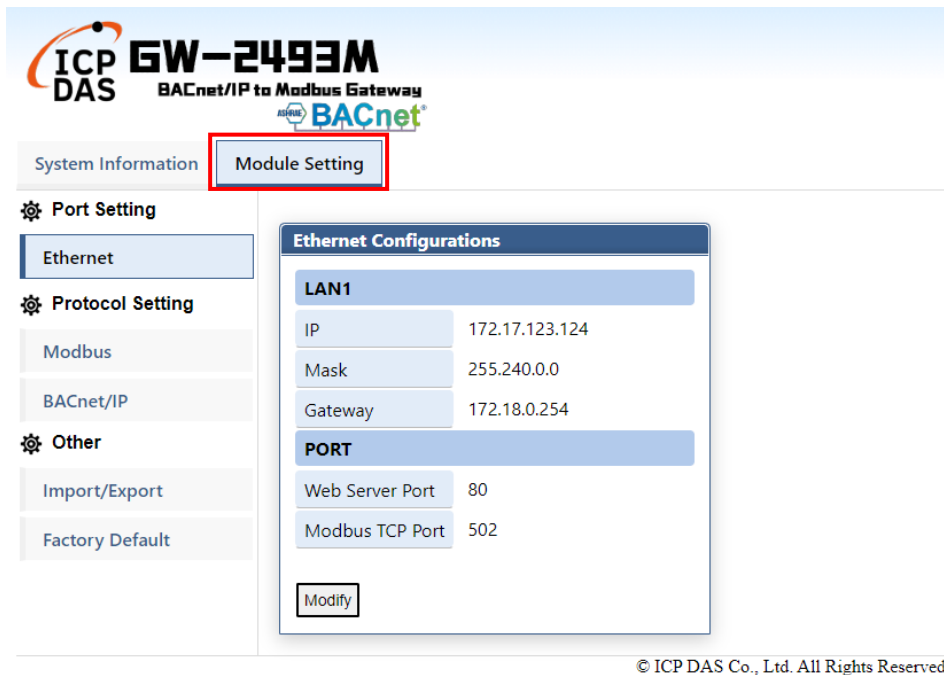
Step2 :

The GW-2493M is based on the information security law. Users need to change account and password for the first time before using it.



Step3 :

Please reflash the web page and login again with new account and password. “Module Setting” page will appear. Users could set the IP of the module.



Step4-1 :

Press “Modify” to configure the parameters of Modbus in the Modbus page.

The screenshot displays the web interface for the ICP DAS GW-2493M BACnet/IP to Modbus Gateway. The page is titled "Modbus Configurations" and is part of the "Module Setting" section. The left sidebar shows a tree view under "Protocol Setting" with "Modbus" selected. The main content area shows the following configuration details:

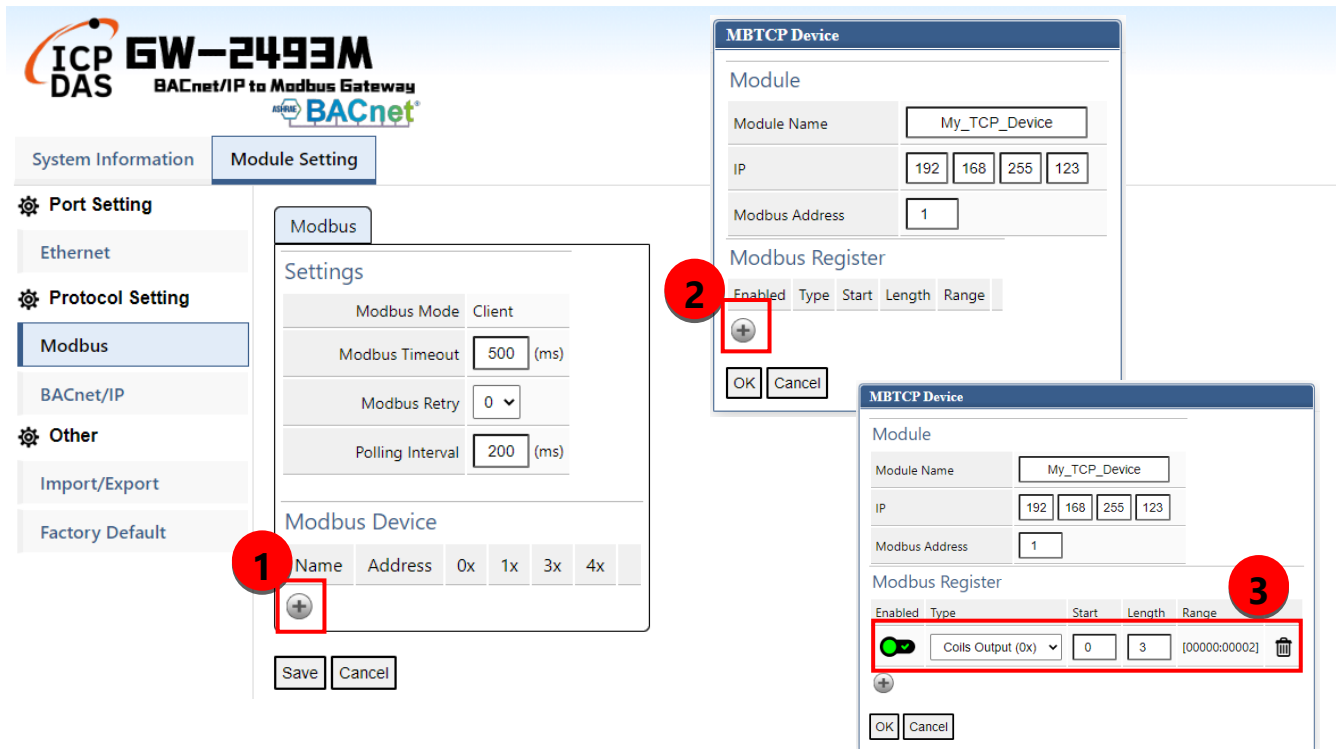
Modbus Information	
Modbus Mode	TCP Client
Modbus Timeout	500
Modbus Retry	0
Polling Interval	200

A "Modify" button is located at the bottom of the configuration panel.

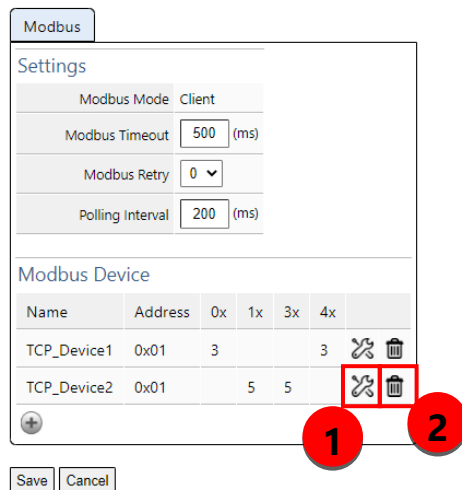
© ICP DAS Co., Ltd. All Rights Reserved

Step4-2 :

- (1) Press “+” button to add a Modbus TCP node.
- (2) After editing “Modbus Name” and “IP Address”, press “+” button to add Modbus registers.
- (3) Press “+” button to add Modbus function codes and registers range.
- (4) Finally, the users need to press “save” to save all Modbus configuration into the GW-2493M.
- (5) The users need to restart the GW-2493M to make configuration work.



- (1) Press the icon to edit a Modbus registers of that node
- (2) Press the icon to delete that Modbus node.



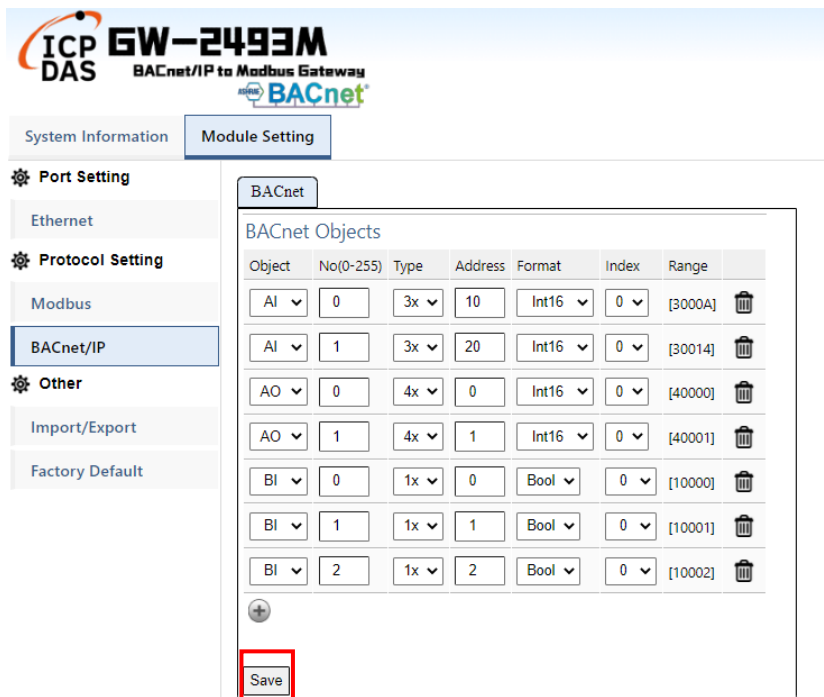
Step5 :

Press “+” button to add a BACnet object.

The screenshot displays the configuration interface for the ICP DAS GW-2493M BACnet/IP to Modbus Gateway. The main header includes the ICP DAS logo and the product name 'GW-2493M BACnet/IP to Modbus Gateway'. The interface is divided into two main sections: 'System Information' and 'Module Setting'. The 'Module Setting' section is active, showing a sidebar with 'Port Setting', 'Protocol Setting', and 'Other' categories. Under 'Protocol Setting', 'BACnet/IP' is selected. The main content area shows the 'BACnet' configuration page, which includes a 'BACnet Objects' table. The table has columns for 'Object', 'No(0-255)', 'Type', 'Address', 'Format', 'Index', and 'Range'. A red box highlights a '+' button located below the table, indicating the action to add a new BACnet object. A 'Save' button is also visible at the bottom of the table area.

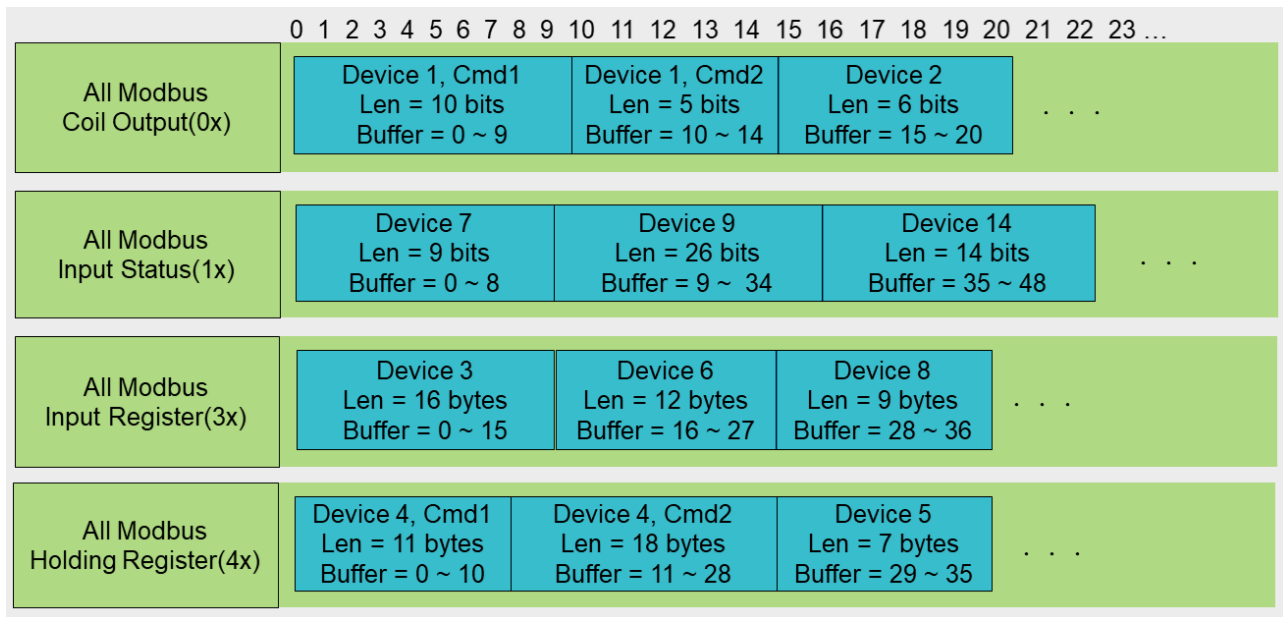
© ICP DAS Co., Ltd. All Rights Reserved

- (1) The “Object” field is BACnet object which support AI/AO/AV/BI/BO/BV/MI/MO/MV.
- (2) The “No” field is the serial number of the BACnet object. If you have AI*3 and AO*4, you need assign the No as AI-0, AI-1, AI-2, AO-0, AO-1, AO-2, AO-3.
- (3) The “Type” field is the Modbus register type. The common configuration is shown below.
 BACnet BO object maps to Modbus Coil Output(0x)
 BACnet BI object maps to Modbus Input Status(1x)
 BACnet AO object maps to Modbus Holding Register(4x)
 BACnet AI object maps to Modbus Input Register(3x)
- (4) The “Address” field is the start address of the Integrated Modbus Register (Note1).
- (5) The “Format” field is the data format which support bool/int16/uint16/int32/uint32/float.
- (6) The “Index” field is reserved.
- (7) The “Range” field is the exact Modbus address of the register.



Note 1.

In the GW-2493M, all remote Modbus data which come from different remote Modbus TCP devices will be integrated by their register type. It means that all remote Coil Output data will be putted into a Coil Output integrated buffer. All remote Input Status data will be putted into an Input Status integrated buffer. There are also have Holding Register integrated buffer and Input Register integrated buffer in the GW-2493M. They were integrated as the illustration shown below.



The BACnet object will read or write the data from those integrated buffers. Those Modbus data with the same type will be ordered by the Modbus Configuration Index in the integrated buffer. The first configuration Modbus command will be in the first address of the buffer. The order was shown below.

Modbus Retry	0				
Polling Interval	200 (ms)				
Modbus Device					
Name	Address	0x	1x	3x	4x
Device1	0x01	10/5			
Device7	0x01		9		
Device2	0x01	6			
Device3	0x01			16	
Device9	0x01		26		
Device6	0x01			12	
Device4	0x01				11/18
Device8	0x01			9	
Device5	0x01				7
Device14	0x01		14		

Save Cancel

For example by the illustration in Holding Register(4x), the Device4 and command 1 is the smallest ID and the smallest command index. The Device4 and command 1 occupies the first address of the Holding Register buffer. The “Address” field of the BACnet object means that the address in those integrated buffers. For example by the illustration, if the address of the BACnet “BO” object is 11, it means that the data of the “BO” object comes from the second bit of the Device 1 and command 2 in the Coil Output buffer. If the address of the BACnet “AO” object(int16) is 7, it means that the output data of the “AO” object(int16) will be written to the 8-th words of Device 4 and command 1 in the Holding Register buffer.

3.3 Import/Export Configuration

(1)Export All Configurations to CSV file:

The GW-2493M supports export function to write all configurations into a csv file..



(2)Import All Configurations from CSV file :

The users could import all configurations from a CSV file. It is convenient to move all configurations from one GW-2493M to another one. Firstly, the users select the CSV file. And then, they can press “Import” button to import configurations into the GW-2493M modules.

ICP DAS GW-2493M
BACnet/IP to Modbus Gateway
BACnet

System Information | **Module Setting**

Port Setting
Ethernet

Protocol Setting
Modbus
BACnet/IP

Other
Import/Export
Factory Default

Import
Import the settings to GW-2493M
The file of .csv format generated by GW-2493M can be re-uploaded for module configuration.
選擇檔案 未選擇任何檔案 Import

Export
Export the settings from GW-2493M
The configurations of GW-2493M can be downloaded and saved as .csv file for troubleshooting and project records.
Export

3.4 How to restore default Account/Password

If the users have forgotten the login information, they can follow the steps to restore default login information.

(1) Short the “INIT” and “GND” pin of GW-2493M and turn on the power.

(2) The GW-2493M will restore the login information.

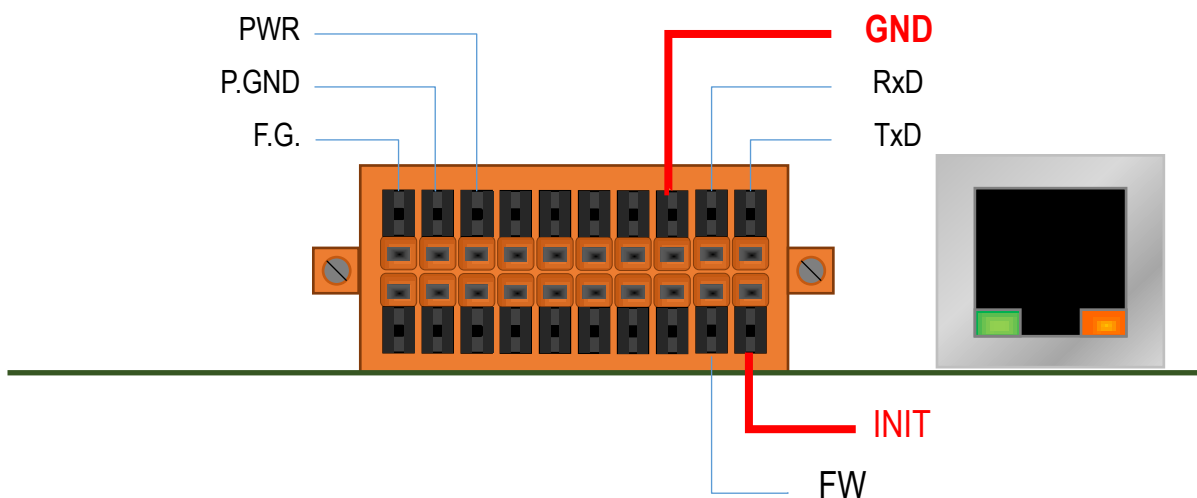
IP : 192.168.255.1

Mask : 255. 255. 0 .0

Gateway: 192.168.0.1

Login Account: admin

Login Password: admin



3.5 How to update the firmware

The GW-2493M can update the firmware via a software tool (Windows) by the following:

1) Download the latest version of the firmware program and update Tool (FW_Update_Tool) on the GW-2493M product page and store it in a computer that you want to connect to the GW-2493M.

- **Update Tool:** Please refers to ->

<https://www.icpdas.com/en/download/show.php?num=7824&model=GW-2493M>

2) Short the “FW” and “GND” pin of the GW-2493M and turn on the power. When the six LEDs of the GW-2493M turn blinking alternately, the GW-2493M is successfully entered the firmware updating mode.

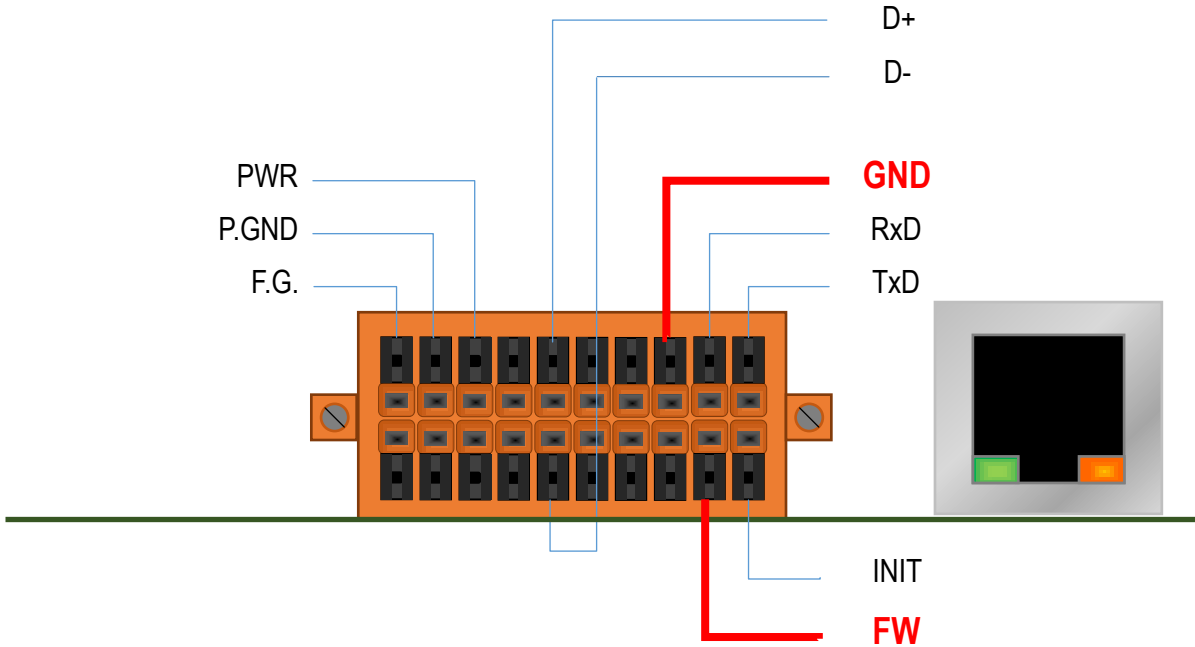


Figure 3.2 GW-2493M FW & GND Pin

3) Execute “FW_Update_Tool.exe” with the administrator privileges (👤) and follow the steps as

Figure 3.3:

In "Download Interface", select a network port for connecting to the GW-2493M.

In "Firmware Path", select the latest firmware update file (GW_2493M_xxxx.fw).

In "Firmware Update", click “Update” to start the firmware updating.

4) When the update is completed, “Update OK” will be displayed in the “FW_Update_Tool” window to indicate that the firmware updating is successful. Next, remove the short connection between FW and GND, and reboot the power supply, then check the current firmware version on the Web interface.

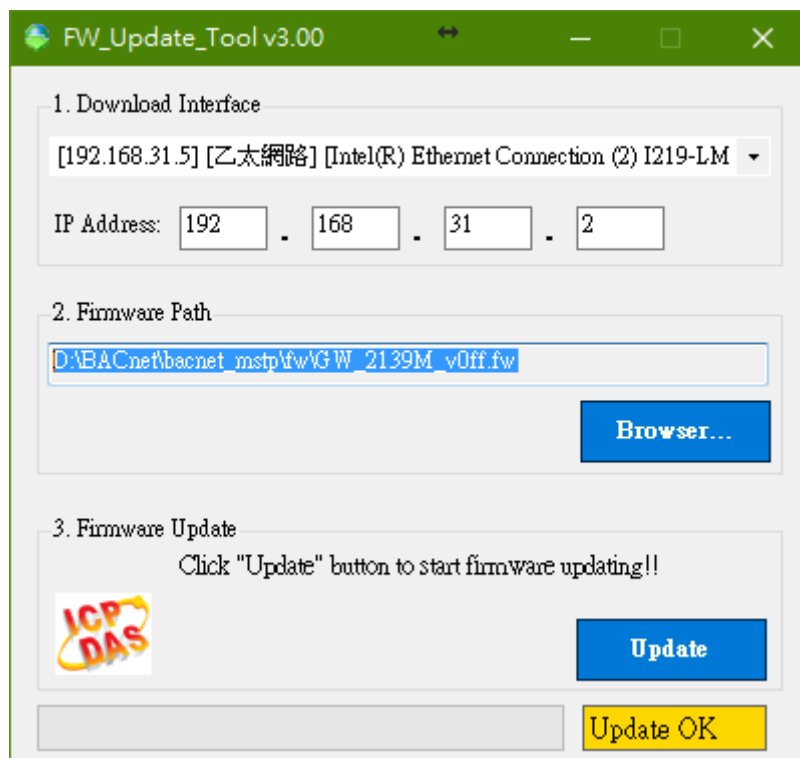


Figure 3.3 FW_Update_Tool firmware update steps