



DAUDIN CO., LTD.

2211TW

V3.0.0

iO-GRID *M*

Control Module User Manual



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1. Control Module List

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

Product Description

The GFMS, master module series is designed for industrial applications. It is an open industrial device for installation in a housing provided on site. It communicates with the controller and iO-GRID M series. For the controller, it supports up to 247 iO-GRID M series slaves. With internal communication, it supports up to 1.5Mbps baud rate. The circuit design and all components of the GFMS 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. Control Module Specification

2.1 GFMS-RM01N

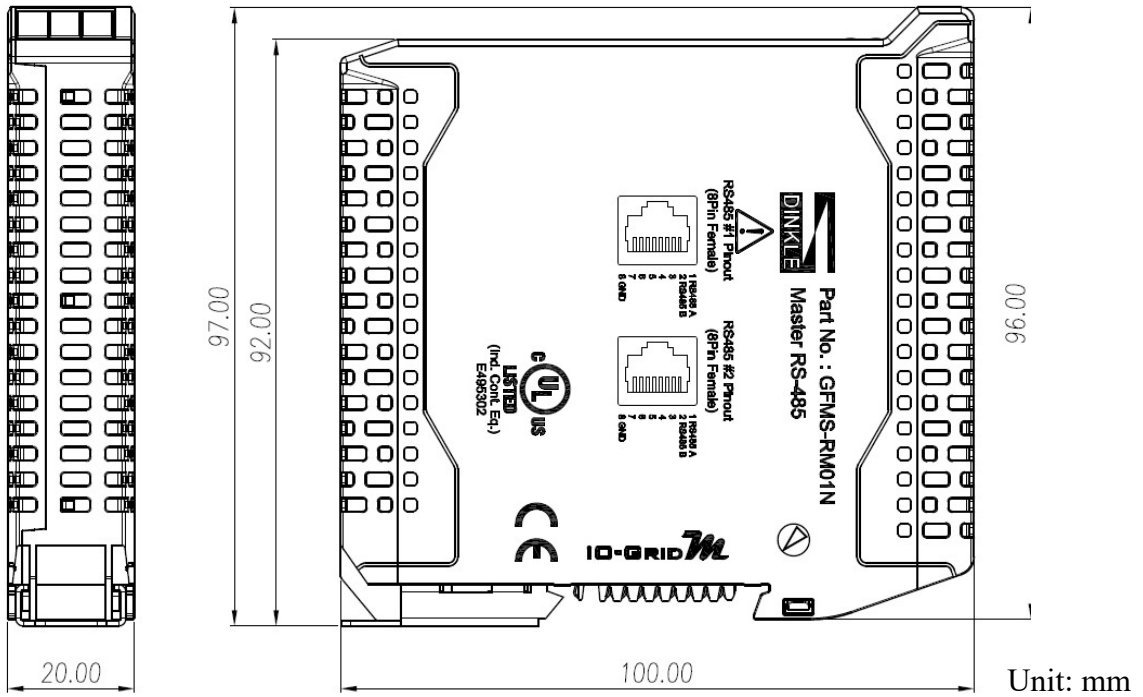
Technical Specification	
Module Type	Master RS485
Power Supply	5 VDC via Dinkle Bus
Max. Number of Expansion Modules	247
Current Consumption	48 mA at 5 VDC
Communication Interface	RS485 via Dinkle Bus
Communication Specification	
Communication Protocol	Modbus RTU
Communication Port	RJ45
Baud Rate Range	1200-1.5 Mbps
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

2.2 GFMS-RM01S

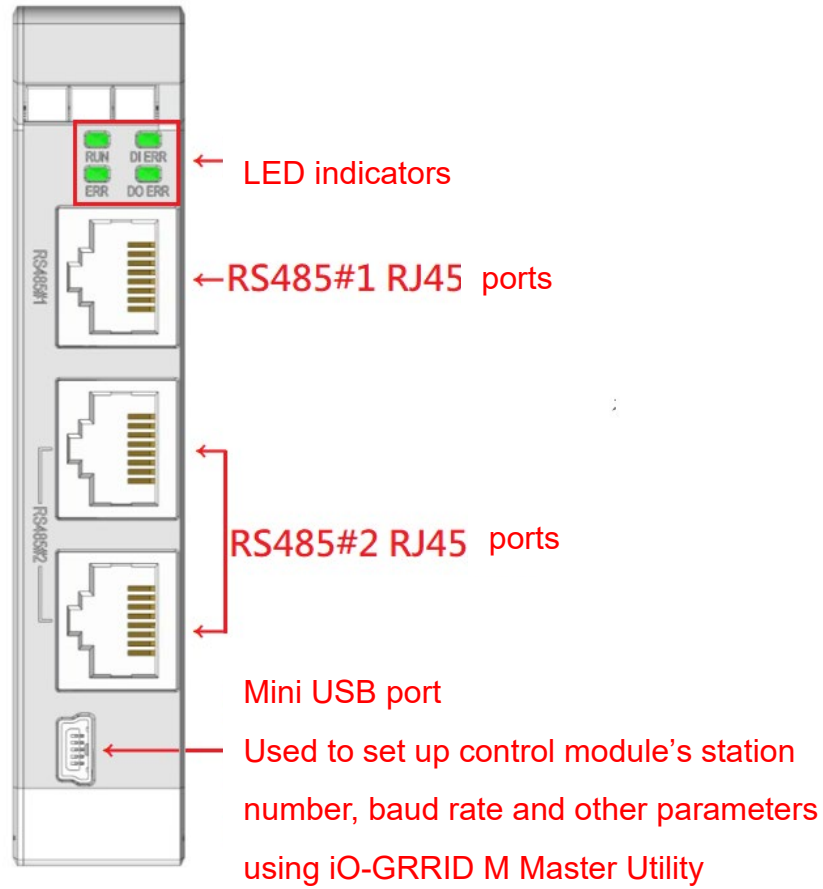
Technical Specification	
Module Type	Master RS485
Power Supply	5 VDC via Dinkle Bus
Max. Number of Expansion Modules	247
Current Consumption	48 mA at 5 VDC
Communication Interface	RS485 via Dinkle Bus
Communication Specification	
Communication Protocol	Modbus RTU
Communication Port	RJ45
Baud Rate Range	1200-1.5 Mbps
General Specification	
Dimension (W*D*H)	20 x 100 x 97mm
Weight	70g
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

3. Control module Information

3.1 Control Module Dimensions



3.2 Control Module Panel Information

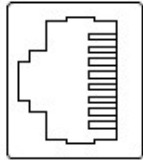


I. LED Indicator Light

LED	Color	Status
RUN	Green	On : Power on. Off : Power off
ERR	Red	On: Communication anomaly Off: Status normal
DI ERR	Red	On: Input module anomaly Off: Status normal
DO ERR	Red	On: Output module anomaly Off: Status normal

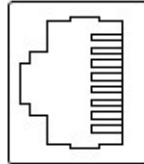
II. RS485#1 and RS485#2 port definitions

**RS485 #1 Pinout
(8Pin Female)**



1 RS485 A
2 RS485 B
3
4
5
6
7
8 GND

**RS485 #2 Pinout
(8Pin Female)**



1 RS485 A
2 RS485 B
3
4
5
6
7
8 GND

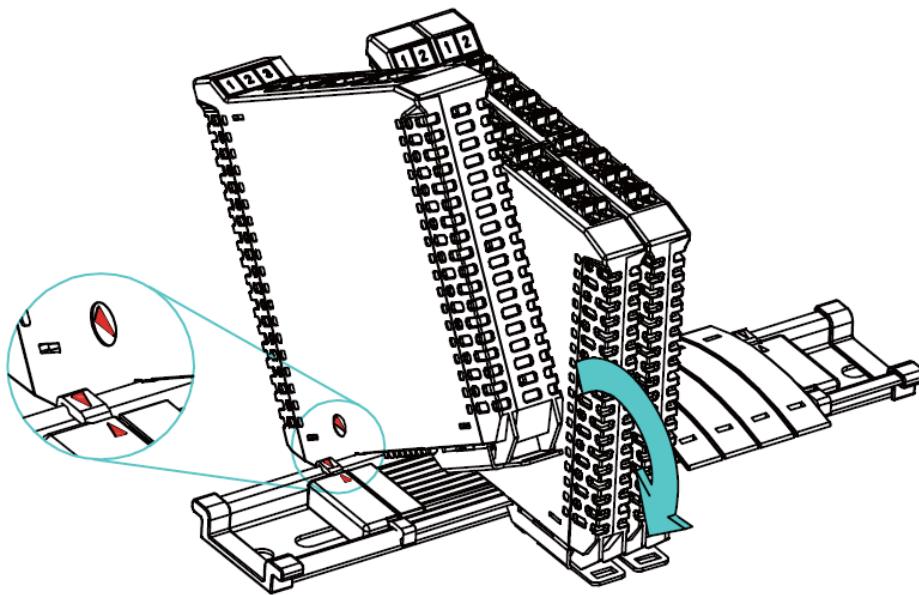
RJ45	Communication pin definitions
1	RS485 A
2	RS485 B
3	-
4	-
5	-
6	-
7	-
8	GND

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”.

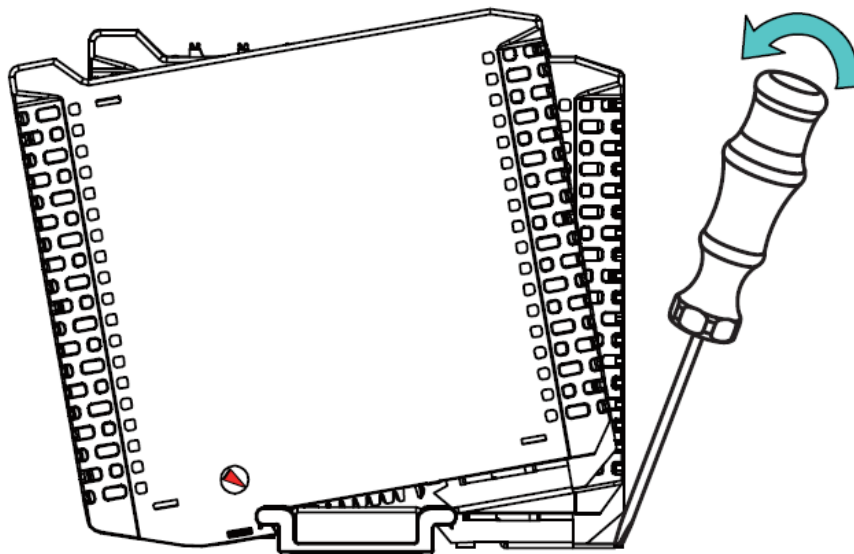


*Note: Make sure the red arrows on the module and the rail are pointing the same direction.

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.



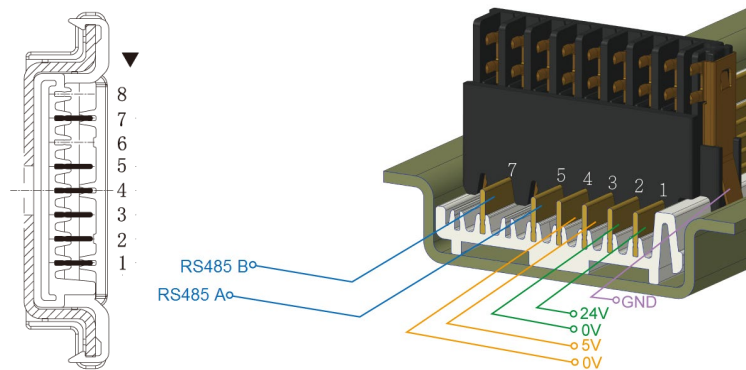
5. iO-GRID^M Series Introduction

iO-GRID^M 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^M 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

Daudin 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-RM11	8-Channel relay module, grounded
GFAR-RM21	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. iIO-GRID^M Parameter Settings and Introduction

6.1 Control Module Settings and Connections

I. Control Module System Configuration List

Name/Product No.	Description
GFMS-RM01N	RS485 control module, Modbus RTU/ASCII 3 Ports
GFMS-RM01S	RS485 control module, Modbus RTU/ASCII 1 Port
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-RM11	8-Channel relay module, grounded
GFAR-RM21	4-Channel relay module, grounded
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)
GFAO-RM10	4-channel analog output module ($\pm 10\text{VDC}$)
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)
Mini USB cable	Must have data transfer functionality
Computer	USB-compatible

II. Module Initial Setting List

Product No.	Description	Station No.	Baud rate	Format
GFMS-RM01N	RS485 Control module Modbus RTU/ASCII 3 Ports	1	115200	RTU(8,N,1)
GFMS-RM01S	RS485 Control module Modbus RTU/ASCII 1 Port	1	115200	RTU(8,N,1)
GFDI-RM01N	16-channel digital input module (source/sink)	1	115200	RTU(8,N,1)
GFDO-RM01N	16-channel digital output module (sink)	1	115200	RTU(8,N,1)
GFDO-RM02N	16-channel digital output module (Source)	1	115200	RTU(8,N,1)
GFAR-RM11	8-Channel relay module, grounded	1	115200	RTU(8,N,1)
GFAR-RM21	4-Channel relay module, grounded	1	115200	RTU(8,N,1)
GFAI-RM10	4-channel analog input module (± 10 VDC)	1	115200	RTU(8,N,1)
GFAI-RM11	4-channel analog input module (0...10VDC)	1	115200	RTU(8,N,1)
GFAI-RM20	4-channel analog input module (0... 20mA)	1	115200	RTU(8,N,1)
GFAI-RM21	4-channel analog input module (4... 20mA)	1	115200	RTU(8,N,1)
GFAO-RM10	4-channel analog output module (± 10 VDC)	1	115200	RTU(8,N,1)
GFAO-RM11	4-channel analog output module (0...10VDC)	1	115200	RTU(8,N,1)
GFAO-RM20	4-channel analog output module (0... 20mA)	1	115200	RTU(8,N,1)
GFAO-RM21	4-channel analog output module (4... 20mA)	1	115200	RTU(8,N,1)
GFAX-RM10	2-channel analog input module, 2-channel analog output module (-10...10VDC)	1	115200	RTU(8,N,1)
GFAX-RM11	2-channel analog input module, 2-channel analog output module (0...10VDC)	1	115200	RTU(8,N,1)
GFAX-RM20	2-channel analog input module, 2-channel analog output module (0... 20mA)	1	115200	RTU(8,N,1)
GFAX-RM21	2-channel analog input module, 2-channel analog output module (4... 20mA)	1	115200	RTU(8,N,1)

III. Software Functions Details

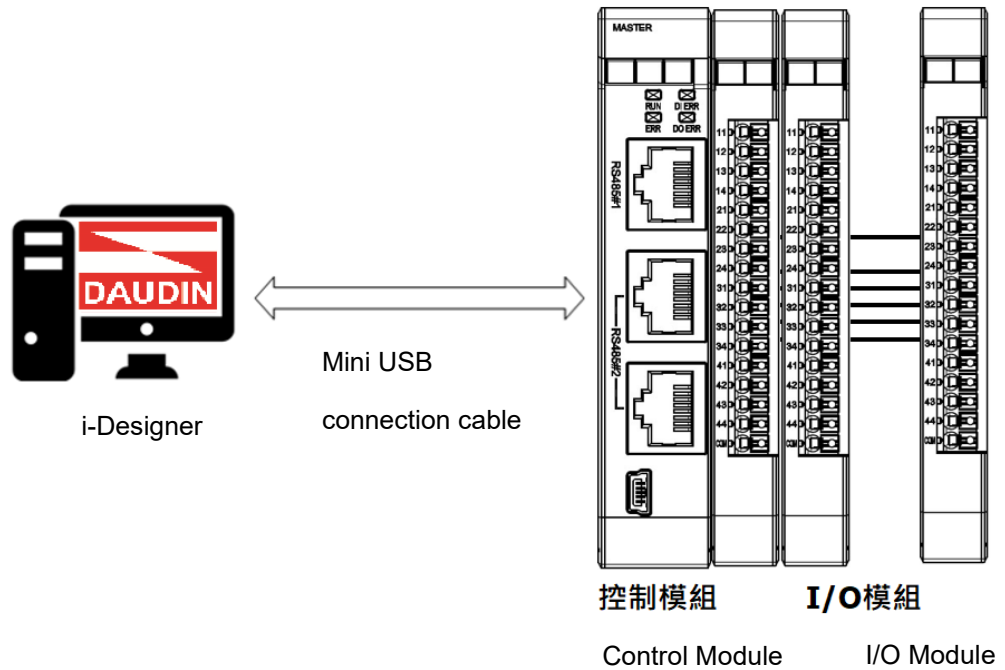
Setup software contains local fieldbus and external ports' communication parameters

- (1) Set up control modules' station numbers
- (2) Rs485#1's external communication ports' types and baud rates
- (3) Rs485#2's fieldbus communication formats and baud rates
- (4) Set up I/O modules' individual station numbers

IV. Control Module Settings and Connections

Connect your control module to your computer using the Mini USB port and open the iO-Grid M Utility program to set up control module parameters

Control module connection illustration:



Control module connection image:



※ Before setting up the control module, please confirm that the I/O module station numbers are not repetitive on the fieldbus

6.2 i-Designer Program Control Module Setup Tutorial

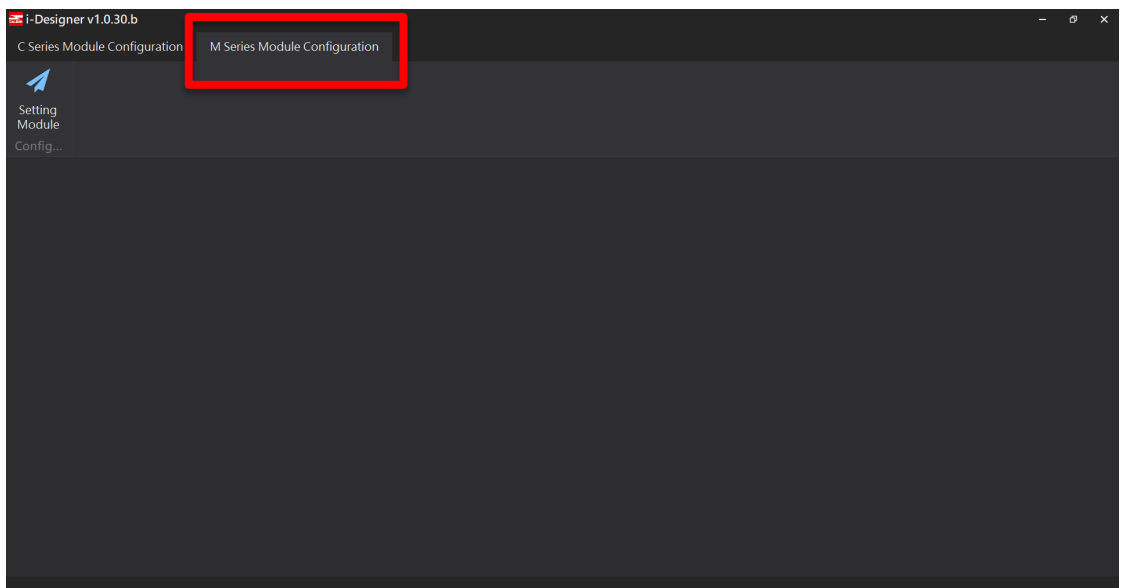
I. Make sure that the module is powered and connected to the USB port



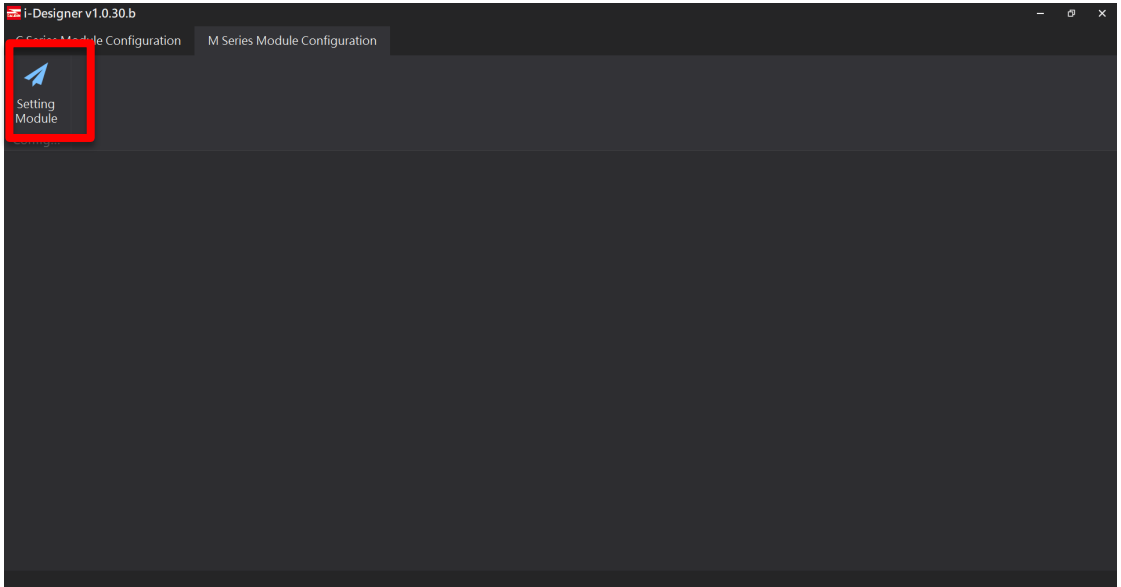
II. Click to launch the software



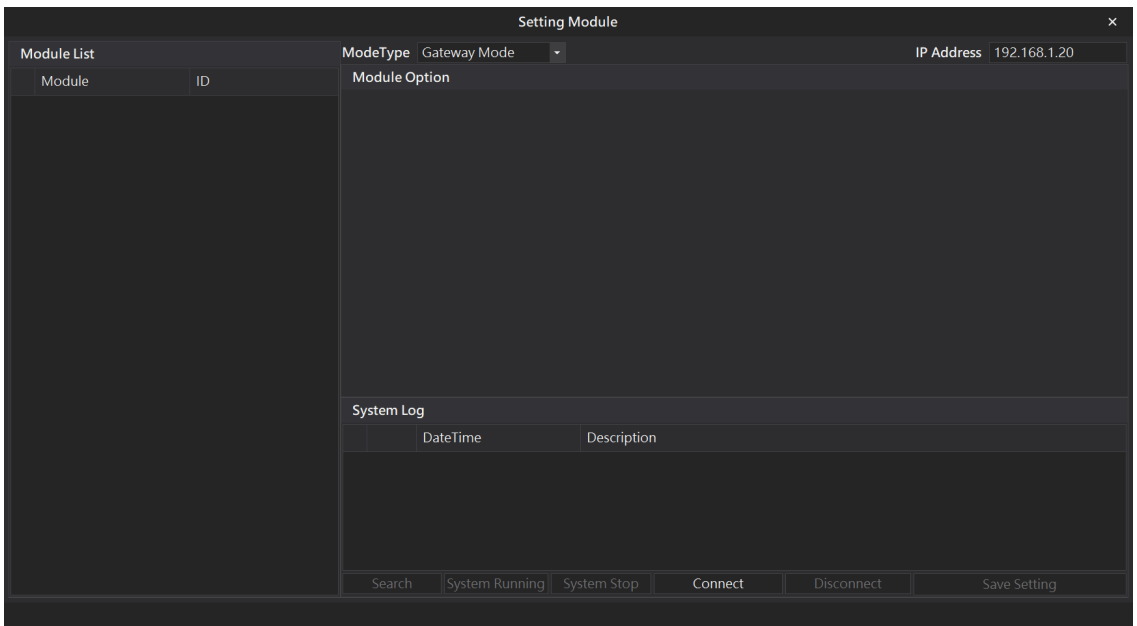
III. Select “M Series Module Configuration”



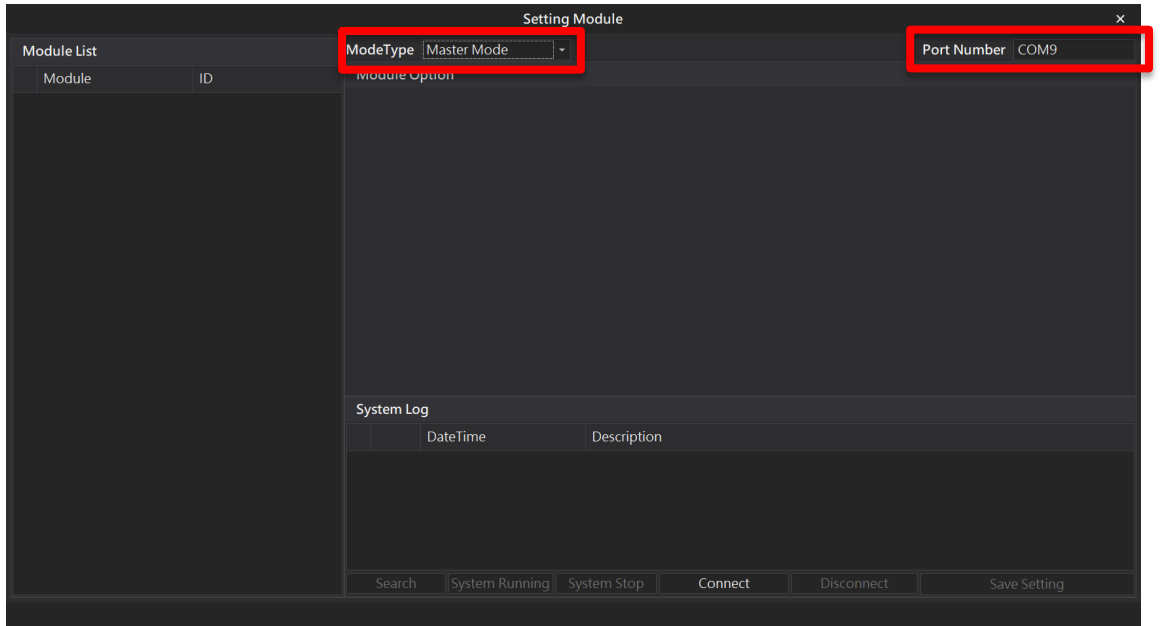
IV. Click on the “Setting Module” icon



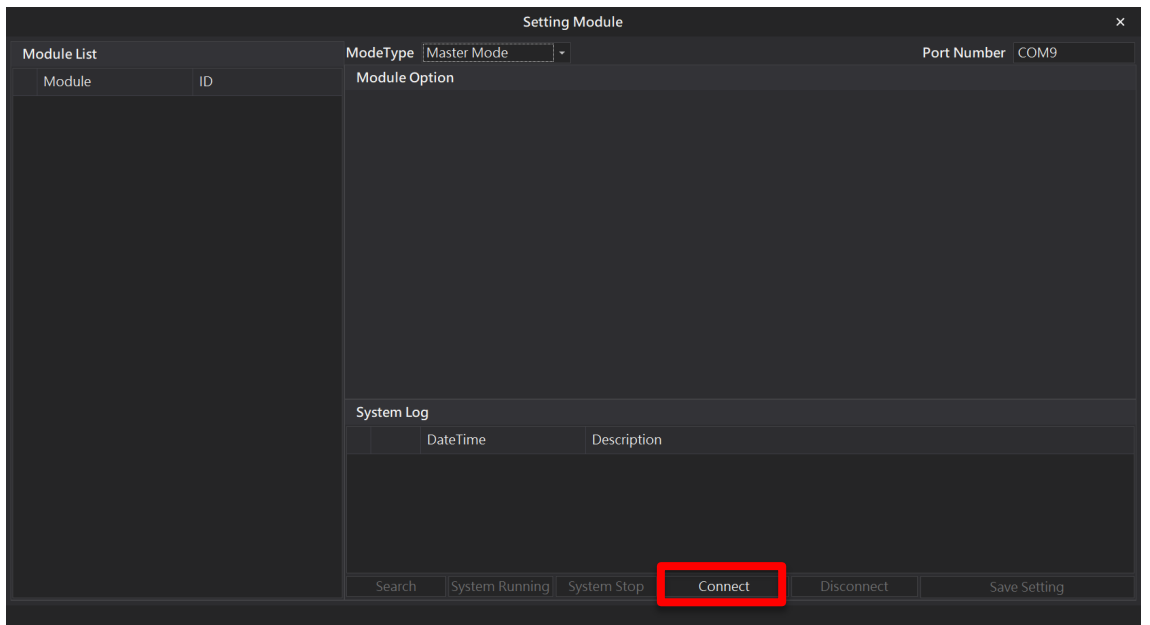
V. Enter the “Setting Module” page for M-series



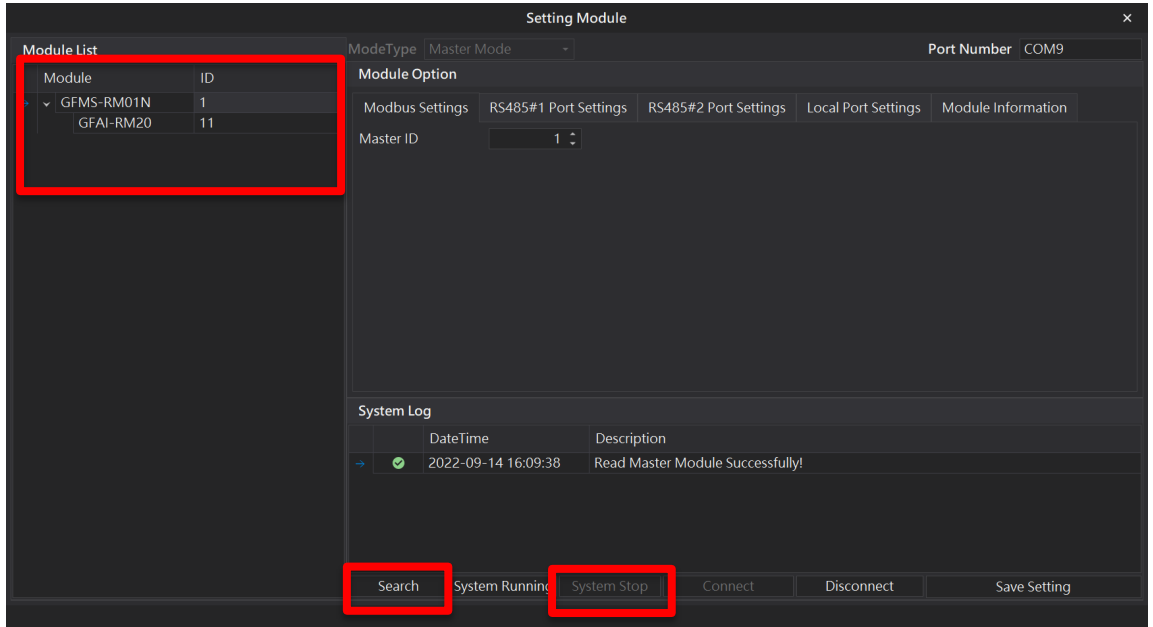
VI. Select the mode type based on the connected module



VII. Click on “Connect”



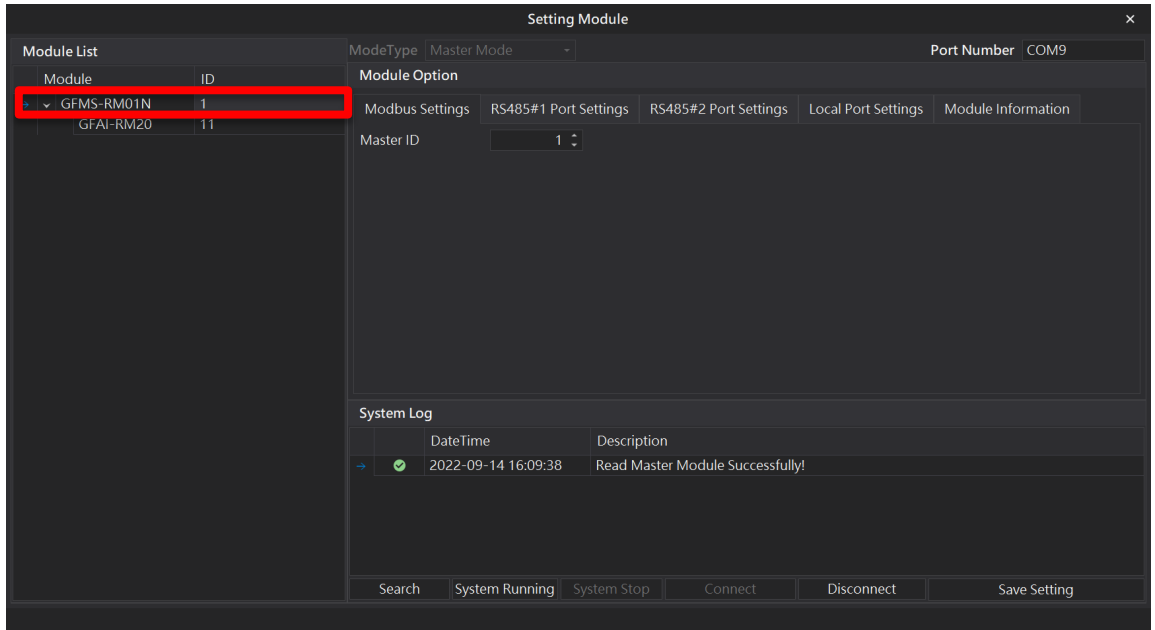
VIII. When the system stops running, click on “Search” to search for the modules. Modules that have been addressed will appear on the list on the left.



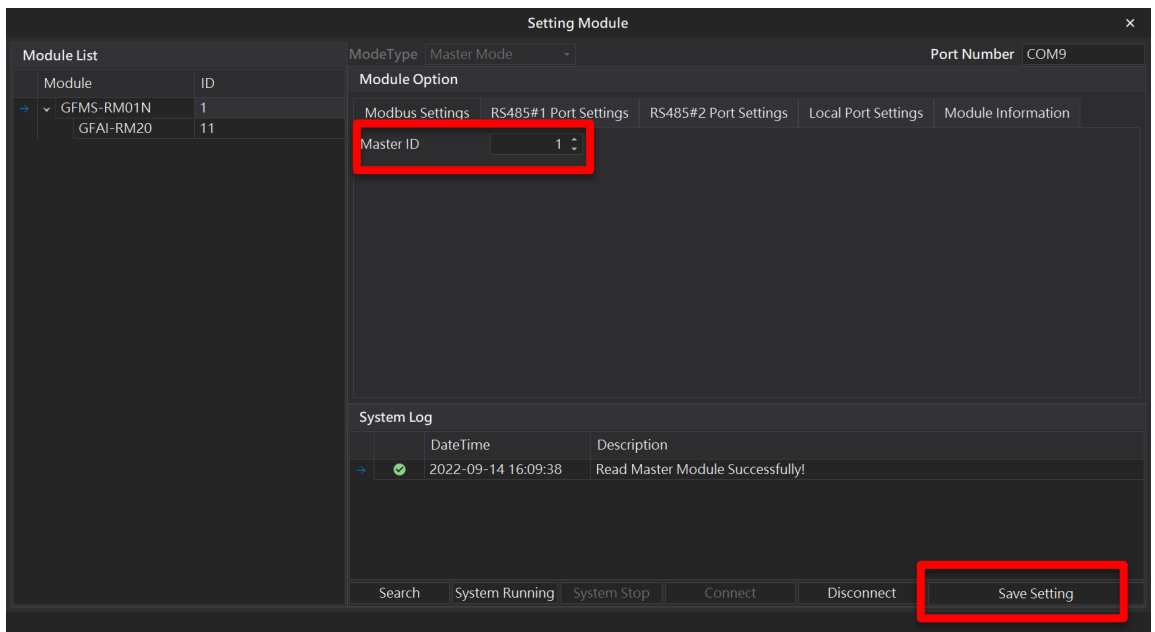
※ No repetitive station numbers on the same DINKLE Bus

※ When using control modules, the local baud rate can be set at 1.5M bps

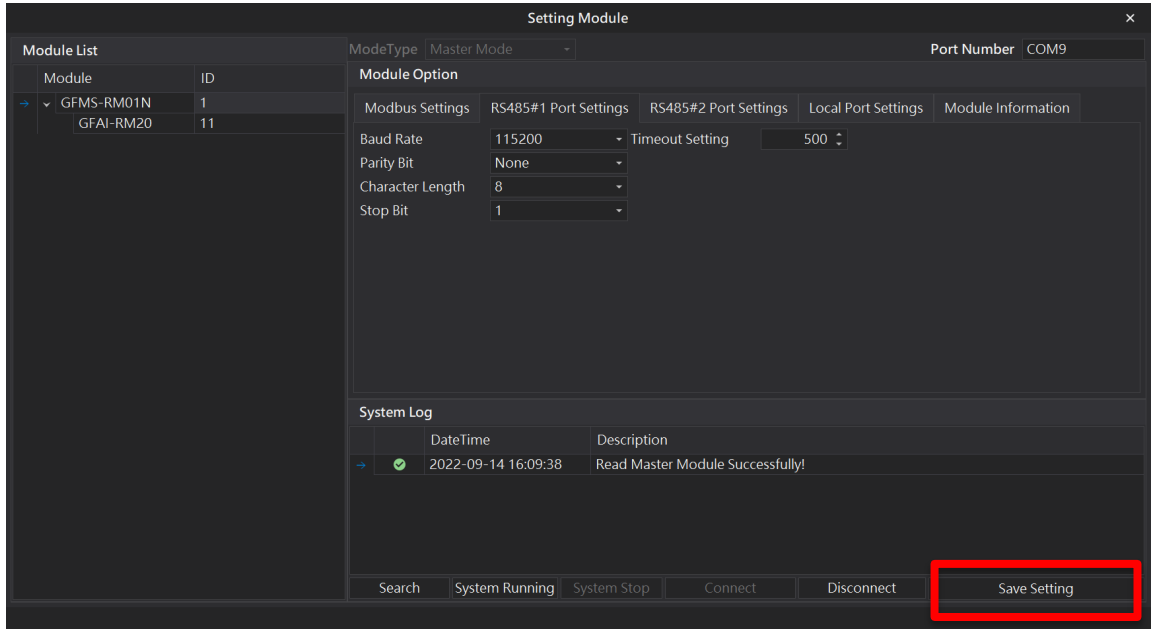
IX. To change a module's parameters, click on the "Module List" to load the "Setting Module" page for that module



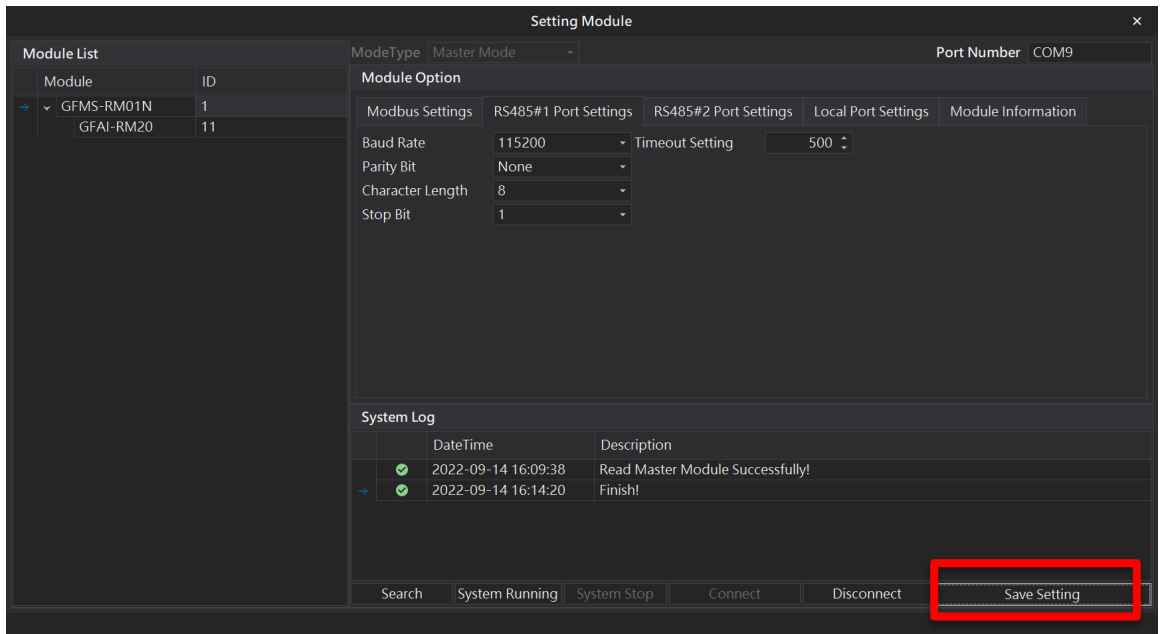
X. Set up control modules' station numbers (must click on "Save" after changing them)



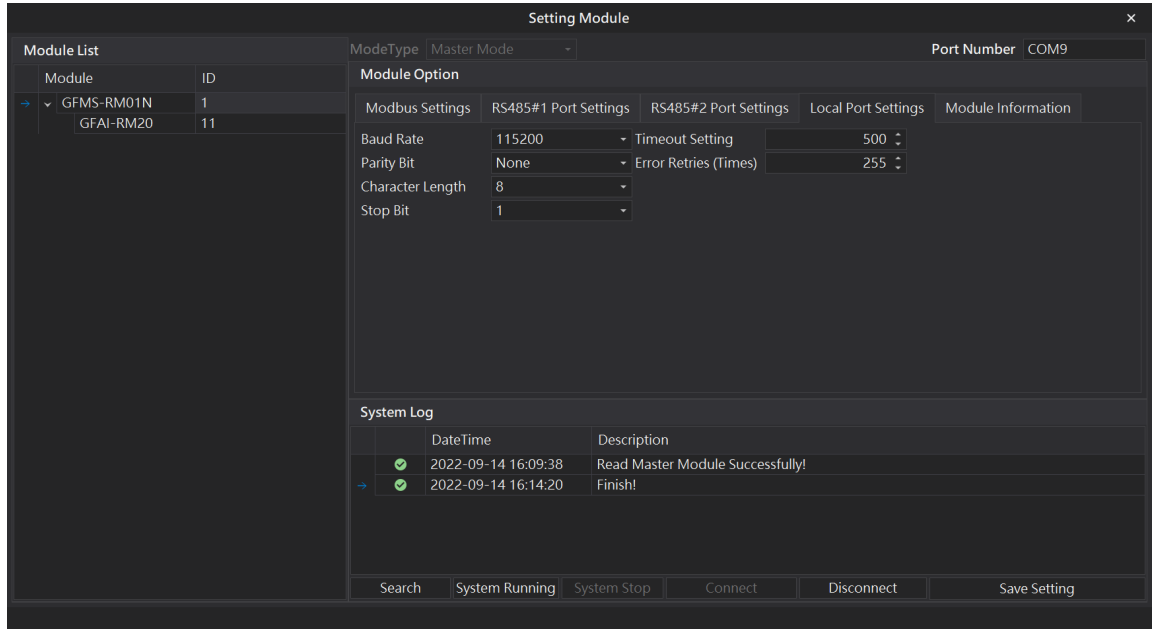
XI. Set up control module RS485#1's port parameters (must click on "Save" after changing them)



XII. Set up control module RS485#1's port parameters (must click on "Save" after changing them)



XIII. Fieldbus communication settings (the format and baud rate must be the same as the I/O module)



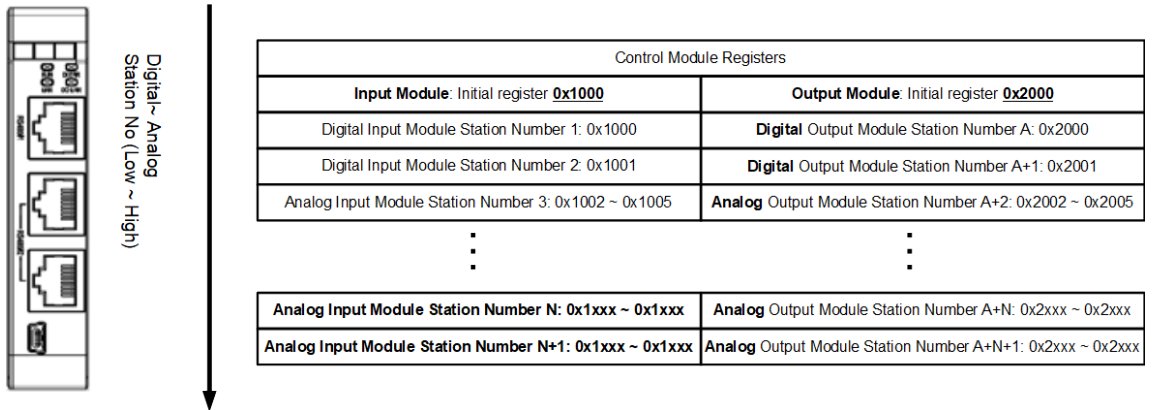
7. Control Module Register Configuration

I. Control Module Register Assignment

The control module will, based on the user's module configuration, automatically assign each module a register address based on the modules' functions, types (digital or analog), station number and data consumption.

The registers are assigned based on the priority below: Digital→Analog→Station number

Control module Register address assignment



The address for input initial registers starts from 0x1000;
the address for output initial registers starts from 0x2000;

A single piece of 16-channel digital module will take up 1 WORD / 2 BYTE while a single piece of 4-channel analog module will take up 4 WORD / 8 BYTE of data.

II. Input module initial register (0x1000)

The control module will, based on the user's module configuration, automatically assign each module an input module register based on the modules' functions, types (digital or analog), station number and data consumption.

The registers are assigned based on the priority below: **Digital→Analog→Station number**

The output initial register address for the (digital) input module with the lowest station number: 0x1000.

Example: With 2 digital input modules (station number 1 and 4) and 2 analog input modules (station number 2 and 3), the control module will assign the following input module registers:

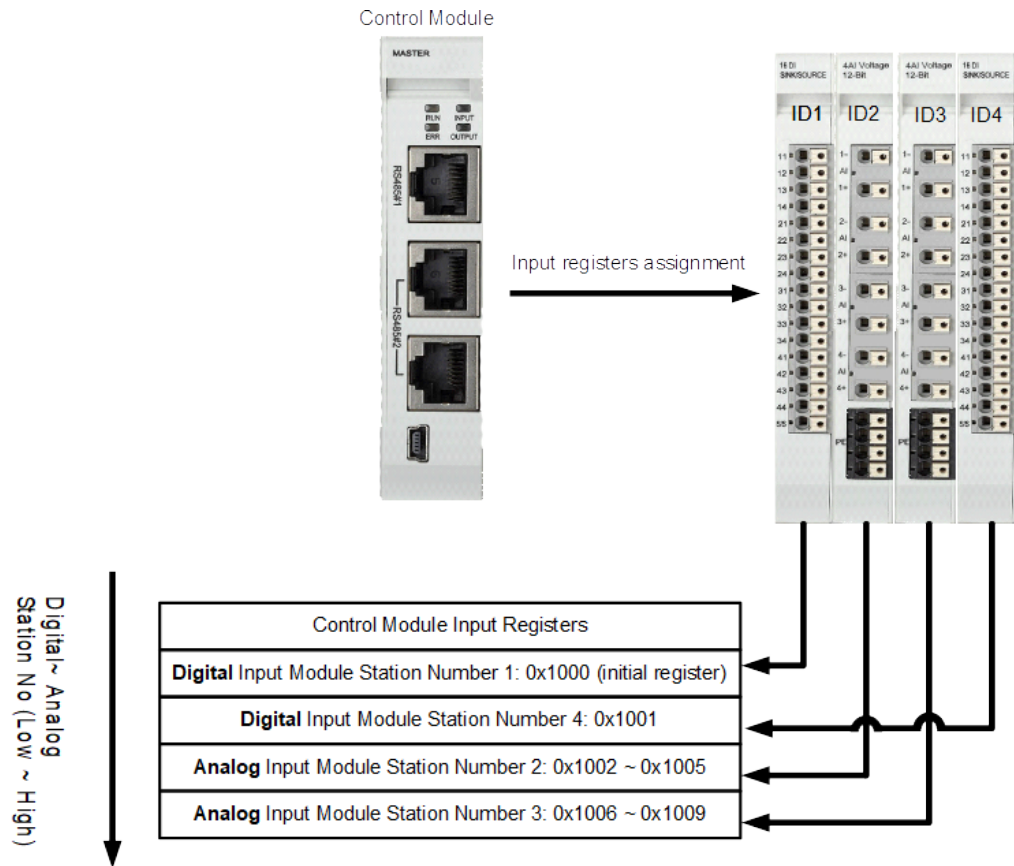
Digital input module (station No.1): 0x1000 (output initial register; takes up 1 WORD of data)

Digital input module (station No.4): 0x1001 (a range of registers assigned by the control module, with the address of 0x1001 (1 higher than the 0x1000 of the station No.1 register address; takes up 1 WORD of data)).

Analog input module (station No.2): 0x1002~ 0x1005 (a range of registers assigned by the control module, with the address of 0x1002 (1 higher than the 0x1001 of the station No.4 register address; takes up 4 WORD of data)).

Analog input module (station No.3): 0x1006~0x1009 (the control module, based on the register assigned to station No.2 and its data consumption, assigns the address of 0x1006 (1 higher than the 0x1005 of the station No.2 register address)).

Control Module Input Register address assignment



III. Output module initial register (0x2000)

The control module will, based on the user's module configuration, automatically assign each module an output module register based on the modules' functions, types (digital or analog), station number and data consumption.

The registers are assigned based on the priority below: **Digital**→**Analog**→**Station number**

The output initial register address for the (digital) output module with the lowest station number: 0x2000.

Example: With 2 digital output modules (station number 1 and 4) and 2 analog output modules (station number 2 and 3), the control module will assign the following output module registers:

Digital output module (station No.1): 0x2000 (output initial register; takes up 1 WORD of data)

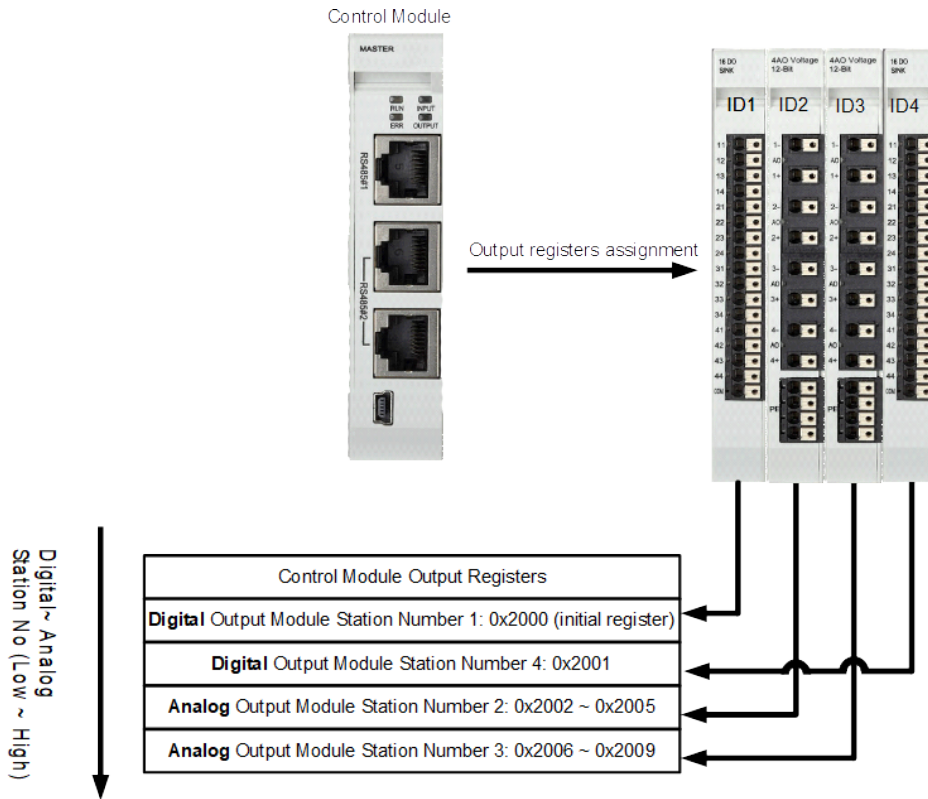
Digital output module (station No.4): 0x2001 (a range of registers assigned by the

control module, with the address of 0x2001 (1 higher than the 0x2000 of the station No.1 register address; takes up 1 WORD of data)).

Analog output module (station No.2): 0x2002~ 0x2005 (a range of registers assigned by the control module, with the address of 0x2002 (1 higher than the 0x2001 of the station No.4 register address; takes up 4 WORD of data)).

Analog output module (station No.3): 0x2006~0x2009 (the control module, based on the register assigned to station No.4 and its data consumption, assigns the address of 0x1006 (1 higher than the 0x2005 of the station No.2 register address)).

Control Module Output Register address assignment :



IV. How Modbus register addresses correspond to control module register addresses:

With **0x1000(hex)** as the initial register address input by the control module, the corresponding Modbus holding register's address is **4xxxx(dec)**

With **0x2000(hex)** as the initial register address output by the control module, the corresponding Modbus holding register's address is **4xxxx(dec)**

Example:

If the address for a Modbus holding register is 41001, then the initial input address for the control module to be read is 44097 and the initial output address for the control module to be written is 48193.

※ Various Modbus may have different initial addresses for their holding registers. Generally the address is 40001.

※ 0x1000, when converted into the decimal system, is 4096; 0x2000, when converted into the decimal system, is 8192.

7.1 Input module register 0x1000– 0x10F6 (readable)

I. Read a digital input register

GFDI-RM01N (16 bit source/sink) register format

Channel open-1; channel closed - 0; reserved value - 0.

Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
Ch44	Ch43	Ch42	Ch41	Ch34	Ch33	Ch32	Ch31
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Ch24	Ch23	Ch22	Ch21	Ch14	Ch13	Ch12	Ch11

Example:

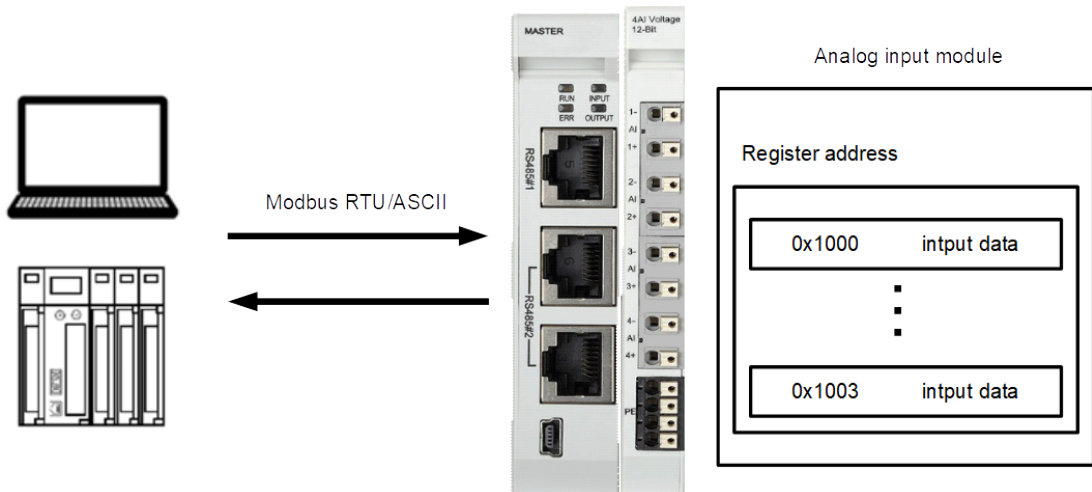
With all channels open: 1111 1111 1111 1111 (0xFF 0xFF).

Channel 1 to 8 are open: 0000 0000 1111 1111 (0x00 0xFF).

With all channels closed: 0000 0000 0000 0000 (0x00 0x00).

II. Read an analog input register

Once an analog input module is set up with a control module, it will import the data received by the analog input module and automatically assign the registers between 0x1000 and 0x1003



Example:

Please refer to the voltage conversion chart below (with the example of 0...10V)

Voltage Conversion Chart:

	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
10	4000	4040	4080	4120	4160	4200	-	-	-	-
9	3600	3640	3680	3720	3760	3800	3840	3880	3920	3960
8	3200	3240	3280	3320	3360	3400	3440	3480	3520	3560
7	2800	2840	2880	2920	2960	3000	3040	3080	3120	3160
6	2400	2440	2480	2520	2560	2600	2640	2680	2720	2760
5	2000	2040	2080	2120	2160	2200	2240	2280	2320	2360
4	1600	1640	1680	1720	1760	1800	1840	1880	1920	1960
3	1200	1240	1280	1320	1360	1400	1440	1480	1520	1560
2	800	840	880	920	960	1000	1040	1080	1120	1160
1	400	440	480	520	560	600	640	680	720	760
0	0	40	80	120	160	200	240	280	320	360
0	0	-40	-80	-120	-160	-200	-	-	-	-

With 10V of external voltage, the reading on the register will be 4000 (0x0F 0xA0).

With 5V of external voltage, the reading on the register will be 2000 (0x07 0xD0).

With 0V of external voltage, the reading on the register will be 0000 (0x00 0x00).

※For other AD conversion charts and reference tables, please refer to [Analog Input Module User Manual](#)

Analog Input Module List:

Name/Product No.	Description
GFAI-RM10	4-channel analog input module (± 10 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)

※ When using control modules, RS485 can connect to control modules with 0170-0101.

7.2 Output module register address information: 0x2000–0x20F6 (rewritable)

I. Rewrite a digital output register

**GFDO-RM01N (16 bit, sink type)/ GFDO-RM02N (16 bit, source type)
register format**

Channel open-1; channel closed - 0; reserved value - 0.

Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
Ch44	Ch43	Ch42	Ch41	Ch34	Ch33	Ch32	Ch31
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Ch24	Ch23	Ch22	Ch21	Ch14	Ch13	Ch12	Ch11

Example:

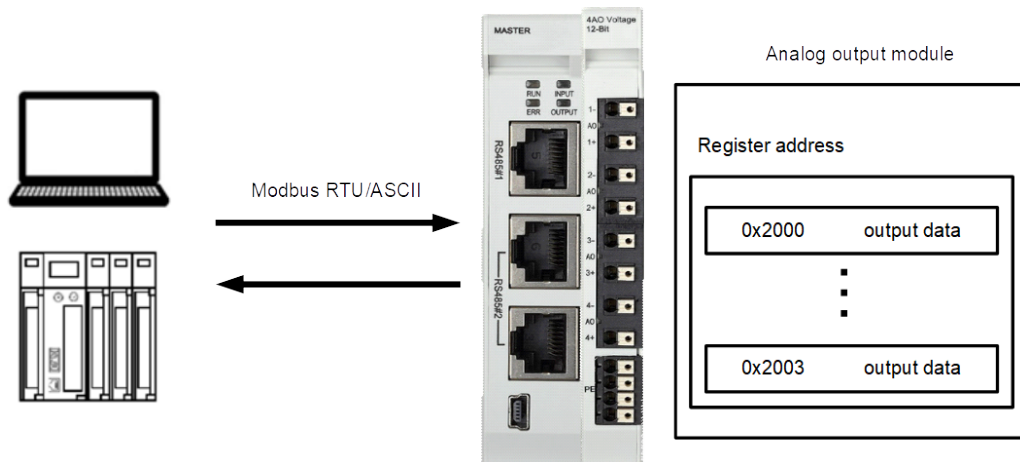
With all channels open: 1111 1111 1111 1111 (0xFF 0xFF).

Channel 1 to 8 are open: 0000 0000 1111 1111 (0x00 0xFF).

With all channels closed: 0000 0000 0000 0000 (0x00 0x00).

III. Rewrite an analog output register

Once an analog output module is set up with a control module, it will automatically assign analog output modules' output records registers between 0x2000 and 0x2003



Example:

Please refer to the voltage conversion chart below (with the example of 0...10V)

Voltage Conversion Chart:

	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
10	4000	4040	4080	4120	4160	4200	-	-	-	-
9	3600	3640	3680	3720	3760	3800	3840	3880	3920	3960
8	3200	3240	3280	3320	3360	3400	3440	3480	3520	3560
7	2800	2840	2880	2920	2960	3000	3040	3080	3120	3160
6	2400	2440	2480	2520	2560	2600	2640	2680	2720	2760
5	2000	2040	2080	2120	2160	2200	2240	2280	2320	2360
4	1600	1640	1680	1720	1760	1800	1840	1880	1920	1960
3	1200	1240	1280	1320	1360	1400	1440	1480	1520	1560
2	800	840	880	920	960	1000	1040	1080	1120	1160
1	400	440	480	520	560	600	640	680	720	760
0	0	40	80	120	160	200	240	280	320	360
0	0	-40	-80	-120	-160	-200	-	-	-	-

With the output voltage maintained at 10V, the reading to be written into the register will be 4000 (0x0F 0xA0).

With the output voltage maintained at 5V, the reading to be written into the register will be 2000 (0x07 0xD0).

With the output voltage maintained at 0V, the reading to be written into the register will be 0 (0x00 0x00).

※For other DA conversion charts and reference tables, please refer to [Analog Output Module User Manual](#)

Analog Output Module List:

Name/Product No.	Description
GFAO-RM10	4-channel analog output module (± 10 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)

※ When using control modules, RS485 can connect to control modules with 0170-0101.

1.3 Modbus function code Example

Modbus function code	Transmission example (ID:0x01)	Respond example (ID:0x01)
0x03	01 01 03 10 00 00	01 03 02 00 00
0x04	01 01 04 10 00 00	01 04 02 00 00
0x05	01 05 00 00 FF 00	01 05 00 00 FF 00
0x06	01 06 20 00 FF FF	01 06 20 00 FF FF
0x0F	01 0F 00 00 00 10 02 00 01	01 0F 00 00 00 10
0x10	01 10 20 00 00 01 02 FF FF	01 01 10 20 00 00

※ In this example, the module ID is “01”

※ When using control modules for communications, the input registers address will start at 0x1000

※ When using control modules for communications, the output registers address will start at 0x2000

8. Anomaly Record Register Address Information

Register address	Description	Volume (word/bytes)	Description
0x5003	Anomaly Module Station No.	1 word / 2 bytes	Keep track of the module station number with anomaly Example: 0X0002: Anomaly at station No.2 module
0x5004	Error Code	1 word / 2 bytes	Keep track of the error codes of the modules with anomaly 0x0000: No error 0x0001: Abnormal Modbus Function Code 0x0002: Wrong data address 0x0004: Wrong data value 0x0008: Return the wrong ID 0x0010: Return the Modbus Function Code error 0x0020: Packet length too large 0x0040: Packet length too small 0X0080: Module time-out 0x0100: CRC error

※ When reading the error messages, both 0x5003 and 0x5004 must be read at the same time