



**iO-GRID<sup>TM</sup>**  
**and MELSEC-Q**  
**Modbus TCP Connection**  
**Operating Manual**



## Table of Contents

1.	Remote I/O Module System Configuration List.....	3
1.1	Product Description.....	3
2.	Gateway Parameter Settings .....	4
2.1	i-Designer Program Setup.....	4
3.	MELSEC-Q series Connection Setup.....	9
3.1	MELSEC-Q series Hardware Connections.....	9
3.2	MELSEC-Q series IP Address and Connection Setup.....	10
4.	Simple Program Demonstration using MELSEC-Q series and <b>iO-GRID™</b> .....	14

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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 MELSEC-Q series' 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

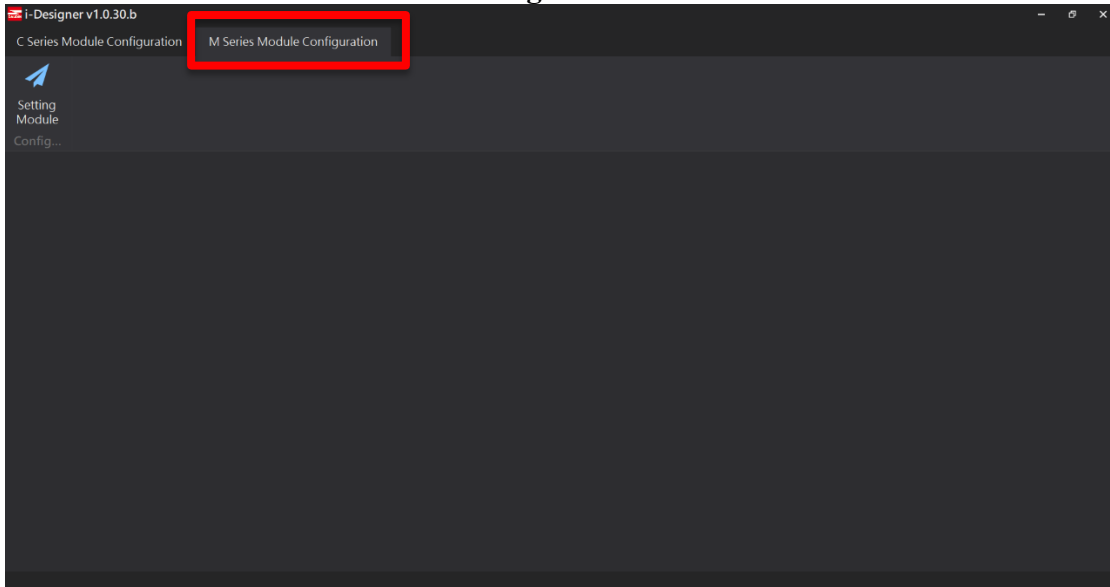
- I. Make sure that the module is powered and connected to the gateway module using an Ethernet cable



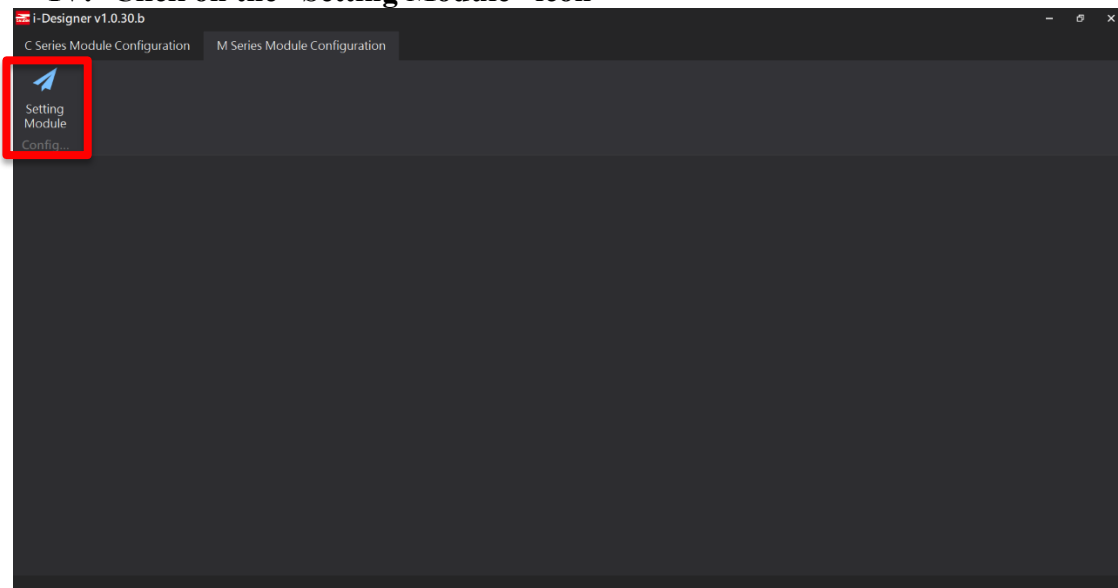
- II. Click to launch the software



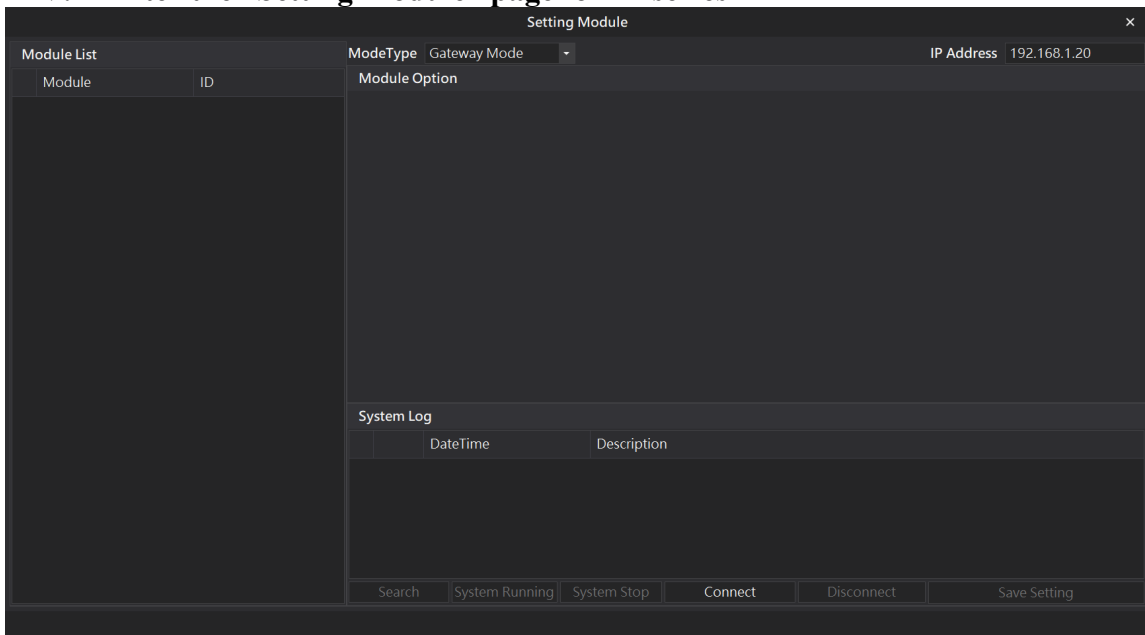
### III. Select “M Series Module Configuration”



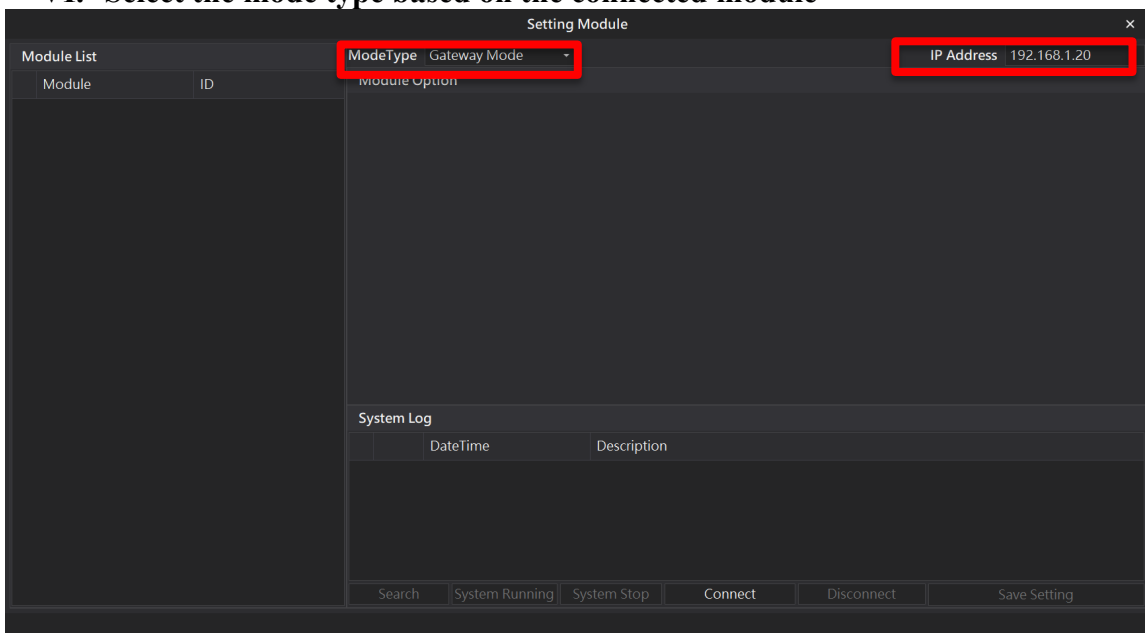
### IV. Click on the “Setting Module” icon



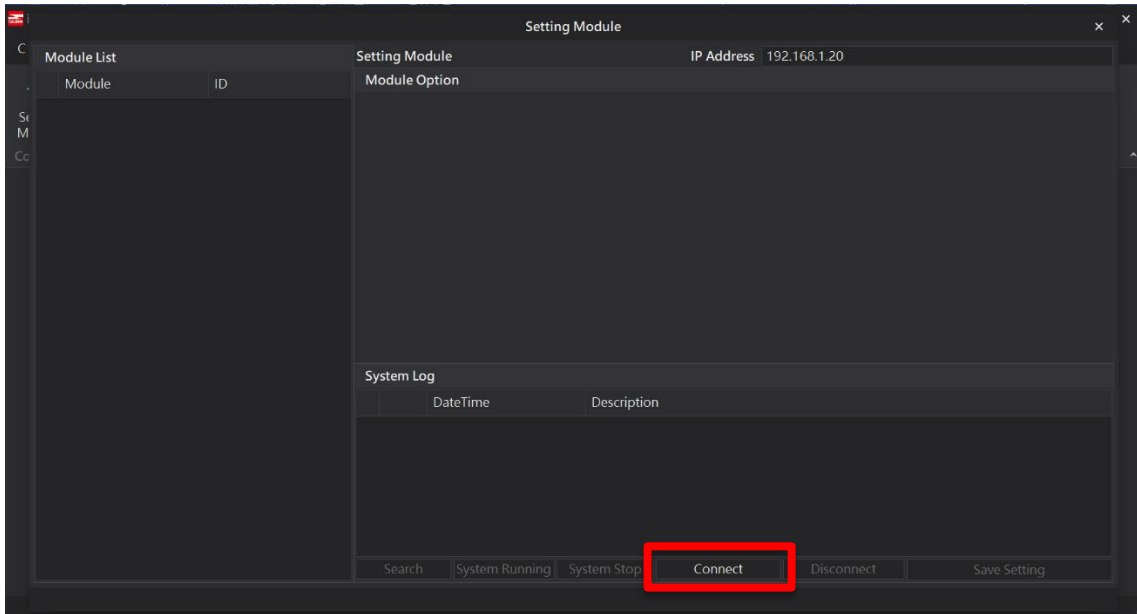
### V. Enter the “Setting Module” page for M-series



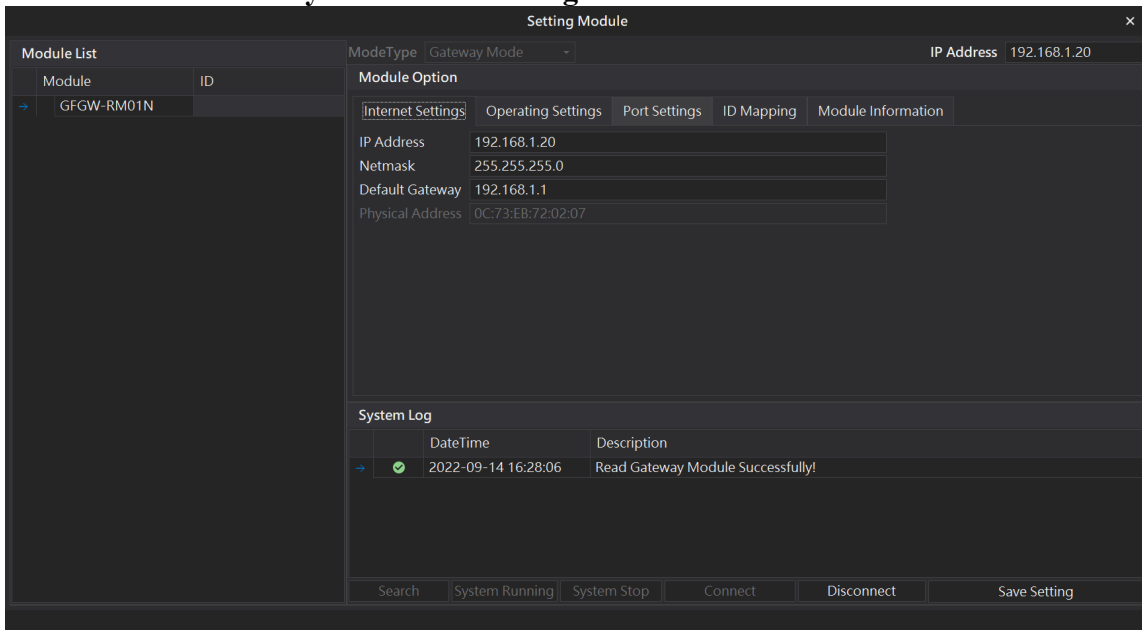
### VI. Select the mode type based on the connected module



### VII. Click on “Connect”

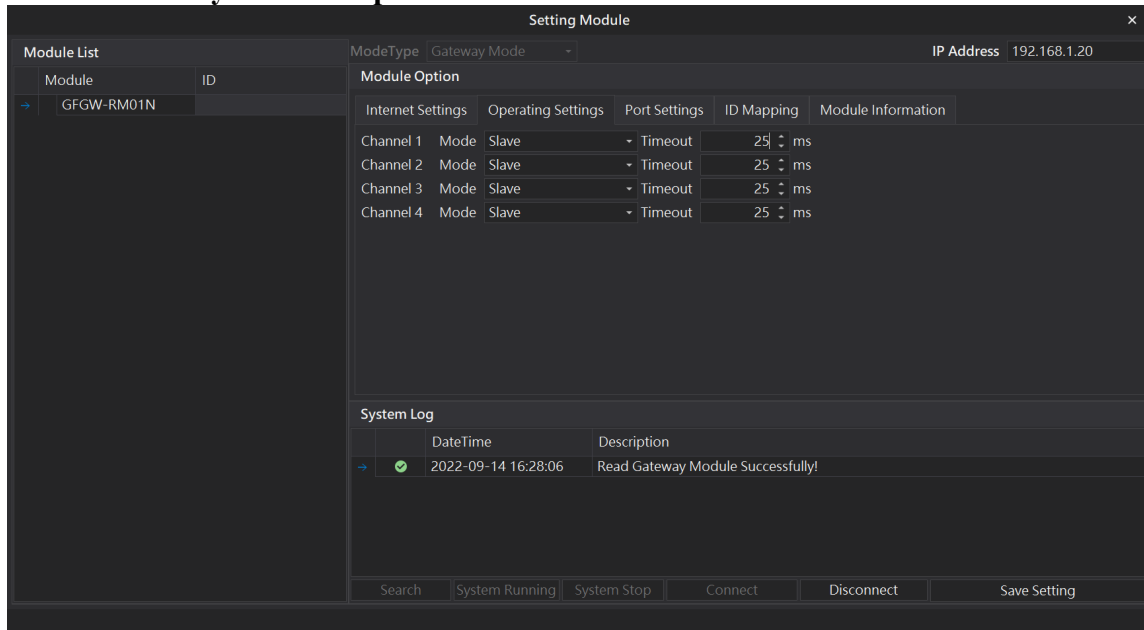


### VIII. Gateway Module IP Settings



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

## IX. Gateway Module Operational Modes



The screenshot shows the 'Setting Module' window with the following details:

- Module List:**

Module	ID
→ GFGW-RM01N	
- ModeType:** Gateway Mode
- IP Address:** 192.168.1.20
- Module Option:**

Channel	Mode	Operating Settings	Port Settings	ID Mapping	Module Information
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)

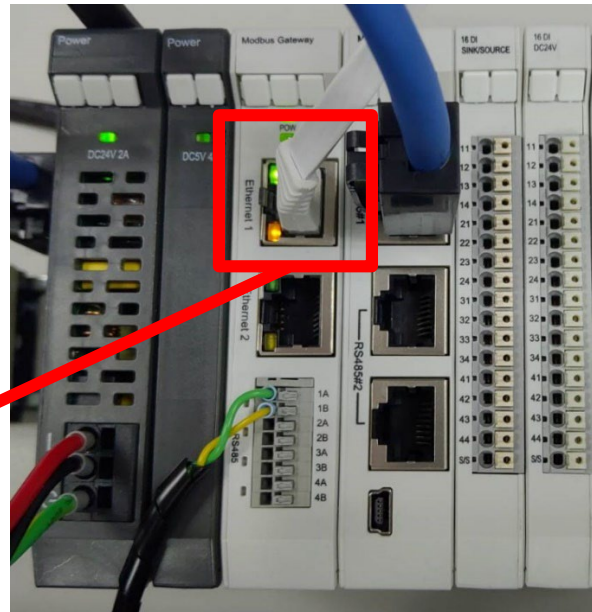
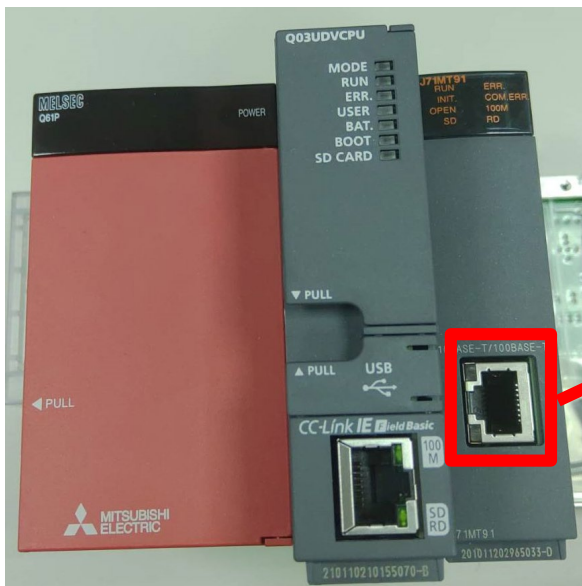


### 3. MELSEC-Q series Connection Setup

This chapter explains how to use the GX Works2 program to use the QJ71MT91 module to connect MELSEC-Q series to a gateway module and add a remote I/O module. For detailed information, please refer to the “*MELSEC-Q Series Manual*”

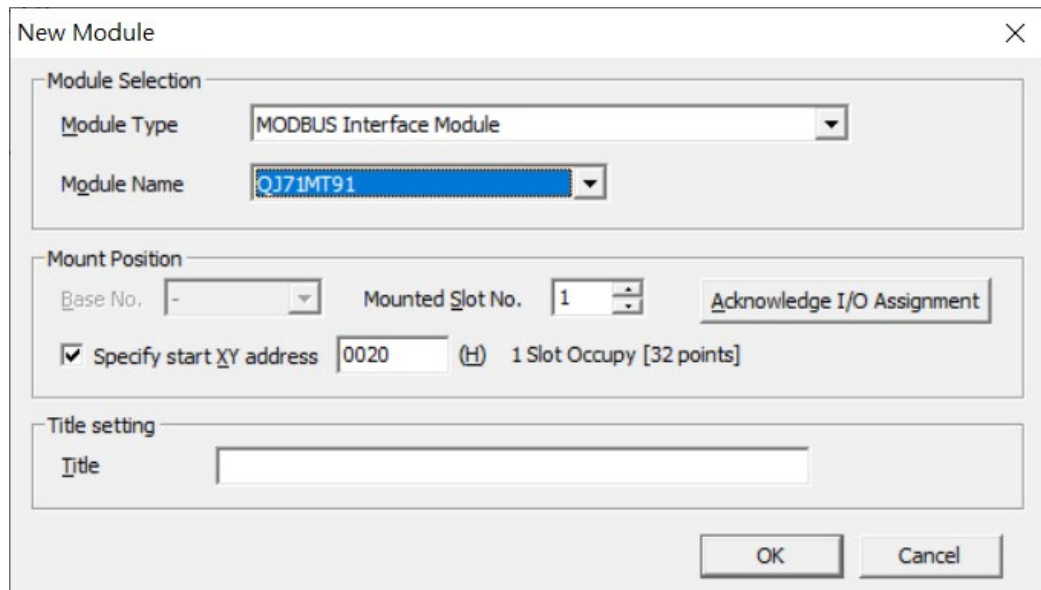
#### 3.1 MELSEC-Q series Hardware Connections

- I. The QJ71MT91 module’s Ethernet port is at its bottom center and can be connected to the gateway

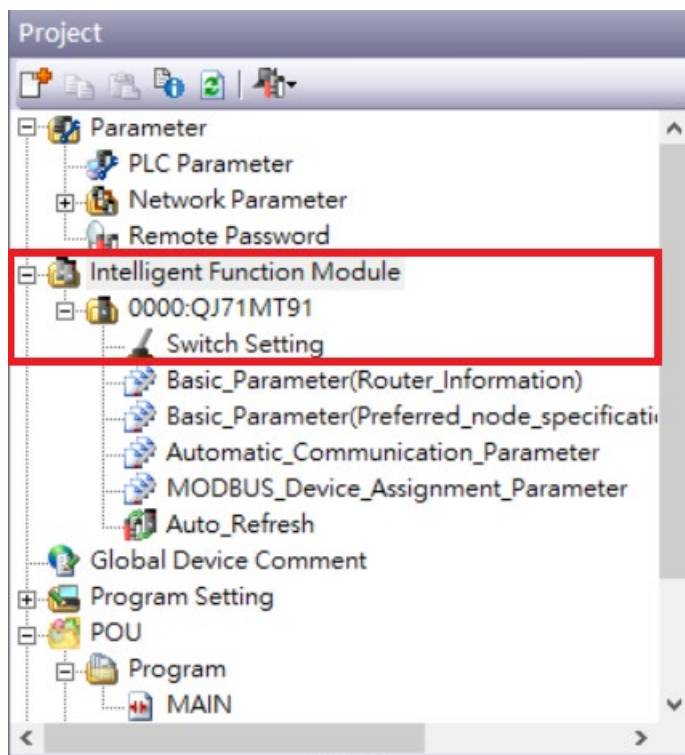


### 3.2 MELSEC-Q series IP Address and Connection Setup

- I. Launch GX Works 2 and right click on the “Intelligent Function Module” menu under “Project” on the left side. Then click on “New Module” to create a “QJ71MB91” module



- II. Launch GX Works 2 and select the “Intelligent Function Module” menu under “Project” on the left side. Then click on “Switch Setting” in the “QJ71MT91” menu



### III. Set “IP Address” to the same domain as the gateway domain at 192.168.1.XXX.

Switch Setting 0000:QJ71MT91 ×

**IP Address Setting**

**Operation Mode Setting**

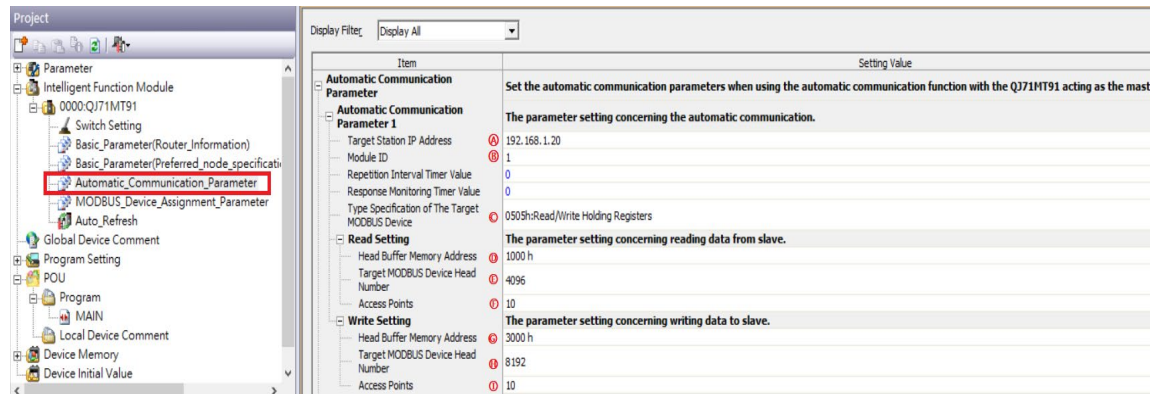
**Communication Condition Setting/Redundant Setting**

	Item	Setting Value
Communication Condition Setting	Basic parameter starting method	User Setting Parameter
	MODBUS device assignment parameter starting method	User Setting Parameter
	Online change enable/disable setting	Online Change Disabled
	Send frame specification	Data are sent in the Ethernet(V2.0)-compliant frame
Redundant Setting	Enable/Disable Redundant Setting	Disable
	IP mode type	Fixed IP Mode
	System switching at disconnection	Disable
	System switching at communication error	Disable
	System switching at communication error	Disable
	Disconnection detection time	4

Redundant setting is available for Product Information 16102000000000-D or later.  
The range of 'disconnection detection time' is 0 to 60 (unit : x500ms)

\* This dialog setting is linked to the Switch Setting of the PLC parameter.  
Default value will be shown in the dialog if the Switch Setting of the PLC parameter contains an out-of-range value.

#### IV. Click on “Automatic\_Communication\_Parameter” to set up reading and writing methods



- Ⓐ Target Station IP Address is set by default at "192.168.1.20"
- Ⓑ The **iD-GRID™** station number to be connected
- Ⓒ From the drop-down menu, select "0505h:Read/Write Holding Registers"
- Ⓓ Set to 1000h
- Ⓔ The Target MODBUS Device Head Number is set to 4096
- Ⓕ Read Points
- Ⓖ Set to 3000h
- Ⓗ The Target MODBUS Device Head Number is set to 8192
- Ⓘ Write Points

#### Notes:

- ※ **iD-GRID™**'s first GFDI-RM01N has the register address at 1000(HEX) converted to 4096
- ※ **iD-GRID™**'s first GFDO-RM01N has the register address at 2000(HEX) converted to 8192

**V. Click on “Auto\_Refresh” to set up the internal register for reading and writing**

The screenshot displays the software's parameter configuration interface. On the left, a tree view shows the project structure, with 'Auto\_Refresh' highlighted under the 'Intelligent Function Module' for device '0000:QJ71MT91'. The main window shows a table of items:

Item	Description
<b>Transfer to PLC</b>	<b>The data of the buffer memory is transmitted to the specified device.</b>
<b>Auto Communication Function Buffer Input</b>	<b>D0 (0,10)</b>
Auto Communication Function Operation Status	
Storage Area (Parameter 1 to 64)	
User Setting Area (Input)	
<b>Transfer to Intelligent Function Module</b>	<b>The data of the specified device is transmitted to the buffer memory.</b>
Auto Communication Function Buffer Output Area	D300 (0,10)
User Setting Area (Output)	

An 'Input Device 0000:QJ71MT91' dialog box is open, showing the configuration for the 'Auto Communication Function Buffer Input Area'. The configuration includes:

- Device Specification: D0
- Offset Value: 0
- Transfer Word Counts: 10

Buttons for 'OK' and 'Cancel' are visible at the bottom of the dialog. Below the table, the transfer direction is noted as 'Intelligent Function Module -> PLC' and the notation is '[Device No. (Offset Value, Transfer Word Counts)]'. The buffer memory address is specified as '[4096 (1000h), Offset Value[0], Transfer Word Counts]'. A note at the bottom states: 'The QJ71MT91 store the data in auto communication buffer input area sequentially from large address in unit of 1 word (16 bit) when receive response from the slave.'

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

The *iO-GRID<sup>M</sup>*'s read register address is 4096, which is D0 for the corresponding internal register of the controller.

And the *iO-GRID<sup>M</sup>*'s write register address is 8192, which is D300 for the corresponding internal register of the controller.

Therefore, when you want to control the program, you can just use the internal register to control the writing and reading.

