

iO-GRID *M*

Gateway Module User Manual

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1. Gateway Module List

Product No.	Description	Default IP address
GFGW-RM01N	Modbus TCP-to-Modbus RTU/ASCII gateway module, 4 Ports	192.168.1.20
GFGW-RM02N	Modbus TCP-to-Modbus RTU/ASCII gateway module, 1 Port	192.168.1.20

Product Description

GFGW, Modbus Gateway series is designed for industrial applications. It is an open industrial device for installation in a housing provided on site. It is a standard Modbus gateway that converts between Modbus TCP and Modbus RTU / ASCII protocols. For TCP masters, it supports up to 247 RTU / ASCII slaves. And vice versa. The circuit design and all components of the GFGW series meet the latest requirements and standards of UL, CE and RoHS. It has a complete circuit protection design to withstand overload, overvoltage and short circuit, and to avoid damage and malfunction caused by improper operation.



Caution (ATTENTION):

1. THIS DEVICE IS FOR INDOOR USE ONLY, DON'T PUT OR USE IT IN HIGH TEMPERATURE AND HIGH MOISTURE ENVIRONMENT.
CET EQUIPEMENT EST DESTINE A UN USAGE INTERIEUR UNIQUEMENT NE PAS STOCKER OU UTILISER DANS UN ENVIRONNEMENT A HAUTE TEMPERATURE ET HAUTE HUMIDITE.
2. AVOID FALLING AND BUMPING OTHERWISE THE ELECTRICAL COMPONENTS WILL BE DAMAGED.
ÉVITEZ DE TOMBER ET DE VOUS ÉCRASER, SINON LES COMPOSANTS ÉLECTRIQUES SERONT ENDOMMAGÉS
3. DON'T TRY TO DISASSEMBLE OR OPEN THE COVER UNDER ANY CIRCUMSTANCE IN ORDER TO AVOID DANGER.
NE TENTEZ JAMAIS DE DEBALLER OU D'OUVRIR LE COUVERCLE POUR EVITER TOUT DANGER.
4. IF THE EQUIPMENT IS USED IN A MANNER NOT SPECIFIED BY THE MANUFACTURER, THE PROTECTION PROVIDED BY THE EQUIPMENT MAY BE IMPAIRED.
SI L'APPAREIL N'EST PAS UTILISE DE LA MANIERE INDIQUEE PAR LE FABRICANT, LA PROTECTION FOURNIE PAR L'APPAREIL PEUT ETRE ALTEREE.
5. THE INSTALLATION THAT THE SAFETY OF ANY SYSTEM INCORPORATING THE EQUIPMENT IS THE RESPONSIBILITY OF THE ASSEMBLER OF THE SYSTEM.
L'INSTALLATION DE TOUT SYSTÈME INTÉGRANT CET ÉQUIPEMENT EST LA RESPONSABILITÉ DU CONSTRUCTEUR DU SYSTÈME.
6. USE WITH COPPER CONDUCTORS ONLY. INPUT WIRING: MINIMUM 28 AWG, 85°C, OUTPUT WIRING: MINIMUM 28 AWG, 85°C
DESTINÉ À ÊTRE UTILISÉ AVEC DES CONDUCTEURS EN CUIVRE SEULEMENT. CABLAGE D'ENTREE: MINIMUM 28 AWG, 85 ° C. CABLAGE DE SORTIE: MINIMUM 28 AWG, 85 ° C.
7. FOR USE IN A CONTROLLED ENVIRONMENT. REFER TO MANUAL FOR ENVIRONMENTAL CONDITIONS.
POUR UN ENVIRONNEMENT CONTROLE. REPORTEZ-VOUS AU MANUEL DES CONDITIONS ENVIRONNEMENTALES.
8. DISCONNECT ALL SOURCES OF SUPPLY BEFORE SERVICING.
COUPER TOUTES LES SOURCES D'ALIMENTATION AVANT DE FAIRE L'ENTRETIEN ET LES RÉPARATIONS.
9. PROPER VENTILATION IS REQUIRED TO REDUCE THE RISK OF HAZARDOUS OR EXPLOSIVE GAS BUILDUP DURING INDOOR CHARGING. SEE OWNERS MANUAL.
UNE VENTILATION ADÉQUATE EST NÉCESSAIRE AFIN DE RÉDUIRE LES RISQUES D'ACCUMULATION DE GAZ DANGEREUX OU EXPLOSIFS DURANT LA RECHARGE À L'INTÉRIEUR. VOIR LE MANUEL D'ENTRETIEN.

2. Gateway Module Specification

2.1 GFGW-RM01N

Technical Specification	
Module Type	Modbus TCP Gateway
Voltage Supply	5 VDC via Dinkle Bus
Current Consumption	400 mA @ 5 V
Number Of Communication Ports	Ethernet * 2 / RS485 * 4
Network Interface	RJ45 * 2
Serial Communication Interface	RS485 (push-in contact)
Communication Protocol	Modbus TCP / RTU
General Specification	
Dimension (W*D*H)	20 x 100 x 97mm
Weight	84g
Ambient temperature (operation)	-10...+60 °C
Storage Temperature	-25°C...+85 °C
Permissible Humidity(non-condensing)	RH 95%
Altitude Limit	< 2000 m
Ingress Protection (Ip)	IP 20
Pollution Severity	II
Safety Approval	CE
Product Certification	UL 61010-1 & UL 61010-2-201
Wiring Range (Iec / Ul)	0.32 mm ² ~ 0.8 mm ² / AWG 28~20
Wiring Ferrules	DN00210D、DN00310D、DN00510D

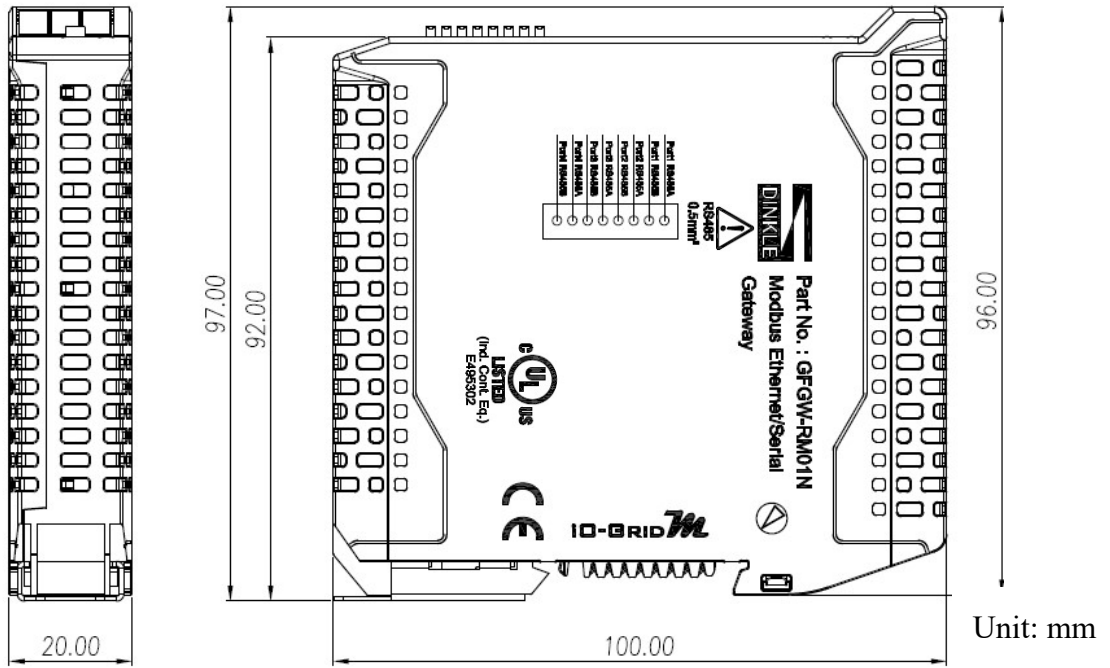
2.2 GFGW-RM02N

Technical Specification	
Module Type	Modbus TCP Gateway
Voltage Supply	5 VDC via Dinkle Bus
Current Consumption	400 mA @ 5 V
Number Of Communication Ports	Ethernet * 2 / RS485 * 1
Network Interface	RJ45 * 2
Serial Communication Interface	RS485 via Dinkle Bus
Communication Protocol	Modbus TCP / RTU
General Specification	
Dimension (W-D-H)	20 x 100 x 97mm
Weight	79
Ambient Temperature (operation)	-10...+60 °C
Storage temperature	-25°C...+85 °C
Permissible Humidity(non-condensing)	RH 95%
Altitude Limit	< 2000 m
Ingress Protection (Ip)	IP 20
Pollution Severity	II
Safety Approval	CE
Produce Certification	UL 61010-1 & UL 61010-2-201
Wiring Range (Iec / UI)	--
Wiring Ferrules	--

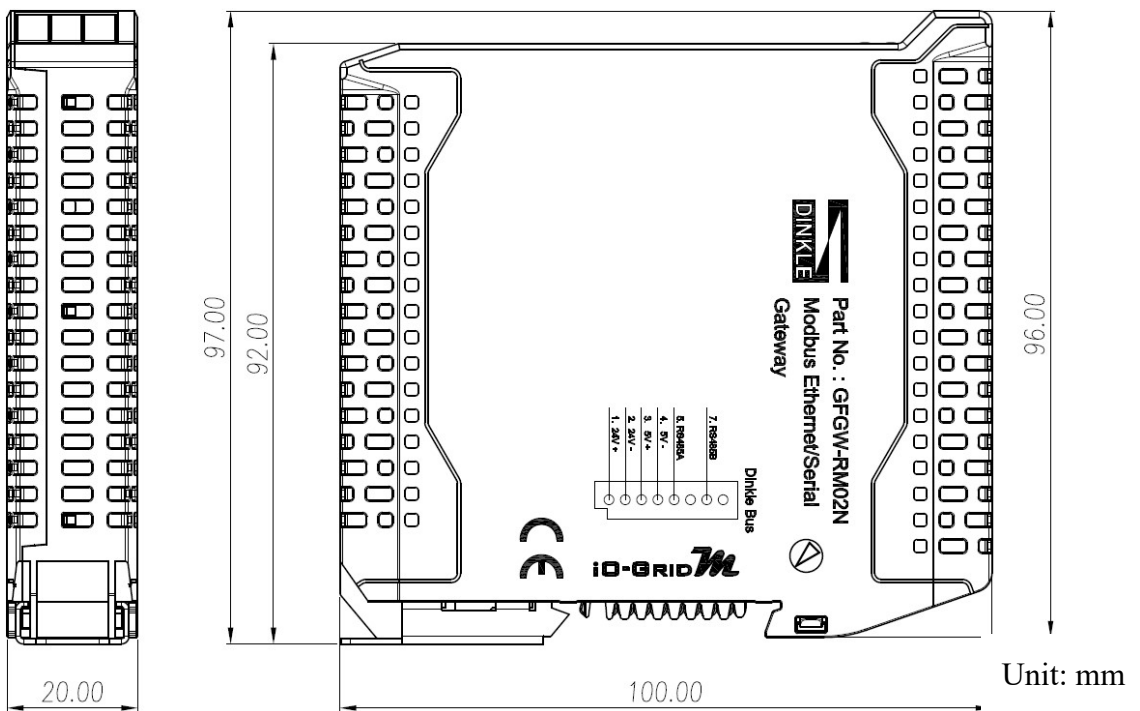
3. Gateway Module Information

3.1 Gateway Module Dimensions

I. GFGW-RM01N

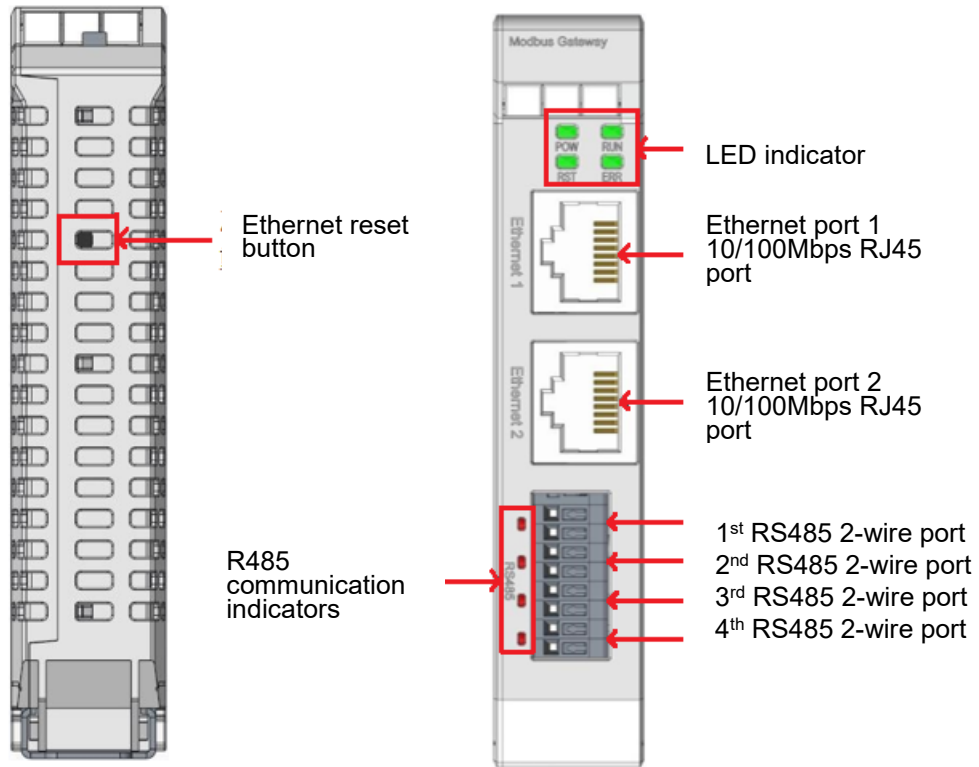


II. GWGW-RM02N



3.2 Gateway Module Panel Information

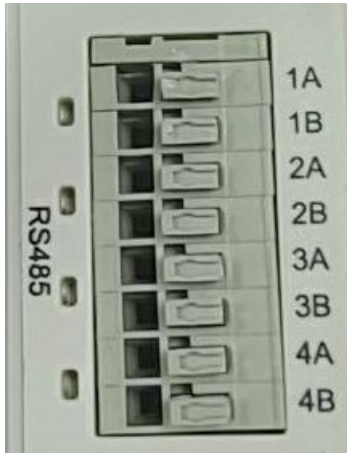
I. GFGW-RM01N



LED indicator definition

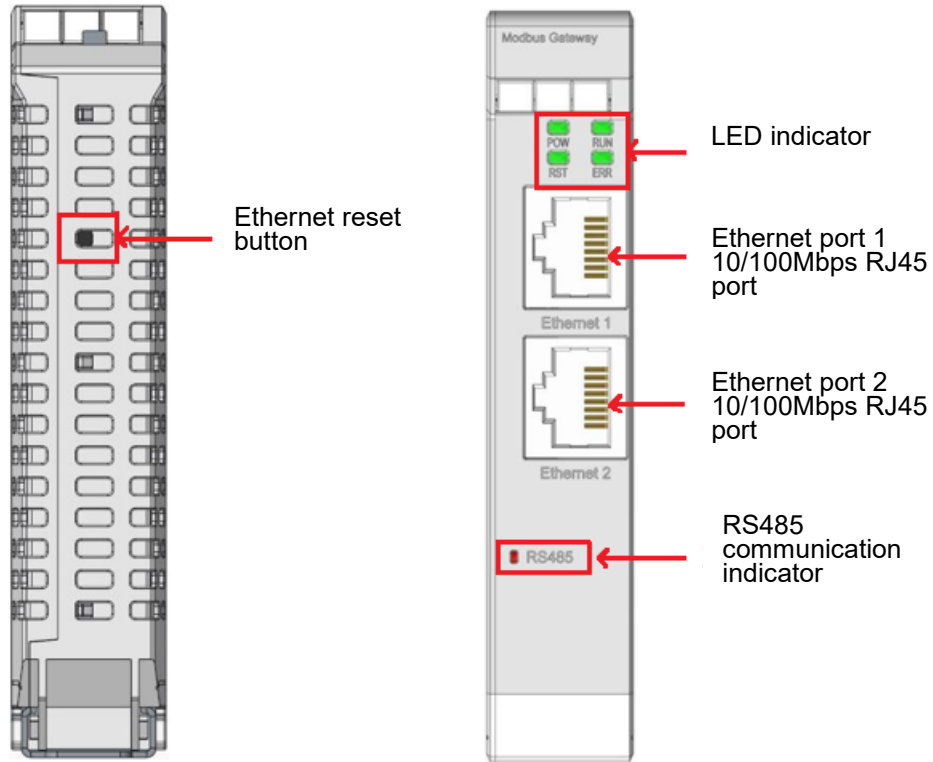
LED	Color	Definition	Status
POW	Green	Power Indicator	On: Power on Off: Power off
RUN	Green	Run Indicator	Blinking: System running Off: Power off
RST	Green	Reset Indicator	Blinking: Reset to default setting 3 seconds after initiating IP reset
ERR	Red	Anomaly Indicator	On: System anomaly Off: Status normal

RS485 port definitions



RS485	Communication pin definitions
1	Serial port A of the first RS485
2	Serial port B of the first RS485
3	Serial port A of the second RS485
4	Serial port B of the second RS485
5	Serial port A of the third RS485
6	Serial port B of the third RS485
7	Serial port A of the fourth RS485
8	Serial port B of the fourth RS485

II. GFGW-RM02N



LED indicator definition

LED	Color	Definition	Status
POW	Green	power indicator	On: Power on Off: Power off
RUN	Green	Run Indicator	Blinking: System running Off: Power off
RST	Green	Reset indicator	Blinking: Reset to default setting 3 seconds after initiating IP reset
ERR	Red	Anomaly indicator	On: System anomaly Off: Status normal

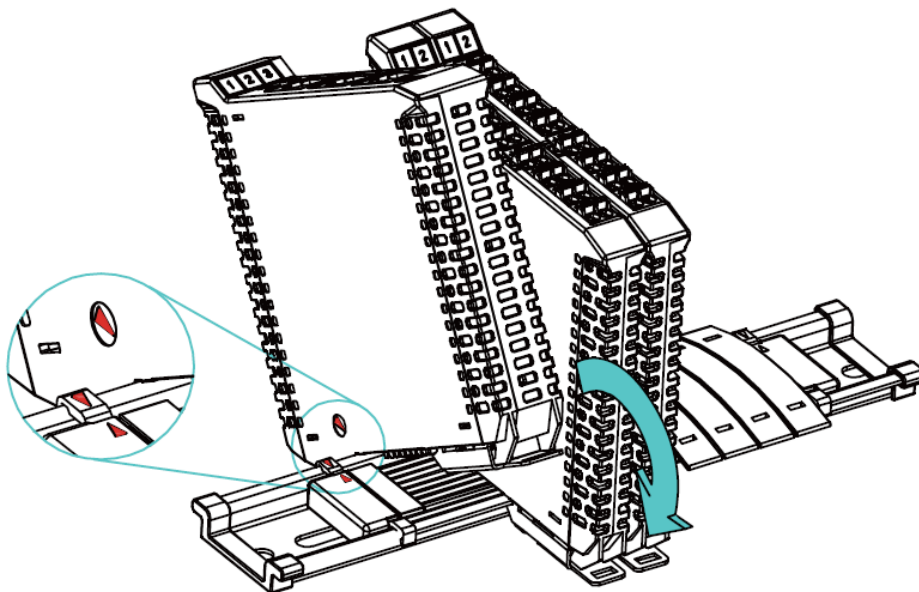
RS485 communication indicator definitions:

RS485	RS485 indicator definitions
1	Serial port A of the first RS485

4. Module Installation/Disassembly

4.1 Installation

- I. Align the red arrow on the side of the module to the arrow on the DIN rail.
- II. Press the module down and the metal clamp will slide (thanks to its spring mechanism) and grab on the other side of the DIN rail. Continue to push down until the metal clamp “clicks”.

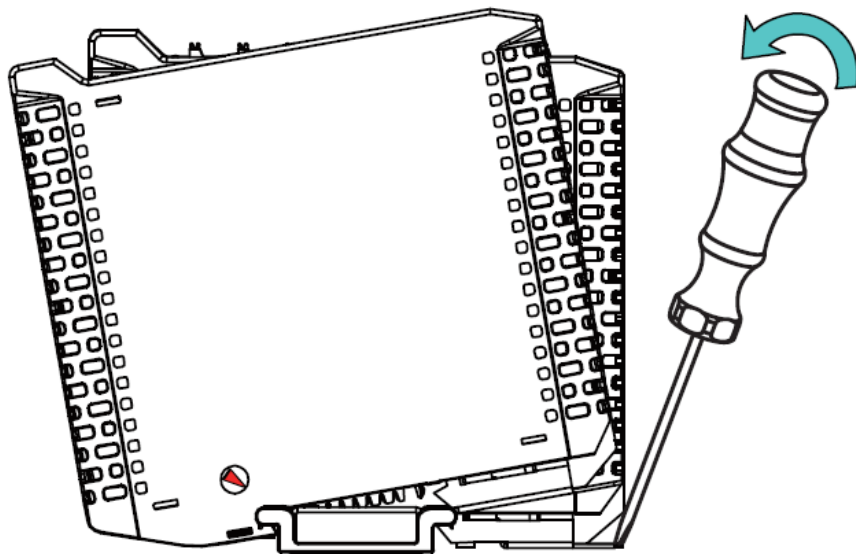


*Note: Make sure the red arrows on the module and the rail are pointing the same direction.

4.2 Removal

- I. Use a screwdriver to pull the metal hook sideways and detach the module from the DIN rail.

- II. Remove all modules from the DIN rail in reverse order of installation.



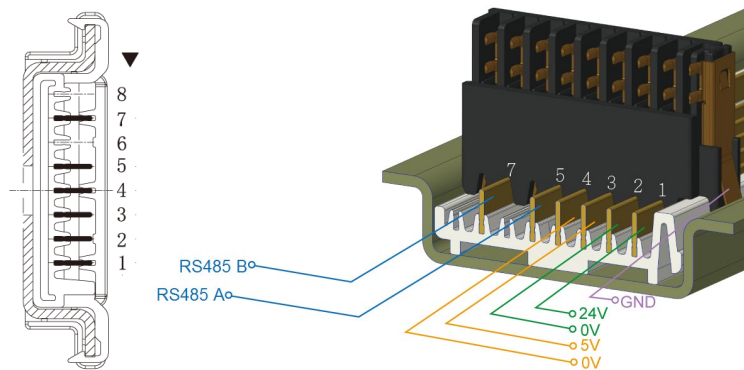
5. iO-GRID™ Series Introduction

iO-GRID™ series utilizes the standard Modbus communication protocol and supports Modbus RTU/ASCII and Modbus TCP. Please choose products and factory controllers to figure your system based on your communication protocol.

5.1 iO-GRID™ Components

I. DINKLE Bus

Rail 1 to 4 are defined for power supply and rail 5 and 7 are defined for communication.



DINKLE Bus Rail Definitions:

Rail	Definition	Rail	Definition
8	—	4	0V
7	RS485B	3	5V
6	—	2	0V
5	RS485A	1	24V

II. Gateway Module

A gateway module converts between Modbus TCP and Modbus RTU/ASCII. The module provides two sets of external Ethernet ports to connect to the controller and the Internet

There are two types of gateway modules available:

4-channel gateway module: Provides 4 RS485 ports to connect to a control module

Single-channel gateway module: No external connectivity for the RS485 ports.

The RS485 signals are transmitted via DINKLE Bus and I/O module.

Gateway module products information:

Product No.	Description
GFGW-RM01N	Modbus TCP-to-Modbus RTU/ASCII gateway module. 4 Ports
GFGW-RM02N	Modbus TCP-to-Modbus RTU/ASCII gateway module. 1 Port

III. Control module

The control module manages I/O modules and sets up the configuration. Provides external RS485 ports to connect to the controller.

There are two types of control modules available:

3-channel control module:

Provides 3 external RS485 ports, suitable for stations with 2 or more control modules. Among the RS485 ports, 2 of them will be connected to the controller and the control module of the next system.

Single-channel control module:

Provides one single RS485 port to connect to the controller, suitable for single-module stations.

Control module products information:

Product No.	Description
GFMS-RM01N	RS485 control module, Modbus RTU/ASCII 3 Ports
GFMS-RM01S	RS485 control module, Modbus RTU/ASCII 1 Port

IV. I/O Module

Dinkle offers different types of I/O modules with different functions:

Product No.	Description
GFDI-RM01N	16-channel digital input module (source/sink)
GFDO-RM01N	16-channel digital output module (sink)
GFDO-RM02N	16-channel digital output module (Source)
GFAR-RM10	8-Channel relay module, grounded
GFAR-RM20	4-Channel relay module, grounded
GFAI-RM10	4-channel analog input module ($\pm 10\text{VDC}$)
GFAI-RM11	4-channel analog input module (0...10VDC)
GFAI-RM20	4-channel analog input module (0... 20mA)
GFAI-RM21	4-channel analog input module (4... 20mA)
GFAO-RM10	4-channel analog output module ($\pm 10\text{VDC}$)
GFAO-RM11	4-channel analog output module (0...10VDC)
GFAO-RM20	4-channel analog output module (0... 20mA)
GFAO-RM21	4-channel analog output module (4... 20mA)
GFAX-RM10	2-channel analog input module, 2-channel analog output module (-10...10VDC)
GFAX-RM11	2-channel analog input module, 2-channel analog output module (0...10VDC)
GFAX-RM20	2-channel analog input module, 2-channel analog output module (0... 20mA)
GFAX-RM21	2-channel analog input module, 2-channel analog output module (4... 20mA)

6. i-Designer Parameter Settings and Information

6.1 Gateway Module Connection Setup

I. Gateway Module System Configuration List

Name/Product No.	Description
GFGW-RM01N	Modbus TCP-to-Modbus RTU/ASCII gateway module. 4 Ports
GFGW-RM02N	Modbus TCP-to-Modbus RTU/ASCII gateway module. 1 Port
Computer	Only needs to support Ethernet RJ45 port connections

II. Module Initial Setting List

Product No.	IP address	PORT	Type	Baud rate	Format
GFGW-RM01N	192.168.1.20	1	Slave	115200	RTU(8,N,1)
		2	Slave	115200	RTU(8,N,1)
		3	Slave	115200	RTU(8,N,1)
		4	Slave	115200	RTU(8,N,1)
GFGW-RM02N	192.168.1.20	1	Slave	115200	RTU(8,N,1)

III. Software Functions Details

The setup software contains the following parameters:

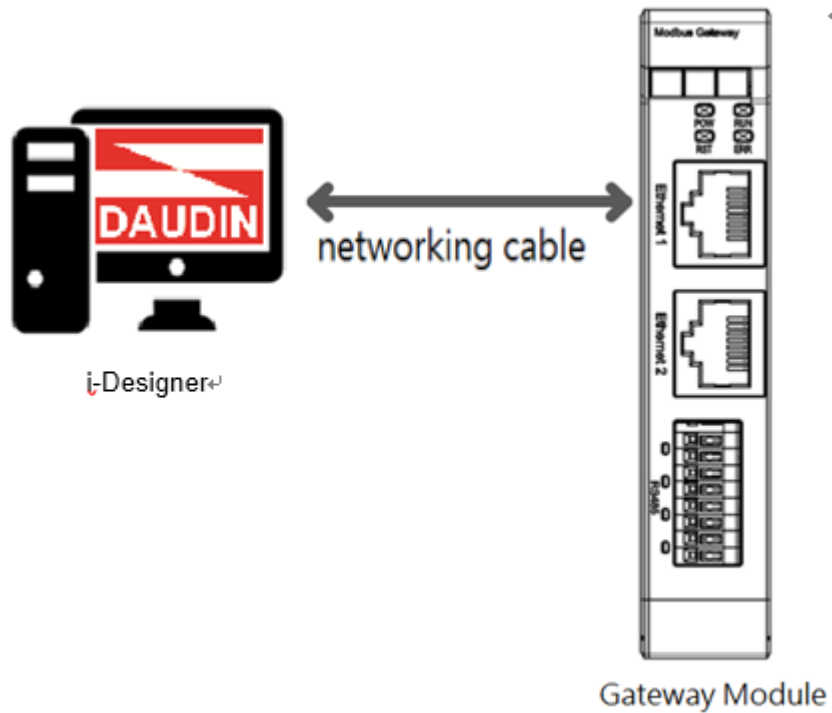
- (1) IP address, subnet mask, default gateway
- (2) Communication parameters of each serial port's RS485 (including baud rate, Modbus communication format and parity checking and stop bit)
- (3) Operational parameters of each serial port's RS485 (including serial port's master/slave module and communication timeout parameters)
- (4) Each serial port's RS485 mapping parameters (including mapping ID range and

mapping IP)

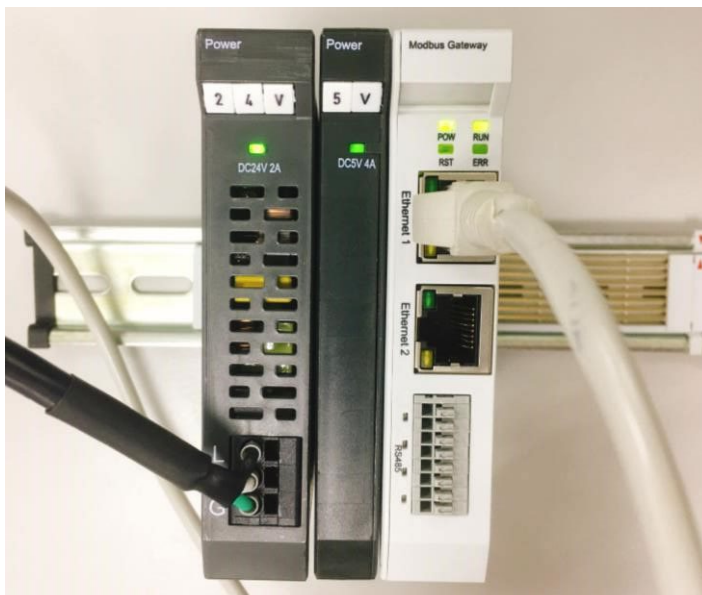
IV. Gateway Module Connection Setup

Connect your gateway module to your computer via the Internet port and then open the i-Designer program to set up gateway

Gateway module connection illustration:



Gateway module connection image:



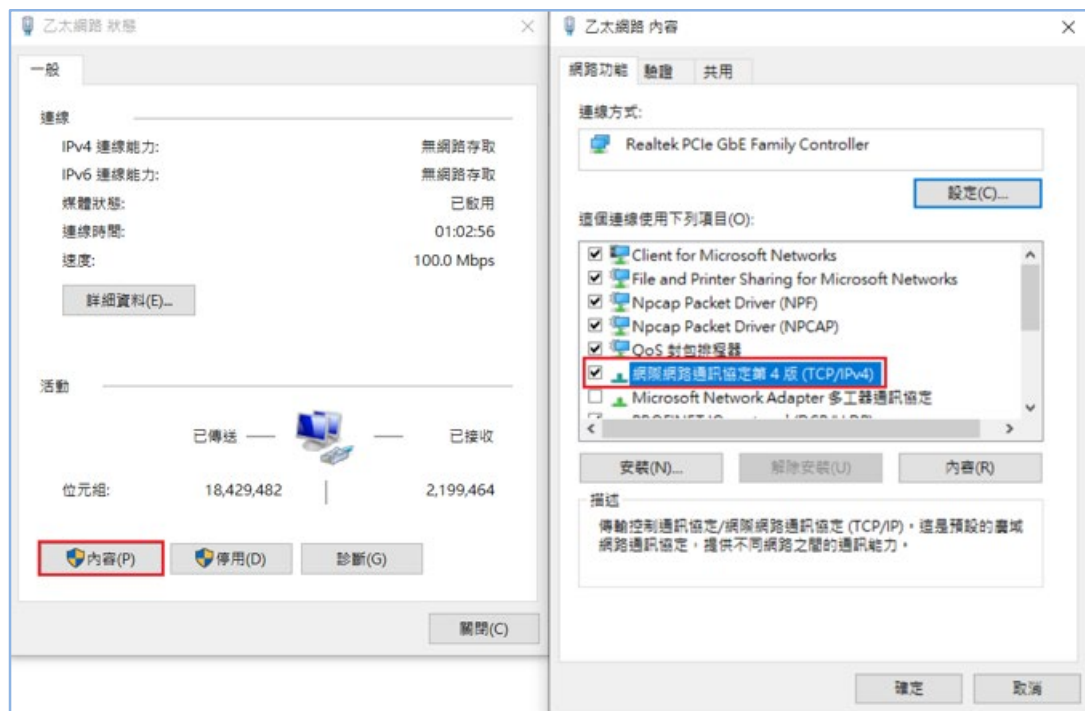
6.2 i-Designer Gateway Module Setup Process

I. Preliminary operation

1 After connecting the gateway module to your computer, open “Control Panel” -> “All Control Panel Items” -> “Network and Sharing Center” and then click on “Change adapter settings”



2 Click on the Ethernet icon -> “Properties” and then click on “TCP/IPv4”



3 Confirm that the network setting is the same as the gateway module setting

of “192.168.1.XXX”

網際網路通訊協定第 4 版 (TCP/IPv4) - 內容

一般

如果您的網路支援這項功能，您可以取得自動指派的 IP 設定。否則，您必須詢問網路系統管理員正確的 IP 設定。

自動取得 IP 位址(O)
 使用下列的 IP 位址(S):

IP 位址(I):
 子網路遮罩(U):
 預設閘道(D):

自動取得 DNS 伺服器位址(B)
 使用下列的 DNS 伺服器位址(E):

慣用 DNS 伺服器(P):
 其他 DNS 伺服器(A):

結束時確認設定(L)

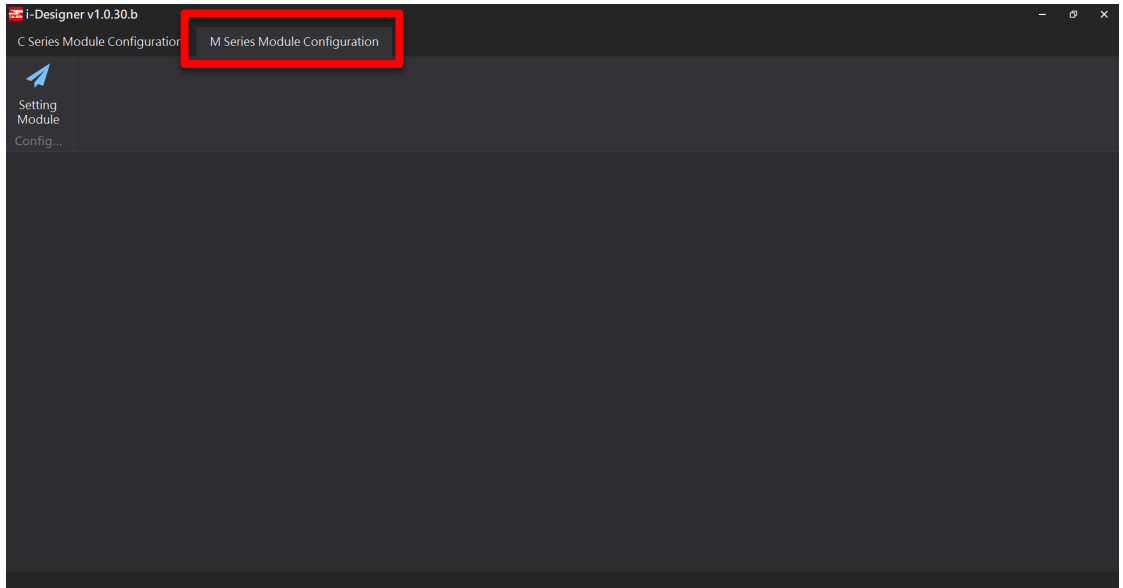
- V. Make sure that the module is powered and connected to the gateway module using an Ethernet cable



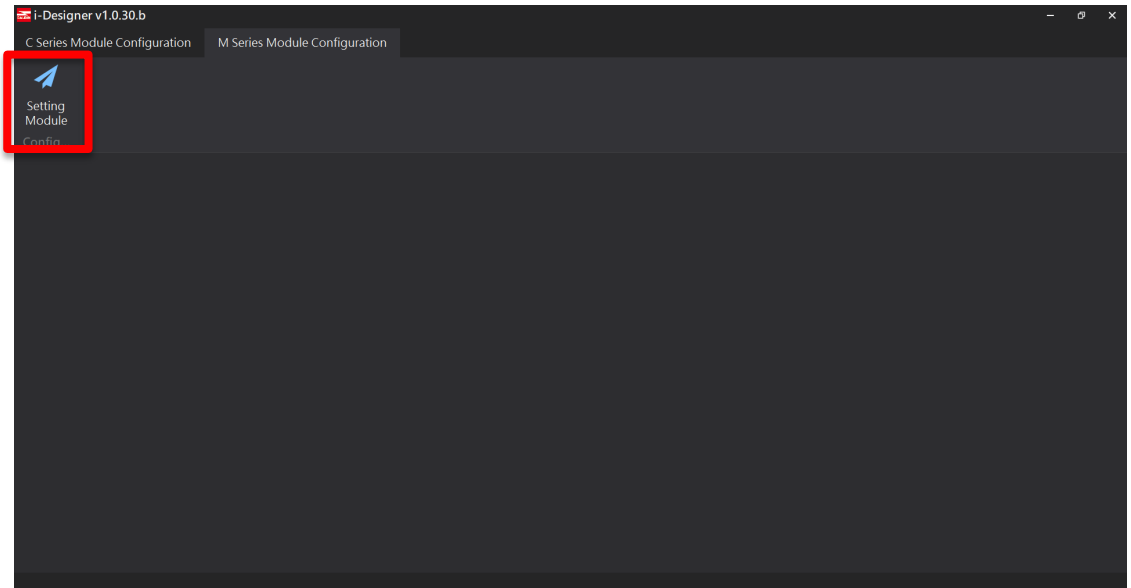
- VI. Click to launch the software



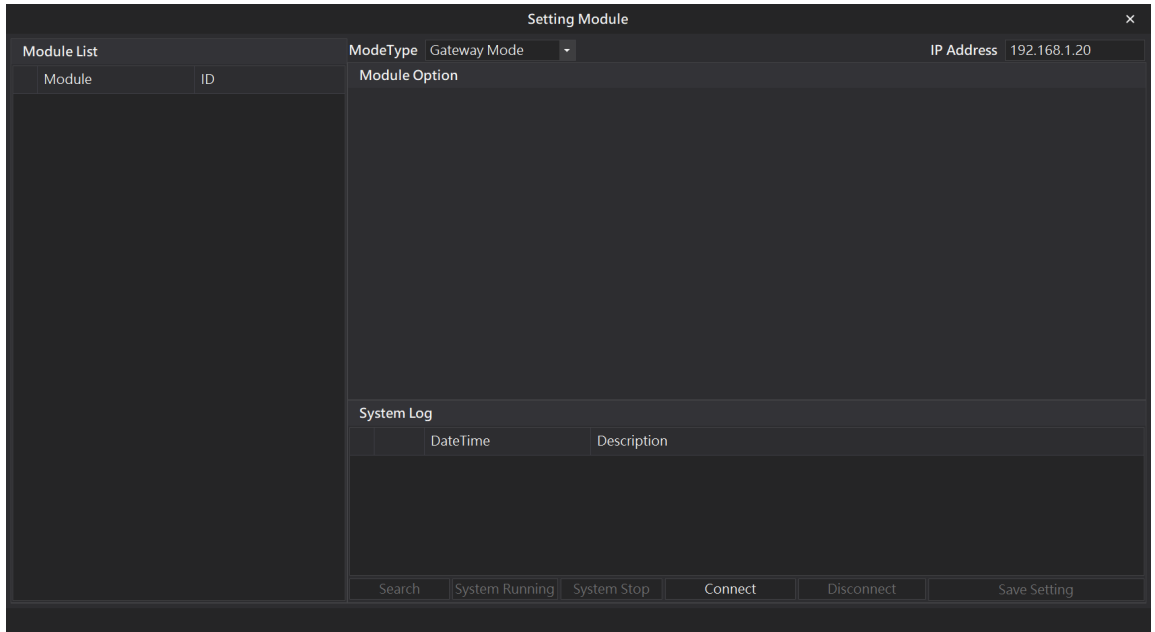
VII. Select “M Series Module Configuration”



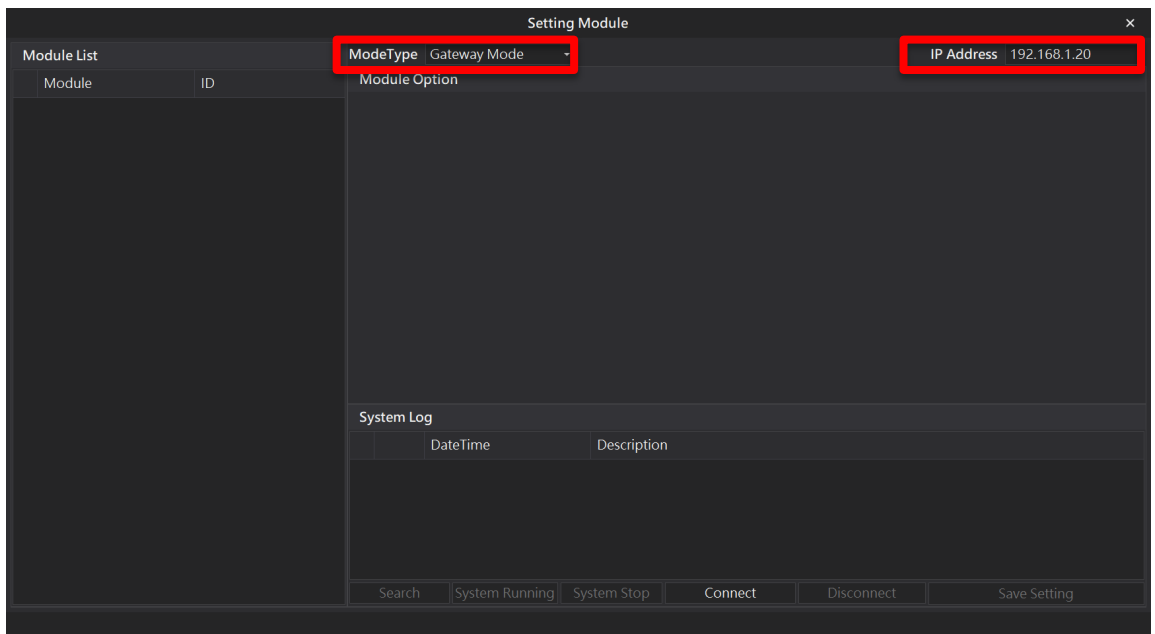
VIII. Click on the “Setting Module” icon



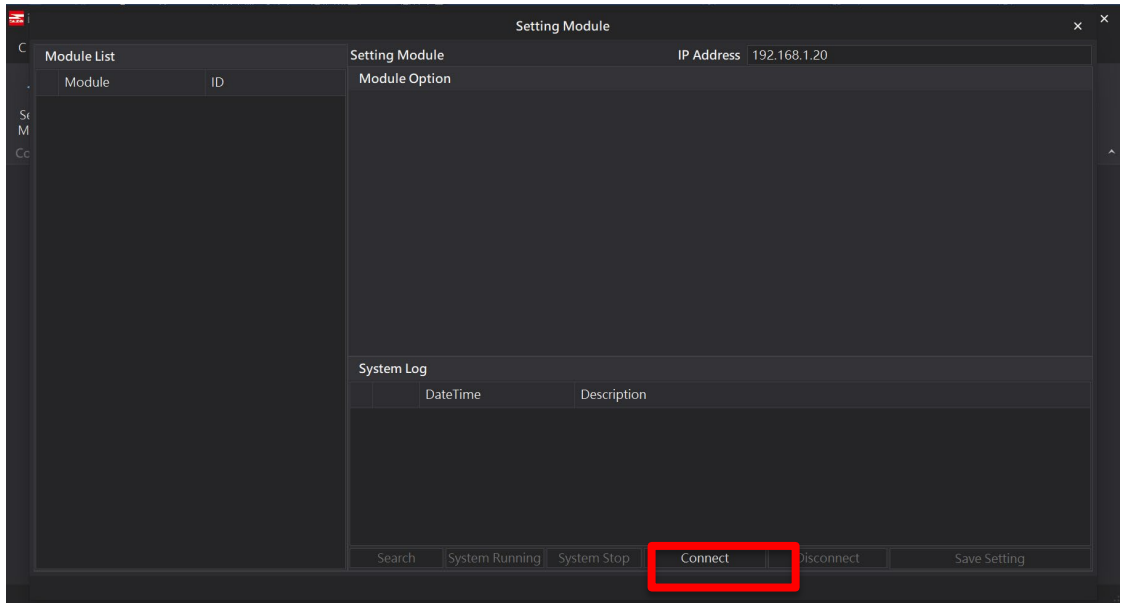
IX. Enter the “Setting Module” page for M-series



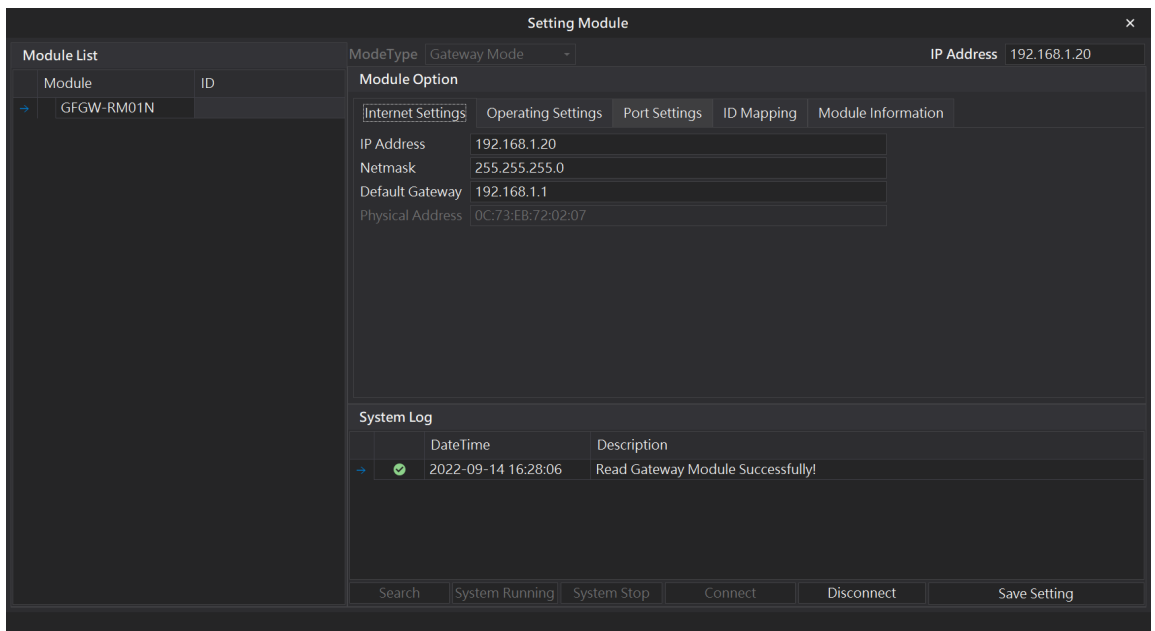
X. Select the mode type based on the connected module



XI. Click on “Connect”



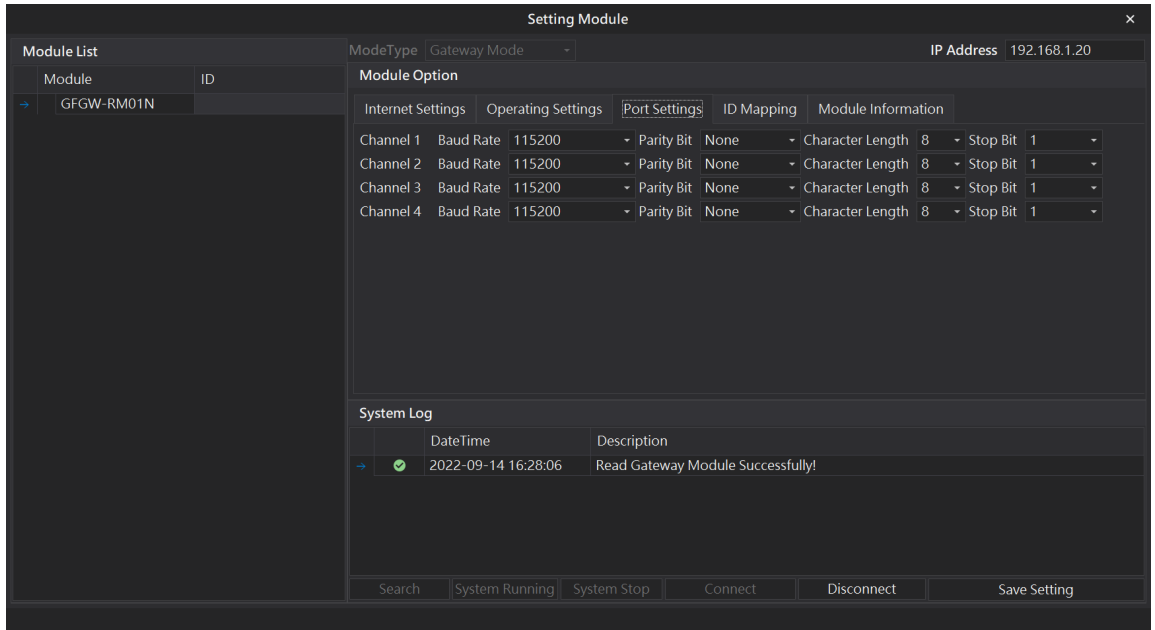
XII. Gateway Module IP Settings



Network setting parameters include: IP address, subnet mask, default gateway and MAC address (non-changeable)

- 1) Set up the IP address.
- 2) Set up the subnet mask.
- 3) Set up the default gateway.
- 4) Click on “Setup” to complete the parameter setup process when you are done.

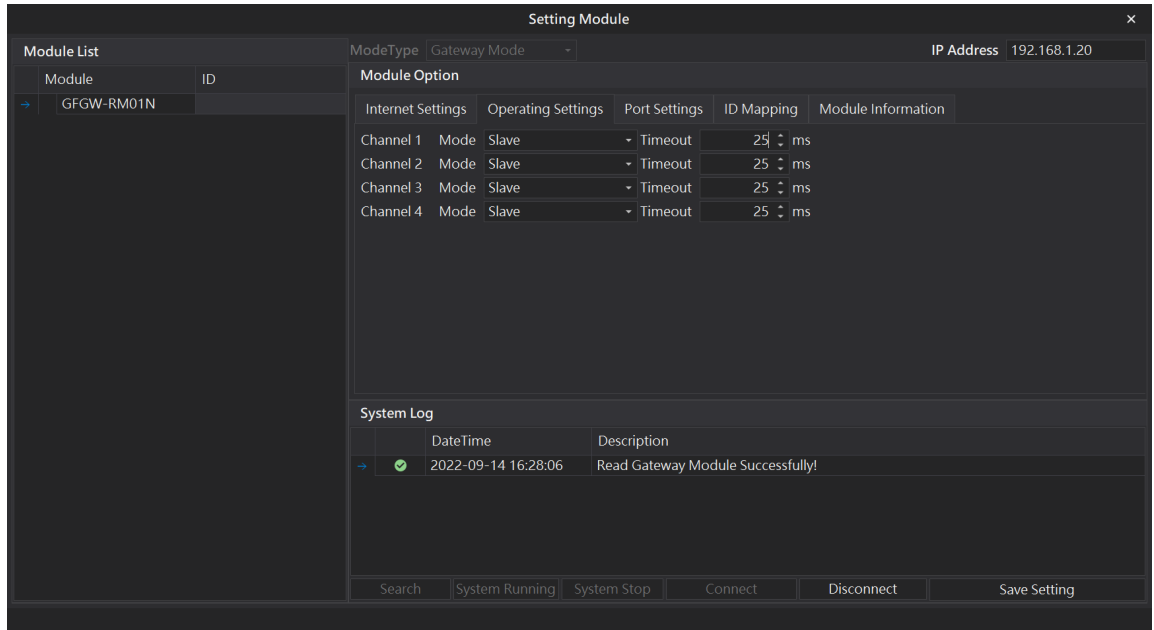
XIII. Communication formats of the 4 RS485 on the gateway module



Serial port parameters of each serial port's RS485 (including baud rate, Modbus communication format and parity checking and stop bit.

- 1) Set up the baud rate transmission speed at each serial port
- 2) Set up the Modbus communication format (RTU/ASCII) at each serial port.
- 3) Set up the parity check (None/Even/Odd).
- 4) Set up the stop bit (0/1/2).
- 5) Click on “Setup” to complete the parameter setup process when you are done.

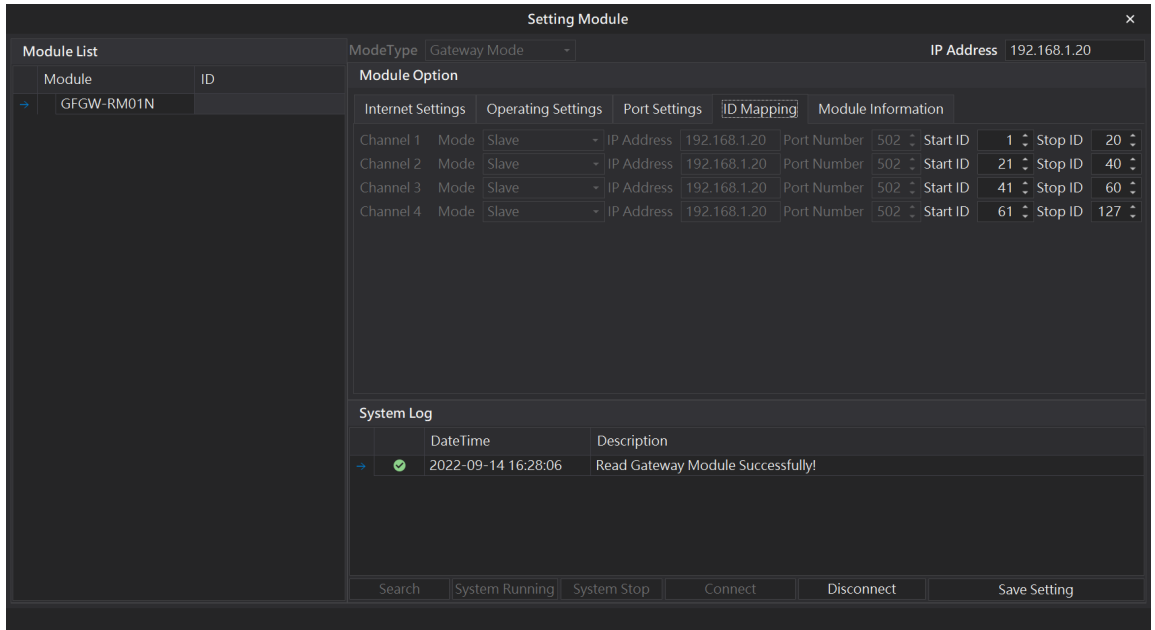
XIV. Gateway Module Operational Modes



The operating mode parameters include: Choosing the master/slave modules for the each RS485 serial port and slave modules' communication timeout settings.

- 1) Choose each serial port's master and slave. Choose "master" for the serial ports connecting the controller and "slave" for the other serial ports **(Simply put, when TCP>RTU, choose slave; when RTU>TCP, choose master)**
- 2) For serial ports connected to "slave", module communication timeout parameters must be set up
- 3) Click on" Setup" to complete the parameter setup process when you are done

XV. Gateway Module ID mapping

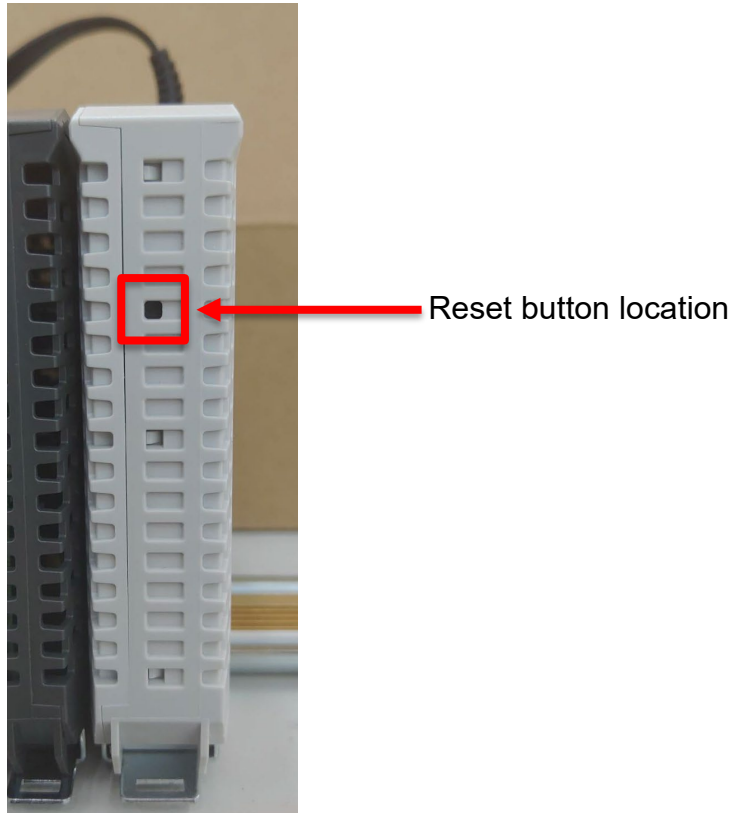


ID mapping parameters include: mapping IP of the master module in the operation mode and the mapping ID range for the slave module.

- 1) In the “master” module’s operation mode, set up the corresponding master’s IP address.
- 2) In the “slave” module’s operation mode, set up the corresponding slave’s ID range (decimal system)
- 3) Click on “Setup” to complete the parameter setup process when you are done.

6.3 GFGW-RM01N Button Reset

I. Reset button location



II. Reset button function

Press and hold for 1 to 3 seconds	Reset IP address
Press and hold for more than 3 seconds	Reset IP address and module settings

III. Press and hold for 1 to 3 seconds to reset the IP address

If the IP address is forgotten, press the reset button to reset the module's IP address to default setting

(Gateway module's default IP address is 192.168.1.20)

IV. Press and hold for more than 3 seconds to reset operating mode, network settings, serial port setting and ID mapping.

The image below is the **module default settings**

