DAUDIN CO., LTD.

2502EN
V1.0.4

iO-GRID X Series
GX-TC200
Module User Manual

Table of Contents

1. Introduction

The GX-TC200 is a plug-in temperature control module that supports thermocouple sensors. When used with GX series connector modules, it can collect real-time temperature data and achieve precise temperature control.

2. Product Features

- Versatile Measurement Types

Supports a variety of sensor types.

- High Sensitivity

Sensitivity: 0.1˚C.

- Compact and Easy to Install

Compact design with minimal space requirements, DIN 35 mm standard rail mounting, and plug-in terminals for fast, easy wiring.

- Easy Diagnostics

Innovative channel indicator light design for easy, quick inspection and troubleshooting.

- Multi-Protocol Support

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

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		
Temperature Control Module	Working Voltage	24 VDC (-15%~+20%)
	Working Current	Max. 70mA@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	62g
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)	0.2 mm^2 ~ 1.5 mm^2 / AWG 24~16	
Recommended Terminals	DN00510D DN00710D	

2.3 Analog Module Specifications

Temperature Input Specifications	
Number of Channels	4
Resolution	16 bit
Sensor Type	Thermocouple
Wiring Options	2-wire
Sensor Types and Supported Temperature Range	T Type: -200~400˚C J Type: -210~1200˚C K Type: -200~1372˚C E Type: -200~1000˚C S Type: -50~1768˚C R Type: -50~1768˚C N Type: -200~1300˚C B Type: 250~1820˚C
Accuracy	0.5% Full Scale
Sensitivity	0.1˚C
Temperature Unit	˚C, ˚F
System Indicators	2 green lights (SP, FP), 1 red light (AL)
Channel Indicators	4 Green LEDs, Input Channel Status

3. Module Panel Introduction

GX-TC200

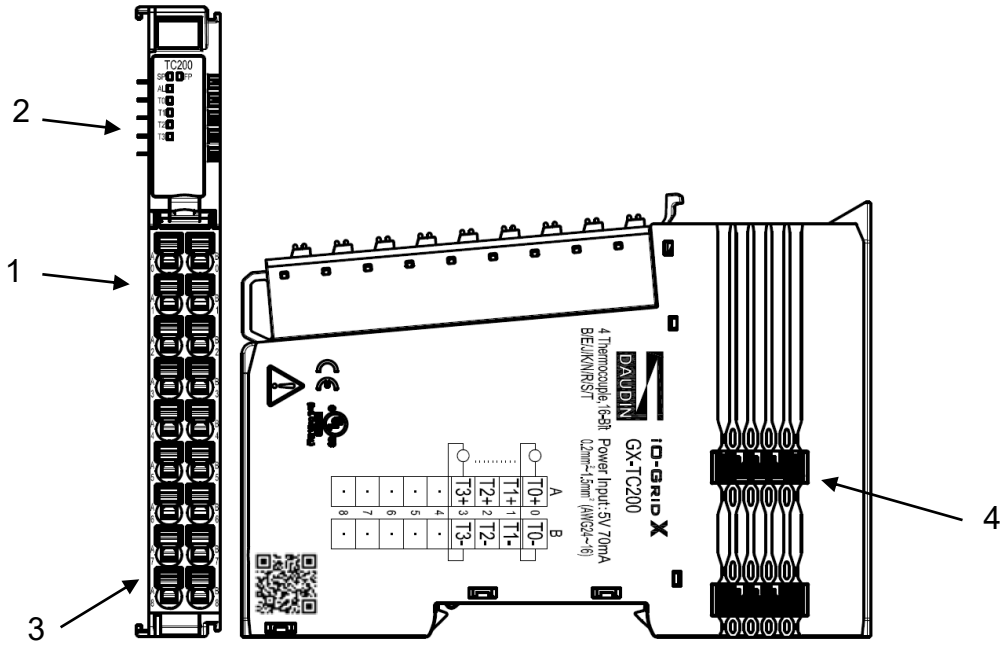

Figure 3.1 GX-TC200

NO.	Name	Description
1	Signal Terminal	Input signal interface with plug-in terminals
2	Channel Status Indicator	4 x green LEDs
3	Terminal	Non-functional plug-in terminal
4	System Bus	Interface for communication and power supply

Status Indicators				
Name	Location	Color	Status	Description
Channel Indicators	31.33.41.43	Green	On	Normal
			Flashing	Warning (out of measurement range)
			Off	Open circuit detection

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.

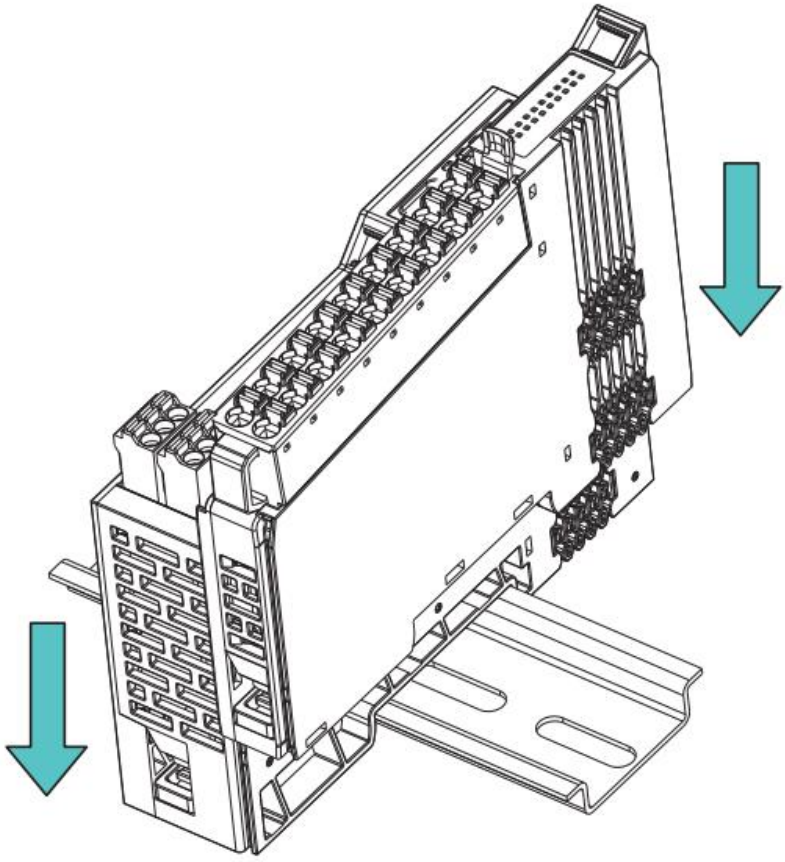

Figure 4.1 Module Installation Diagram

※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.

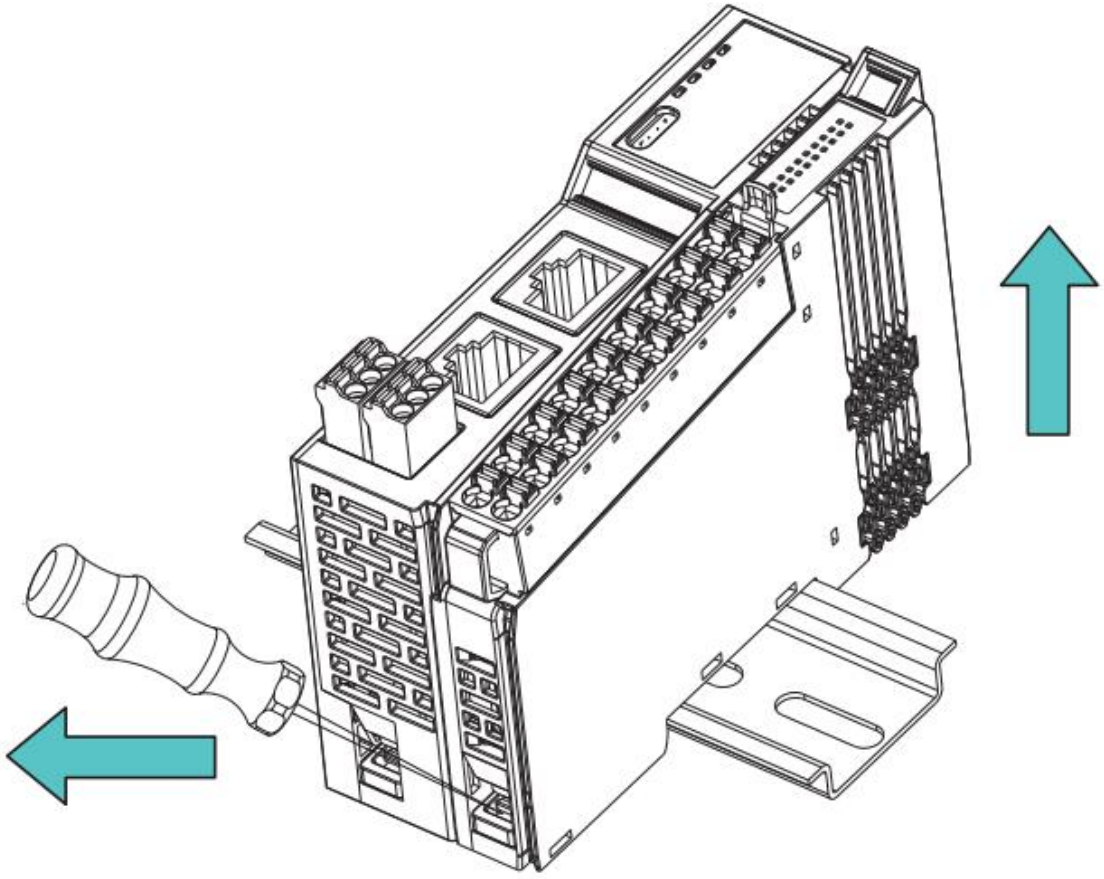

Figure 4.2 Module Removal Diagram

4.3 Module Dimensions

4.3.1. I/O and Functional Module Dimensions

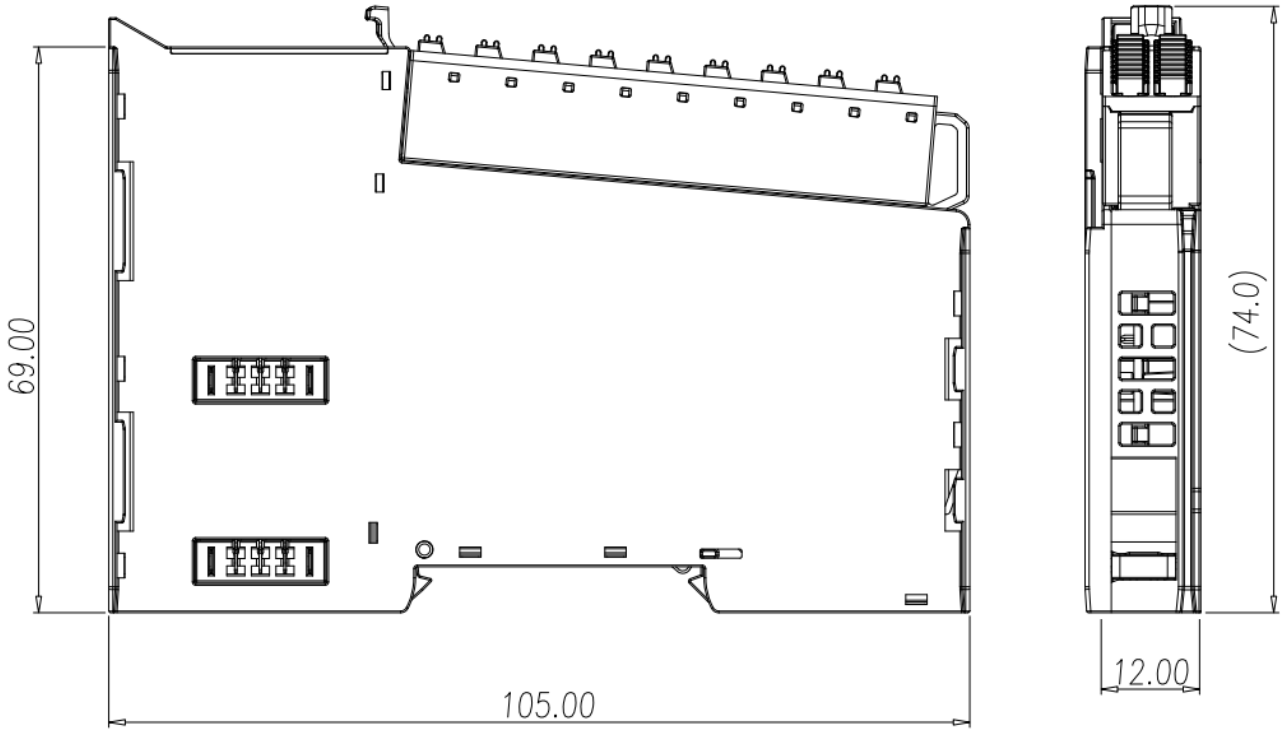

Figure 4.4 I/O Module Dimension Diagram

5. Temperature Module Wiring Instructions

5.1 GX-TC200

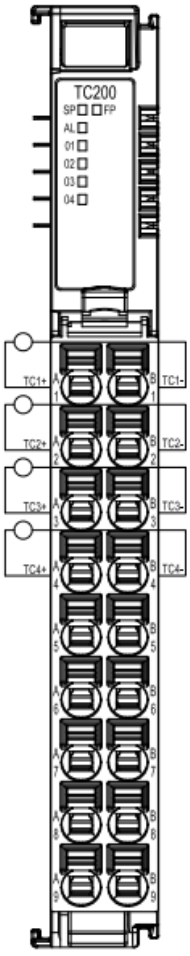

Figure 5.1 GX-TC200 Wiring Diagram

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.

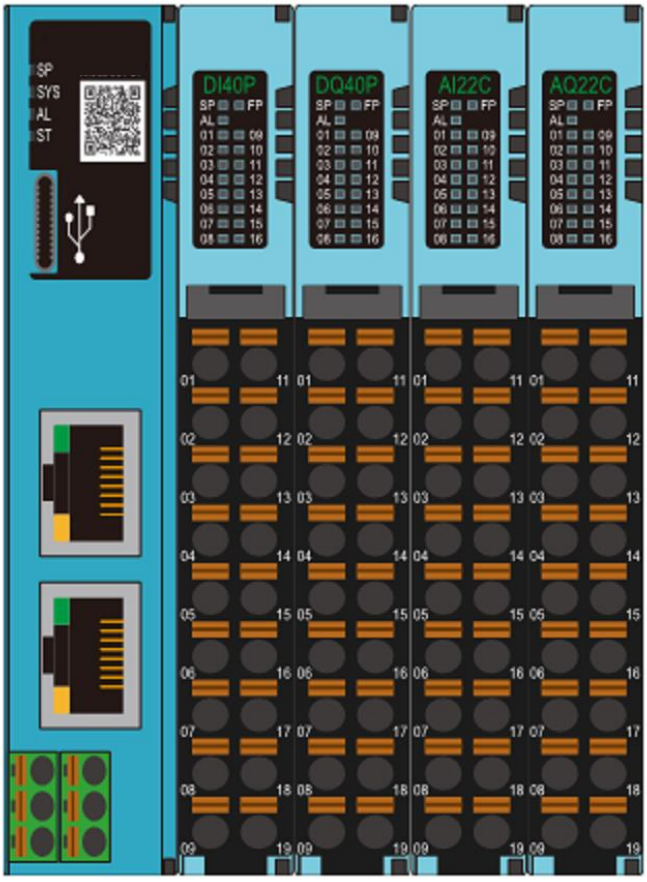

Figure 6.1

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

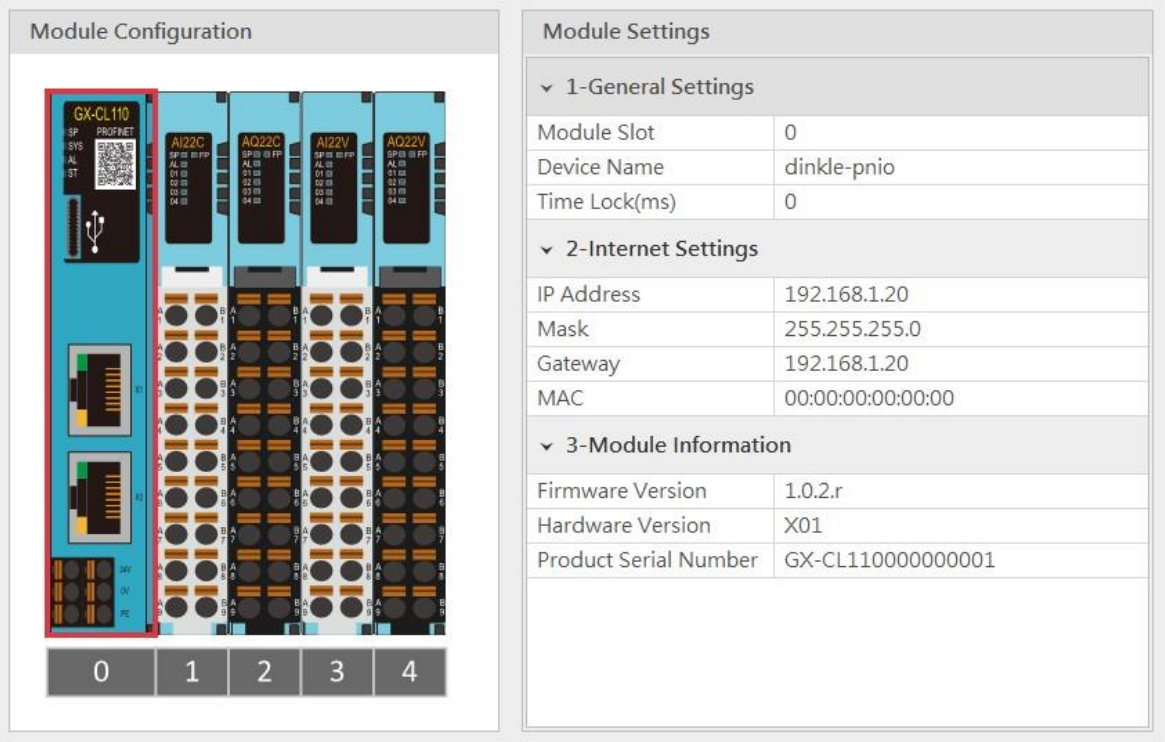

Figure 6.2 Coupler Parameters

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.
- Hot Swap: Allows replacement of the same model module without powering down.

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 19.168.1.1.20.
- 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.

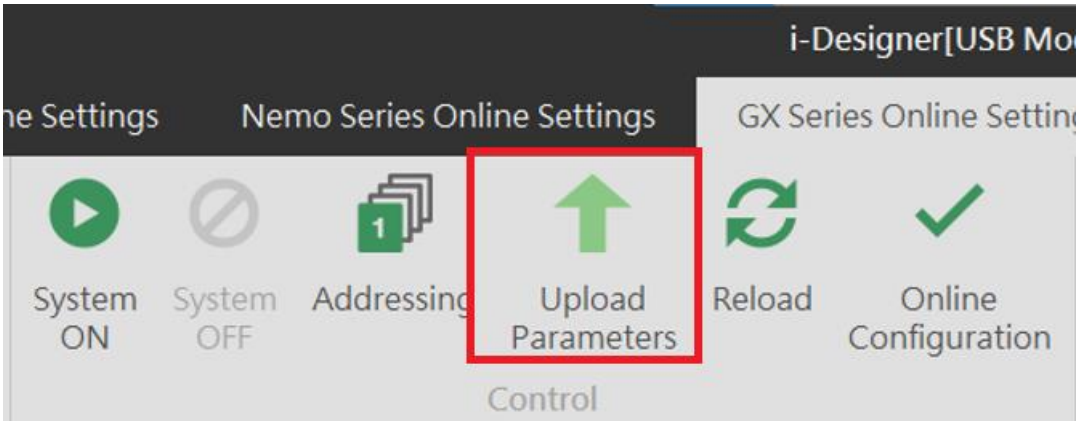

Figure 6.3 Upload Parameters

⚠ 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.

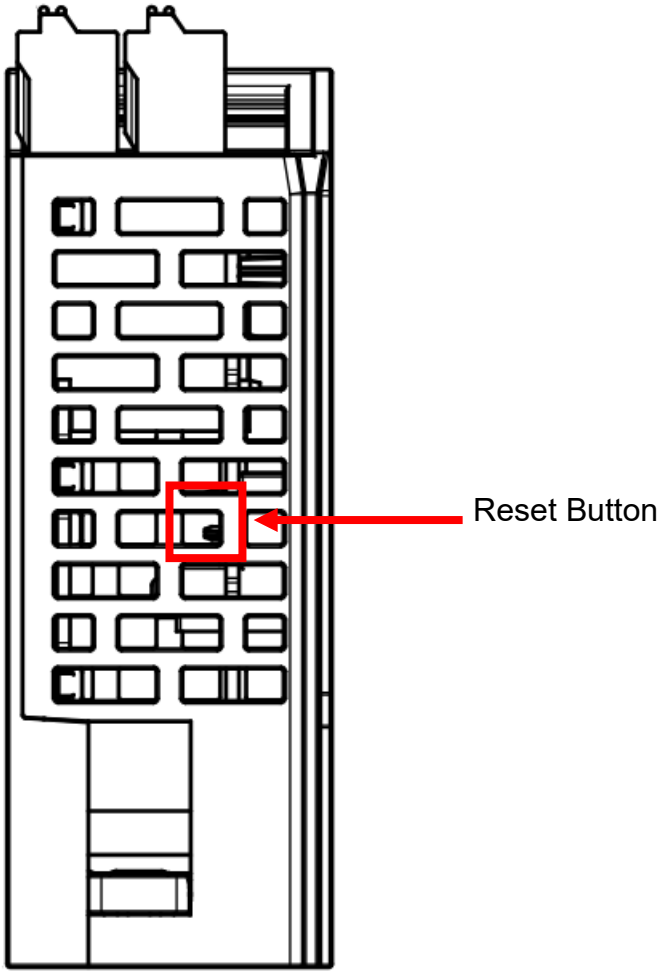

Figure 6.5 System Reset Button

6.4 Error Code Lookup

Users can query system error information and identify timed-out physical modules via the error code module (virtual module). Upon completion of system boot and station setup, the system will automatically place the Error Code Module in the last three available slots, one after another. If no empty slots are available, the system will automatically ignore this placement.

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 Temperature Module Parameters

TC Analog Input Module

Input Data Description

Input Data								
Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Analog Input Data(CH1)							
Byte 1								
Byte 2	Analog Input Data(CH2)							
Byte 3								
Byte 4	Analog Input Data(CH3)							
Byte 5								
Byte 6	Analog Input Data(CH4)							
Byte 7								

Value Definition:

Analog Input Data CH#	The measured temperature for the channel is displayed with 0.1-degree precision in either °C or °F. If the temperature unit is set to °C and the reading is 123, it represents 12.3°C. A reading of 32767 (0x7FFF) indicates either an open circuit or that the measurement has exceeded the upper limit.

Supported Range for Each Sensor Type

Sensor: Type T

Analog Input Data			
Temperature	Decimal	Hex	Location
>401	32767	7FFF	Exceeds the upper limit
400	4000	FA0	Rated range
:	:	:	
-200	-2000	F830	
<-201	32767	7FFF	Exceeds the lower limit

Sensor: Type J

Analog Input Data			
Temperature	Decimal	Hex	Location
>1201	32767	7FFF	Exceeds the upper limit
1200	12000	2EE0	Rated range
:	:	:	
-210	-2100	F7CC	
<-211	32767	7FFF	Exceeds the lower limit

Sensor: Type K

Analog Input Data			
Temperature	Decimal	Hex	Location
>1373	32767	7FFF	Exceeds the upper limit
1372	13720	3598	Rated range
:	:	:	
-200	-2000	F830	
<-201	32767	7FFF	Exceeds the lower limit

Sensor: Type E

Analog Input Data			
Temperature	Decimal	Hex	Location
>1001	32767	7FFF	Exceeds the upper limit
1000	10000	2710	Rated range
:	:	:	
-200	-2000	F830	
<-201	32767	7FFF	Exceeds the lower limit

Sensor: Type S, Type R

Analog Input Data			
Temperature	Decimal	Hex	Location
>1769	32767	7FFF	Exceeds the upper limit
1768	17680	4510	Rated range
:	:	:	
-50	-500	FE0C	
<-51	32767	7FFF	Exceeds the lower limit

Sensor: Type N

Analog Input Data			
Temperature	Decimal	Hex	Location
>1301	32767	7FFF	Exceeds the upper limit
1300	13000	32C8	Rated range
:	:	:	
-200	-2000	F830	
<-201	32767	7FFF	Exceeds the lower limit

Sensor: Type B

Analog Input Data			
Temperature	Decimal	Hex	Location
>1821	32767	7FFF	Exceeds the upper limit
1820	18200	4718	Rated range
:	:	:	
250	2500	9C4	
<249	32767	7FFF	Exceeds the lower limit

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.

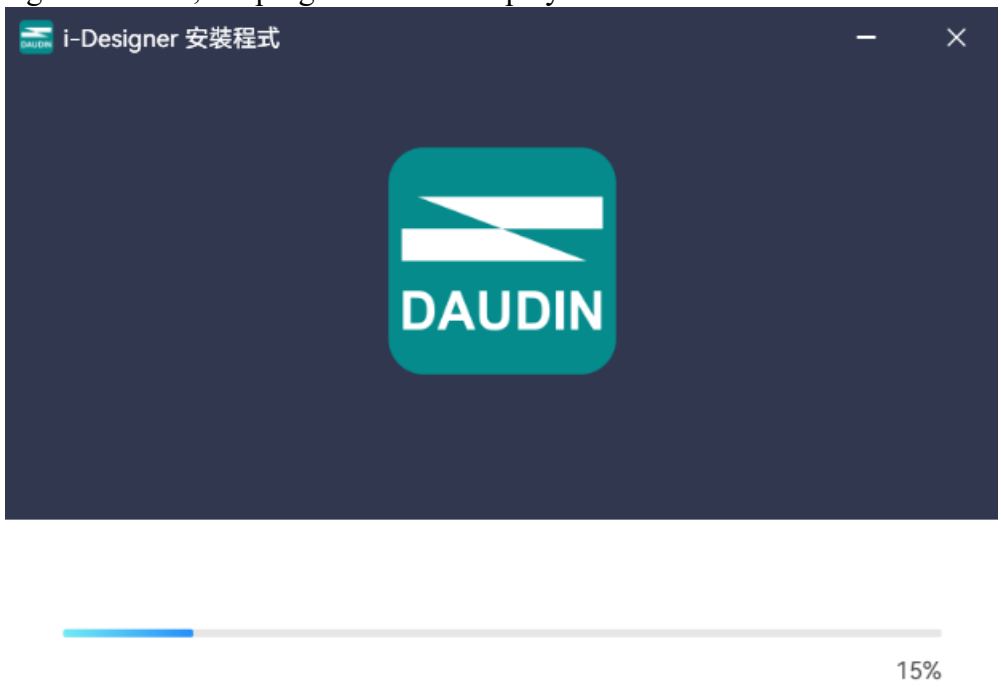

Figure 7.3 Installation Progress

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).

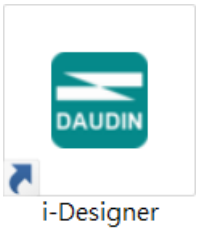

Figure 7.5 Program Icon

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 Setup Tab: For configuring parameters for each iO-GRID product series.

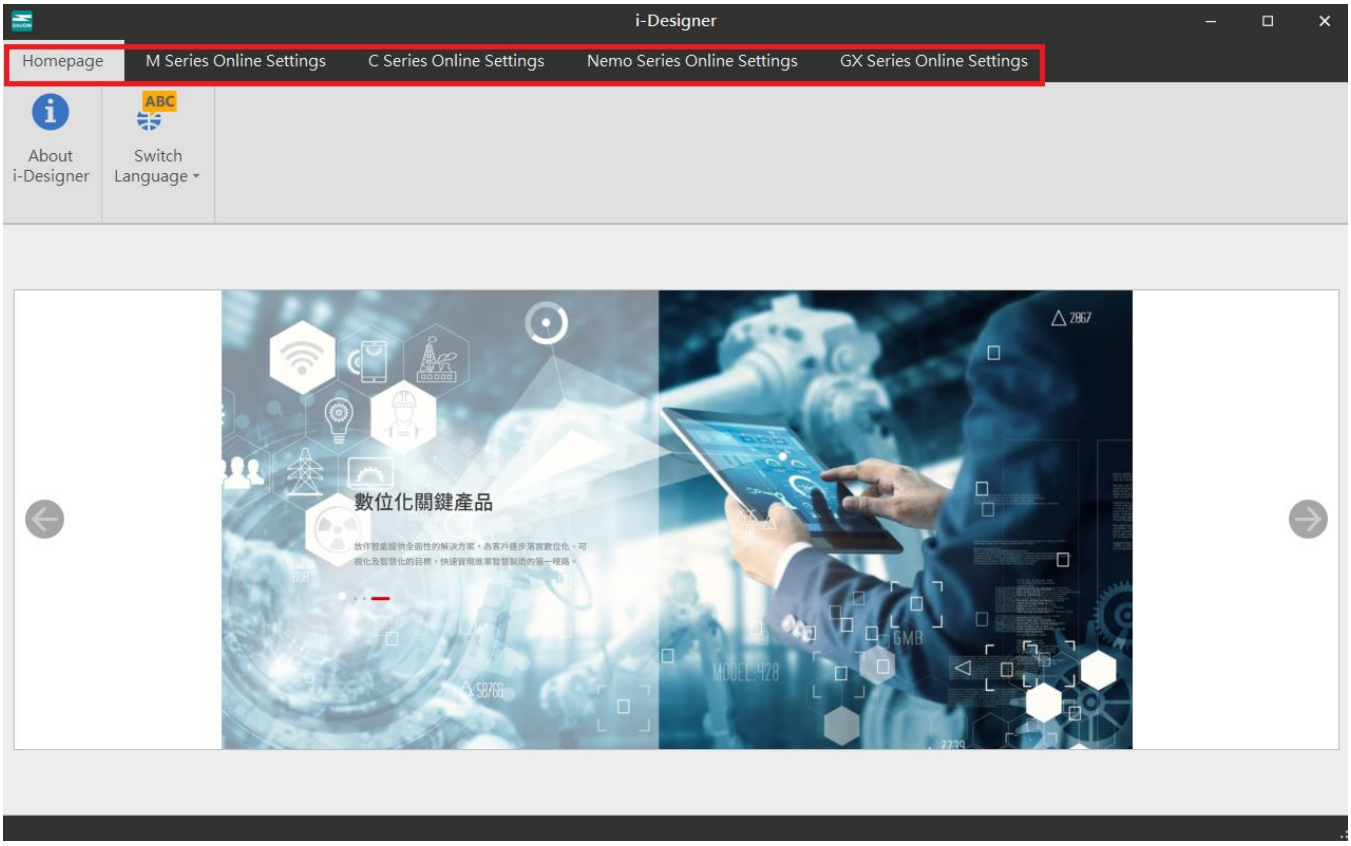

Figure 7.7 Tab

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.

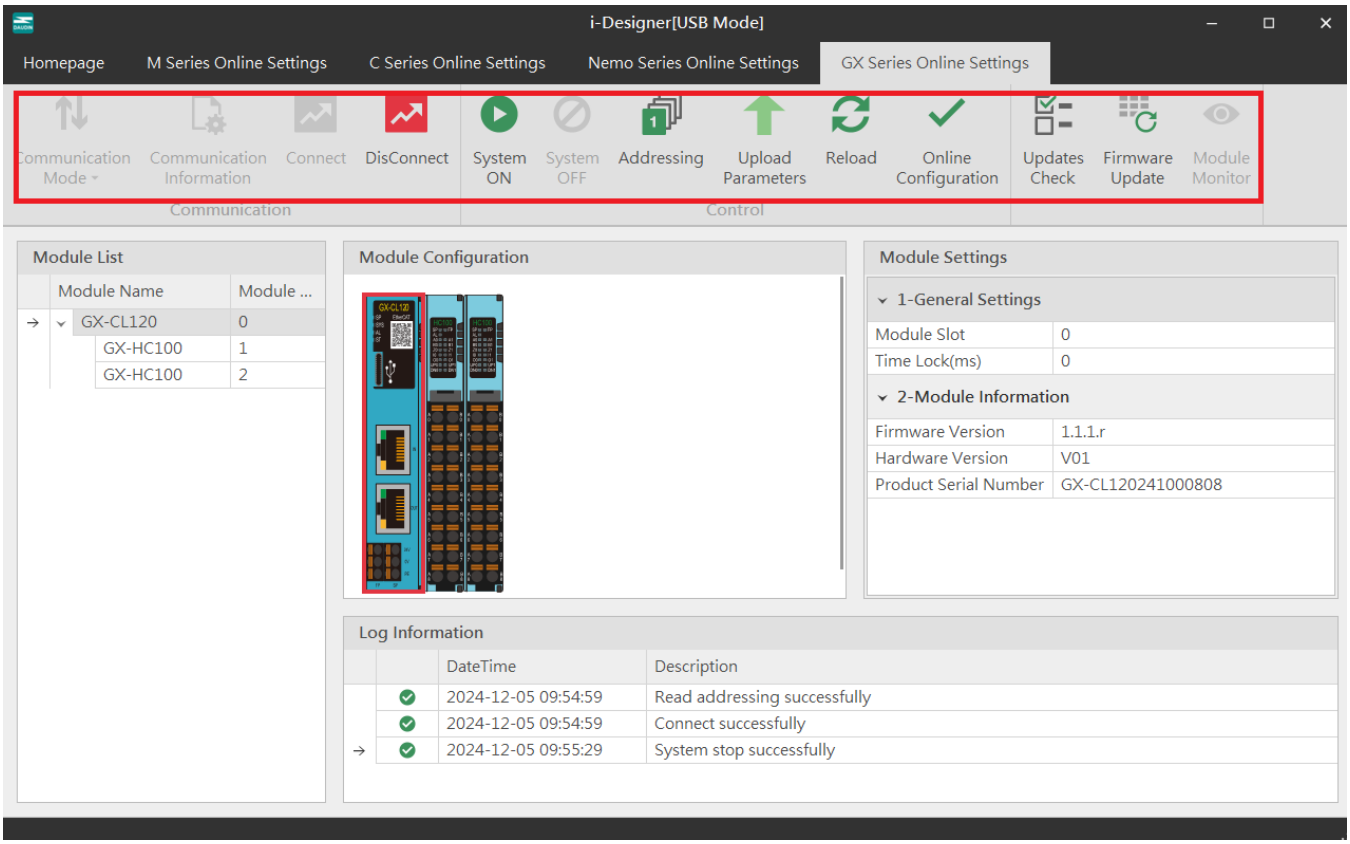

Figure 7.8 Function Key Area

Display and Configuration Area

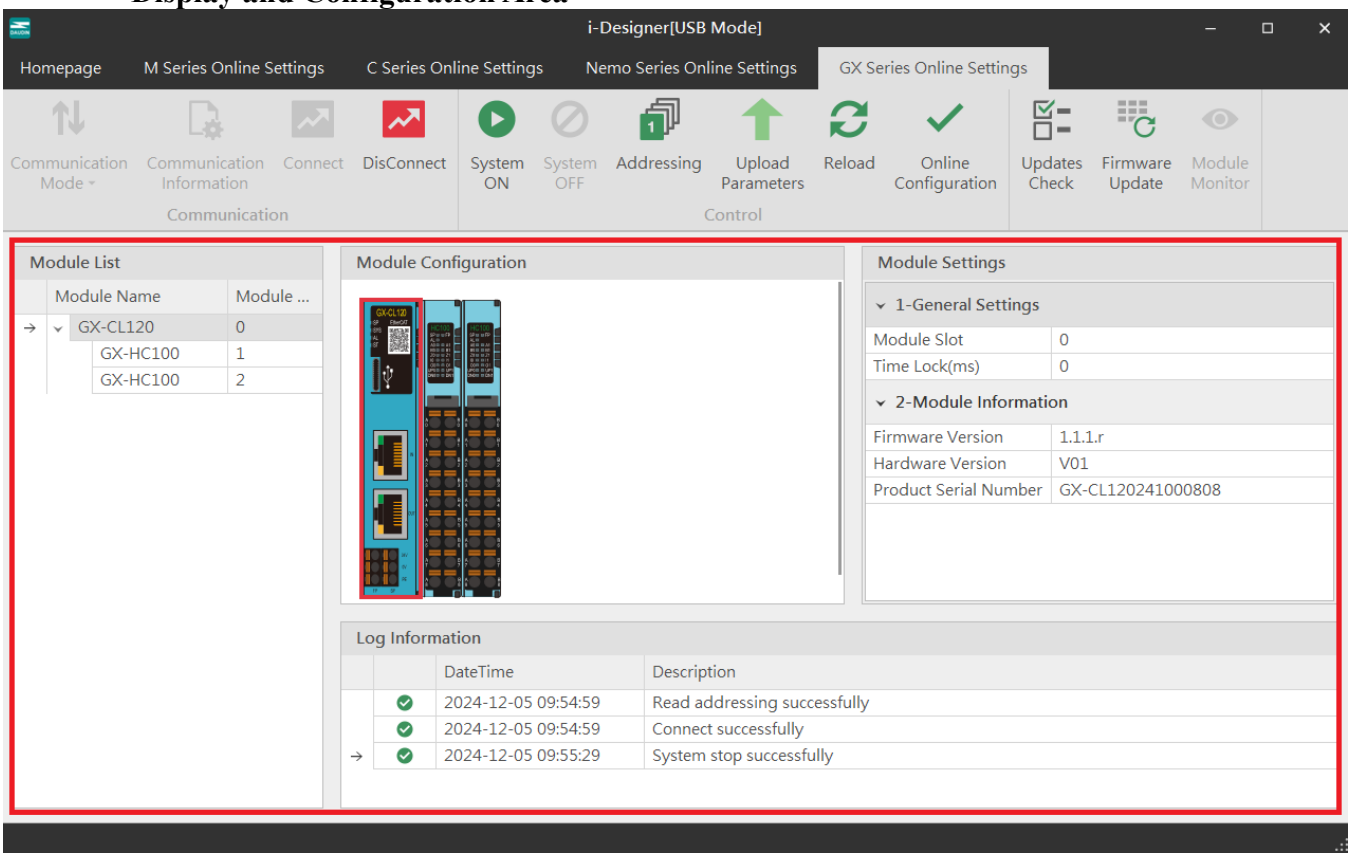

Figure 7.9 Display and Configuration Area

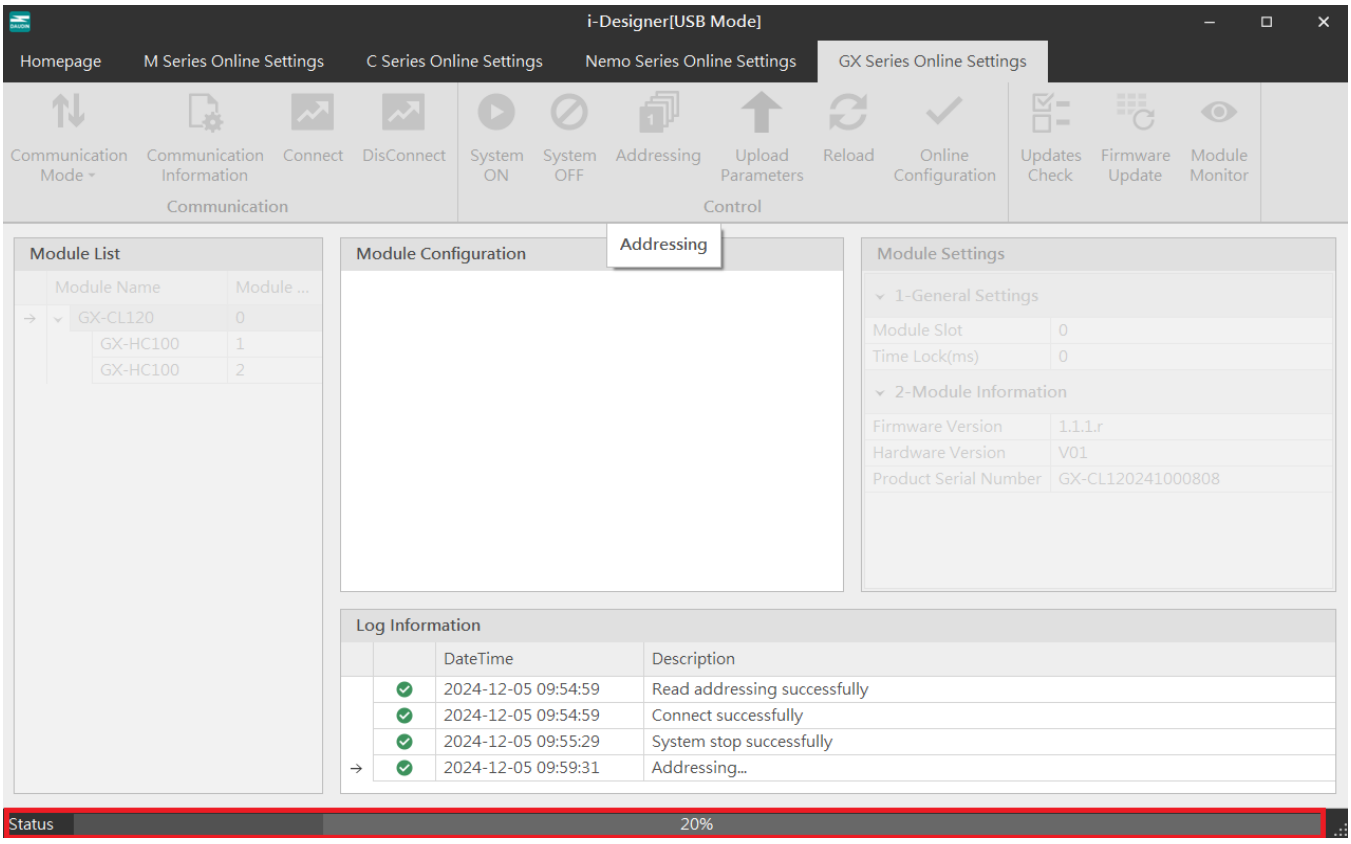

Figure 7.10 Progress Display Area

7.3 i-Designer Information Verification

Click on the homepage -> About i-Designer

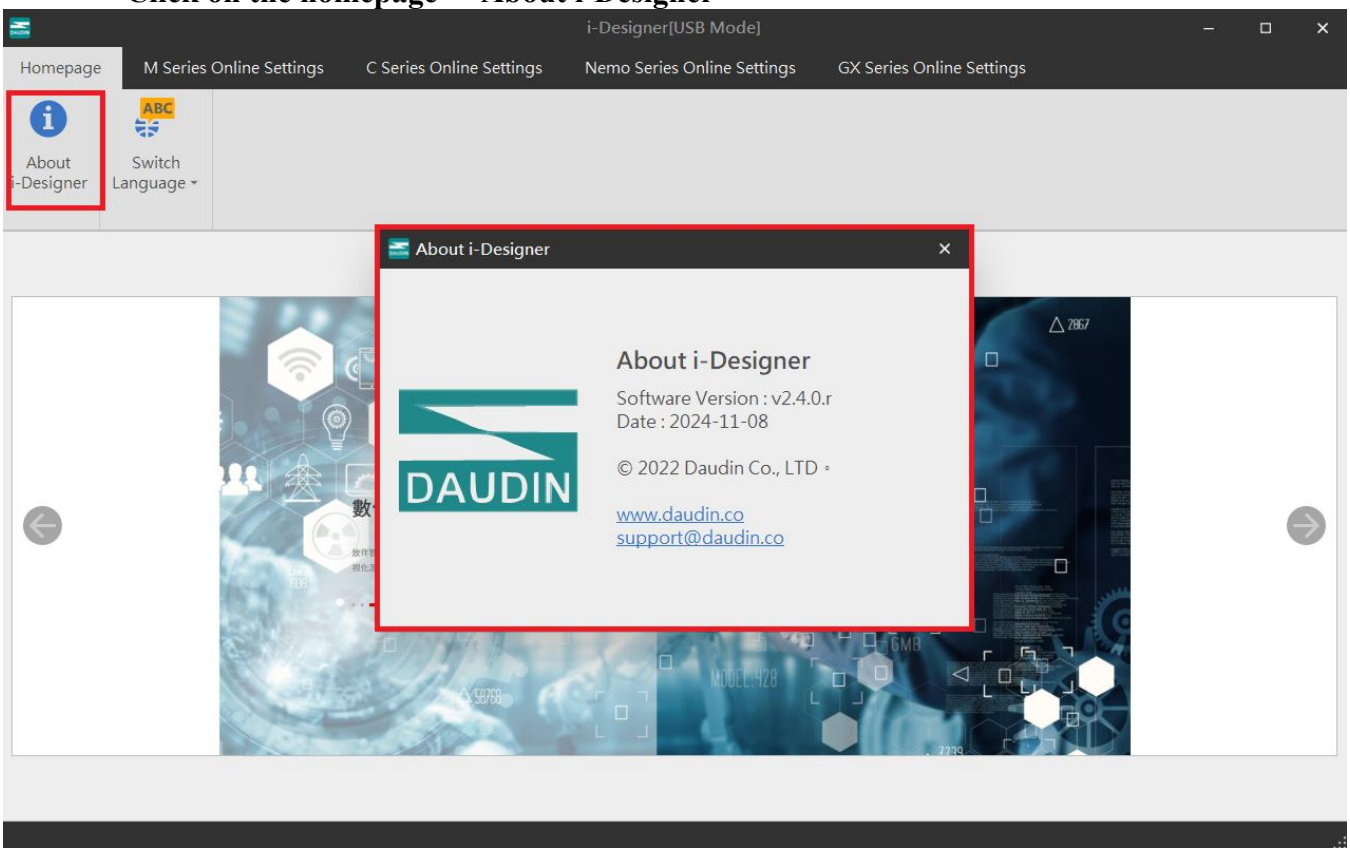

Figure 7.11 Software Information

7.4 Language Settings

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

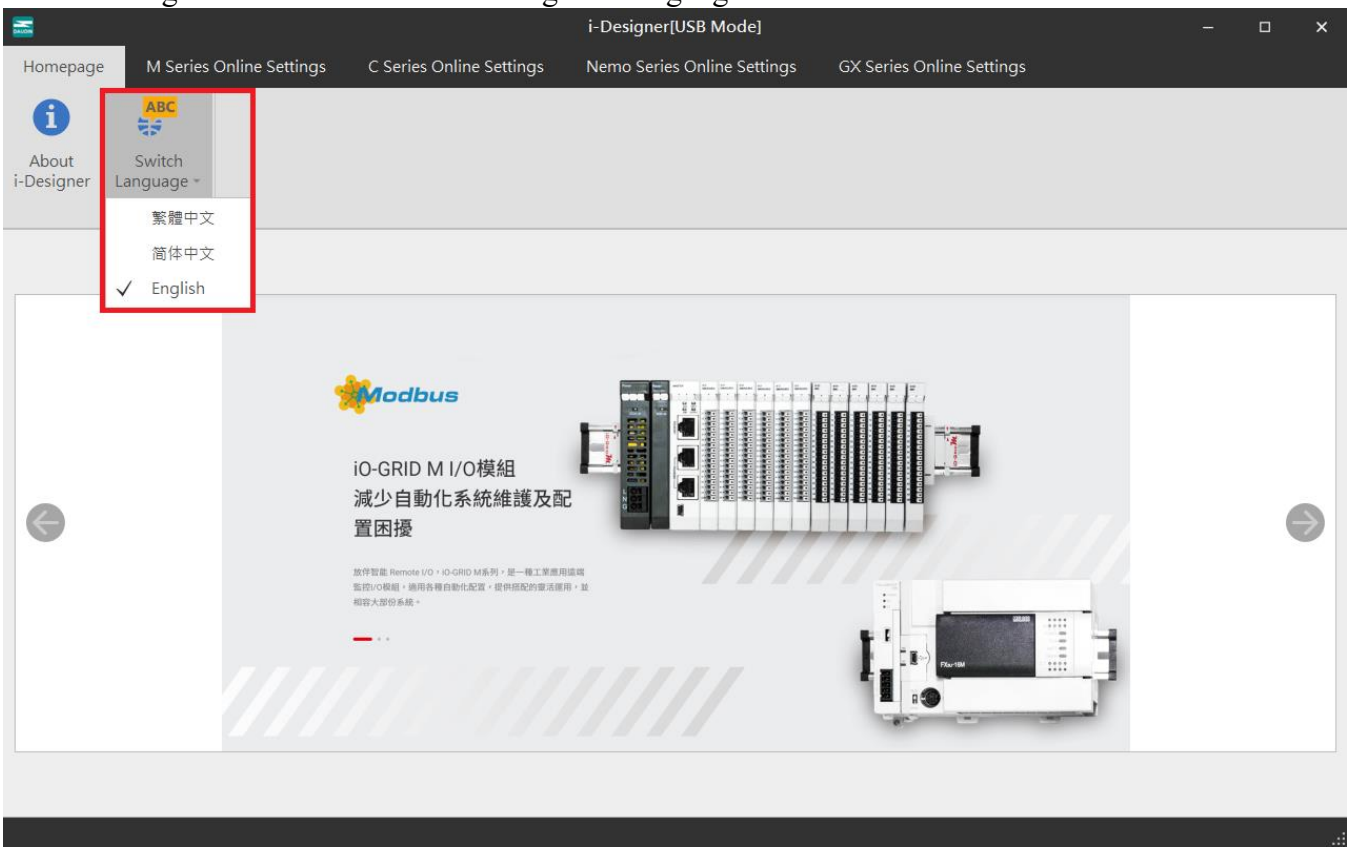

Figure 7.12 Language Selection

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.

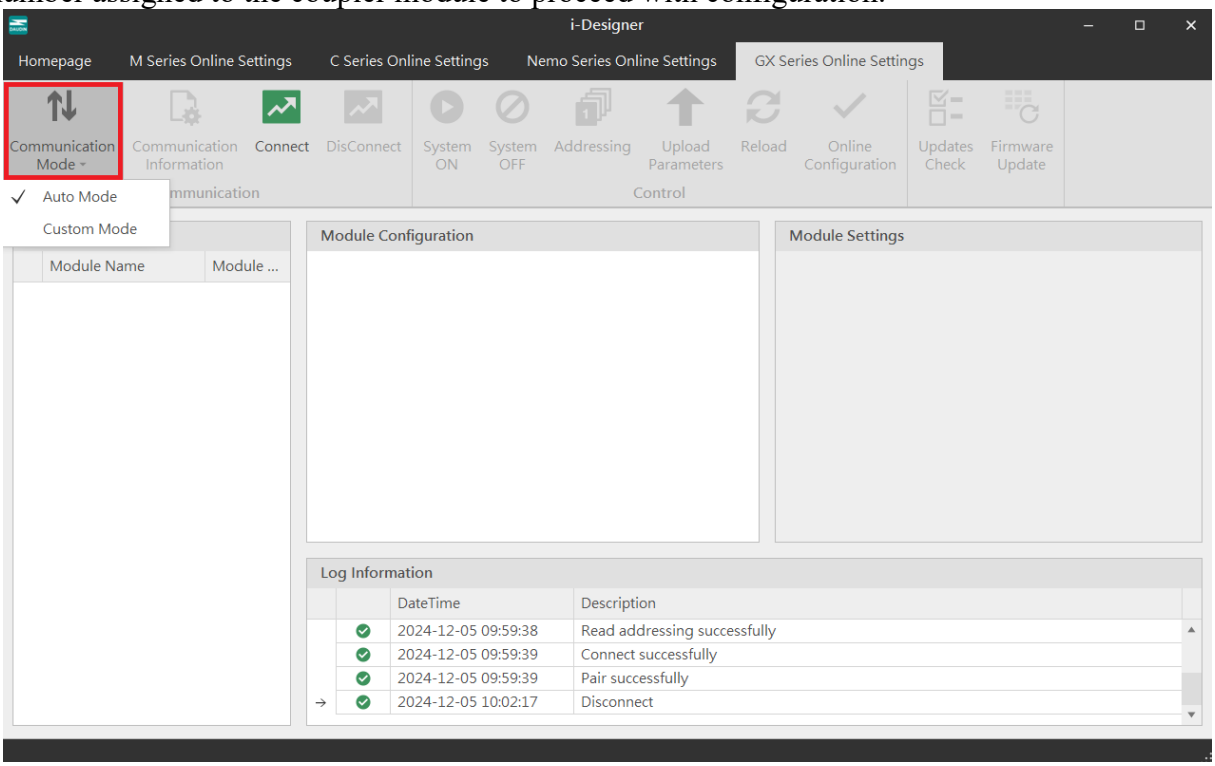

Figure 7.13 Connection Modes

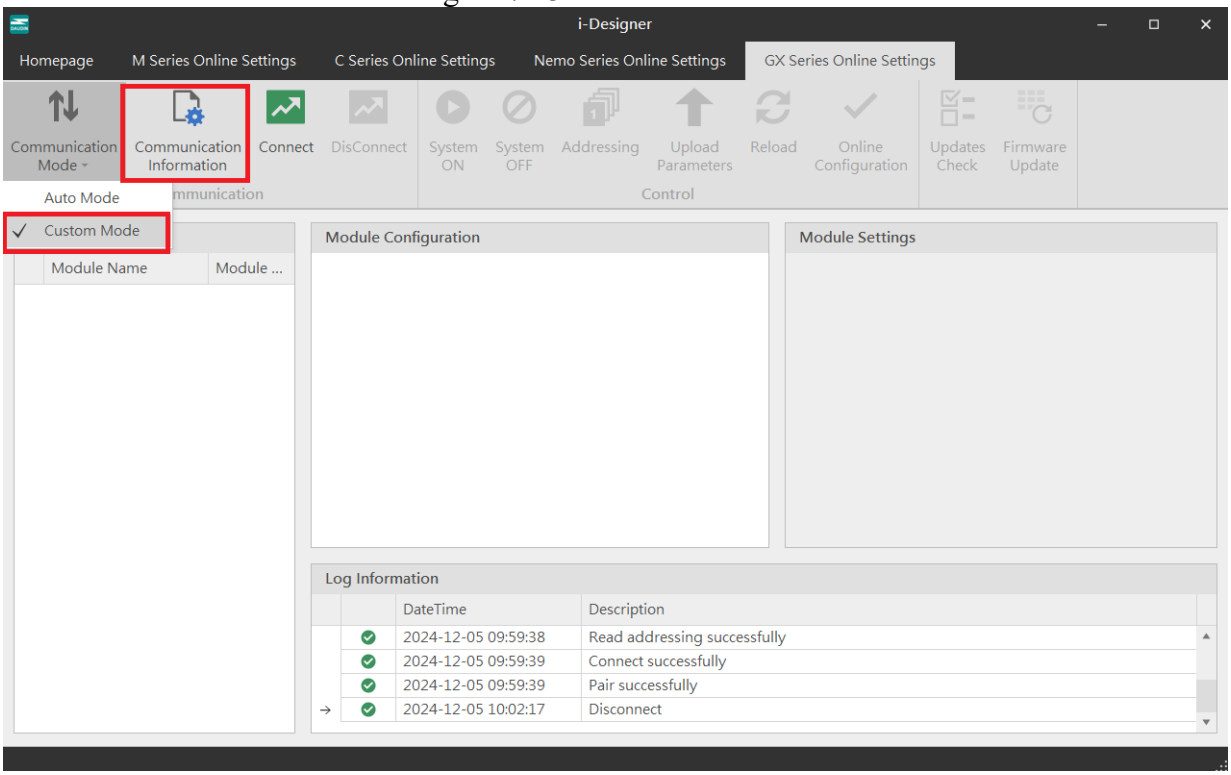

Figure 7.14 Custom Mode Setup

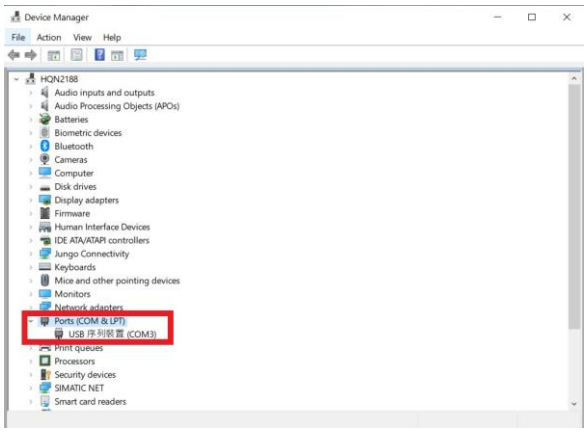

Figure 7.15 Checking the COM Port Number in Device Manager

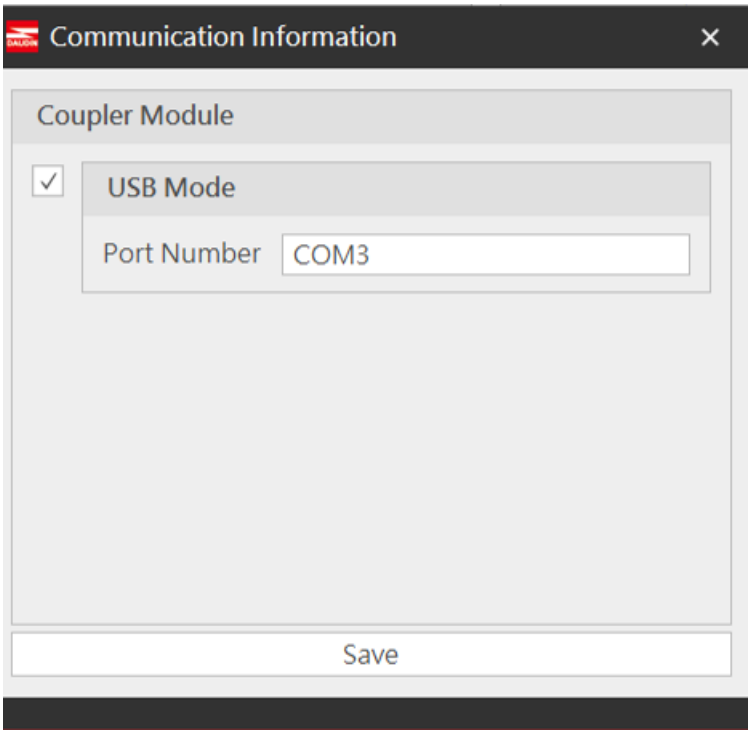

Figure 7.16 Configuring COM Port Settings

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.

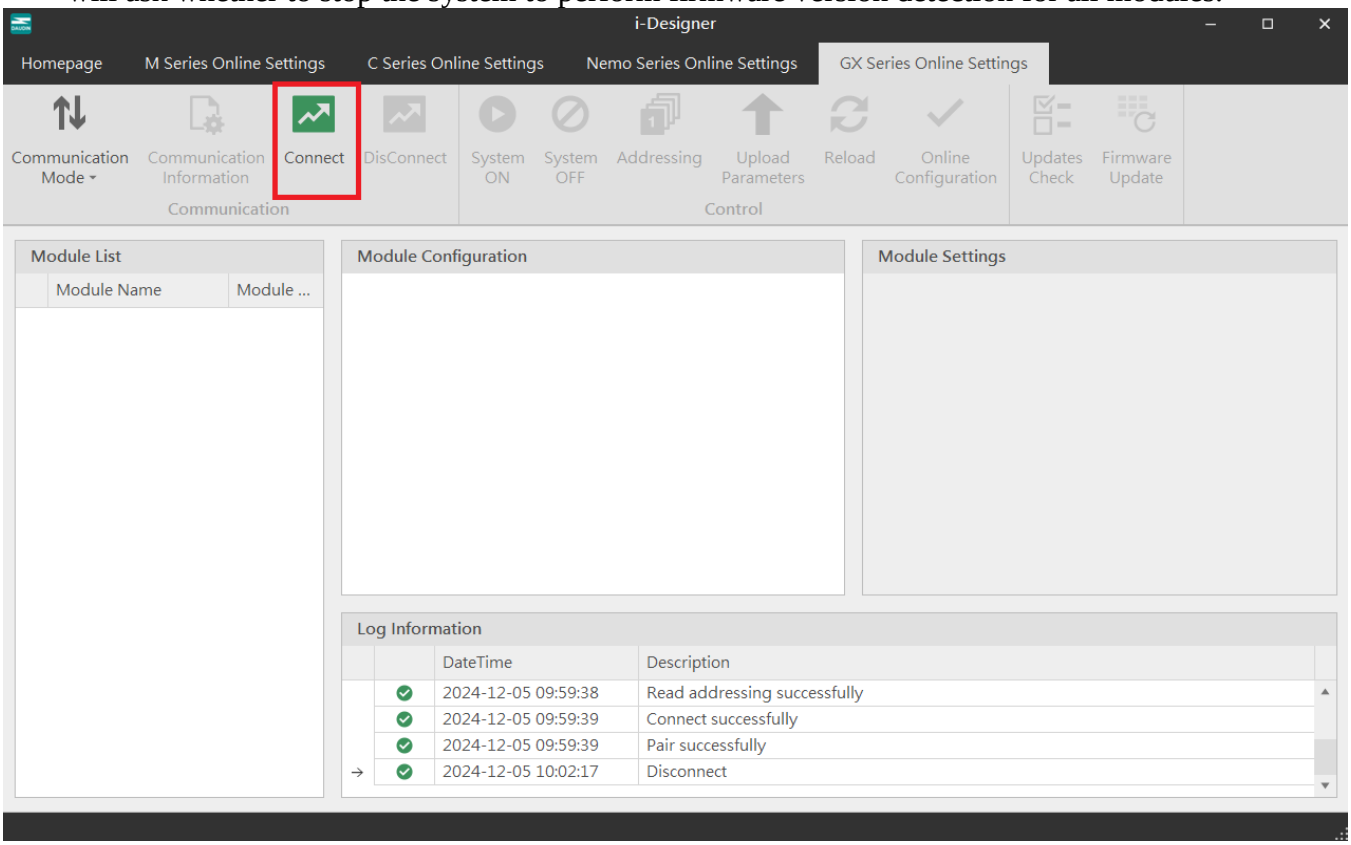

Figure 7.17 Setting Connection

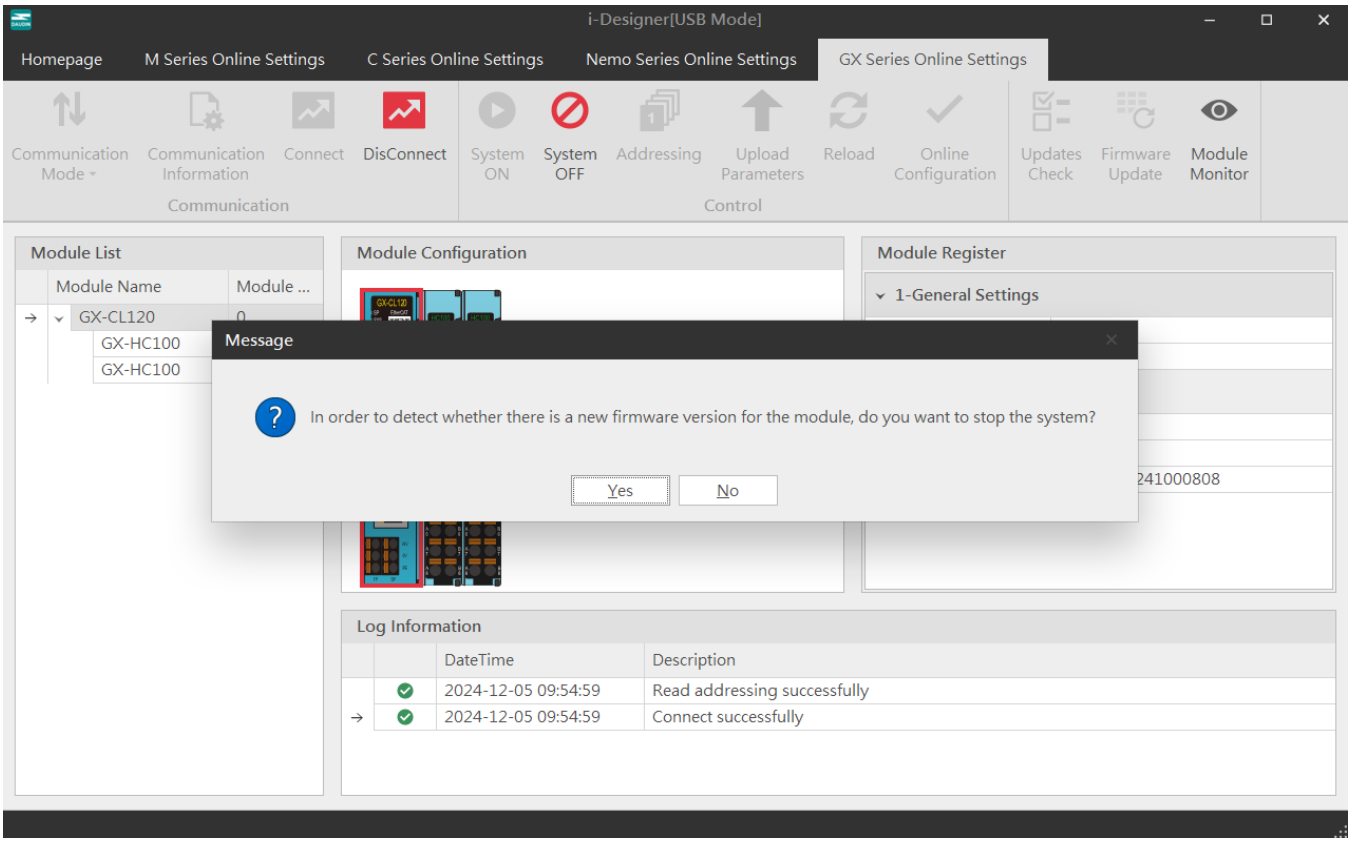

Figure 7.18 After Connection, The Module Automatically Checks For Updates And Notifies You
If the system is stopped, i-Designer will automatically detect the module version.

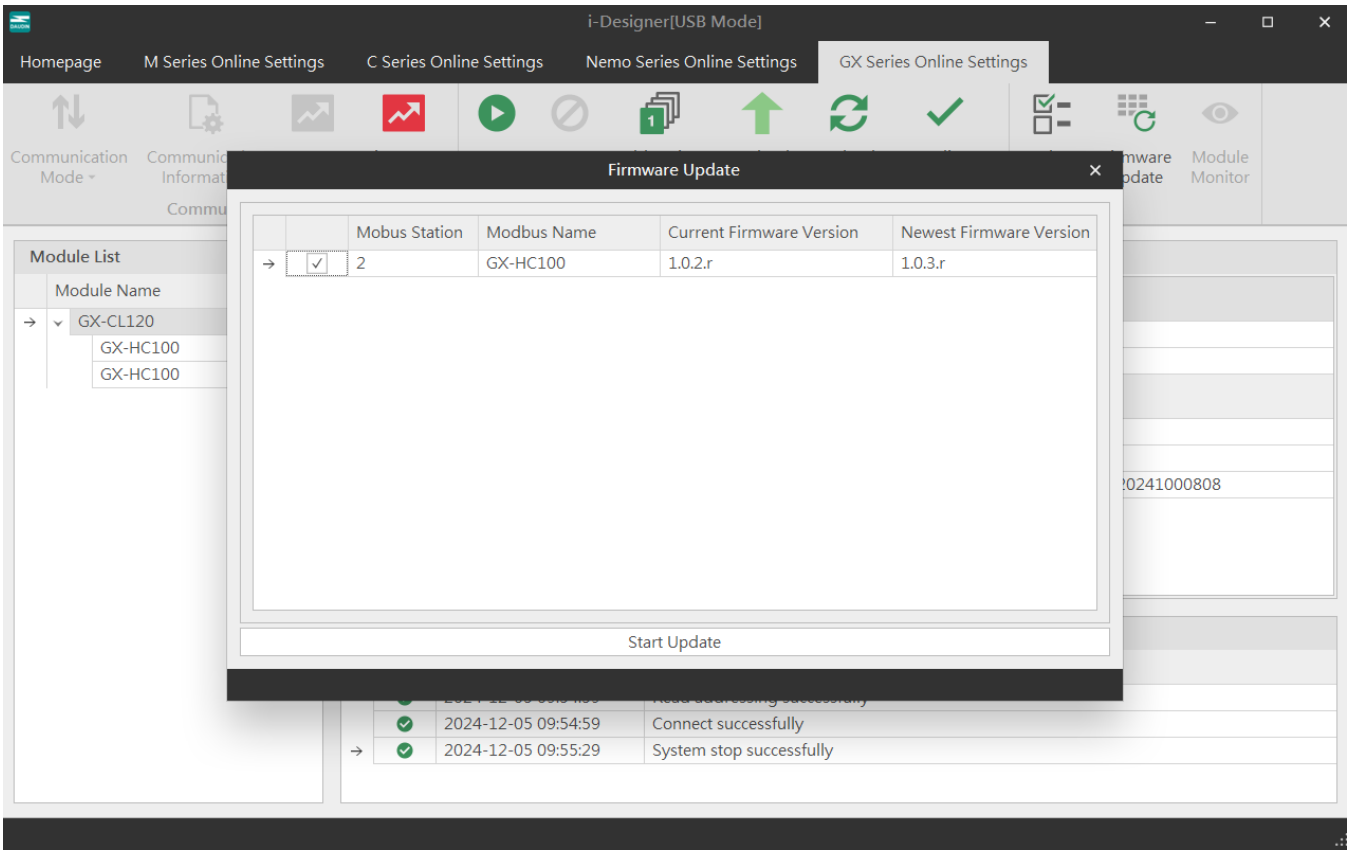

Figure 7.19 Module Version Data

Only after the system is stopped can the module functions be configured.

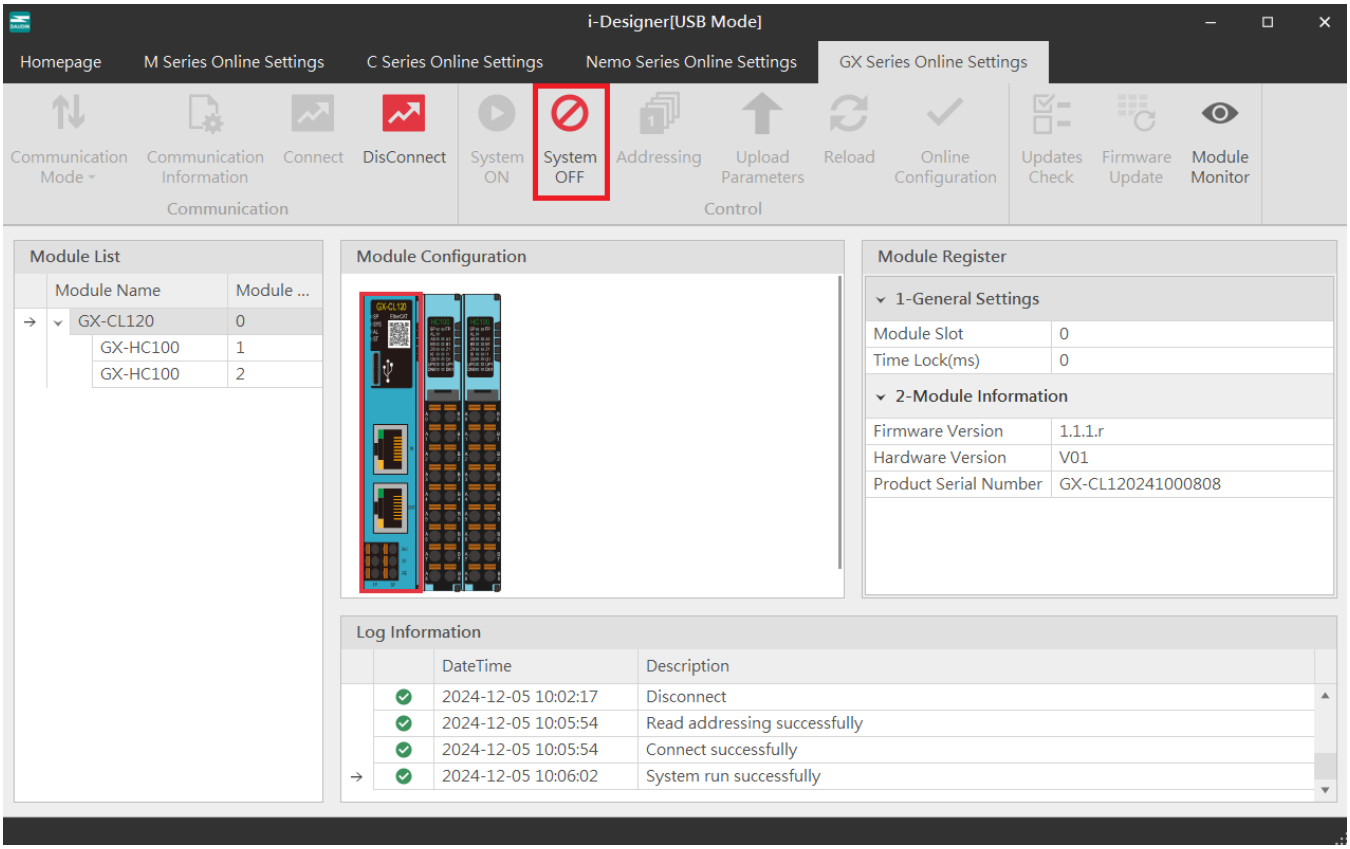

Figure 7.20 System Stop Screen

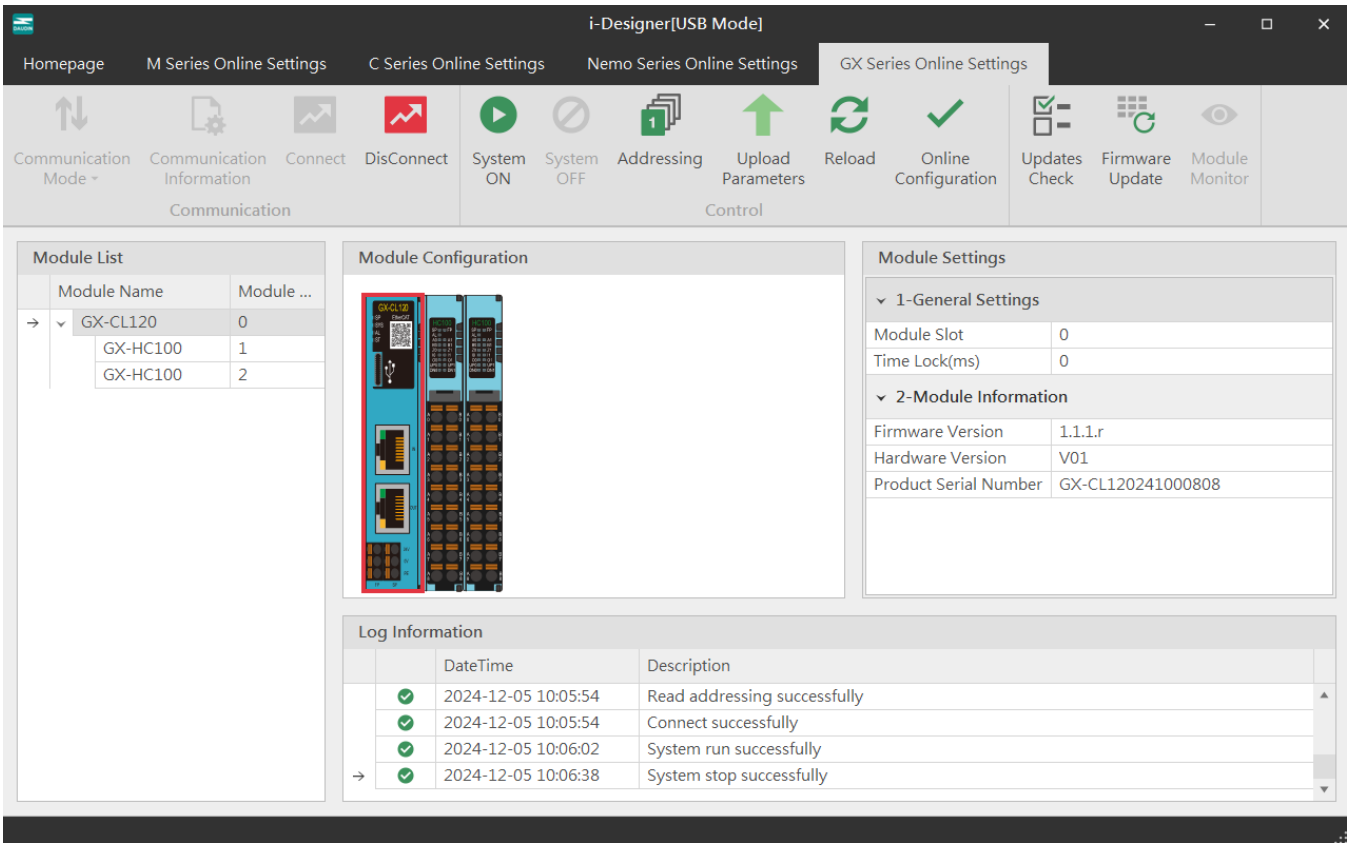

Figure 7.21 System Stop Screen

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.

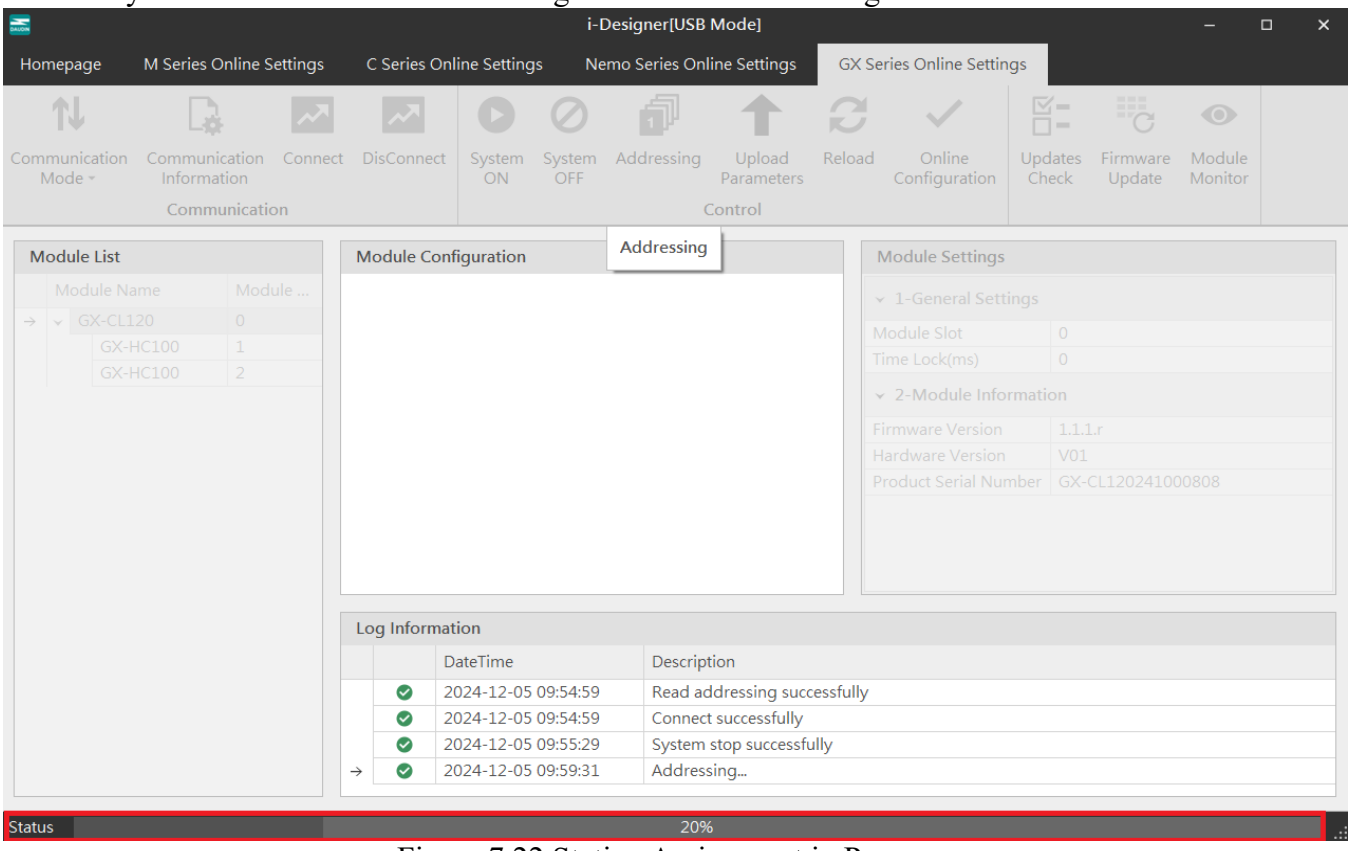

Figure 7.22 Station Assignment in Progress

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

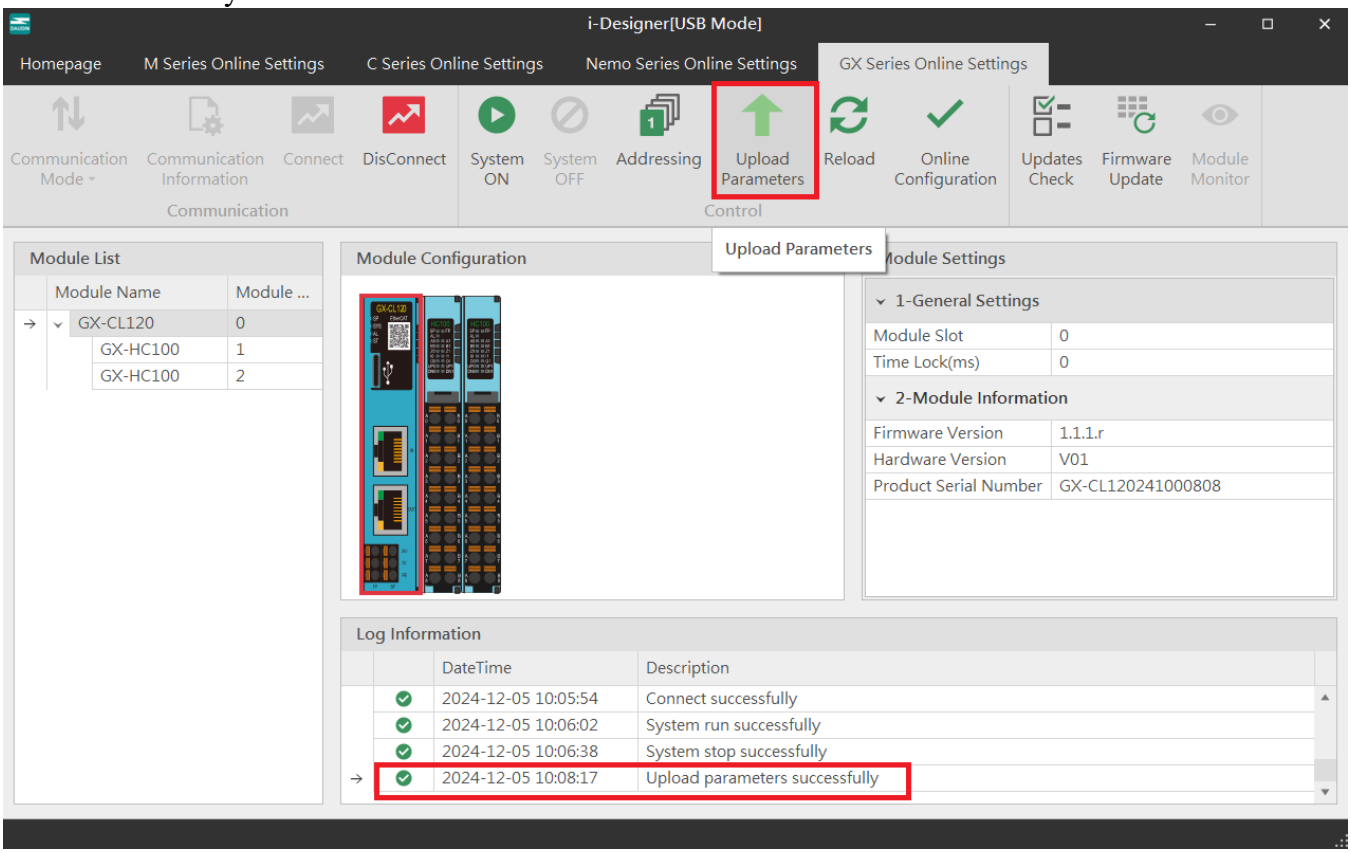

Figure 7.23 Screen After Uploading Parameters

You can view the IO point status through the online debugging feature.

Note: You must disconnect from the external master station before proceeding.

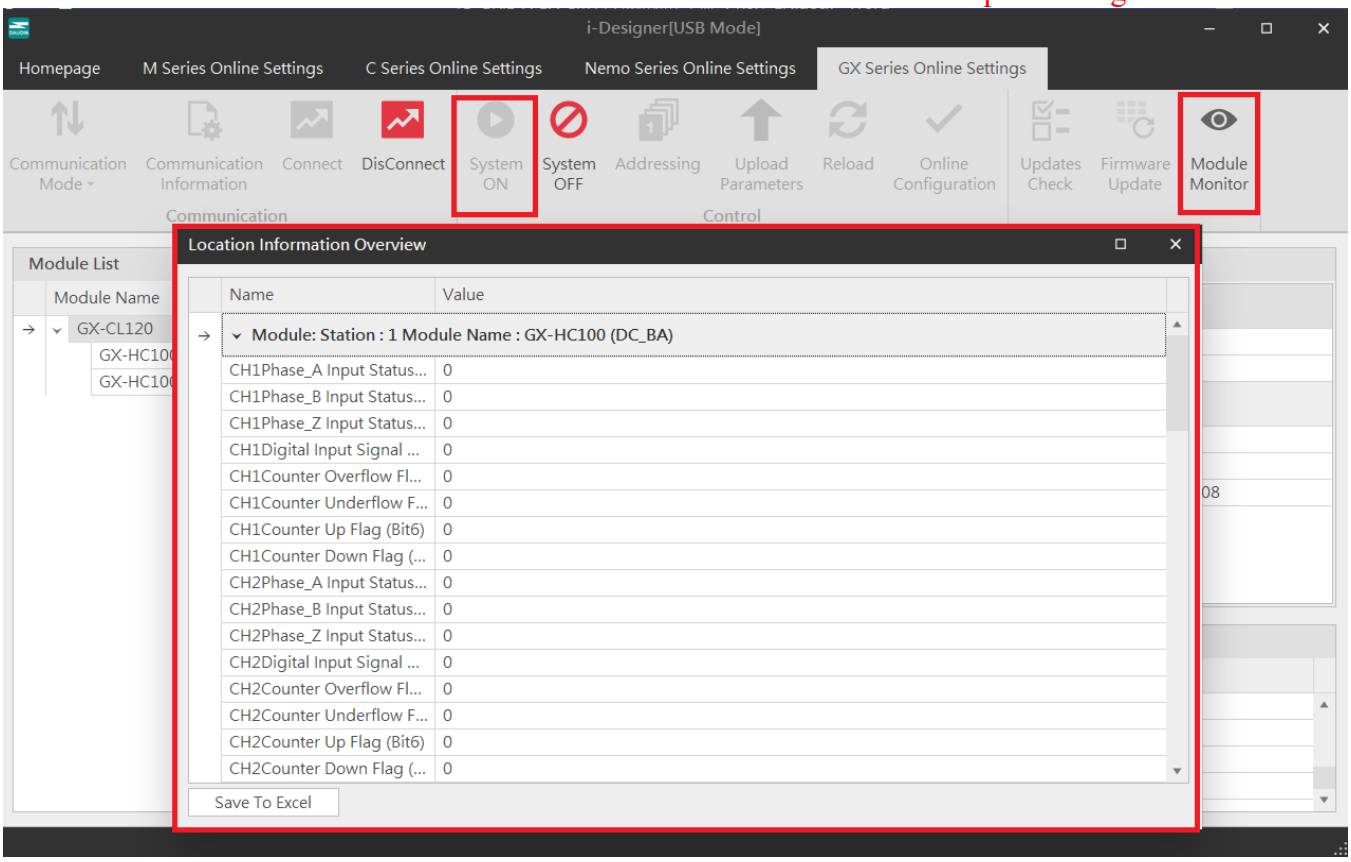

Figure 7.24 Online Adjustment Screen

The system will detect whether the current module version is the latest and prompt for updates.

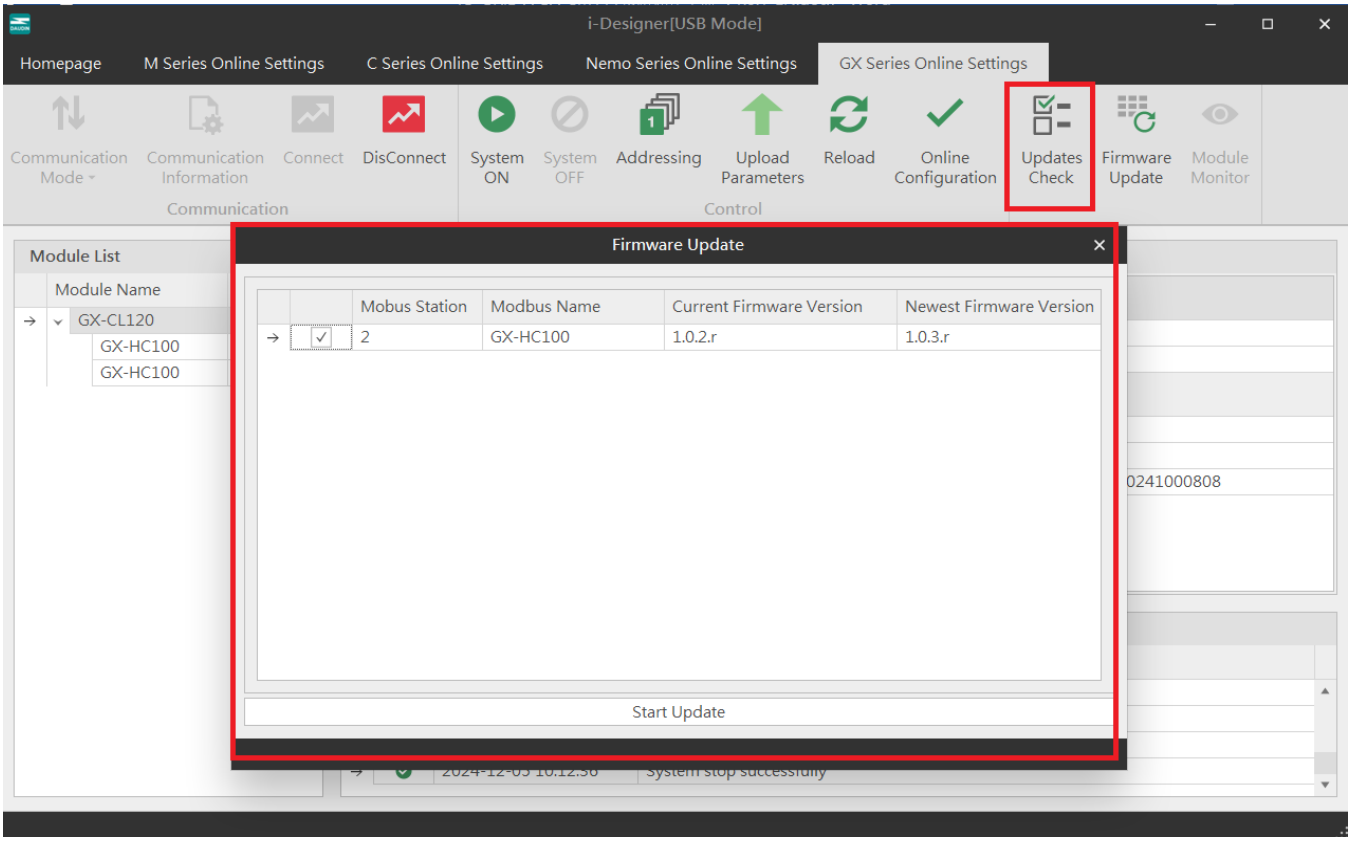

Figure 7.25 Firmware Update Screen

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

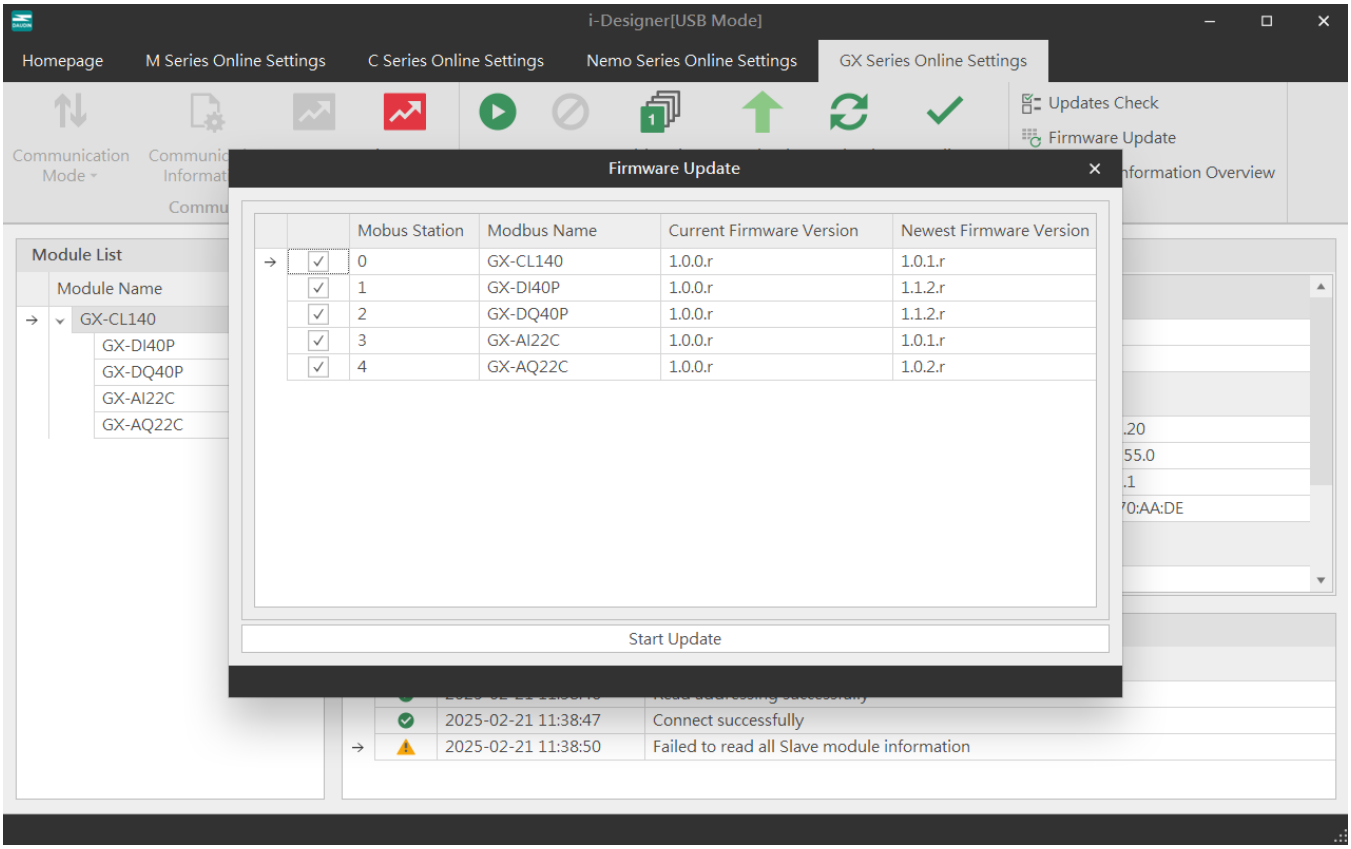

Figure 7.26 Point Information Overview Screen