



**iD-GRID<sup>TM</sup>**

**and FX5U**

# **Modbus TCP Connection Operating Manual**



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## 1. Remote I/O Module System Configuration List

Part No.	Specification	Description
GFGW-RM01N	Modbus TCP-to-Modbus RTU/ASCII, 4 Ports	Gateway
GFMS-RM01S	Master Modbus RTU, 1 Port	Main Controller
GFDI-RM01N	Digital Input 16 Channel	Digital Input
GFDO-RM01N	Digital Output 16 Channel / 0.5A	Digital Output
GFPS-0202	Power 24V / 48W	Power Supply
GFPS-0303	Power 5V / 20W	Power Supply

### 1.1 Product Description

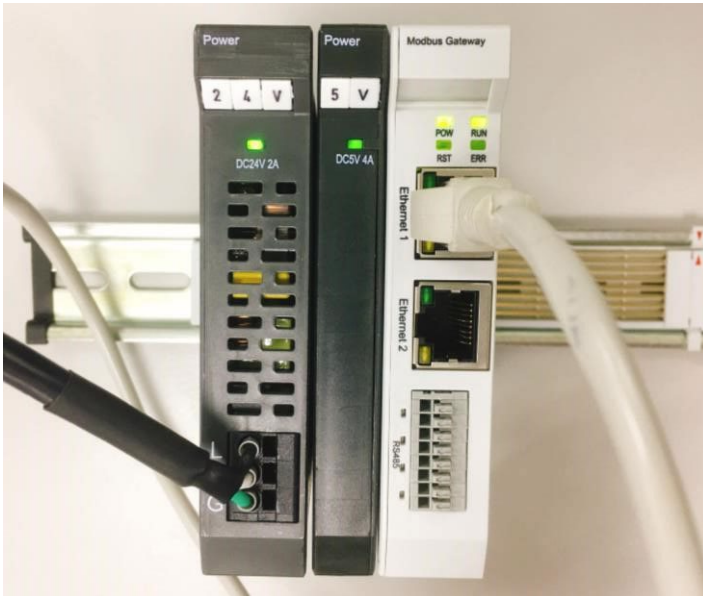
- I. The gateway is used externally to connect with FX5U's built-in communication port (Modbus TCP)
- II. The main controller is in charge of the management and dynamic configuration of I/O parameters and so on.
- III. The power module is standard for remote I/Os and users can choose the model or brand of power module they prefer.

## 2. Gateway Parameter Settings

This section details how to connect a gateway to MELSEC-Q series. For detailed information regarding **iO-GRID<sup>M</sup>**, please refer to the [iO-GRID<sup>M</sup> Series Product Manual](#)

### 2.1 i-Designer Program Setup

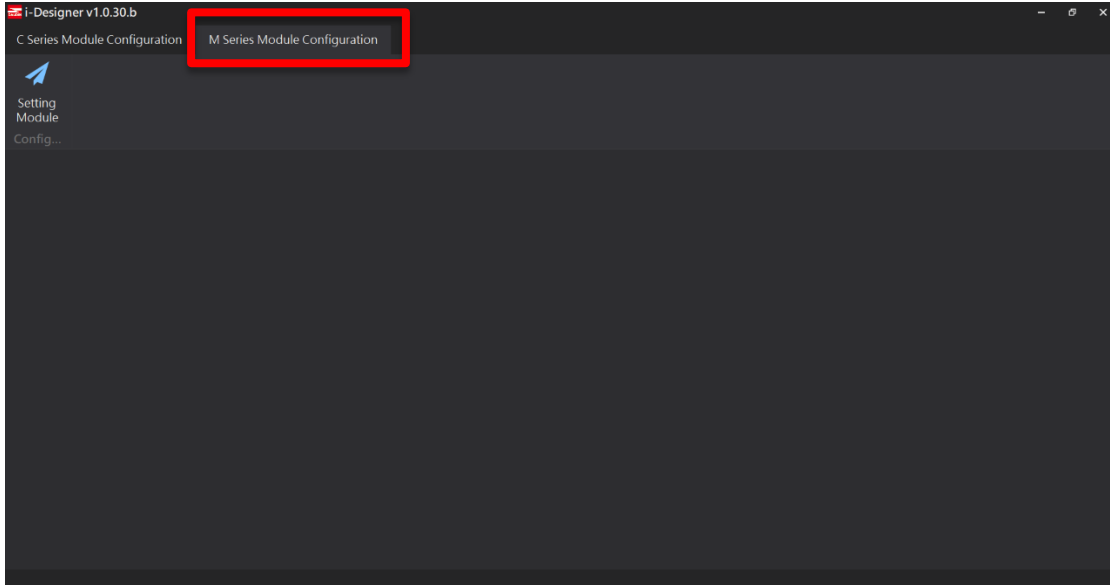
- I. Make sure that the module is powered and connected to the gateway module using an Ethernet cable



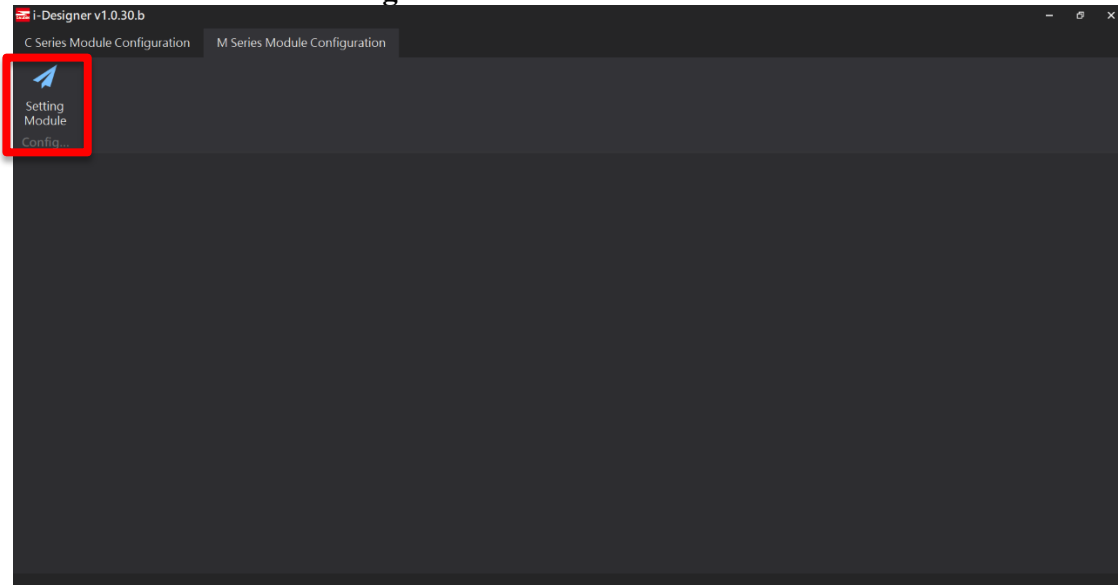
- II. Click to launch the software



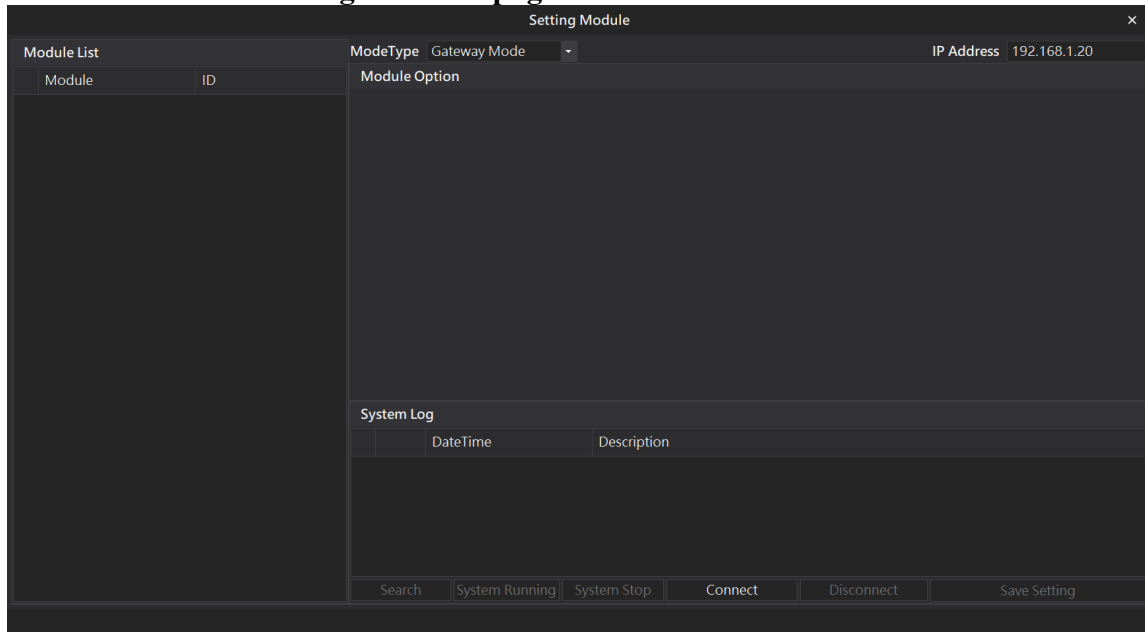
### III. Select “M Series Module Configuration”



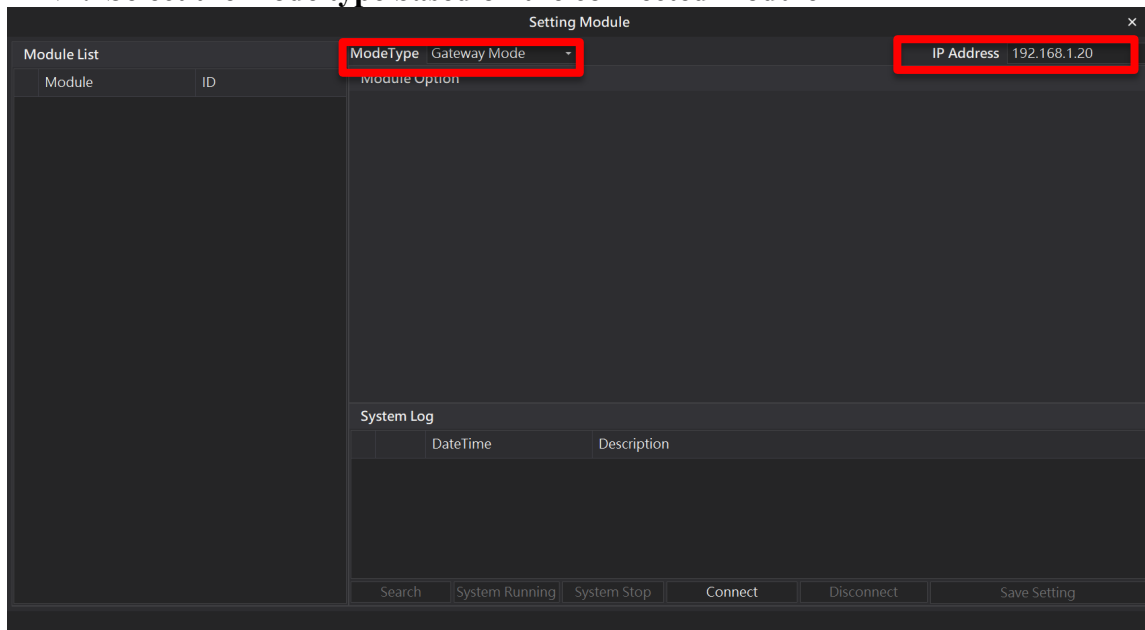
### IV. Click on the “Setting Module” icon



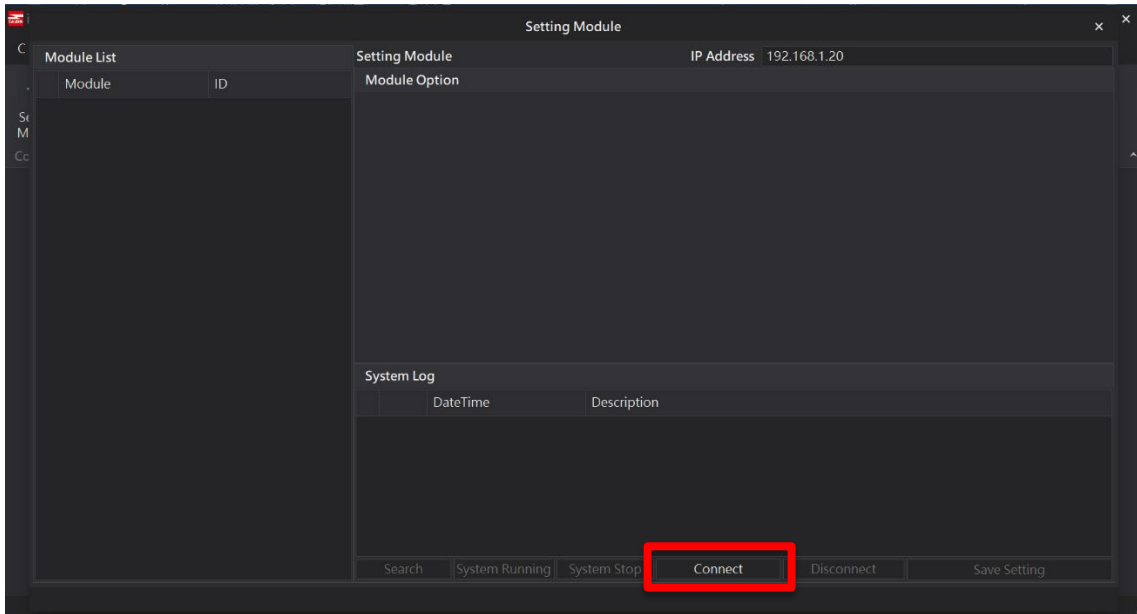
### V. Enter the “Setting Module” page for M-series



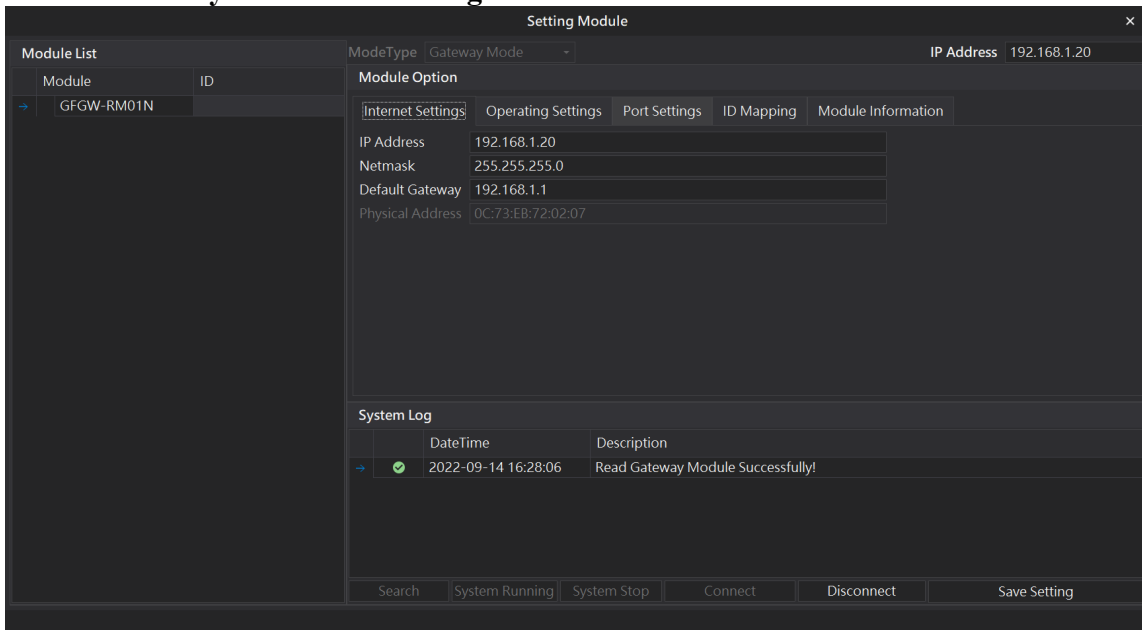
### VI. Select the mode type based on the connected module



### VII. Click on “Connect”

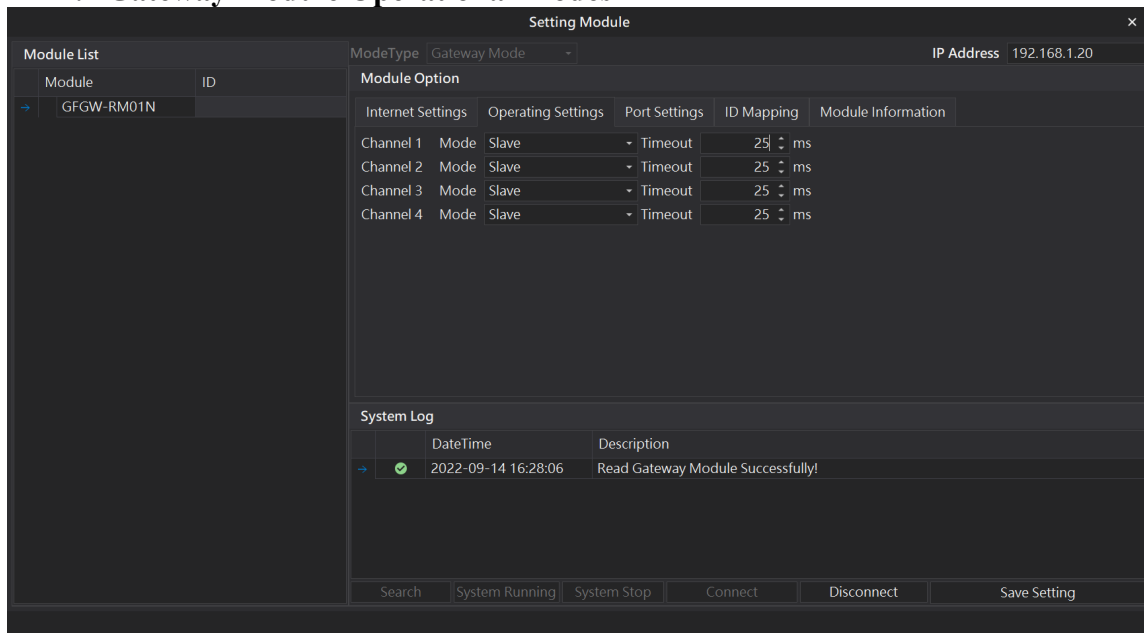


### VIII. Gateway Module IP Settings



**Note: The IP address must be in the same domain as the controller**

## IX. Gateway Module Operational Modes



**Setting Module**

ModeType: Gateway Mode | IP Address: 192.168.1.20

Module List		Module Option				
Module	ID	Internet Settings	Operating Settings	Port Settings	ID Mapping	Module Information
→ GFGW-RM01N						
		Channel 1	Mode: Slave	Timeout: 25 ms		
		Channel 2	Mode: Slave	Timeout: 25 ms		
		Channel 3	Mode: Slave	Timeout: 25 ms		
		Channel 4	Mode: Slave	Timeout: 25 ms		

**System Log**

DateTime	Description
→ ✓ 2022-09-14 16:28:06	Read Gateway Module Successfully!

Buttons: Search | System Running | System Stop | Connect | Disconnect | Save Setting

Note:

Set Group 1 as Slave and set the gateway to use the first set of RS485 port to connect to the main controller (GFMS-RM01N)

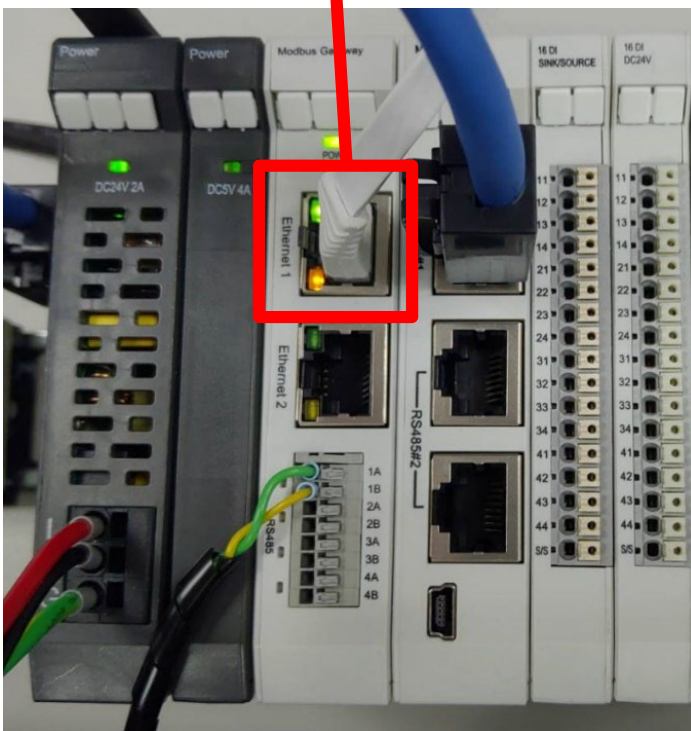
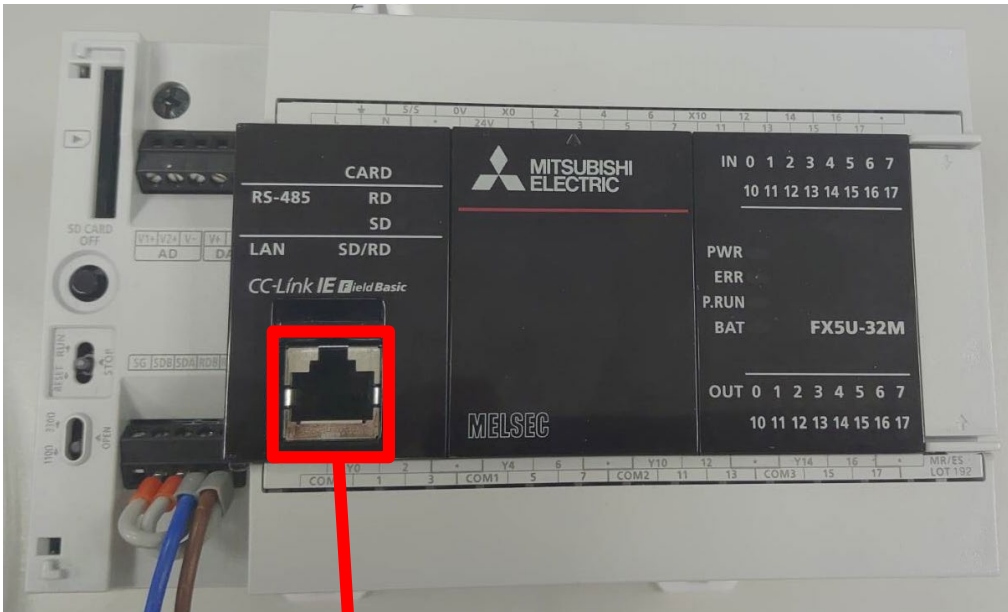


### 3. FX5U Connection Setup

This chapter explains how to use the GX Works3 program to connect FX5U to a gateway module and add a remote I/O module. For detailed information, please refer to the “*MODBUS Communication*” section in the *MELSEC iQ-F FX5 User’s Manual*

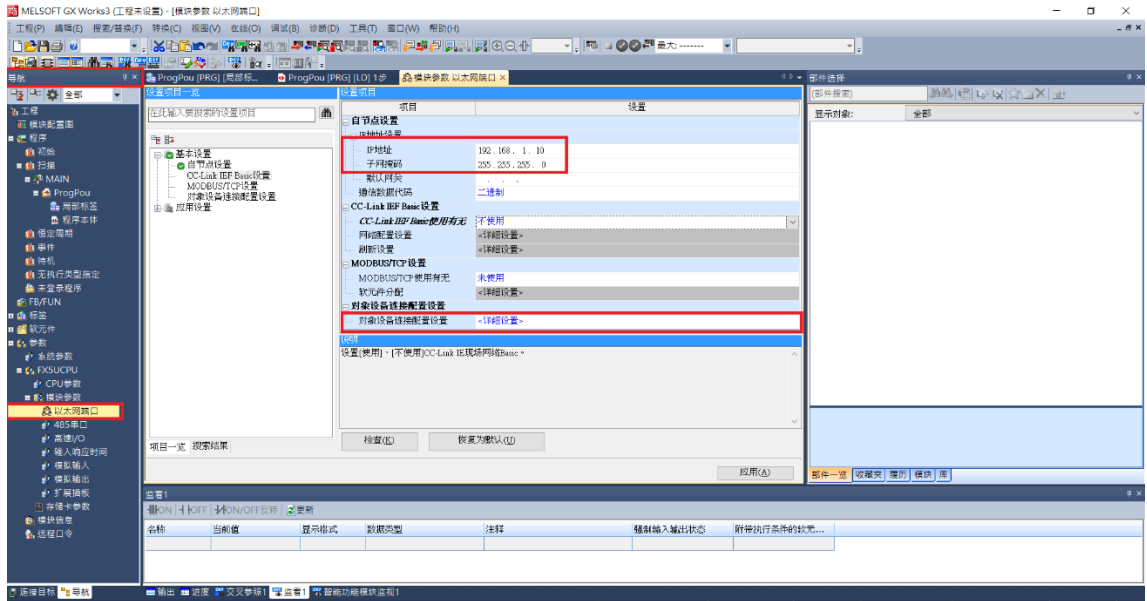
#### 3.1 FX5U Hardware Connection

- I. The Ethernet port is at the bottom center of FX5U and can be connected to the gateway



## 3.2 FX5U IP Address and Connection Setup

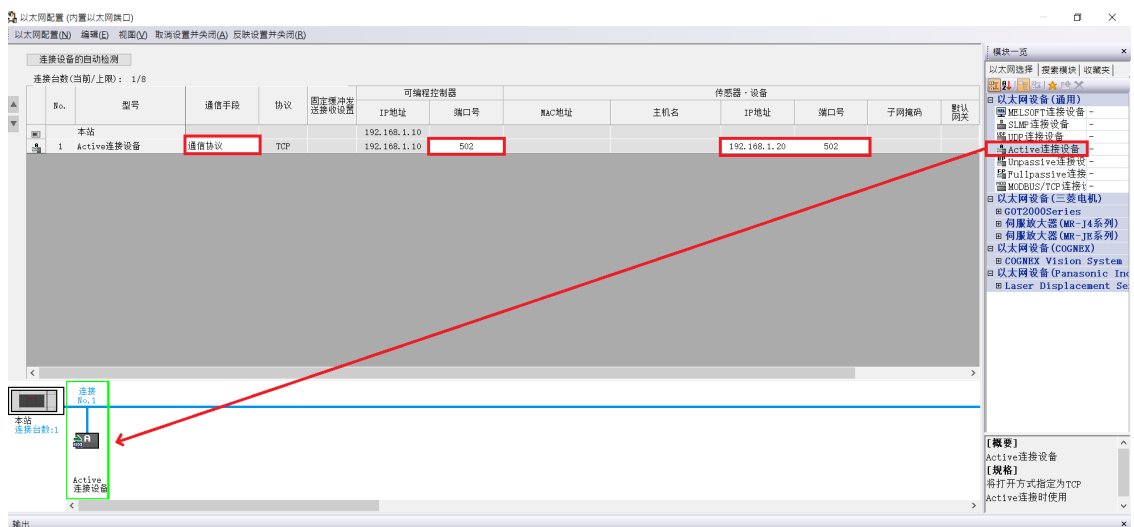
- I. Launch GX Works3. Go to the “Navigation” section on the left then [參數]-> [FX5UCPU]-> [設備參數]-> [以太網端口]-> [基本設置] and set up the “IP Address” and “Subnet Mask”. The “IP Address” is set the same as the gateway domain at 192.168.1.XXX. Under [外部設備連接配置], double click <詳細設置> under “外部設備連接配置設置”



- II. Drag “Active 連接設備” under “Device List” to the left side of the screen.

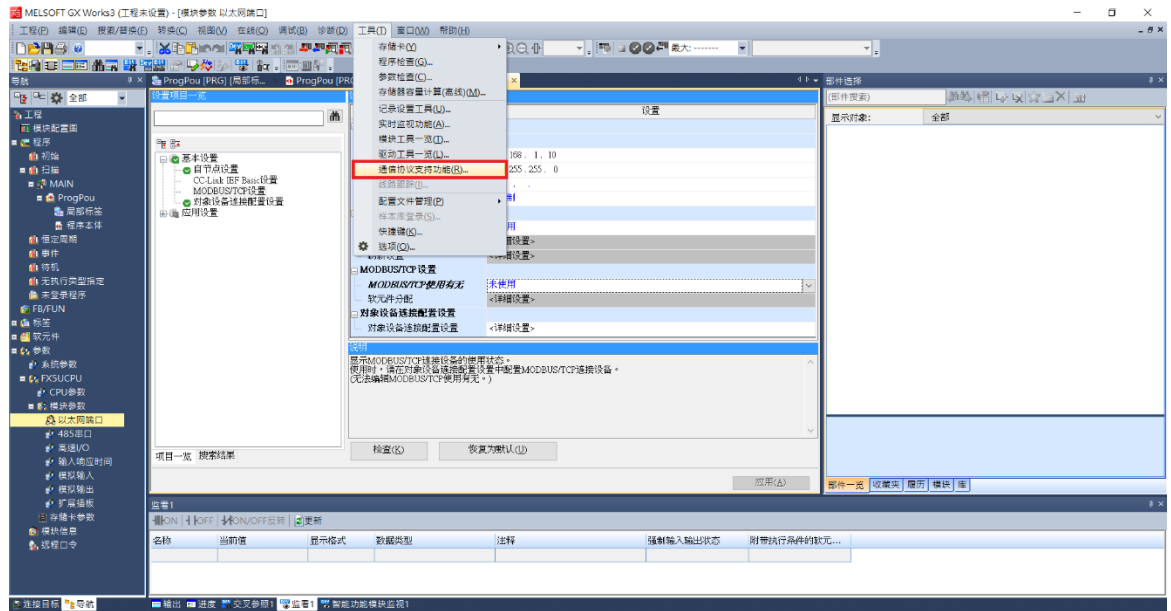
Set “Communication Method” to “Communication Protocol”. Set up the port numbers on the master.

Set **iO-GRID<sup>M</sup>**’s IP address and port number (always 502) as the IP address and port number for the "Sensor/Device"

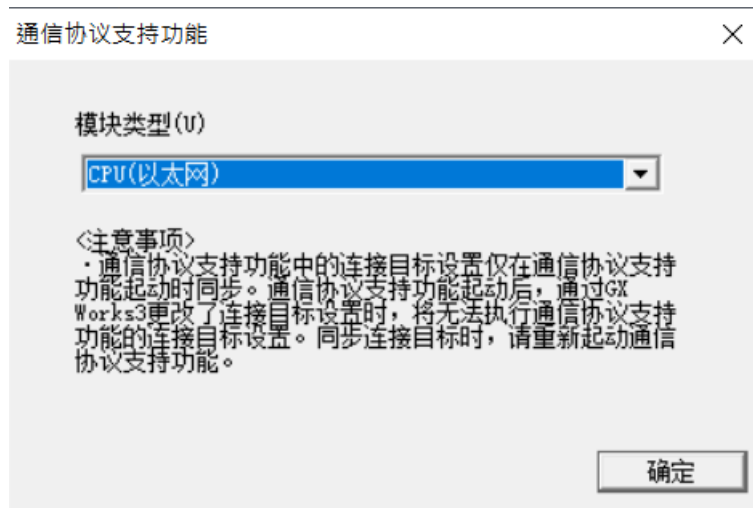


### III. Set Up the Protocol

[工具]-> [通信協議支持功能]



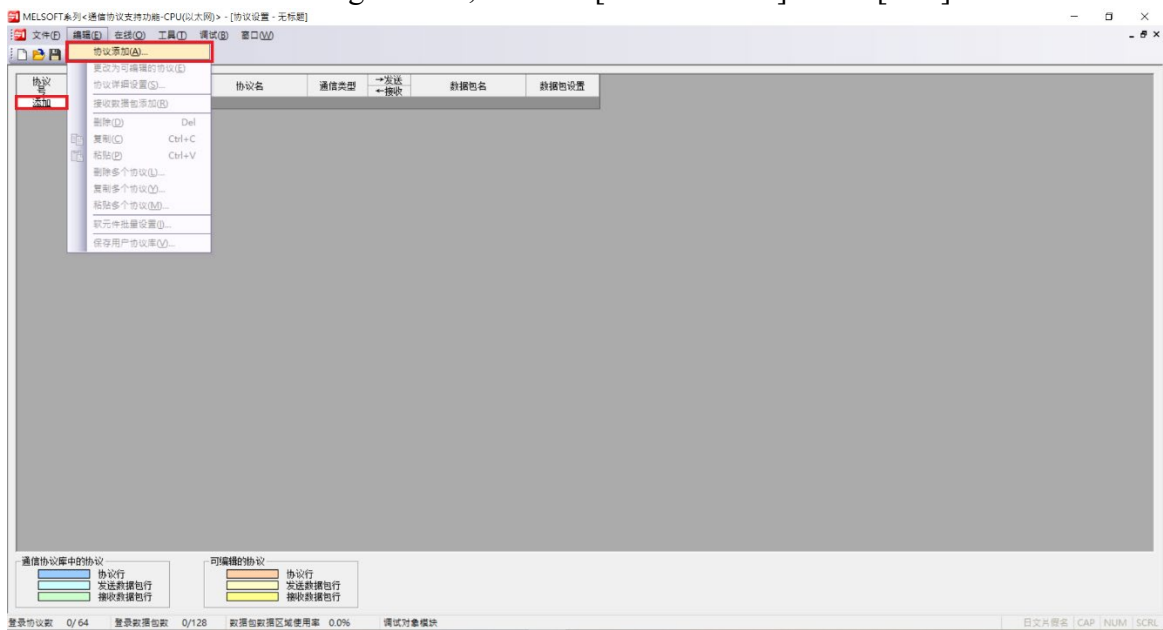
Specify the unit type



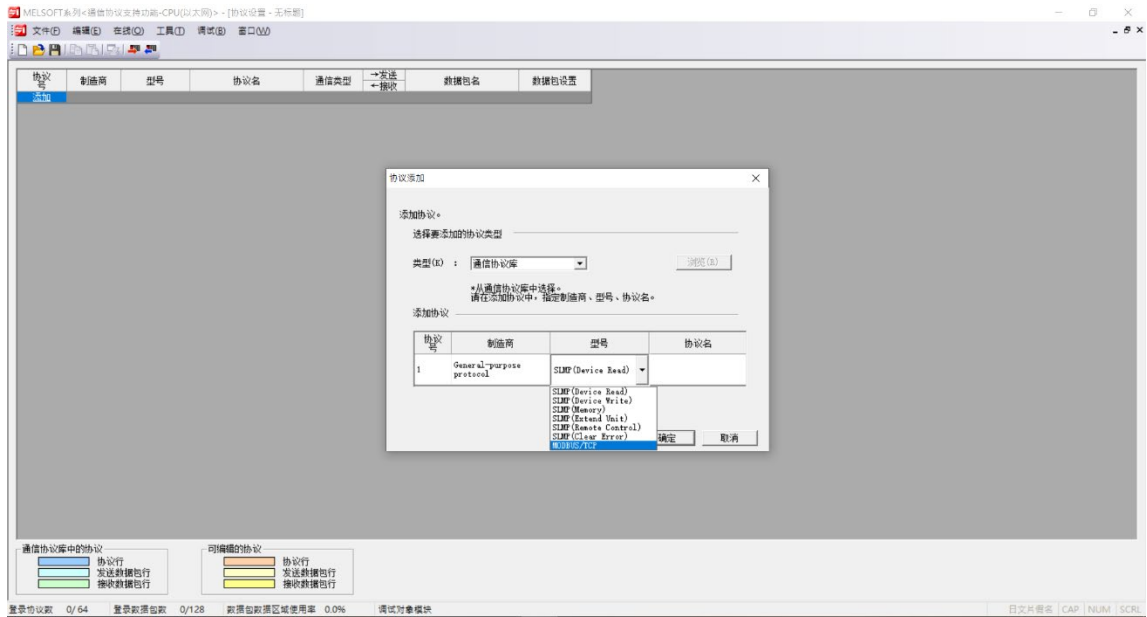
[文件]-> [新建]



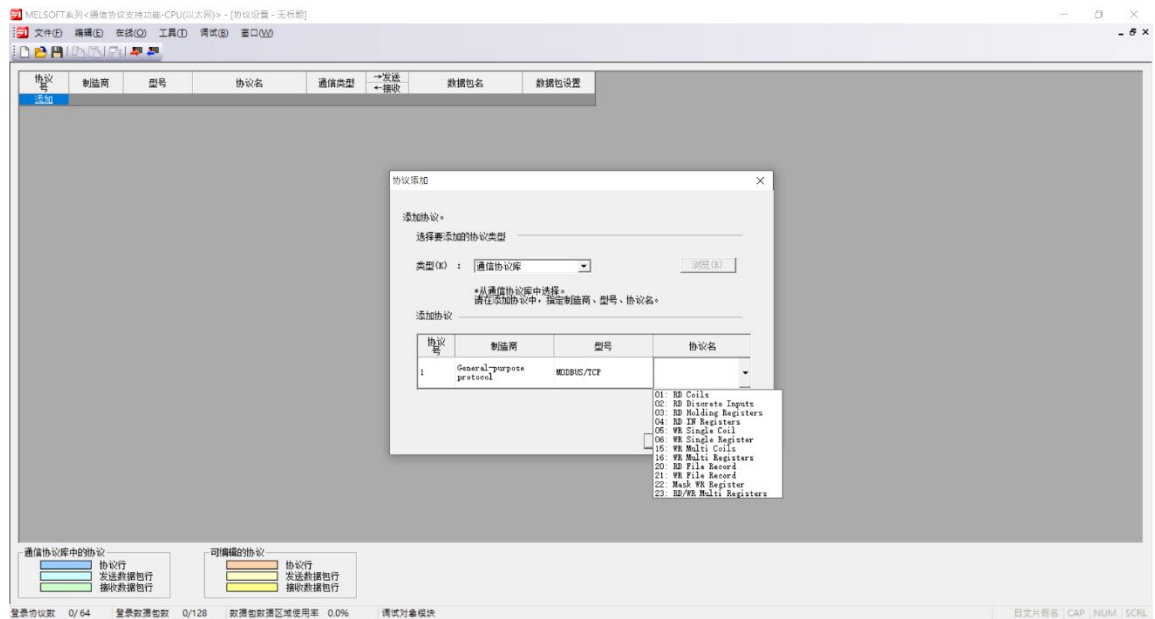
Under the “Protocol Setting” screen, click on [Add Protocol] under [Edit]



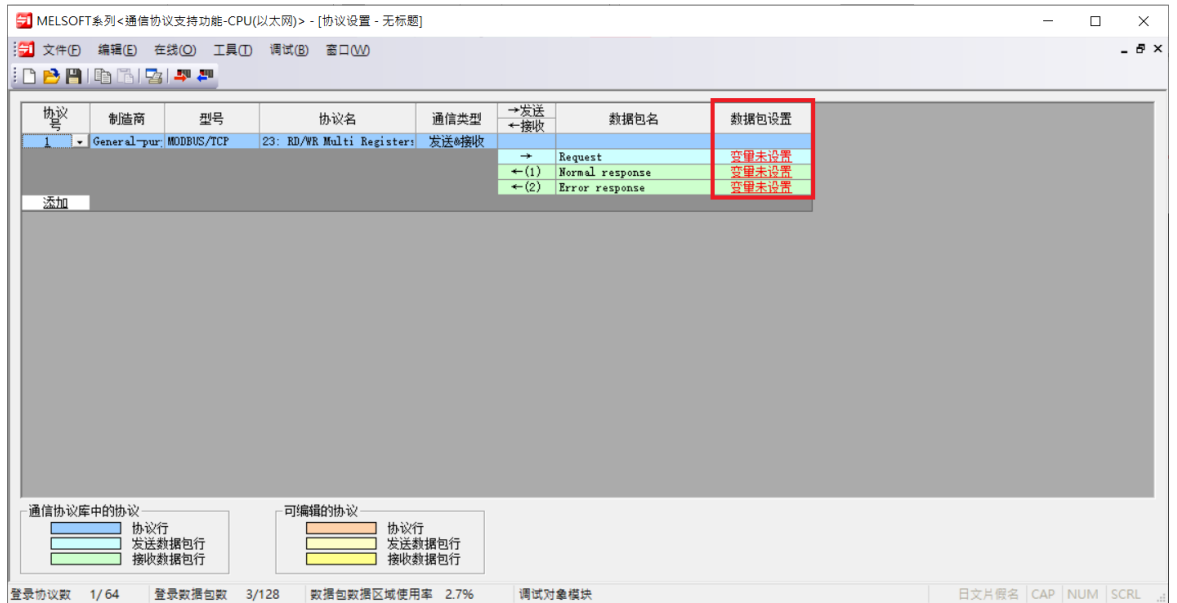
Select “MODBUS/TCP” from the “Model” drop-down list.



From the “Protocol Name” drop-down list, select “23: RD/WR Multi-Registers” (for GFDI 16 channel input and GFDO 16 channel output)



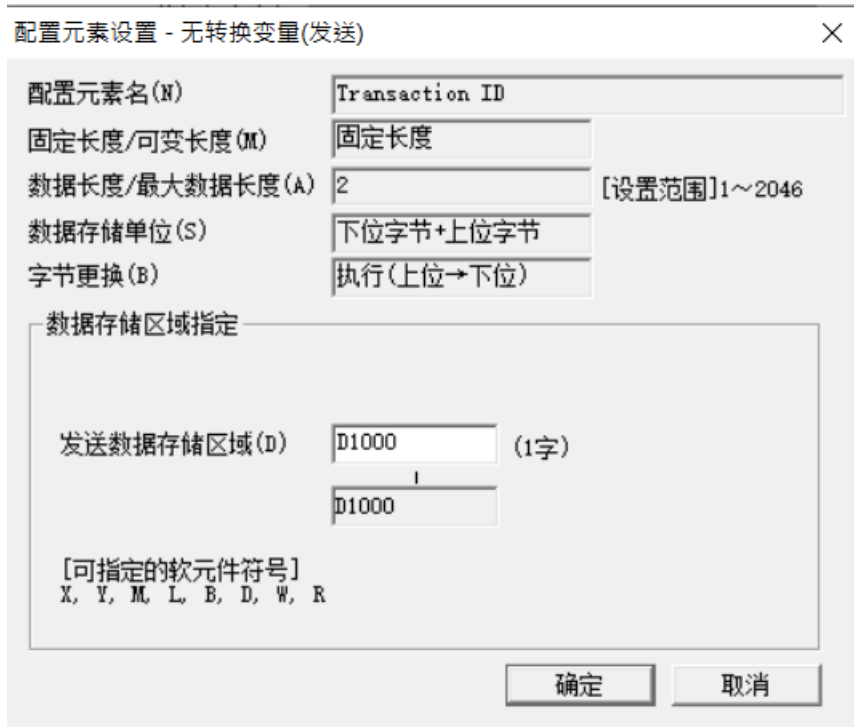
Once added, click on “Unset Variables” under “Data Packet” to begin the setup process



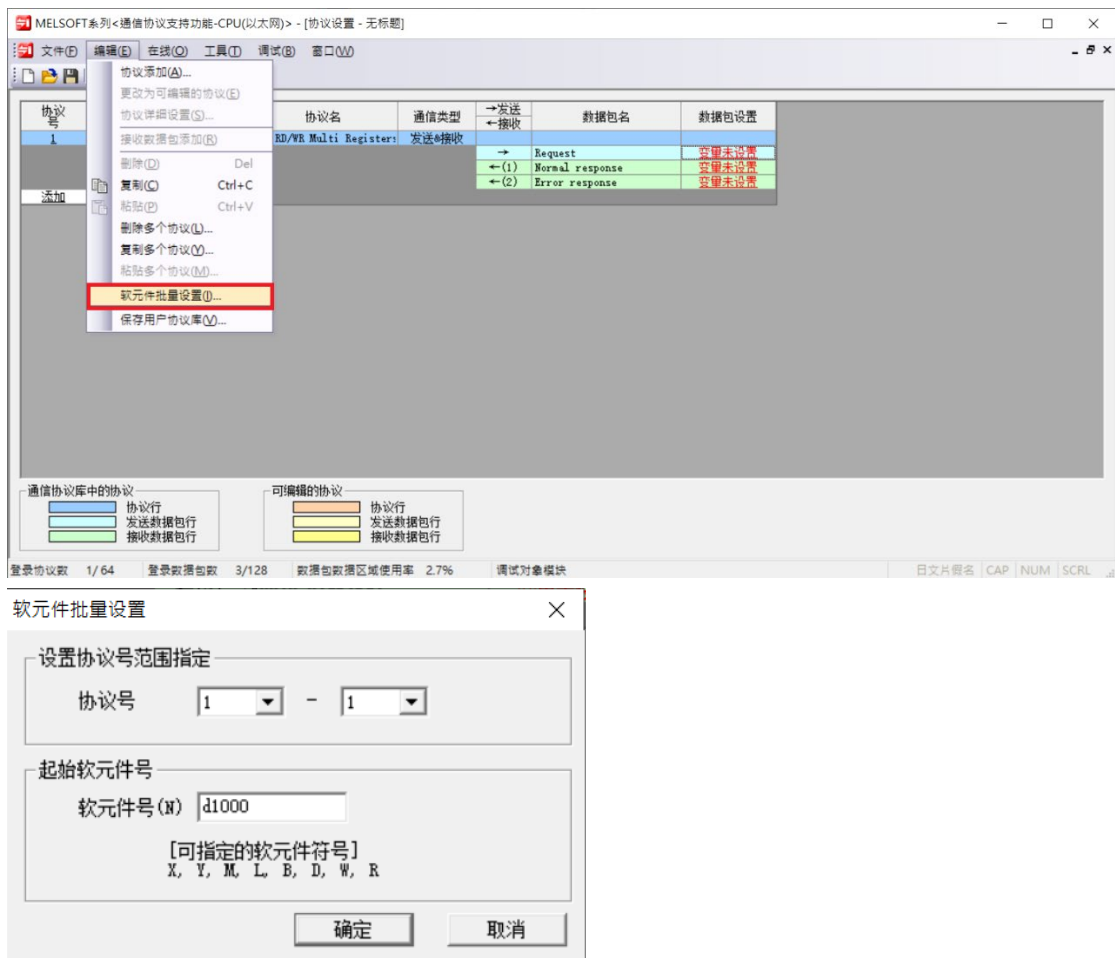
Click on the red texts to set up



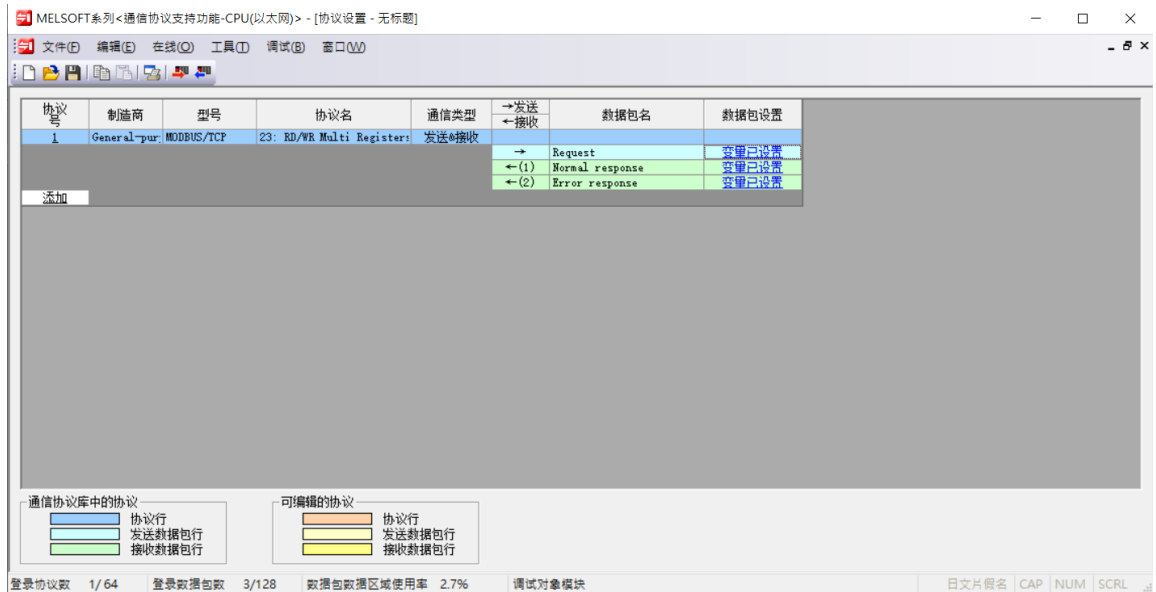
Component variables and device numbers.



If it is troublesome to set up device numbers, go to [Edit] and use “Batch Setup” to set up the first device number.



Once device number is set, it will change to “Variables Set”.



When sending commands, enter the “transaction ID” for D1000, “Module ID” for D1001, “read head holding register number” for D1002, “read points” for D10003, “writing head holding register number” for D1004, “write points” for D1005, “number of bytes” for D1006, and “write device data” for D1007 to D1106.





With normal response, the system will store “read device data” starting from D1110.

数据包设置

协议号: 1      协议名: 23: RD/WR Multi Registers

数据包类型: 接收数据包      数据包名(N): Normal response

数据包号: 1

配置元素一览(L)

配置元素号	配置元素类型	配置元素名	配置元素设置
1	无转换变量	Transaction ID	[D1107-D1107] (固定长度/2字节/上下字节/有更换)
2	固定数据	Protocol ID	0000 (2字节)
3	长度	Length	(对象元素4-7/HEX/正/2字节)
4	无转换变量	Module ID	[D1108-D1108] (固定长度/1字节/上下字节/无更换)
5	固定数据	Function Code	17 (1字节)
6	长度	Number of bytes	(对象元素7-7/HEX/1字节)
7	无转换变量	Read device data	[D1109][D1110-D1235] (可变长度/251字节/上下字节/有更换)

类型更改(E)    新建(A)    复制(C)    粘贴(P)    删除(D)    关闭

With abnormal termination, the exception code will be stored in D1238.

数据包设置

协议号: 1      协议名: 23: RD/WR Multi Registers

数据包类型: 接收数据包      数据包名(N): Error response

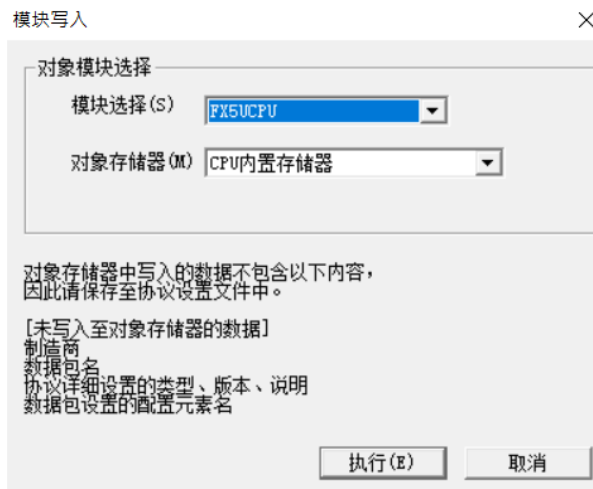
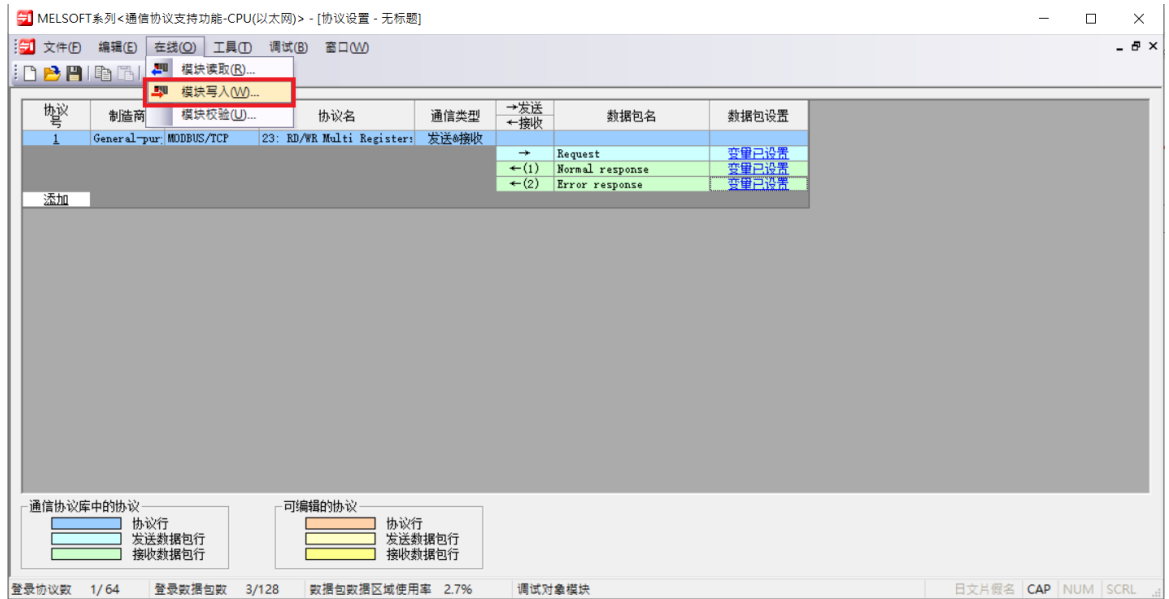
数据包号: 2

配置元素一览(L)

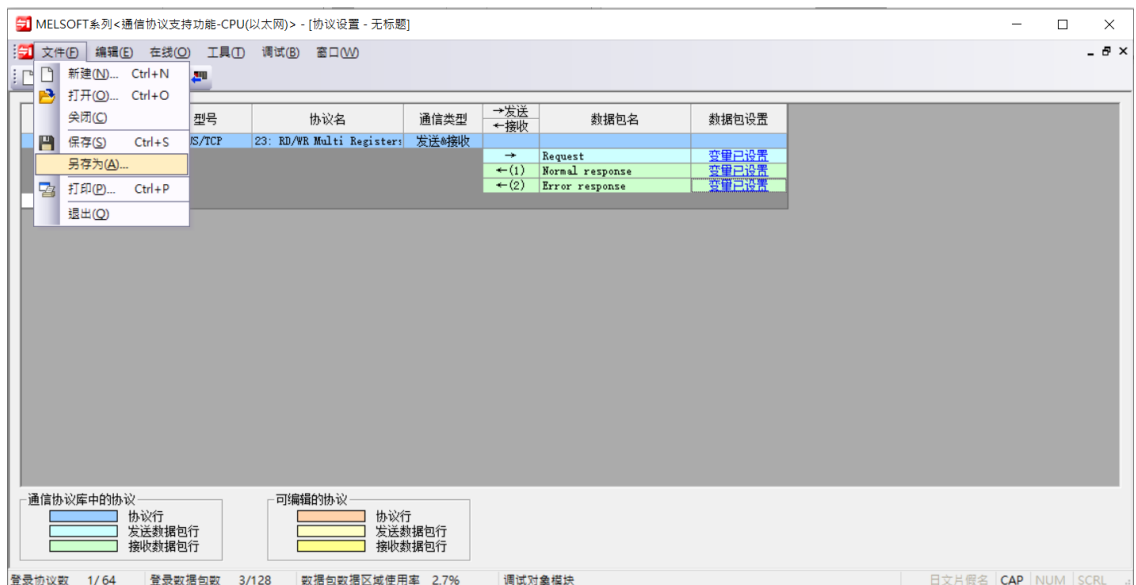
配置元素号	配置元素类型	配置元素名	配置元素设置
1	无转换变量	Transaction ID	[D1236-D1236] (固定长度/2字节/上下字节/有更换)
2	固定数据	Protocol ID	0000 (2字节)
3	长度	Length	(对象元素4-6/HEX/正/2字节)
4	无转换变量	Module ID	[D1237-D1237] (固定长度/1字节/上下字节/无更换)
5	固定数据	Function Code	97 (1字节)
6	无转换变量	Exception Code	[D1238-D1238] (固定长度/1字节/上下字节/无更换)

类型更改(E)    新建(A)    复制(C)    粘贴(P)    删除(D)    关闭

## Write in FX5U.



## Save it as a new file.



## 4. Simple Program Demonstration using FX5U and *iO-GRID<sup>M</sup>*

### <Establish Connections>

#### <Establish Connections>

- SD415: Enter a value to turn SM415 into (2n)mS
- SM409: 0.01 second
- SD10680.0: Open the “Complete” signal (.0 = connecting number1)
- SD10681.0: Open the “Request” signal (.0 =connecting number1)

### SP.SOCOPEN“ U0” K1 D100 M100

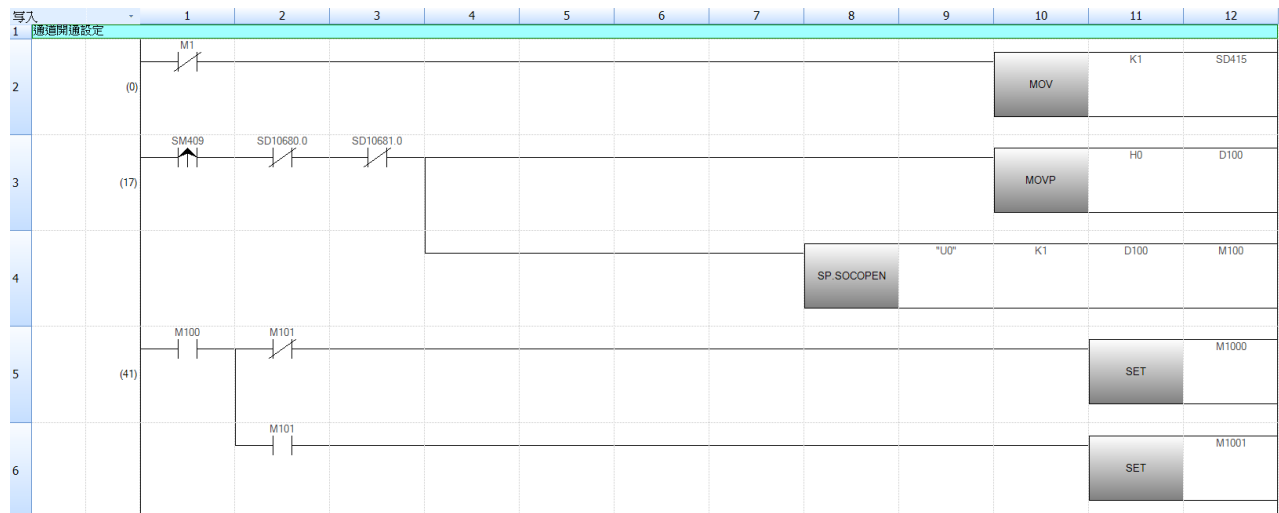
- “U0”: A fixed value
- K1: Connecting number
- D100: Device number for storing the control data

When “目標設備連接配置設置” D100 = 0, by using the program for set up, please refer to the manual for the detailed information regarding the storage device of the H8000 parameters

M100: Once a scan is complete, if the number is 1, it will be launched; if the number is +1, then it will terminate abnormally and the device will not launch

M1000: Launched Successfully

M1001: Failed to Launch



<Protocol Communication Support Functions by the Registered Protocol>

SM415: Set SD415 to 1 and SM415 to 2ms

SD10680.0: Open the "Complete" signal (.0 = connecting number 1 )

- D1000: Transaction ID
- D1001: Module ID
- D1002: Starting number of the read register
- D1003: Read points
- D1004: Starting number of the write register
- D1005: Write points
- D1006: Number of bytes

D302: Number of executed protocol

**SP.ECPRCTL "U0" K1 K1 D300 M300 :**

"U0": A fixed value

K1: Connecting number

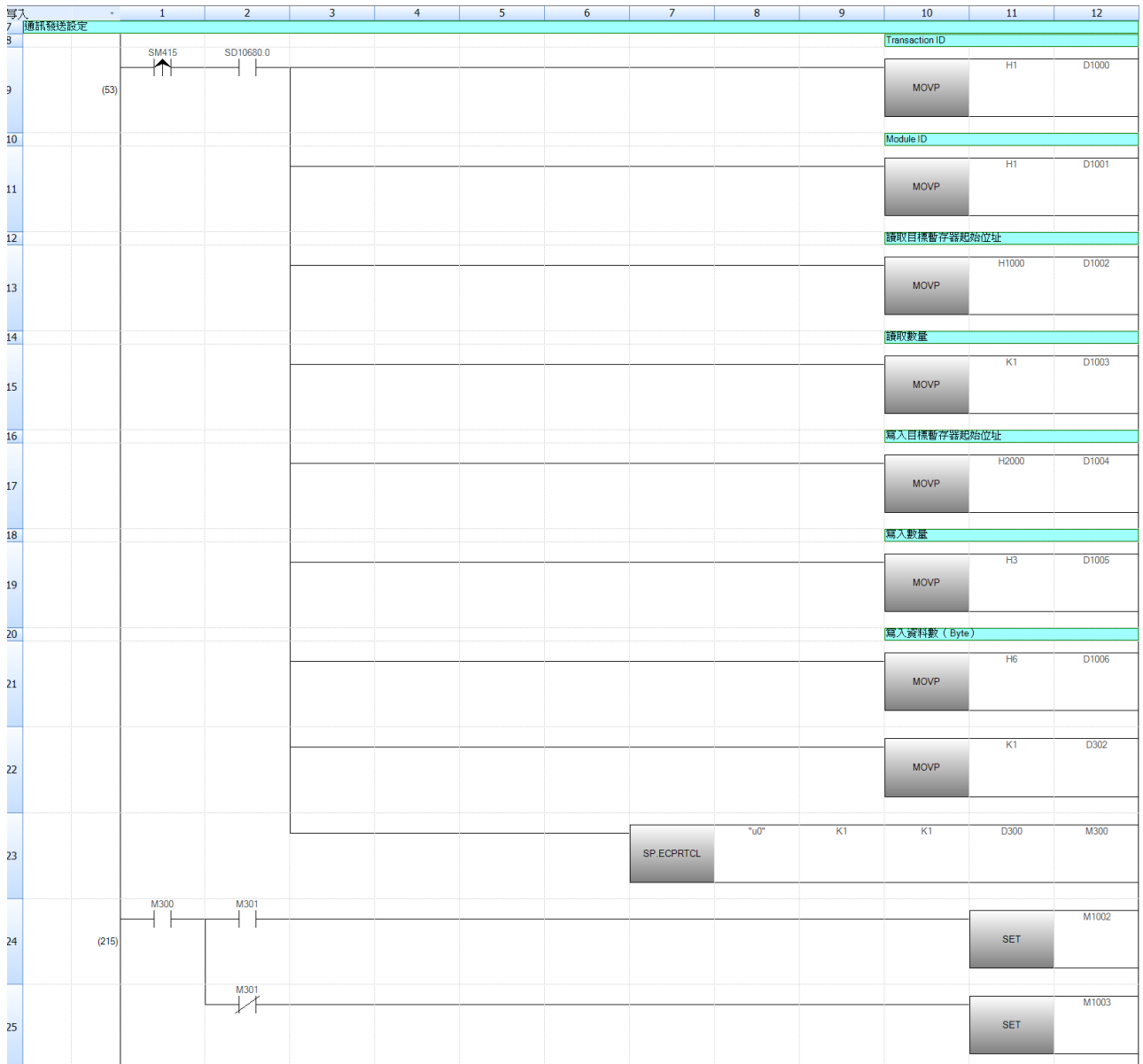
K1: Number of continuously executed protocols

D300: Starting number of the device for storing control data

M300: The number goes up by 1 for each scan completed with the device open

M1002: Normal termination

M1003: Abnormal termination



<Disconnected> (not necessary in practice)

SD10680.0: Open the “Complete” signal (.0 = connecting number 1)

SD10681.0: Open the “Request” signal (.0 = connecting number 1)

M1004: The request to disconnect from external device

M4000: Disconnect and execute the command **SP.SOCCLOSE“ U0” K1 D200 M200**

“ U0”: A fixed value

K1: Connecting number

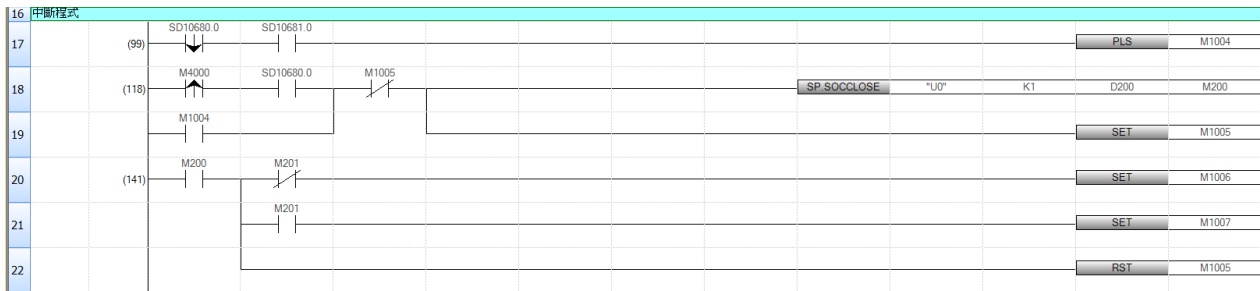
D200: Starting number of the device for storing control data

M200: Complete

M1005: Sign of cutting execution

M1006: Normal termination

M1007: Abnormal termination



<Simple Program Controls>

SM8013: 0.5 seconds

D1110: Read data and start storing the address of the register

D1007: Write data and start storing the address of the register

When channel 1 of GFDI\_1 starts inputting data, it will export to channel 1 of GFDO\_1 and controls GFDO\_2 directly using the flicker circuit.

