iO-GRID X Series
GX-CM111
Module User Manual

Table of Contents

1. Introduction

The GX-CM111 Serial Communication Module for Plug-in I/O is compatible with GX Series couplers. With a variety of functional modules, it enables Modbus master-slave, serial communication. Compact and efficient, these modules are designed for straightforward data handling, fitting various serial communication needs across multiple applications.

2. Product Features

● Multi-Protocol Support

Simplified system configuration, supporting standard industrial communication protocols including PROFINET, EtherCAT, EtherNetIP, and ModbusTCP when used with a coupler.

● Two Communication Interfaces

Offers interface options for RS485 and RS232.

● Supporting Two Communication Protocols

Modbus RTU/ASCII

● Compact Design

Space-saving, compact structure.

● Easy Diagnostics

Intuitive and clear channel status display for simplified monitoring and maintenance.

● Straightforward Configuration

Quick and easy module configuration.

● Convenient Installation

Designed for standard DIN 35 mm rail mounting with quick-connect terminals for fast and easy wiring.

DAUDIN CO., LTD.

⚠ **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.

10. PLEASE BE SURE TO USE CERTIFIED POWER SUPPLY WITH SELV OUTPUT OR CERTIFIED POWER SUPPLY PROVIDING DOUBLE INSULATION EVALUATED BY UL60950-1, UL 62368-1, OR UL61010-1 AND UL61010-2-201 STANDARDS.

VEUILLEZ VOUS ASSURER D'UTILISER UNE ALIMENTATION CERTIFIÉE AVEC SORTIE SELV OU UNE ALIMENTATION CERTIFIÉE OFFRANT UNE DOUBLE ISOLATION ÉVALUÉE PAR LES NORMES UL60950-1 OU UL 62368-1 OU UL61010-1 ET UL61010-2-201.

2. Module Specifications

2.1 Electrical Specifications

Electrical Specifications		
Serial Communication Module	Working Voltage	24 VDC (-15%~+20%)
	Working Current	Max. 130mA @ 5VDC

2.2 General Specifications

General Specifications		
Size (W x D x H)	Coupler	25 x 105 x 69mm
	I/O Module	12 x 105 x 69mm
Weight	Coupler	80g
	I/O Module	65g
Operating Temperature	0 … +60°C	
Storage Temperature	-25˚C…+85˚C	
Relative Humidity	RH 95%, non-condensing	
Altitude Limit	< 2000m	
IP Protection Level	IP 20	
Pollution Degree	II	
Safety Certifications	CE	
Wire Gauge Range (IEC / UL)	$0.2mm^2 \sim 1.5mm^2$ / AWG 24~16	
Recommended Terminals	DN00510D DN00710D	

2.3 Communication Module Specifications

| Serial Communication Specifications	
Number of Channels	3
Communication Protocol	Modbus RTU Master / Slave
Communication Mode	Modbus Master, Slave, Free Port
Baud Rate Range	1200 to 115.2 kbps
Signal Type	RS232, RS485
Data Bits	7, 8
Stop Bits	1, 2
Parity Check	None, Odd, Even
Character Interval	1.5T~200T, default 3.5T
Response Timeout	Customizable, default 1000 ms
Polling Interval	Customizable, default 100 ms
Data Input Handling Mode	Retain last input value, clear input value
Data Output Mode	Polling, data change
Power-on Output Module Control Mode	Enable, disable
Output Module Control	Enable, disable
Output Module Control Mode	Polling (continuously active), rising-edge trigger (single activation)
Slave ID	Customizable, default 1
Slave Response Time	Customizable, default 50 ms
Free-Transmission Communication Mode	Auto-report, listening mode
System Indicators	1 Green LED(SP), 1 Red LED(AL)
Channel Indicators	3 Green LEDs, 3 Red LEDs

3. Module Panel Introduction

3.1 GX-CM111
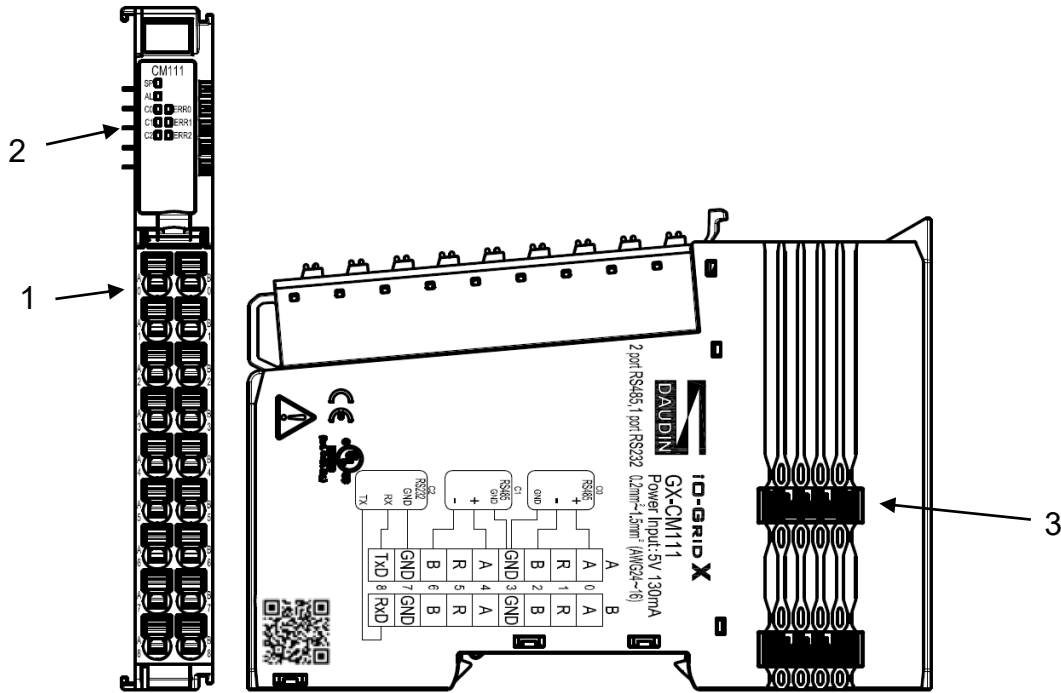
Fig. 3.1 GX-CM111

NO.	Name	Description
1	Signal Terminal	Input/output signal interface, plug-in terminal
2	Channel Status Indicator	3 x Green LEDs, 3 x Red LEDs
3	System Bus Interface	Interface for communication and power supply

Status Indicators				
Name	Label	Color	Status	Description
Communication Indicator	1A, 2A TX	Green	Flashing	Communication interface transmitting packets
			Off	No configuration or no packet transmission
	RA RX	Red	On	Module communication error, packet error, or response timeout
			Off	Normal module communication

4. Module Installation and Removal Instructions

4.1 Installation

Align each module unit's side with the direction indicated by the arrow, and snap it onto the upper side of the DIN rail.
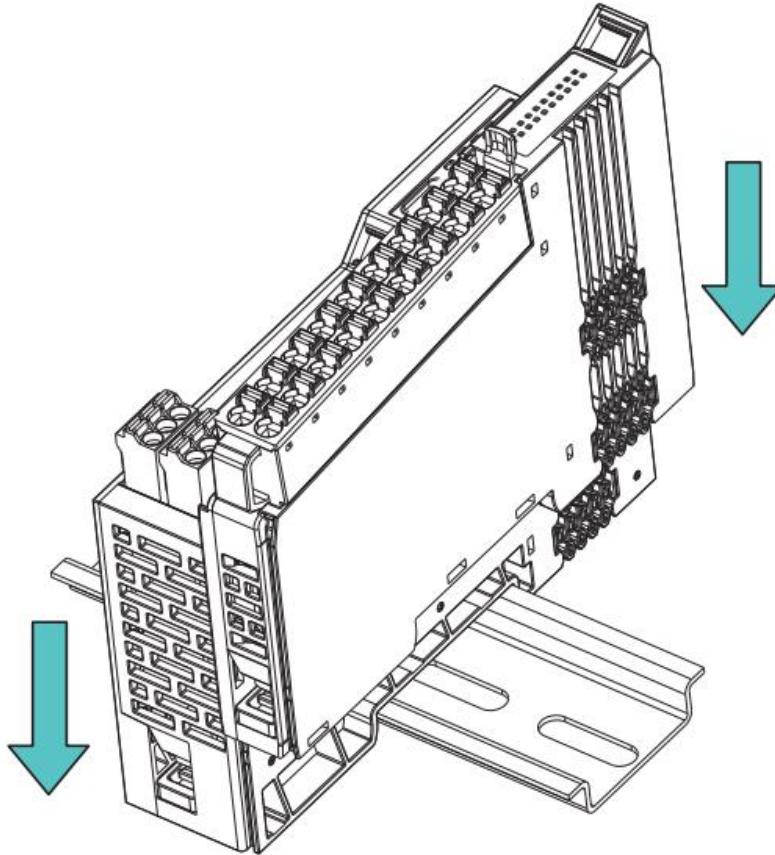Once each unit is positioned, the clip automatically locks onto the rail.

Figure 4.1 Module Installation Diagram

※Note: If the clip fails to engage, press the top of the clip to reset and secure it to the rail.

4.2   Removal

Use a screwdriver to pull down the metal hook on the bottom of each module unit. Following the reverse order of installation, remove each module unit from the DIN rail.
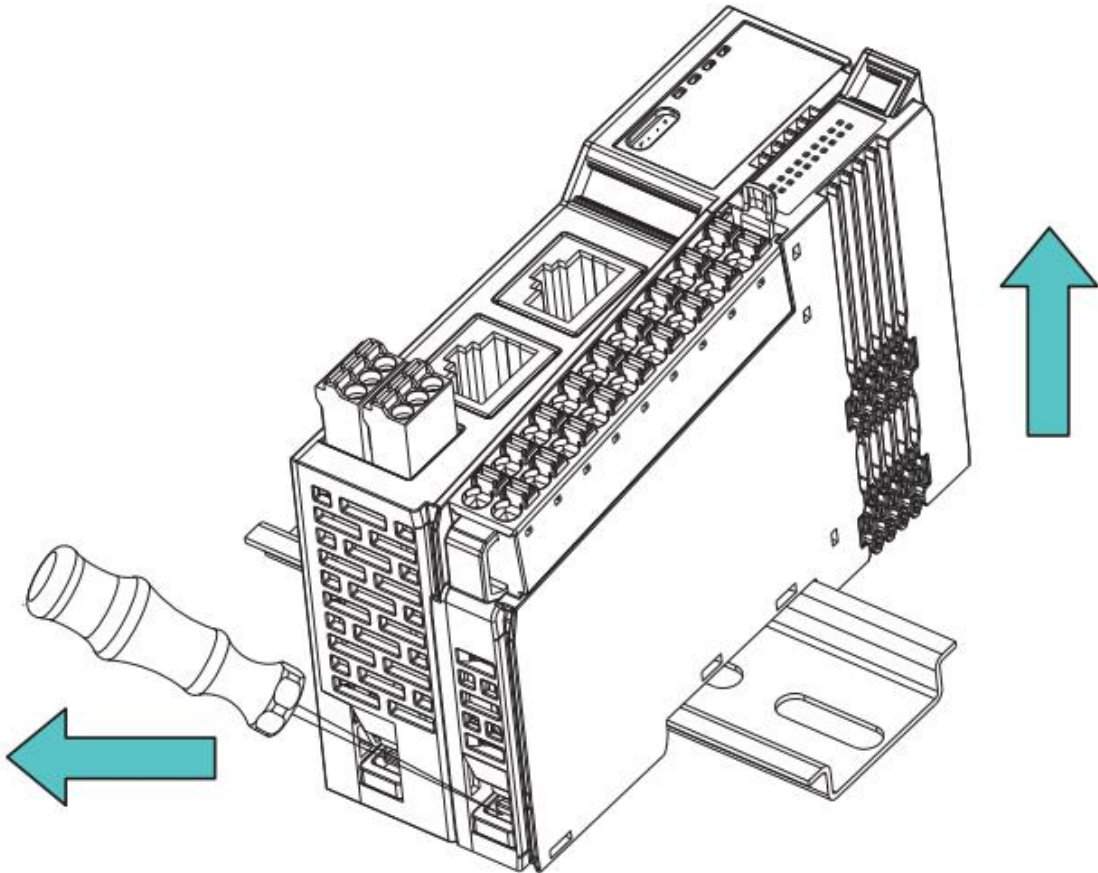
Figure 4.2 Module Removal Diagram

4.3   Module Dimensions

4.3.1.   I/O and Functional Module Dimensions
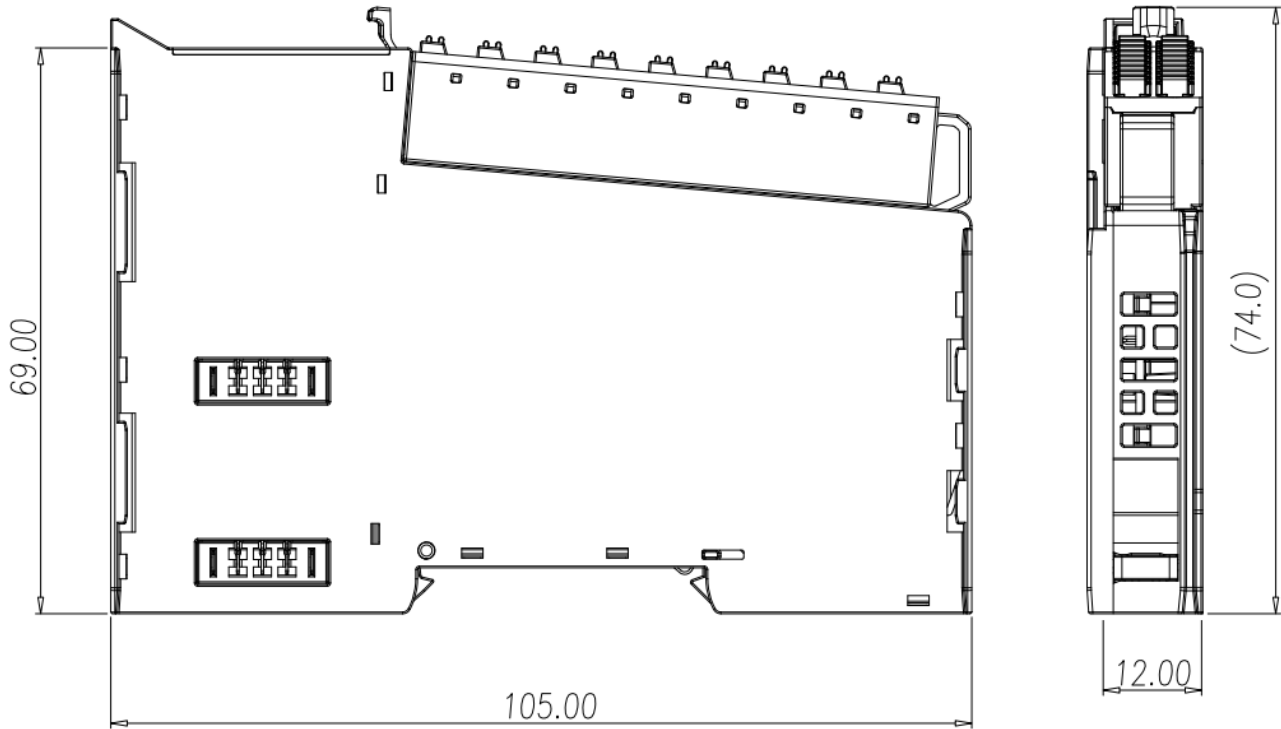
Figure 4.4 I/O Module Dimension Diagram

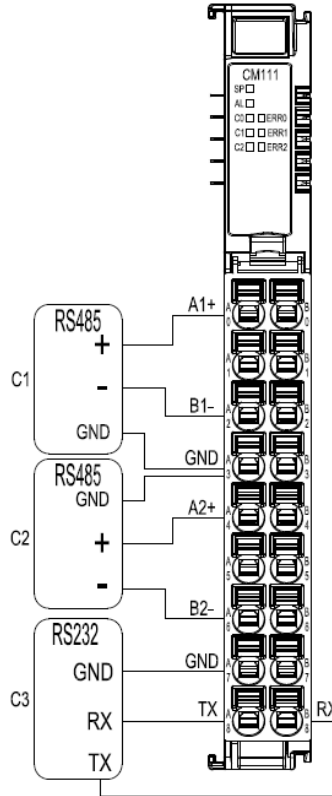# 5. Module Wiring Instructions

5.1 Communication Module

Figure 5.1 GX-CM111

6. Parameter Setting and Configuration Instructions

6.1 Product Assembly Configuration

As shown in the image below, product configuration primarily involves couplers and I/O modules.
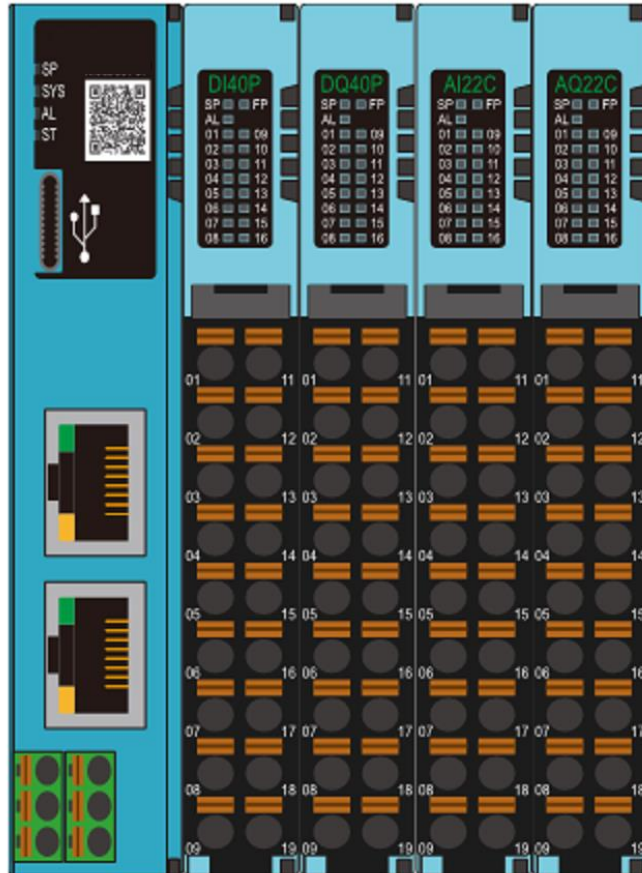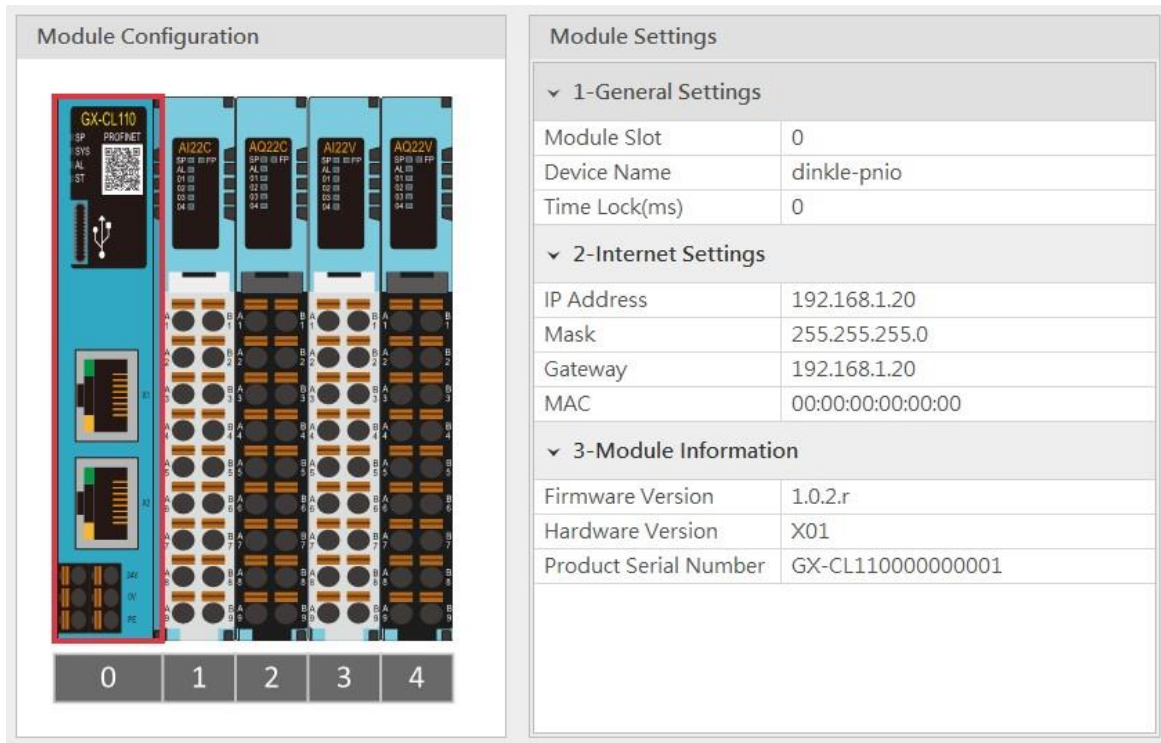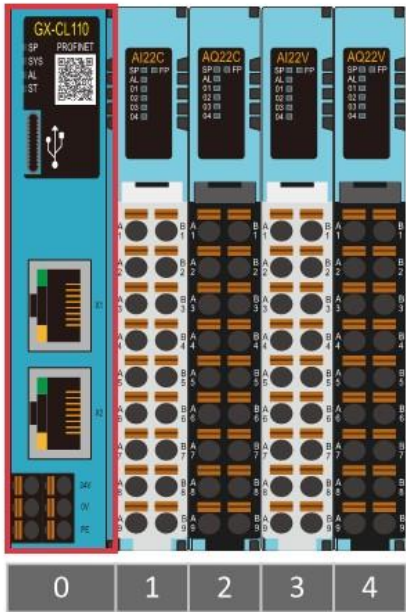

Figure 6.1

Quantity Limit for Configuration
1. A maximum of 64 physical I/O modules can be configured on the coupler.
2. The coupler supports up to 64 modules in total, including both expanded virtual and physical modules.

Virtual Module Limitations

Currently, only GX-CM111 applications are supported. For expanded commands, the virtual module configuration limit is set to 32.

6.2 Coupler Parameter Description

Figure 6.2 Coupler Parameters

6.2.1 General Settings

- Module Slot: Slot number (position); fixed at 0 for the coupler.
- Device Name: Used for name recognition in Profinet network communication. Follow standard naming conventions for the settings.
- Reset Time: Defaults to 0 if not set, meaning the reset function is disabled.
  If the timeout parameter is set to 1000, it means that within 1 second, the module must exchange IO data with the host computer. If no data exchange occurs within this set time, the module will set the output channels to 0.

6.2.2 Network Settings

- IP Address: Can be configured in IPv4 network address format, with a default factory setting of 192.168.1.20.
- Subnet Mask: Configurable; default setting is 255.255.255.0.
- Default Gateway: Configurable; default setting is 19.168.1.20.
- Physical Address: Not configurable; MAC address is factory-set for network identification of different device modules.

6.2.3 Module Information

- Firmware Version: Current module firmware version
- Hardware Version: Module hardware design version
- Product Serial Number: Unique identifier for Daudin products

As shown in Figure 6.2, all parameters (except MAC) can be configured as needed.
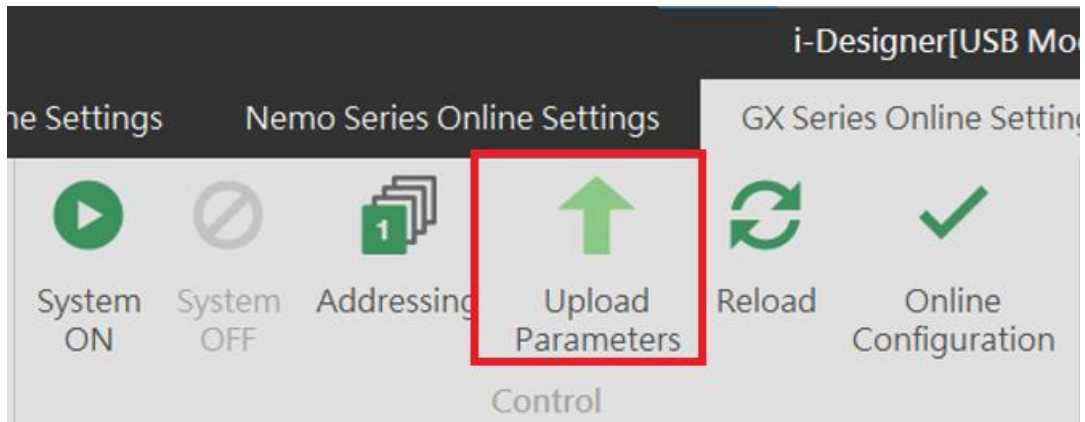After completing the settings, proceed to upload the parameters as shown in Figure 6.3.

Figure 6.3 Upload Parameters

Before proceeding with relevant settings, the system operation must be paused.

6.3 Factory Defaults

Apart from setting parameters through i-Designer, users can also reset system parameters using the reset button located inside the side casing.

Press Time/Mode	Application Mode
Light Press (<6 seconds)	Module restart (RESET)
Long Press (>6 seconds)	Restore default parameters (Application Mode)[Note]

Note: When the user presses the reset button for more than six seconds, the SYS light will illuminate red. After releasing the button, the red light will flash, indicating that the default parameters have been restored.
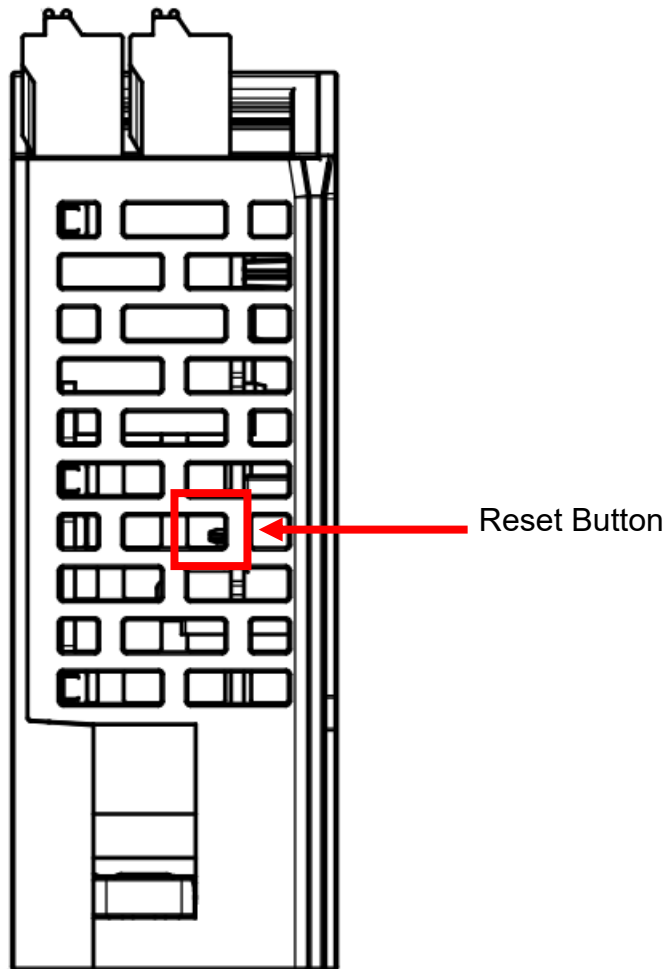

Reset Button

Figure 6.5 System Reset Button

6.4 Error Code Lookup

Users can query system error information and identify timed-out physical modules via the error code module (virtual module).Once setup is complete, the error code module will automatically occupy the last three available slots. If no slots are available, the system will disregard it.

Error Code	Purpose	Length (Word)
System Error	System error information	2
Error Module (01-32)	Physical modules 1-32 triggering timeout	2
Error Module (33-64)	Physical modules 33-64 triggering timeout	2

System Error: System error log, 32-bit data ordered from HSB to LSB

Description	System Error [4 Byte]							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
System Error [3]	Reserved							
System Error [2]	Reserved						Err17	Err16
System Error [1]	Err15	Err14	Err13	Err12	Err11	Err10	Err9	Err8
System Error [0]	Err7	Err6	Err5	Err4	Err3	Err2	Err1	Err0

Err0: Reserved
Err1: Bit set to 1 (Coupler/IO module): Indicates the first boot, with no relevant data in memory
Err2: Bit set to 1 (Coupler/IO module): Indicates memory exceeds the planned size
Err3: Bit set to 1 (Coupler/IO module): Indicates a Checksum error
Err4: Bit set to 1 (Coupler/IO module): Indicates boot failure
Err5: Bit set to 1 (IO module): Indicates that the power is not supplied to the load side of the IO module
Err6: Bit set to 1 (IO module): Indicates IO module over-voltage/over-current
Err7: Bit set to 1 (IO module): Indicates ADC read error in the analog module
Err8: Bit set to 1 (Coupler/IO module): Indicates memory write/erase operation failed
Err9: Bit set to 1 (Coupler): Indicates no saved station record in memory
Err10: Bit set to 1 (Coupler): Indicates the memory station record differs from the boot scan
Err11: Bit set to 1 (Coupler): Indicates no module station number was detected in the boot scan
Err12: Bit set to 1 (Coupler): Indicates communication timeout in Polling Mode for IO modules
Err13: Bit set to 1 (Coupler): Indicates station failure
Err14: Bit set to 1 (Coupler/IO module): Indicates data length in operating mode exceeds the set value
Err15: Bit set to 1 (Coupler): Indicates hot-swap function recovery failure
Err16: Bit set to 1 (Coupler): Indicates network initialization failure
Err17: Bit set to 1 (Coupler): Indicates register address exceeds the control range

Error Module (01-32) **:** Records IO module timeout information, 32-bit data ordered from HSB to LSB

Description	Error Module (01-32) [4 Byte]							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Module Error [3]	Slot32	Slot31	Slot30	Slot29	Slot28	Slot27	Slot26	Slot25
Module Error [2]	Slot24	Slot23	Slot22	Slot21	Slot20	Slot19	Slot18	Slot17
Module Error [1]	Slot16	Slot15	Slot14	Slot13	Slot12	Slot11	Slot10	Slot9
Module Error [0]	Slot8	Slot7	Slot6	Slot5	Slot4	Slot3	Slot2	Slot1

Slot1: IO module ID 1; Bit set to 1 indicates polling timeout for this module
Slot2: IO module ID 2; Bit set to 1 indicates polling timeout for this module
Slot3: IO module ID 3; Bit set to 1 indicates polling timeout for this module
　:
(and so on)
　:
Slot32: IO module ID 32; Bit set to 1 indicates polling timeout for this module

Error Module (33-64) **:** Records IO module timeout information, 32-bit data ordered from HSB to LSB

Description	Error Module (33-64) [4 Byte]							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Module Error [3]	Slot64	Slot63	Slot62	Slot61	Slot60	Slot59	Slot58	Slot57
Module Error [2]	Slot56	Slot55	Slot54	Slot53	Slot52	Slot51	Slot50	Slot49
Module Error [1]	Slot48	Slot47	Slot46	Slot45	Slot44	Slot43	Slot42	Slot41
Module Error [0]	Slot40	Slot39	Slot38	Slot37	Slot36	Slot35	Slot34	Slot33

Slot33: IO module ID 33; Bit set to 1 indicates polling timeout for this module
Slot34: IO module ID 34; Bit set to 1 indicates polling timeout for this module
Slot35: IO module ID 35; Bit set to 1 indicates polling timeout for this module
　:
(and so on)
　:
Slot64: IO module ID 64; Bit set to 1 indicates polling timeout for this module

6.5   Serial Communication Parameters

6.5.1 Valid Mode Parameters

Serial Port Modes / Function Parameters	Master	Slave	Free Port	Description
Communication Port	Port 1~3			RS485(Port 1,2), RS232(Port 3)
Serial Mode	●	●	●	Modbus RTU/ASCII [Note 1]
Transmission Format	●	●	●	Data bits: 7, 8 Parity bit: None, Odd, Even Stop bits: 1, 2
Baud Rate	●	●	●	1200 ~115200
Character Interval	●	●	●	1.5t~200t
Data Input Processing Mode	●			Retain last input value, clear input value
Data Output Mode	●			Polling, data change
Command Delay Time	●		●	Custom, default 100ms
Output Module Reset Time	●			Custom, default 0ms (disabled)
Output Module Control	●			Enabled/Disabled
Output Module Control Mode	●			Polling (continually active), rising edge trigger (single activation)
Power-on Output Module Control Mode	●			Enabled/Disabled
Command Reply Timeout	●		●	Custom, default 1000ms
Slave ID		●		Custom, default 1
Response Delay Time		●		Custom, default 50ms
Communication Return Mode			●	Automatic reporting, acknowledge mode

Note 1: ASCII Mode is currently not supported by the firmware version.

6.5.2 Function Parameter Description

(1) **(M/S/F) Operating Modes:**
- Modbus Master: Used with virtual modules starting with SubM or SubMS_
- Modbus Slave: Used with virtual modules starting with SubS_ or SubMS
- Free Port Mode: Used with virtual modules starting with SubF_

(2) **(M/S/F) Communication Ports:**
- Port 1: RS485 (labeled 1A.1B on the casing)
- Port 2: RS485 (labeled 2A.2B on the casing)
- Port 3: RS232 (labeled TX.RX on the casing)

(3) **(M/S/F) Serial Mode:** Modbus Protocol Mode
- RTU
- ASCII

(4) **(M/S/F) Transmission Format:**
Supports eight modes based on data bits, parity bits, and stop bits.
- (N, 8, 1)
- (N, 8, 2)
- (E, 8, 1)
- (O, 8, 1)
- (E, 7, 1)
- (E, 7, 2)
- (O, 7, 1)
- (O, 7, 2)

(5) **(M/S/F) Baud Rate:**
Standard baud rate, default 9600bps.
- 1200 bps
- 2400 bps
- 4800 bps
- 9600 bps
- 14400 bps
- 19200 bps
- 38400 bps
- 57600 bps
- 115200 bps

(6) **(M/S/F) Character Interval:**
Time interval for receiving packet data; T represents the time for a single character transmission, related to the baud rate, default is 3.5T.
- 1.5T
- 3.5T
- 5T
- 10T
- 10T
- 20T
- 50T
- 100T
- 200T

(7) **(M) Data Input Processing Mode:**

Defines how input data is handled during a timeout while reading from devices. The default is to retain the last input value.
- Retain last input value
- Reset input value to zero

(8) **(M) Data Output Mode:**

In Master mode, this defines how the virtual output module sends commands.
- Polling Mode: Sends packets periodically
- Data Change: Sends write commands only when output data changes

(9) **(M/F) Command Delay Time (ms):**

Interval between Modbus command transmissions (from receiving a response packet from a device to sending the next command). Range: 1-65535 ms, default is 100ms.

(10) **(M) Output Module Reset Time (ms):**

If the CM111 module does not update data after the set time in communication with the coupler system, the output module control data will be set to 0.A setting of 0ms disables the reset function.
- 0: Function disabled
- Available range: 1-65535

(11) **(M) Output Module Control:**

When it is necessary to control Modbus module commands, the content of SubM_Control_Output_xxDev should be used as a control value to determine whether the corresponding module sends commands for read/write control.
- Off
- On

(12) **(M) Output Module Control Mode:**

The method used to control the output module. This control value is only valid when the output module control function is enabled.
- Polling (continually active)
- Rising edge trigger (single activation)

(13) **(M) Power-On Output Module Control Mode:**

Sets the timing for when the output module sends commands.
- On: The CM111 module will send output module commands immediately after power stabilization.
- Off: The CM111 waits to send output module commands until communication control with the coupler is established.

(14) **(M/F) Command Reply Timeout (ms):**

The time the master station waits for a response after sending a command to a slave device. Valid range: 1–65535 ms, default is 1000 ms.

(15) **(S) Slave ID:**

When switching to Slave mode, this ID is the slave ID. The valid range is 1–247.

(16) **(S) Response Reply Time：**

When switching to Slave mode, the time it takes for the module to respond after receiving a command. Valid range: 0–65535 ms, default is 50 ms.

(17) **(F) Communication Return Mode：**

The module's sending/receiving mode when switching to FreePort Mode.
- Autonomous Reporting: Displays received data in the configured virtual input module.
- Acknowledge Mode: Requires control of virtual output module commands (requests) via SubF_Control_Status to display received data in the configured virtual input module (response).

6.5.3 Virtual Module Settings and Descriptions

I. Master Mode
(1) Diagnostic Module

- **Module Status Input (SubMS_Status_xxDev):** Available in four lengths: 08, 16, 24, and 32 Dev, each occupying 1, 2, 3, or 4 bytes of input space. Each bit corresponds to the index of a virtual module, with "0" indicating no error and "1" indicating an error in that module.
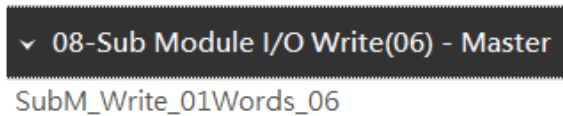
- **Module Error Code Input (SubMS_ErrorInfo_xxDev): Available in four lengths: 08, 16, 24, and 32 Dev, each occupying 8, 16, 24, or 32 words of input space. Each word contains an error message associated with a specific virtual module index, composed of the module's function code and error code. Users can identify error causes based on these codes to determine corrective actions.**

Master Error Codes		
Error Code	**Description**	**Solution**
0x00	Operating normally	None
0xAA	Slave device timeout	Verify module serial port settings and connections to the slave device
0xXX	Slave device error code	Address issues based on the error codes from the slave device

- **Module Output Control (SubM_Control_Output_xxDev):** Available in four lengths: 08, 16, 24, and 32 Dev, occupying 1, 2, 3, or 4 bytes of input space. Each bit acts as a control switch for a virtual module index. This setting takes effect **only when the output module control function is enabled.** In Polling Mode, when the control bit is set to 0, command transmission is disabled; when set to 1, command transmission is enabled. In rising-edge trigger mode, only the transition from 0 to 1 triggers command transmission.

- **Polling Time Input (SubM_Polling_Time):** Occupies 3 words, representing polling times for Port1, Port2, and Port3.

(2) **Read Coil Module (SubS_Write_xxxBytes_01): Data length: 8 to 128 bytes**

∨ 03-Sub Module I/O Read(01) - Master
SubM_Read_008Bits_01
SubM_Read_016Bits_01
SubM_Read_024Bits_01
SubM_Read_032Bits_01
SubM_Read_040Bits_01
SubM_Read_048Bits_01
SubM_Read_056Bits_01
SubM_Read_064Bits_01
SubM_Read_072Bits_01
SubM_Read_080Bits_01
SubM_Read_088Bits_01
SubM_Read_096Bits_01
SubM_Read_104Bits_01
SubM_Read_112Bits_01
SubM_Read_120Bits_01

Figure 6.12

(3) **Read Discrete Coil Module (SubS_Write_xxxBytes_02): Data length: 8 to 128 bytes**

∨ 04-Sub Module I/O Read(02) - Master
SubM_Read_008Bits_02
SubM_Read_016Bits_02
SubM_Read_024Bits_02
SubM_Read_032Bits_02
SubM_Read_040Bits_02
SubM_Read_048Bits_02
SubM_Read_056Bits_02
SubM_Read_064Bits_02
SubM_Read_072Bits_02
SubM_Read_080Bits_02
SubM_Read_088Bits_02
SubM_Read_096Bits_02
SubM_Read_104Bits_02
SubM_Read_112Bits_02
SubM_Read_120Bits_02
SubM_Read_128Bits_02

Figure 6.13

(4)   **Read Input Register Module (SubS_Write_xxxWords_04): Data length: 8 to 128 bytes**

06-Sub Module I/O Read(04) - Master
SubM_Read_01Words_04
SubM_Read_02Words_04
SubM_Read_03Words_04
SubM_Read_04Words_04
SubM_Read_05Words_04
SubM_Read_06Words_04
SubM_Read_07Words_04
SubM_Read_08Words_04
SubM_Read_09Words_04
SubM_Read_10Words_04
SubM_Read_11Words_04
SubM_Read_12Words_04
SubM_Read_13Words_04
SubM_Read_14Words_04
SubM_Read_15Words_04
SubM_Read_16Words_04

Figure 6.14

(5)   **Read Holding Register Module (SubS_Write_xxxWords_03): Data length: 8 to 128 bytes**

05-Sub Module I/O Read(03) - Master
SubM_Read_01Words_03
SubM_Read_02Words_03
SubM_Read_03Words_03
SubM_Read_04Words_03
SubM_Read_05Words_03
SubM_Read_06Words_03
SubM_Read_07Words_03
SubM_Read_08Words_03
SubM_Read_09Words_03
SubM_Read_10Words_03
SubM_Read_11Words_03
SubM_Read_12Words_03
SubM_Read_13Words_03
SubM_Read_14Words_03
SubM_Read_15Words_03
SubM_Read_16Words_03

Figure 6.15

(6) **Write Coil Module (SubS_Read_xxxBytes_0F): Data length: 8 to 128 bytes**

10-Sub Module I/O Write(0F) - Master
SubM_Write_008Bits_0F
SubM_Write_016Bits_0F
SubM_Write_024Bits_0F
SubM_Write_032Bits_0F
SubM_Write_040Bits_0F
SubM_Write_048Bits_0F
SubM_Write_056Bits_0F
SubM_Write_064Bits_0F
SubM_Write_072Bits_0F
SubM_Write_080Bits_0F
SubM_Write_088Bits_0F
SubM_Write_096Bits_0F
SubM_Write_104Bits_0F
SubM_Write_112Bits_0F
SubM_Write_120Bits_0F
SubM_Write_128Bits_0F

Figure 6.16

Supports Single Coil Writing (SubM_Write_xxxBits_05)

07-Sub Module I/O Write(05) - Master
SubM_Write_016Bits_05

Figure 6.17

(7) **Write Holding Register Module (SubM_Write_xxxWords_10): Data length: 1 to 16 words**

09-Sub Module I/O Write(10) - Master
SubM_Write_01Words_10
SubM_Write_02Words_10
SubM_Write_03Words_10
SubM_Write_04Words_10
SubM_Write_05Words_10
SubM_Write_06Words_10
SubM_Write_07Words_10
SubM_Write_08Words_10
SubM_Write_09Words_10
SubM_Write_10Words_10
SubM_Write_11Words_10
SubM_Write_12Words_10
SubM_Write_13Words_10
SubM_Write_14Words_10
SubM_Write_15Words_10
SubM_Write_16Words_10

Figure 6.18

Supports single register writing (SubM_Write_xxxWords_06)

08-Sub Module I/O Write(06) - Master
SubM_Write_01Words_06

Figure 6.19

II. **Slave Mode**

(1) **Diagnostic Module**

- **Module Status Input (SubMS_Status_xxDev):** Available in four lengths: 08, 16, 24, and 32 Dev, each occupying 1, 2, 3, or 4 bytes of input space. Each bit corresponds to the index of a virtual module, with "0" indicating no error and "1" indicating an error in that module.

- **Module Error Code Input (SubMS_ErrorInfo_xxDev): Available in four lengths: 08, 16, 24, and 32 Dev, each occupying 8, 16, 24, or 32 words of input space. Each word contains an error message associated with a specific virtual module index, composed of the module's function code and error code. Users can identify error causes based on these codes to determine corrective actions.**

Slave Error Codes		
Error Code	**Description**	**Solution**
0x00	Operating normally	None
0x01	Invalid function code	Module does not support the current function code; refer to the relevant function code module.
0x02	Invalid data address	Data exceeds module address range; modify the data starting position or length.
0x03	Invalid data length	Incorrect data length; adjust to the correct length.
0x04	Incorrect or invalid virtual module configuration	Refer to the settings for the corresponding virtual module.

(2) **Read Coil Module (SubS_Write_xxxBytes_01): Data length: 1 to 128 bytes**

(3)

> ∨ 03-Sub Module I/O Write(01) - Slave
> SubS_Write_001Bytes_01
> SubS_Write_002Bytes_01
> SubS_Write_004Bytes_01
> SubS_Write_008Bytes_01
> SubS_Write_016Bytes_01
> SubS_Write_032Bytes_01
> SubS_Write_064Bytes_01
> SubS_Write_128Bytes_01
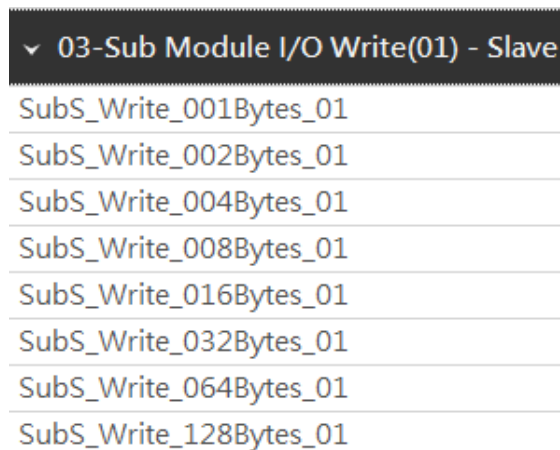
Figure 6.20

(4) **Read Discrete Coil Module (SubS_Write_xxxBytes_02): Data length: 1 to 128 bytes**

Figure 6.21

(5) **Read Input Register Module (SubS_Write_xxxWords_04): Data length: 1 to 64 words**

Figure 6.22

(6) **Read Holding Register Module (SubS_Write_xxxWords_03): Data length: 1 to 64 words**

Figure 6.23

(7)   **Write Coil Module (SubS_Read_xxxBytes_0F): Data length: 1 to 128 bytes**

- 10-Sub Module I/O Read(0F) - Slave
SubS_Read_001Bytes_0F
SubS_Read_002Bytes_0F
SubS_Read_004Bytes_0F
SubS_Read_008Bytes_0F
SubS_Read_016Bytes_0F
SubS_Read_032Bytes_0F
SubS_Read_064Bytes_0F
SubS_Read_128Bytes_0F

Figure 6.24
Supports Single Register Write (SubS_Read_xxxWords_05)
Figure 6.25

- 07-Sub Module I/O Read(05) - Slave
SubS_Read_002Bytes_05

(8)   **Write Holding Register Module (SubS_Read_xxxWords_10): Data length: 1 to 64 words**

- 09-Sub Module I/O Read(10) - Slave
SubS_Read_001Words_10
SubS_Read_002Words_10
SubS_Read_004Words_10
SubS_Read_008Words_10
SubS_Read_016Words_10
SubS_Read_032Words_10
SubS_Read_064Words_10

Figure 6.26
Supports single register writing (SubS_Read_xxxWords_06)

- 08-Sub Module I/O Read(06) - Slave
SubS_Read_001Words_06

Figure 6.27

III. **Free Mode**
(1) **Status Control Module (SubF_Control_Status):**

Control and Status Module Data Definition				
Data Direction	**Data Name**	**Data Variable Name**	**Data Type**	**Byte Offset**
Input Data	Send Control Feedback	TransControl	uint16_t	0
	Send Status Feedback	TransStatus	uint16_t	2
	Send Length Feedback	TransLenth	uint16_t	4
	Receive Count Value	ReceiveCount	uint16_t	6
	Receive Length	ReceiveLenth	uint16_t	8
	Error Count Value	ErrCount	uint16_t	10
Output Data	Output Control	SendControl	uint16_t	0
	Send Length	SendLenth	uint16_t	2

(2) **Input Data Module (SubF_Read_xxxWords): Data length: 1 to 64 words**
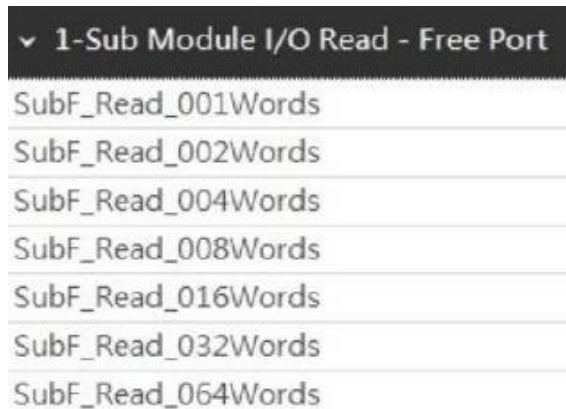
Figure 6.28

(3) **Output Data Module (SubF_Write_xxxWords): Data length: 1 to 64 words**
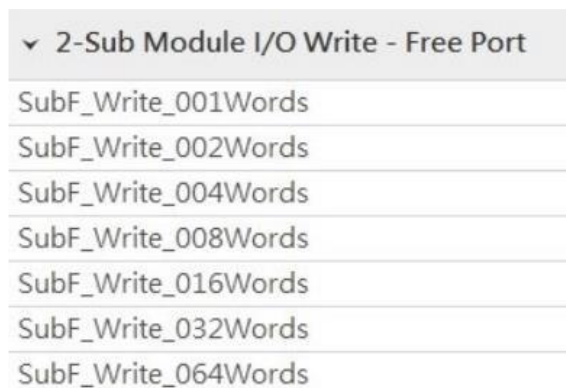
Figure 6.29

6.5.4 Diagnostic Module

Free Port Mode

˅ 01-Sub Module Diagnostic
SubMS_Status_08Dev
SubMS_Status_16Dev
SubMS_Status_24Dev
SubMS_Status_32Dev
SubM_Polling_Time
SubM_Control_Output_08Dev
SubM_Control_Output_16Dev
SubM_Control_Output_24Dev
SubM_Control_Output_32Dev
SubF_Control_Status
˅ 02-Sub Module Error Information
SubMS_ErrorInfo_08Dev
SubMS_ErrorInfo_16Dev
SubMS_ErrorInfo_24Dev
SubMS_ErrorInfo_32Dev

Slave Mode

˅ 01-Sub Module Diagnostic
SubMS_Status_08Dev
SubMS_Status_16Dev
SubMS_Status_24Dev
SubMS_Status_32Dev
SubM_Polling_Time
SubM_Control_Output_08Dev
SubM_Control_Output_16Dev
SubM_Control_Output_24Dev
SubM_Control_Output_32Dev
˅ 02-Sub Module Error Information
SubMS_ErrorInfo_08Dev
SubMS_ErrorInfo_16Dev
SubMS_ErrorInfo_24Dev
SubMS_ErrorInfo_32Dev

Master Mode

∨ 01-Sub Module Diagnostic
SubMS_Status_08Dev
SubMS_Status_16Dev
SubMS_Status_24Dev
SubMS_Status_32Dev
SubM_Polling_Time
SubM_Control_Output_08Dev
SubM_Control_Output_16Dev
SubM_Control_Output_24Dev
SubM_Control_Output_32Dev
∨ 02-Sub Module Error Information
SubMS_ErrorInfo_08Dev
SubMS_ErrorInfo_16Dev
SubMS_ErrorInfo_24Dev
SubMS_ErrorInfo_32Dev

7. Appendix I: i-Designer Instructions

7.1 Installation

Download the i-Designer program from the official website, then click on the program (as shown in the figure) to install it.

Figure 7.1 Program Icon

After reading the user agreement, please check the box and click Start Installation.

Figure 7.2 Click Start Installation

During installation, the progress will be displayed.
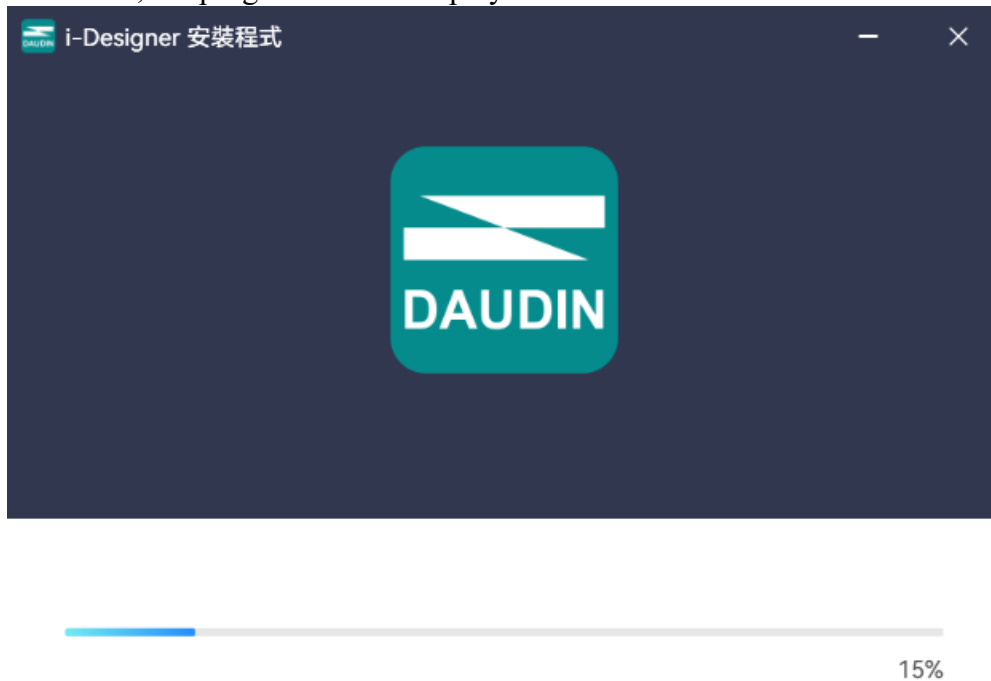
Figure 7.3 Installation Progress

Once the software installation is complete, you can choose to run it immediately by clicking the Finish button.

Figure 7.4 Installation Complete

7.2 UI Screen Description

After installation, locate the program icon on the desktop and click it to open the settings screen (see the figure below).

Figure 7.5 Program Icon

The screen is organized as follows, from top to bottom:
I.   Tab Area: Select different product series or switch languages.
II. Function Key Area: Displays different function keys based on the selected tab.
III. Display and Configuration Area: Shows the module status and settings.
IV. Progress Display Area: Displays the progress of various functions in percentages, helping users understand the current execution status, such as configuration or updates.
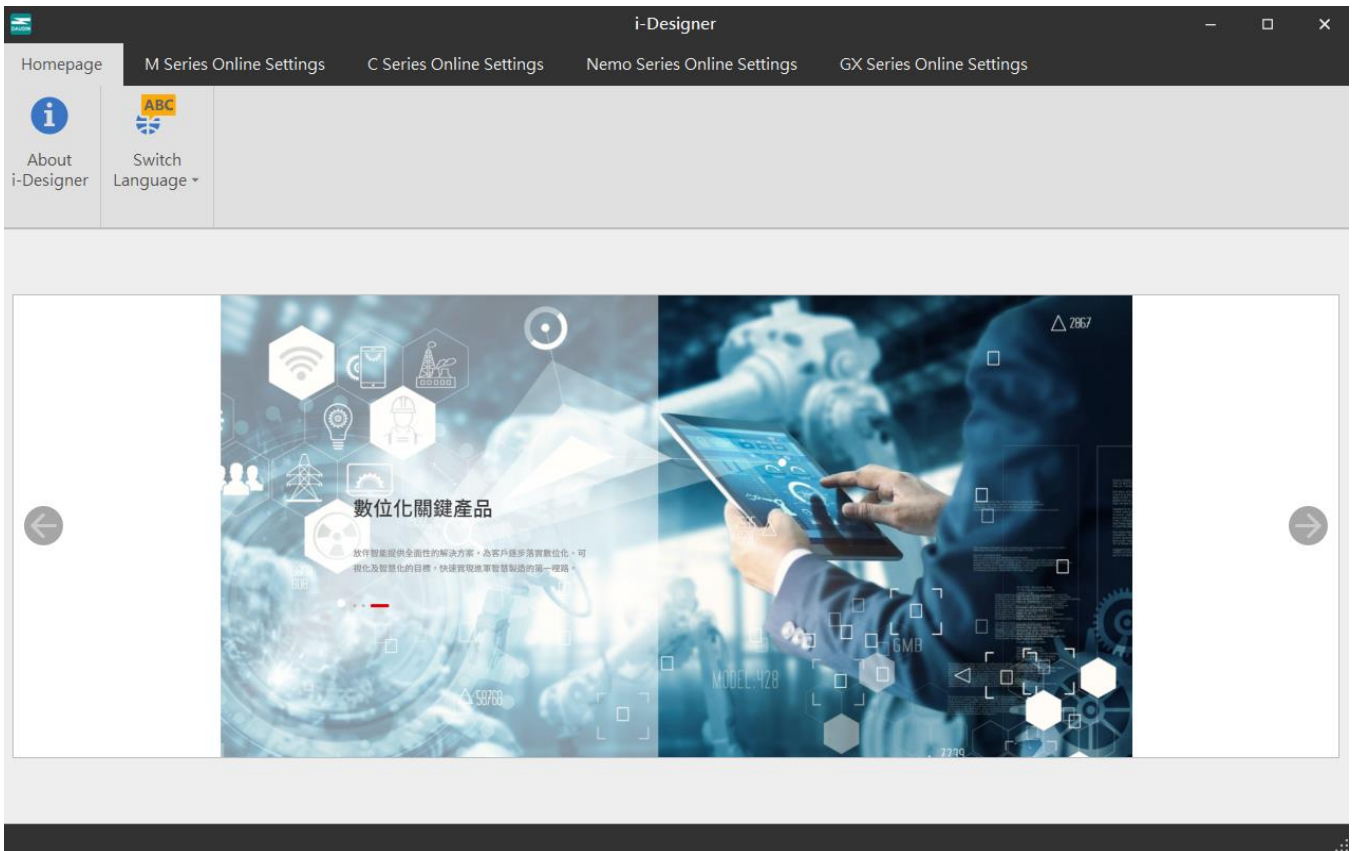
Figure 7.6 Default Homepage

Tab Area:

(1) Homepage Tab: Provides information about i-Designer and options for switching the language.

(2) Product Settings Tab: Used for setting parameters for various **iO-GRID** product series.
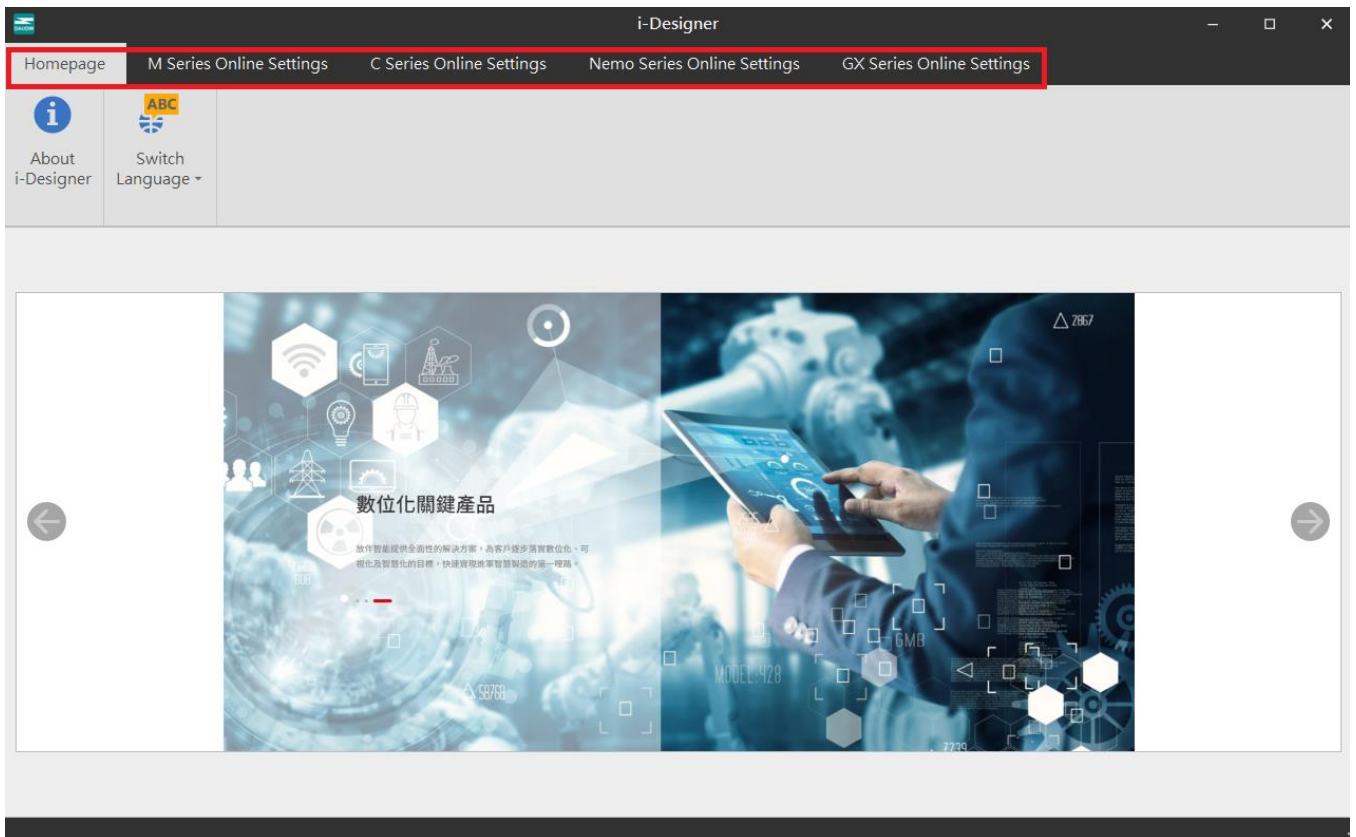
Figure 7.7 Tab

Function Key Area:

The function keys displayed here vary based on the selected tab and product. The relevant descriptions are as follows:

Icon		Name	Description
		About i-Designer	Shows software version information.
		Switch Languages	Switches between Traditional Chinese, Simplified Chinese, and English.
		Connection Mode	Offers automatic or manual module connection modes.
		Connection Info	
		Connect	Connects to the module.
		Disconnect	Disconnects from the module.
		System stop	Temporarily stops the module system.
		System running	Starts the module system.
		Auto Station Assignment	Reconfigures the station numbers of the module system.
		Upload parameters	Updates the module settings.
		Online Adjustment	
		Check for Updates	Searches and compares the current module firmware version to check if it's the latest.
		Firmware update	Manually updates the module firmware.
		Point Information Overview	Displays all operational data of the modules.
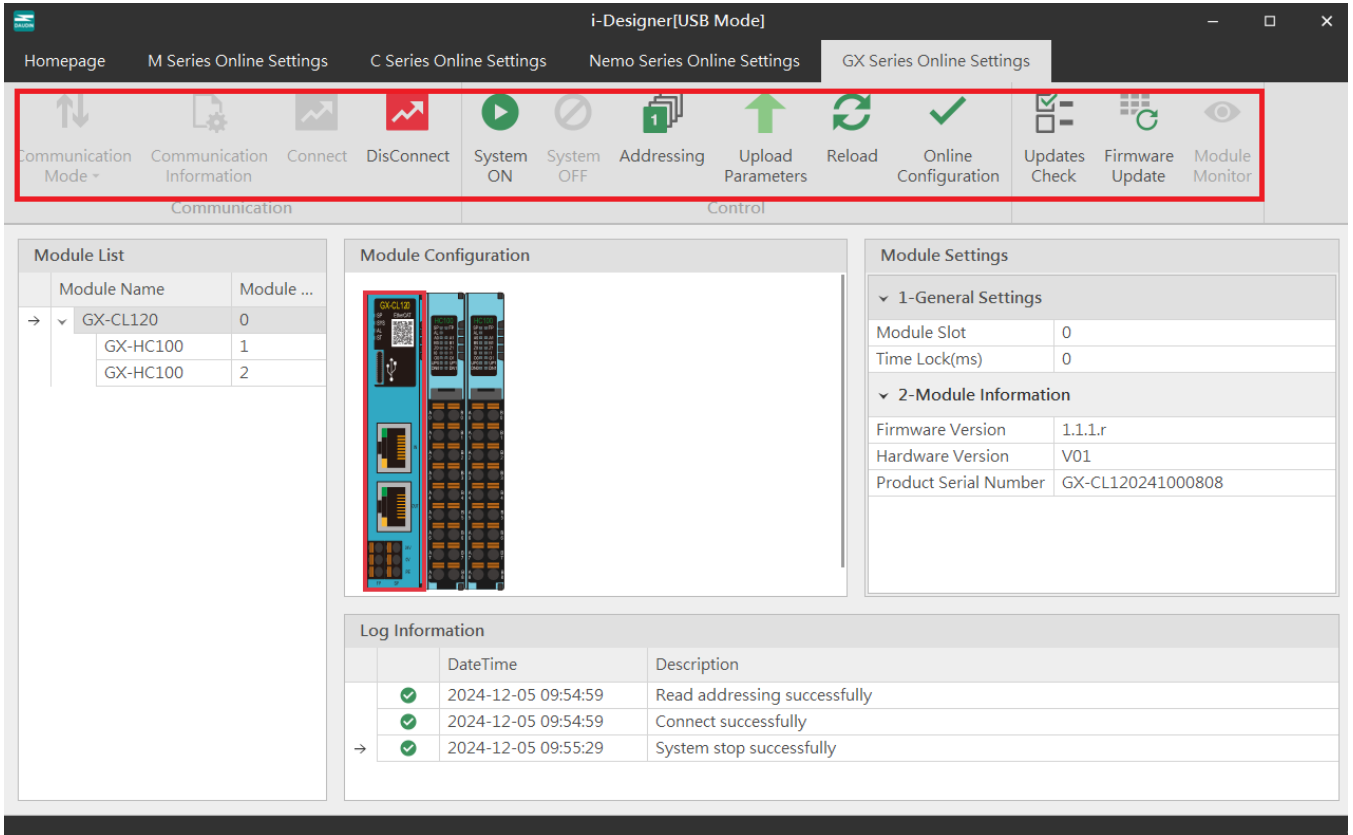
Figure 7.8 Function Key Area

Display and configuration section：

Figure 7.9 Display and configuration section

Figure 7.10 Progress Display Area

7.3 i-Designer Information Verification

Click on the homepage -> About i-Designer
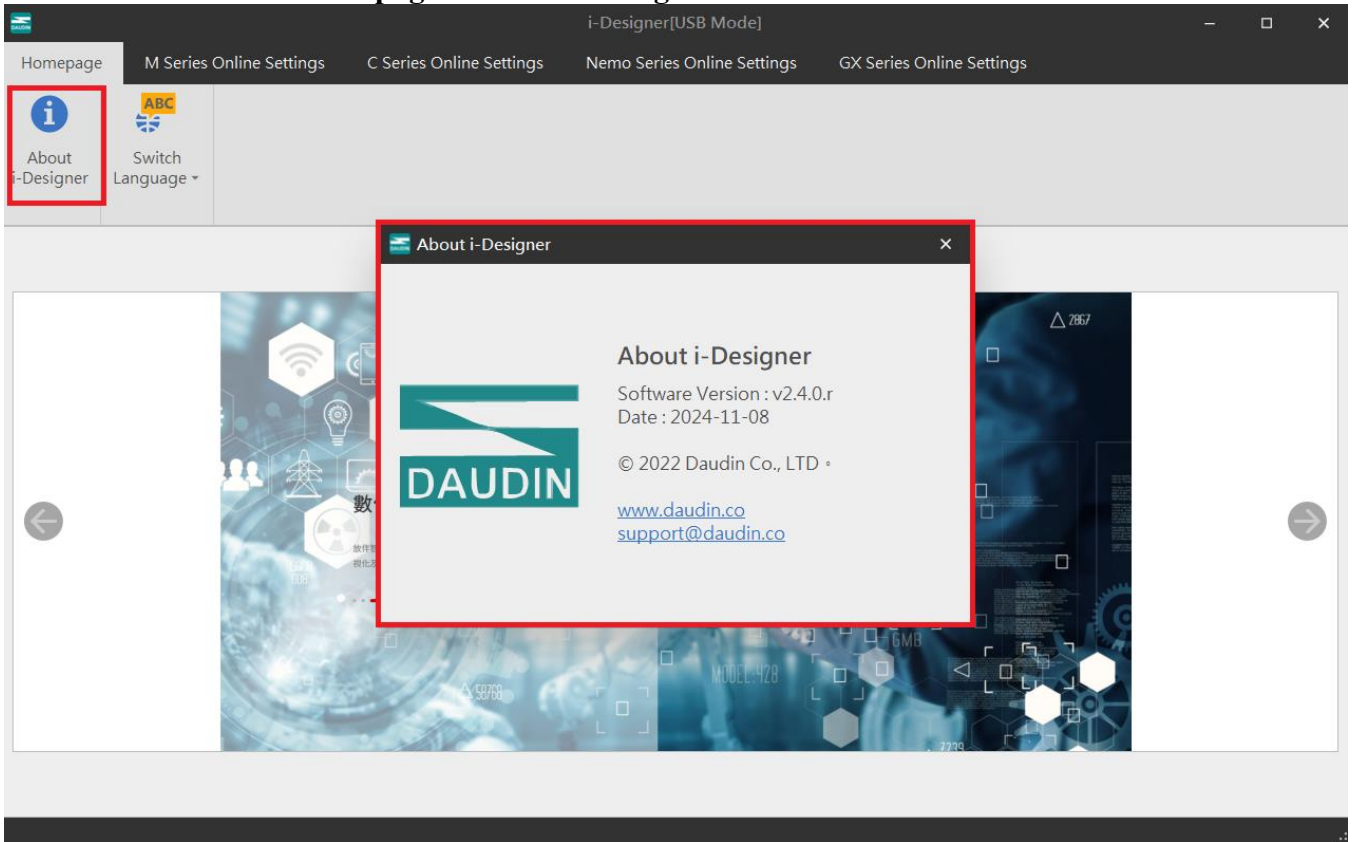
Figure 7.11 Software Information

7.4 Language Settings

i-Designer currently supports three languages: Traditional Chinese, Simplified Chinese, and English. Use this feature to change the language.
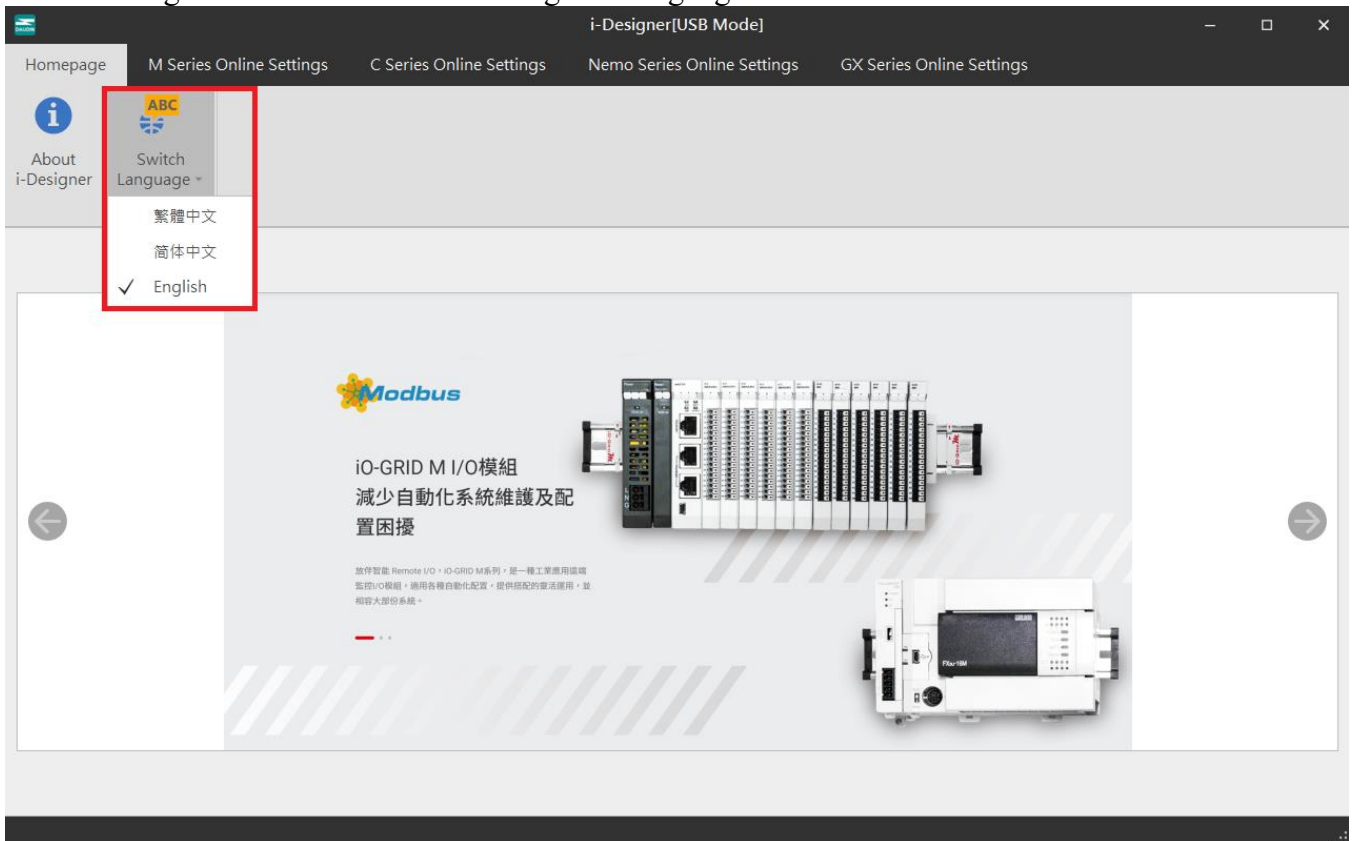
Figure 7.12 Language Selection

7.5 COM Port Connection Settings

i-Designer communicates with the **iO-GRID** coupler module primarily through the COM Port interface. Connection modes include automatic module search mode and manual COM Port connection mode.

Before setting up a custom connection with the **iO-GRID**, please confirm the COM Port number assigned to the coupler module to proceed with configuration.
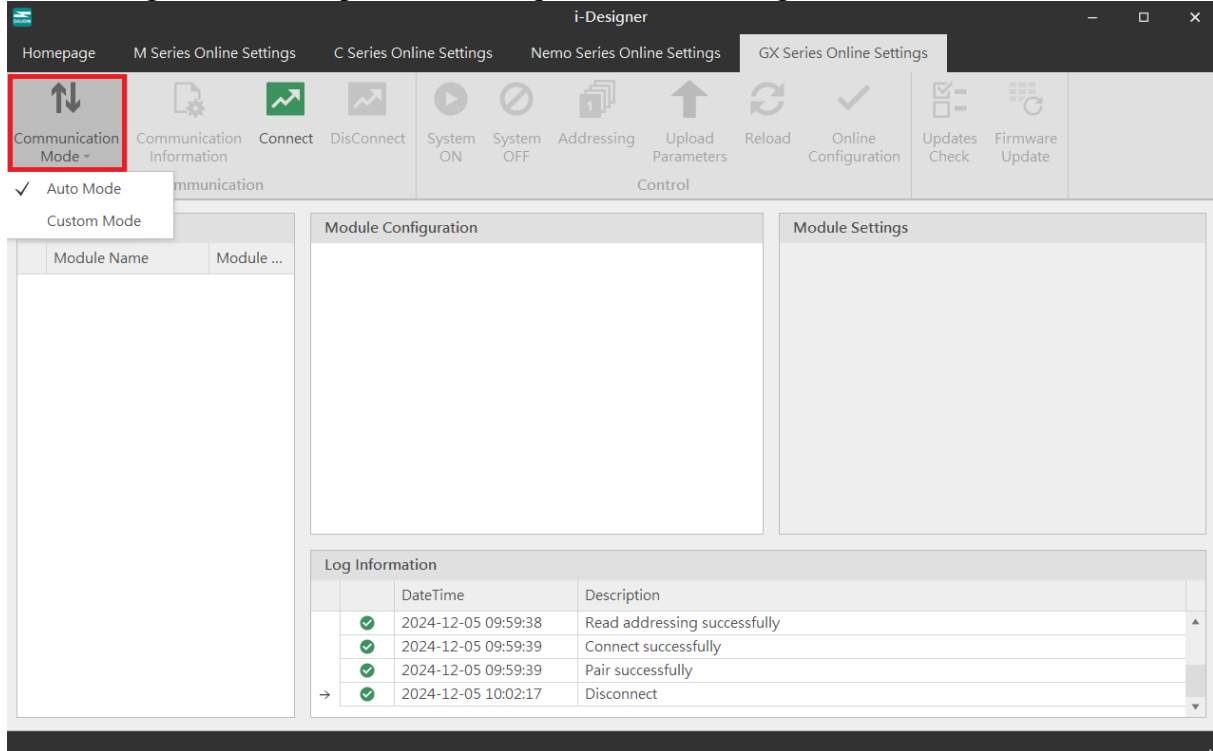
Figure 7.13 Connection Modes
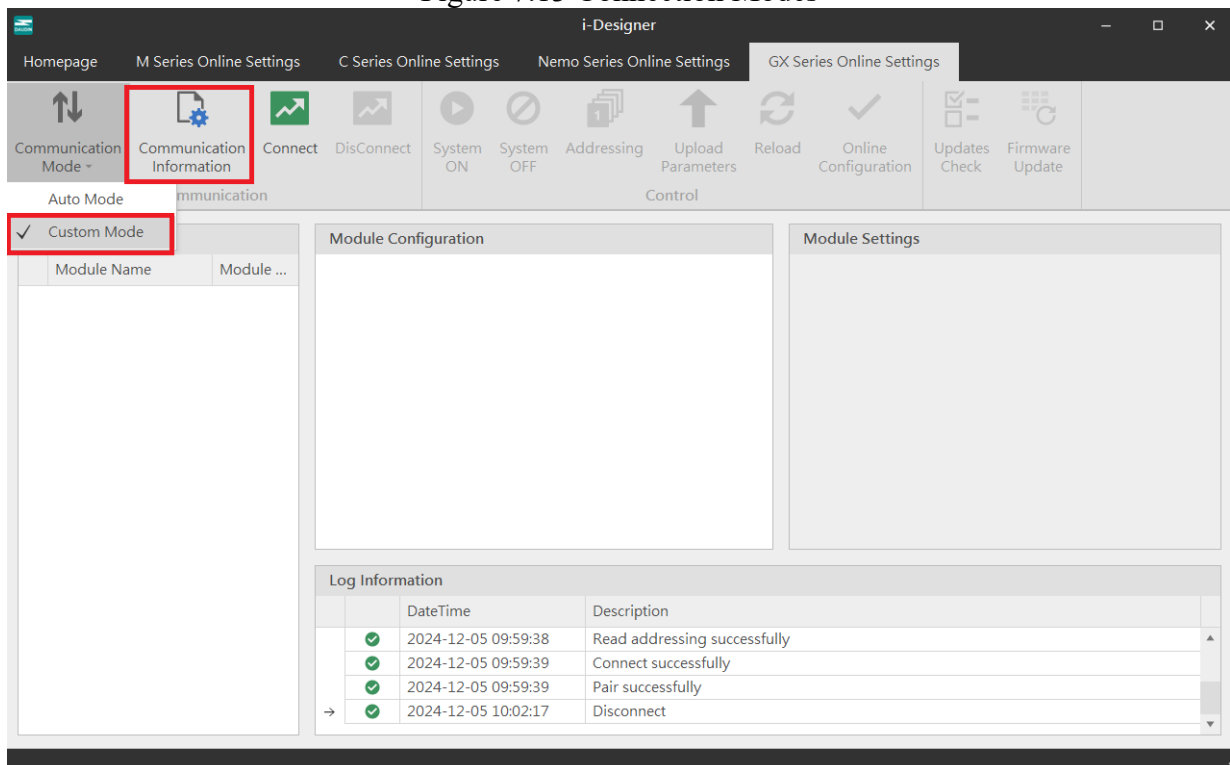
Figure 7.14 Custom Mode Setup
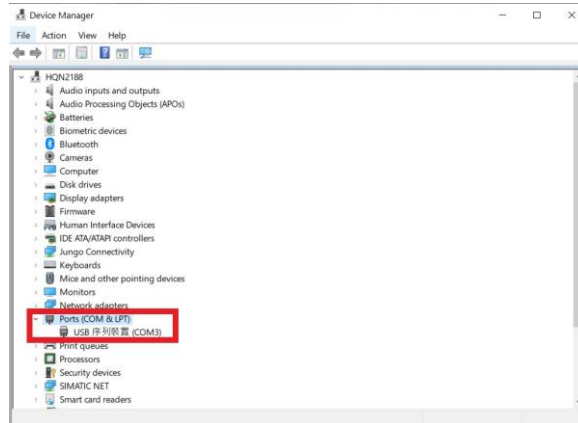
Figure 7.15 Checking the COM Port Number in Device Manager
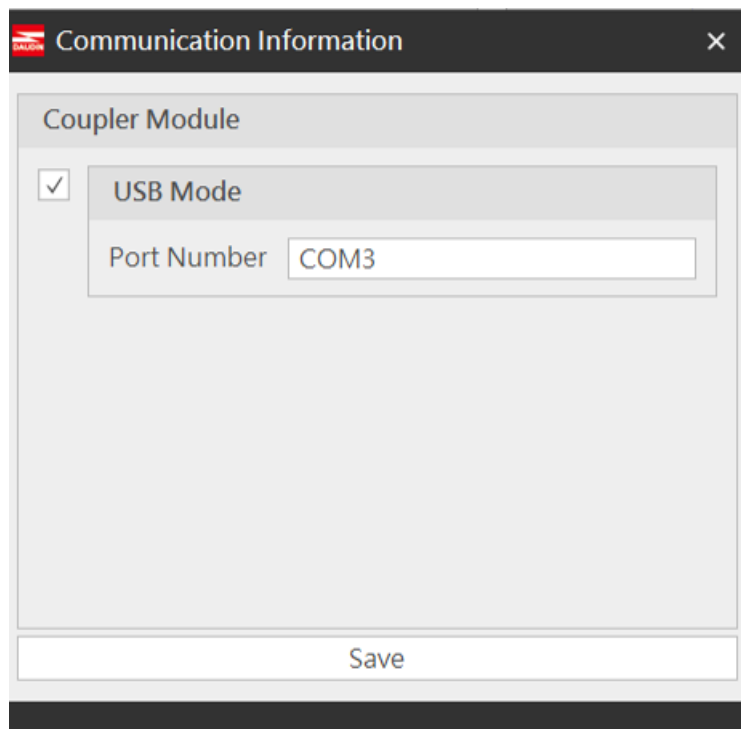
Figure 7.16 Configuring COM Port Settings

7.6 Connection Setting Instructions

Once the connection is successful, the current connection mode will be displayed in the window, and the firmware version of all modules will be detected. If the system is running, a pop-up window will ask whether to stop the system to perform firmware version detection for all modules.
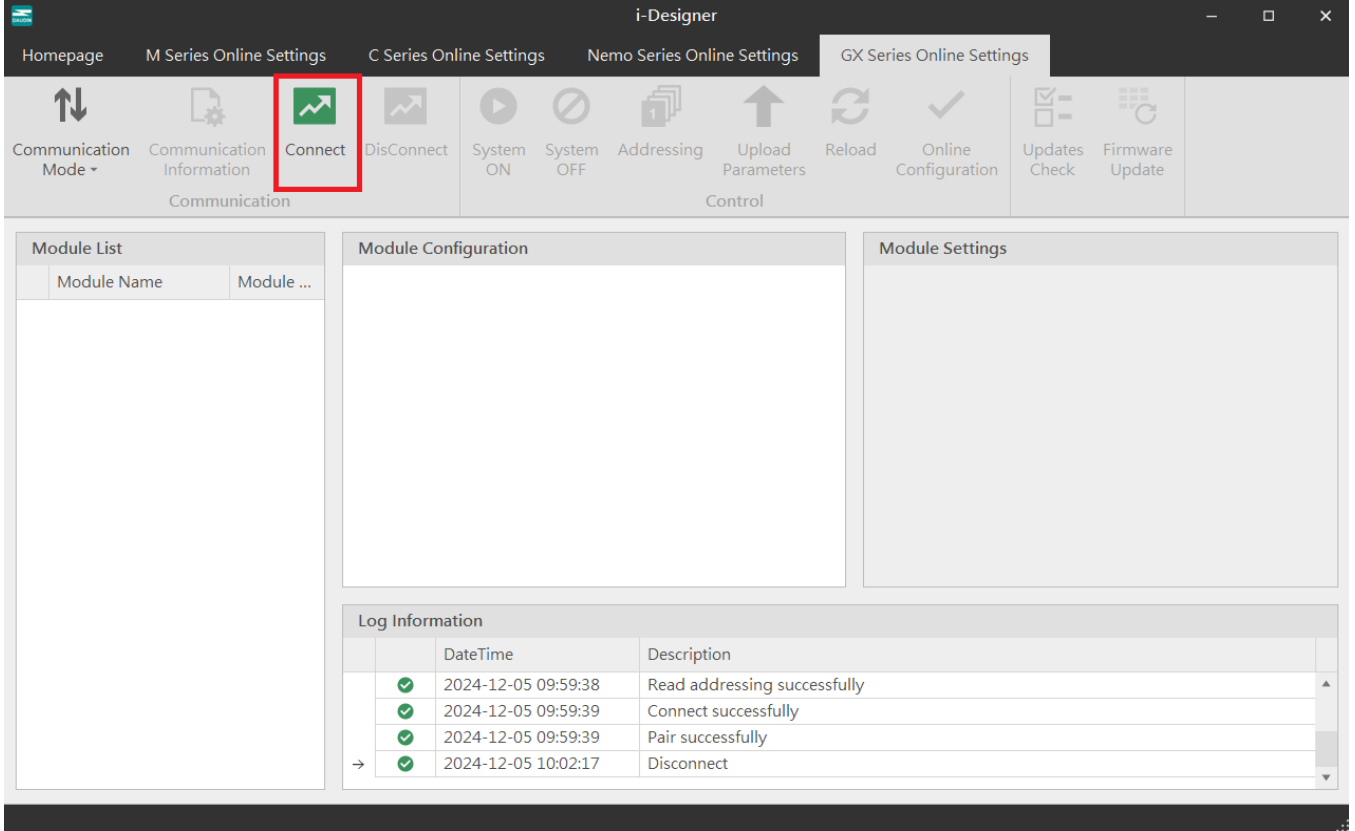
Figure 7.17 Setting Connection
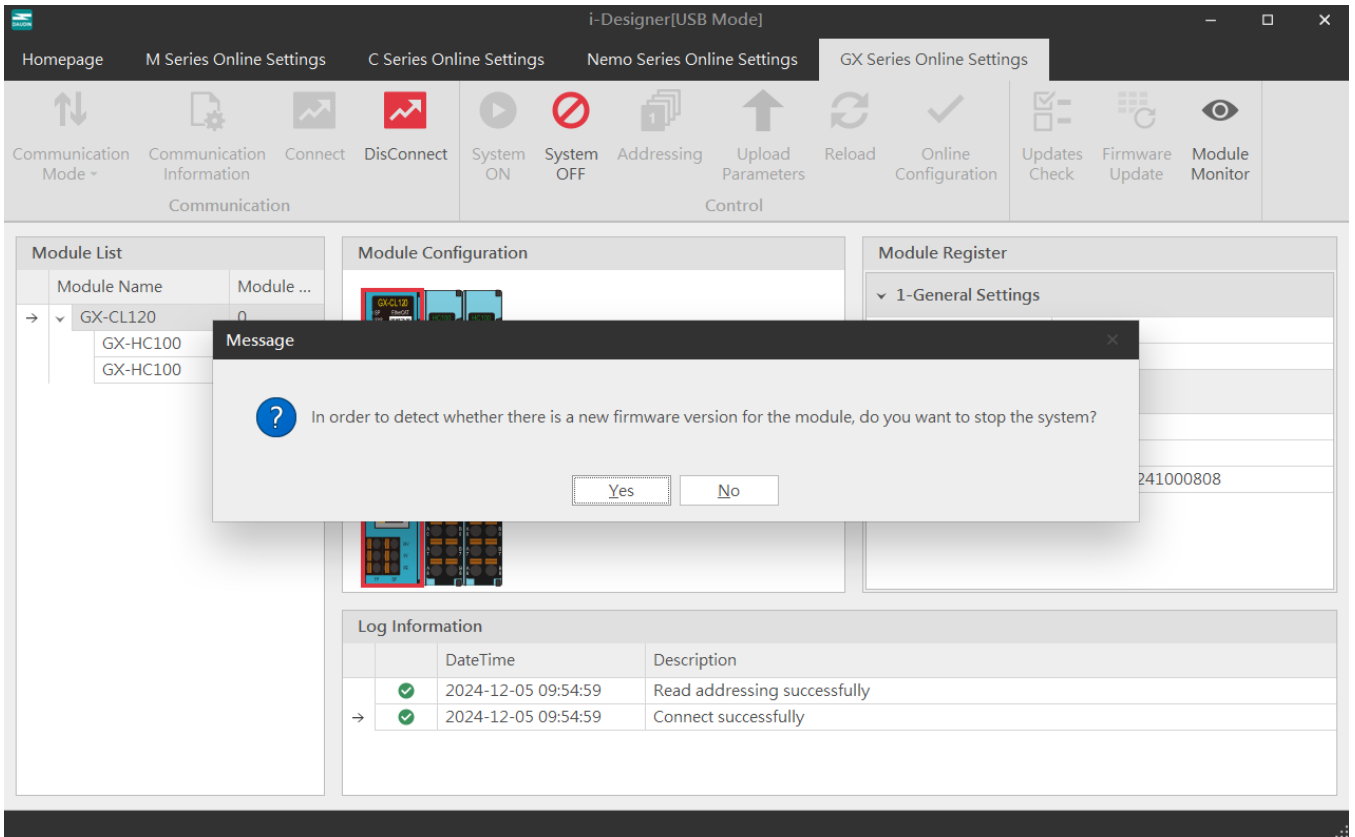
Figure 7.18 After Connection, The Module Automatically Checks For Updates And Notifies You
If the system is stopped, i-Designer will automatically detect the module version.
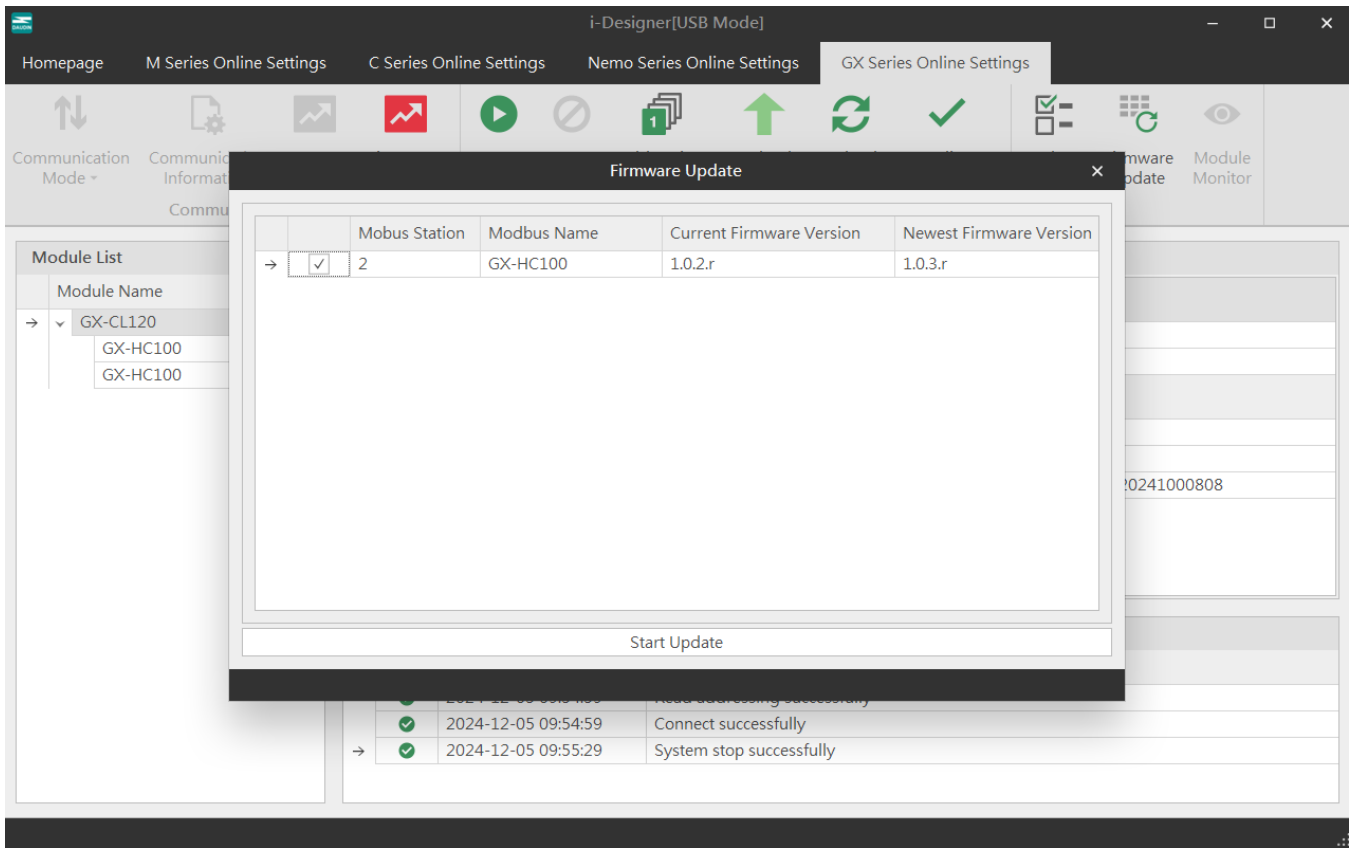
Figure 7.19 Module Version Data

Only after the system is stopped can the module functions be configured.
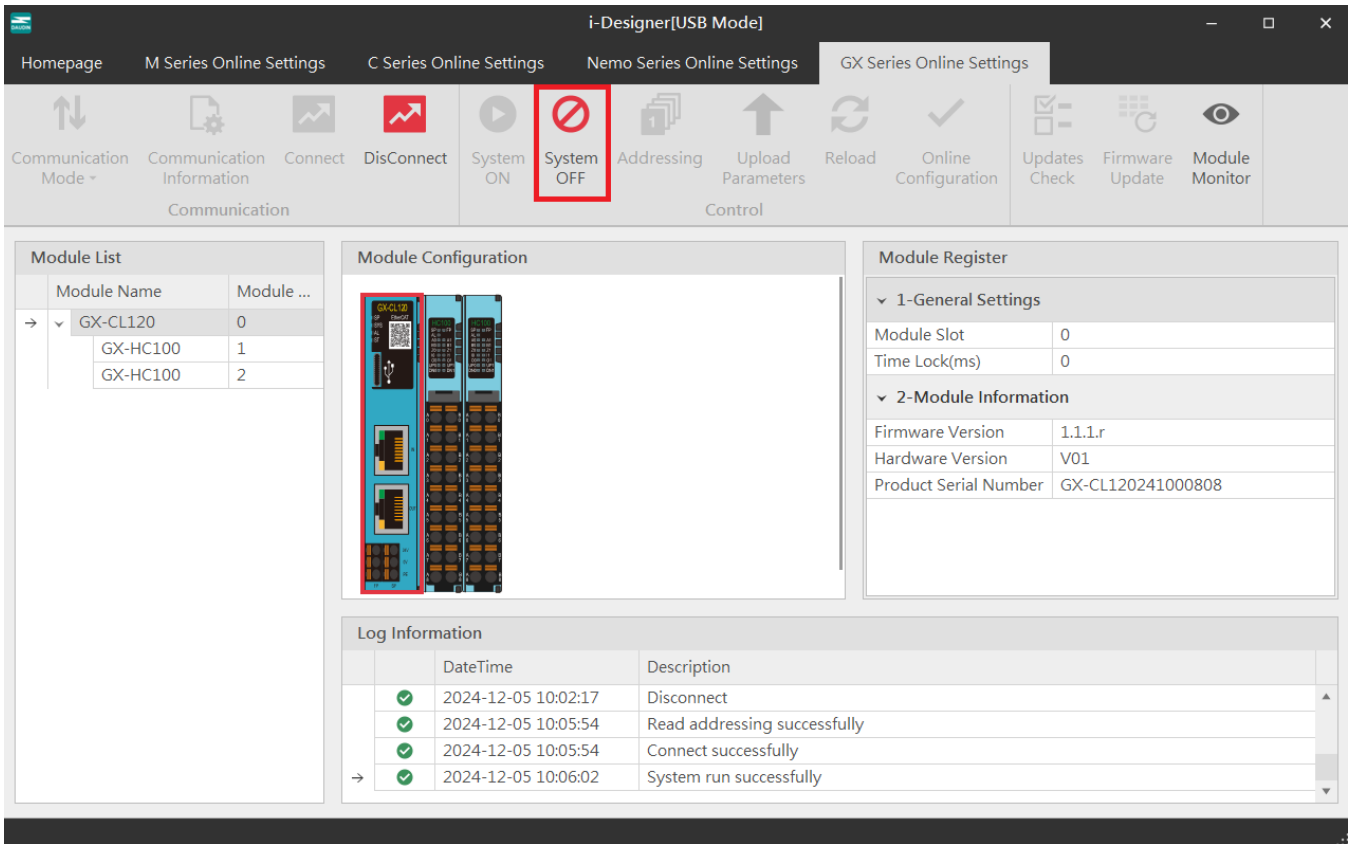
Figure 7.20 System Stop Screen
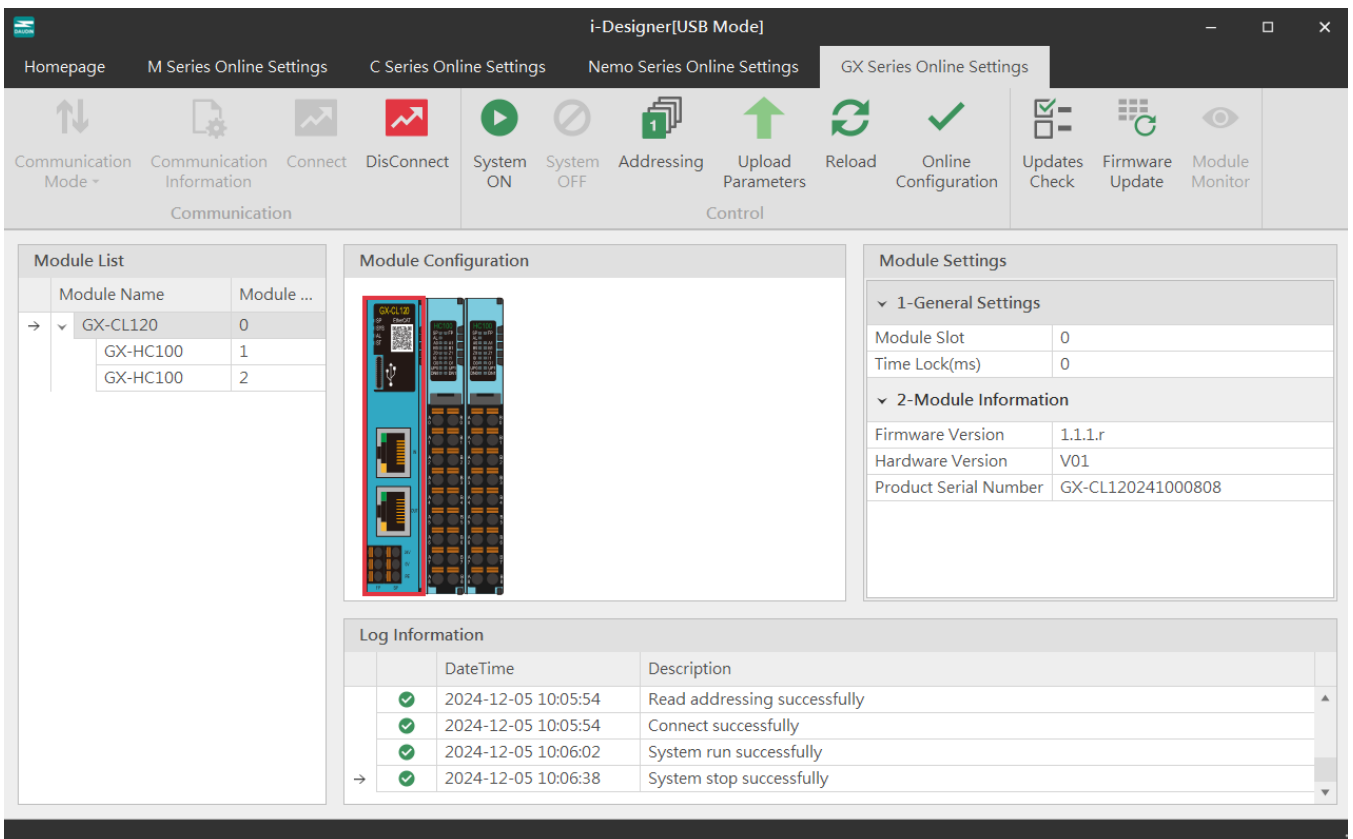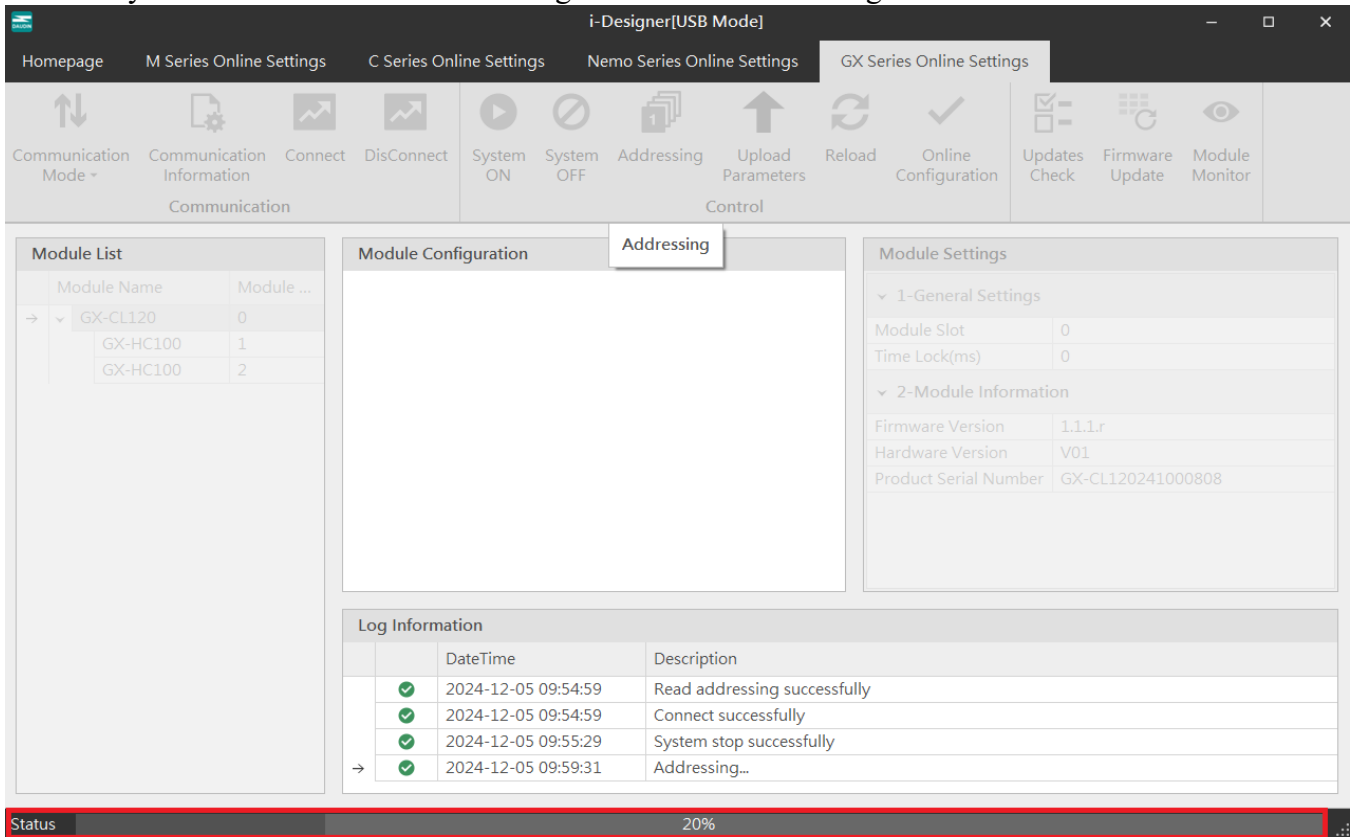
Figure 7.21 System Stop Screen

When connecting to X series modules, if the listed modules do not match the actual modules, you can search for modules through the Auto Station Assignment function.

Figure 7.22 Station Assignment in Progress

After configuring the module functions, you must click "Upload Parameters" to save the settings correctly.
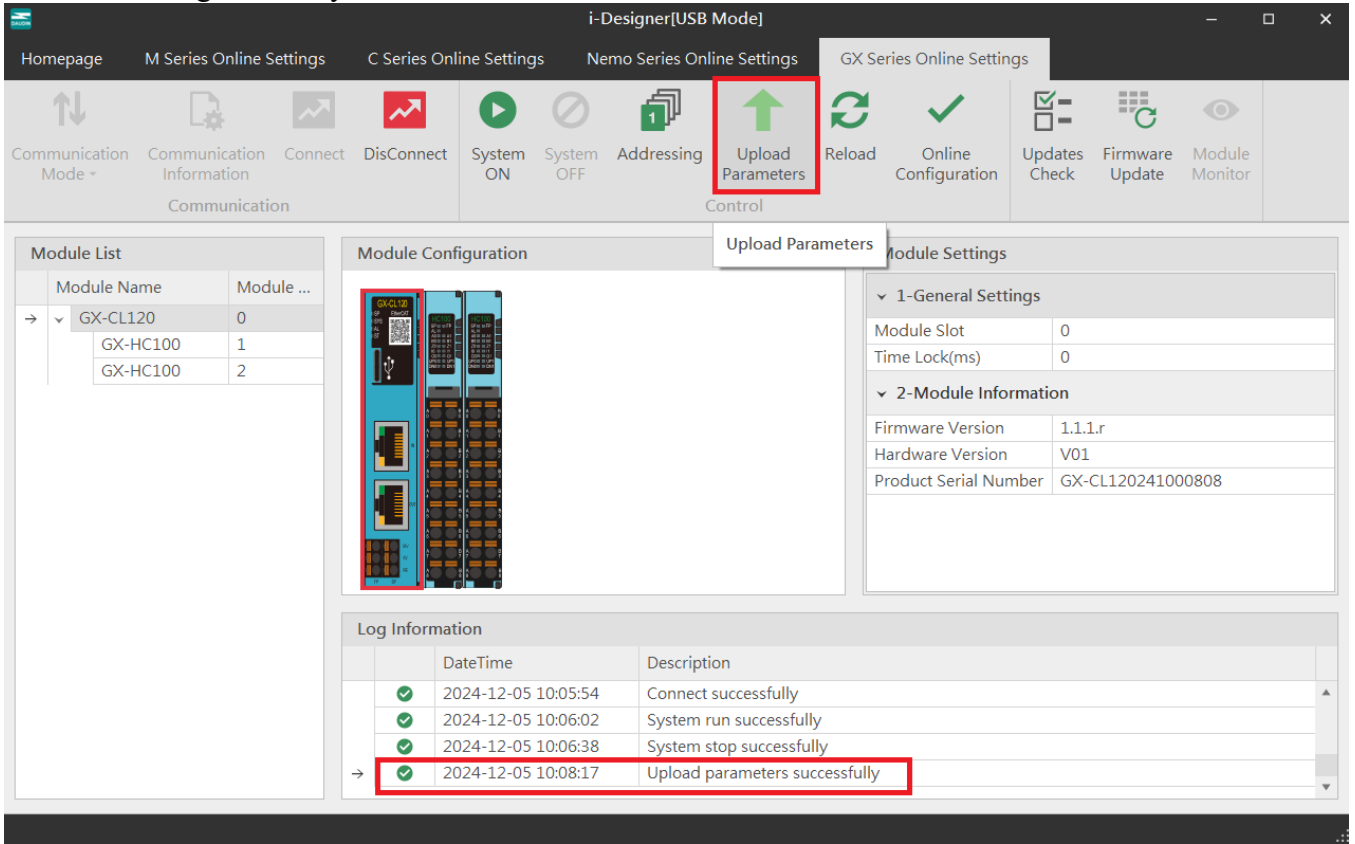
Figure 7.23 Screen After Uploading Parameters

You can view the IO point status through the online debugging feature.
Note: You must disconnect from the external master station before proceeding.
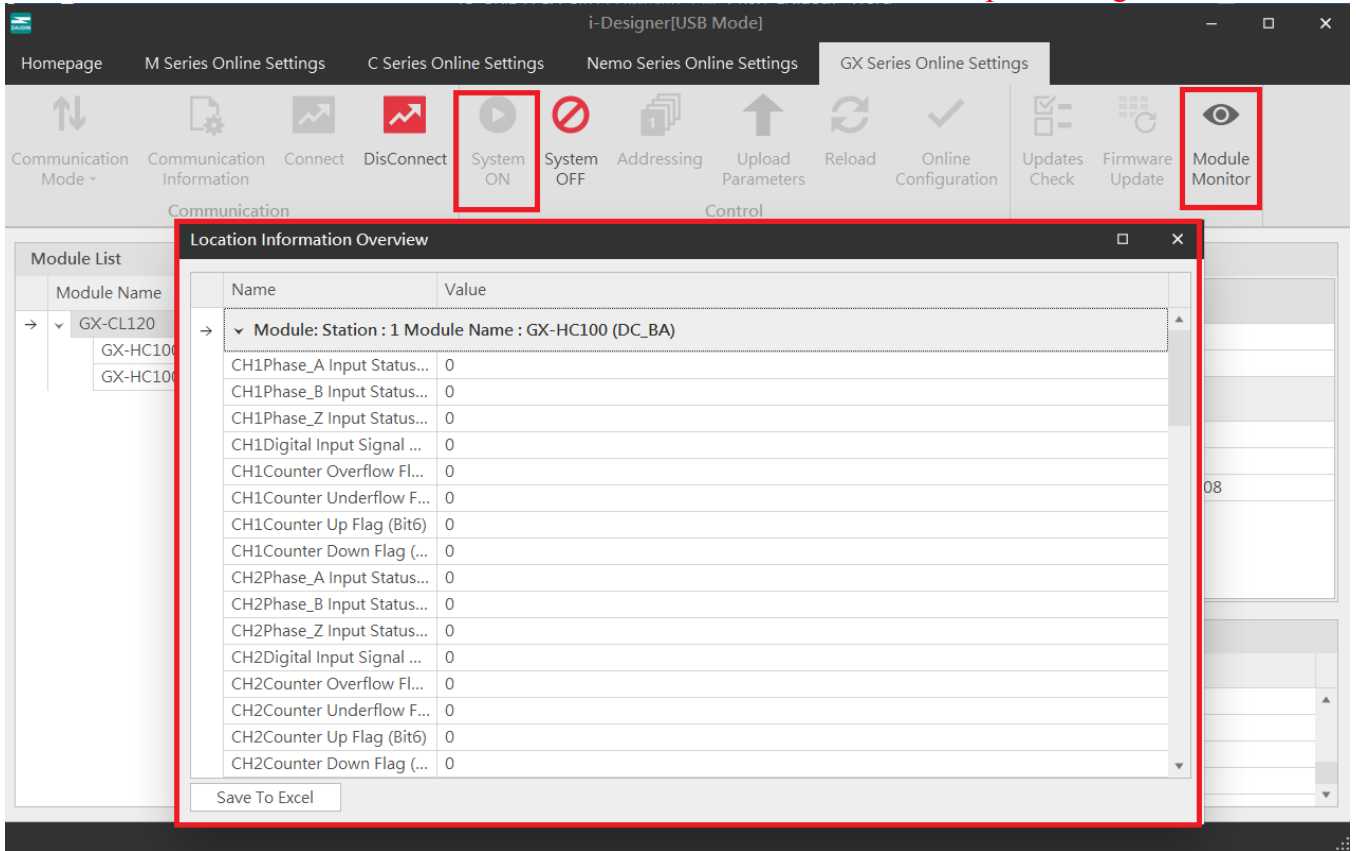
Figure 7.24 Online Adjustment Screen

The system will detect whether the current module version is the latest and prompt for updates.
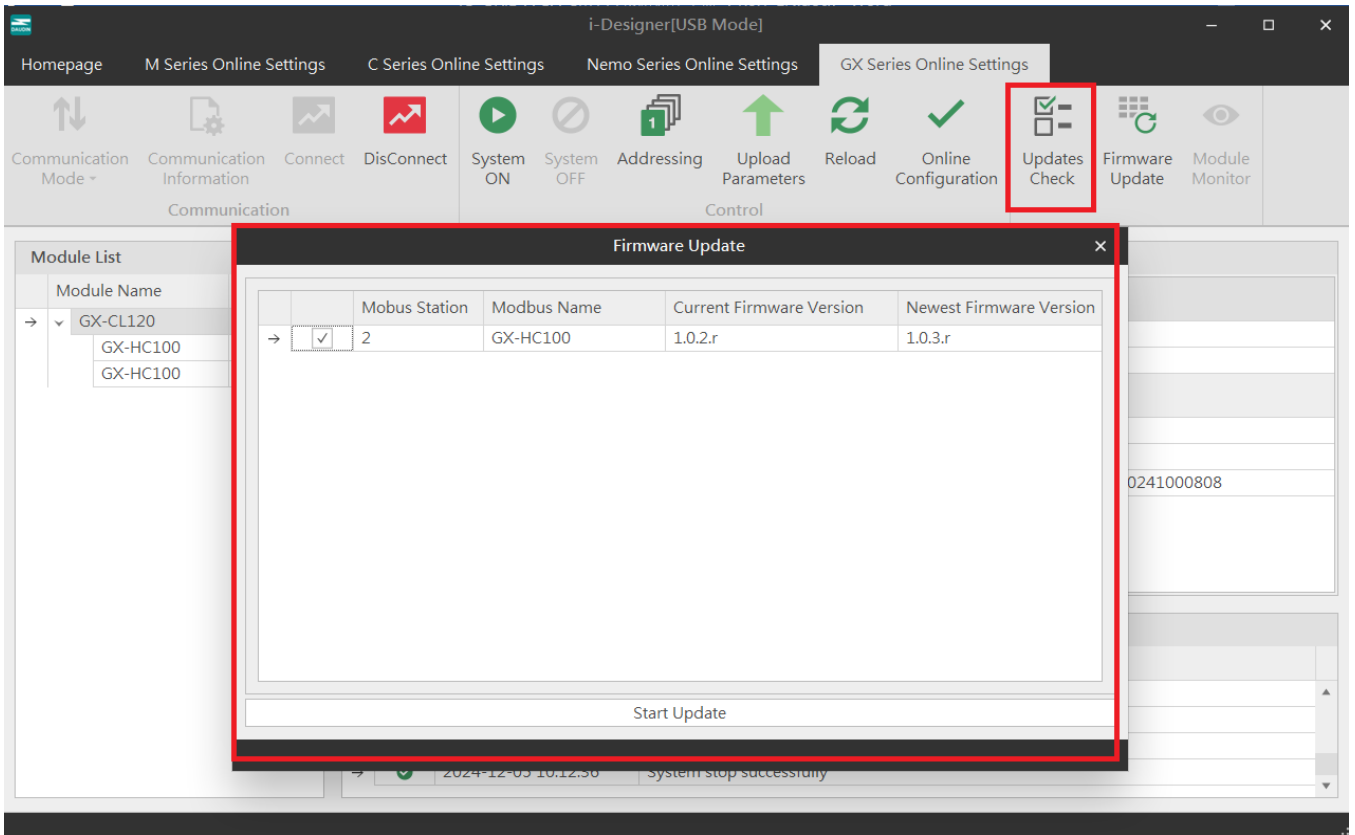
Figure 7.25 Firmware Update Screen

The GX-CL140 will display the Modbus register positions for the configured IO modules.

Figure 7.26 Point Information Overview Screen