Compact67 I/O Module

----CC-Link Manual

CC-Link

Preface

1. Scope of application of this manual:

It's for ELCO Compact67 distributed I/O device with CC-Link protocol. From the information in the manual, you can operate the Compact67 module on the CC-Link bus as a distributed I/O device connection controller (PLC, DCS, etc.).

2. Basic knowledge required:

This manual assumes a basic knowledge of electrical and automation engineering and describes each component based on valid data at the time of release. New components and parameter adjustments are updated in the new manual.

3. Guide:

This manual describes the hardware and use of the Compact67 distributed I/O device under the CC-Link protocol.

Covered topics are:

Installation and wiring

Debugging and diagnosis

Components

Ordering data

Technical parameters

4. Technical support:

This manual describes the product features and usage of the Compact67 distributed I/O device as fully as possible. If you have any questions about this product, please contact your local ELCO office or call the service hotline at 400-608-4005. You can also find more automation products on the ELCO website:

https://www.elcoautomation.com/en-us/

5. Disclaimer of liability:

We have checked the consistency of the content and hardware and software described in the manual. However, the possibility of deviation is not excluded, and the content cannot be guaranteed to be completely consistent with the hardware and software.

The data parameters have been tested as required, and the necessary modifications will be improved in the new version.

Contents

1. Product Overview

1.1 Definition

The Compact67 distributed I/O device is a compact CC-Link I/O device with IP67 protection.

1.2 Product Introduction

The standard Compact67 bus I/O provides a reliable, trusted solution for connecting field controllers and fieldbus I/O systems in harsh field environments.

The Compact67 module based on a 60mm wide IP67 housing with standardized installation allows a safe and reliable operation in harsh working environments where water,

dust and vibration can occur. These features make them suitable for a wide range of

applications, such as material handling systems, automated assembly systems, and more.

Other features include support for multiple signal inputs and outputs, and embedded high-brightness LED diagnostics to help maintainers easily determine I/O, module and network status.

1.3 Features

- Compact design saves space for installation of mechanical equipment
- Fast and reliable connector connection, MiniChange (7/8”), MicroChange (M12)
- Support multiple input and output of signals
- Configurable I/O combination
- LED status indication
- Online diagnosis of modules and channels

1.4 Product Model List

No.	Model	Description
1	FCCL-1600P-M12	16-point PNP input or passive contact Short circuit protection, diagnosis
2	FCCL-0808P-M12	8-point PNP input or passive contact 8-point active output Short circuit protection, diagnosis
3	FCCL-16UP-M12	16-point PNP input and output, configurable Short circuit protection, diagnosis
4	FCCL-1600 N-M12	16-point NPN input or passive contact Short circuit protection, diagnosis
5	FCCL-0808 N-M12	8-point NPN input or passive contact 8-point active output Short circuit protection, diagnosis
6	FCCL-16UN-M12	16-point NPN input and output, configurable Short circuit protection, diagnosis

2. Technical Parameters

2.1 Hardware parameters

FCCL-16UN-M12

ARTICLE PROPERTIES

PRODUCT TYPE	Compact67 CC-Link	**OPERATING MODES**	Remote device station (4 station)
DESCRIPTION	16 configurable input / output, NPN, 8 x M12	**TRANSFER RATE**	156 Kbps ... 10 Mbps
PROTOCOL	CC-Link	**ADDRESS SETTINGS**	1 … 64, rotary switch

ELECTRICAL DATA

SUPPLY VOLTAGE	24 V DC (18 … 30 V DC)	**INPUT CHANNELS**	Max.16
MODULE CONSUMPTION CURRENT	Max. 200 mA	**INPUT SUPPLY CURRENT**	Max. 200 mA per channel
OUTPUT SUPPLY CU RRENT	Total max. 8 A	**INPUT SIGNAL TYPE**	NPN sensor, stroke switch, dry contact, etc.
ELECTRICAL ISOLATION	Module / Ui and Uo voltage isolation	**INPUT DELAY**	2.5 ms
POWER SUPPLY	2 x 7/8'' 5pin, Male + Female	**OUTPUT CHANNELS**	Max.16
BUS COMMUNICATION	2 x M12 A-code 5pin, Male + Female	**OUTPUT RATED CURRENT**	Max. 2 A per channel, total max. 8 A
SIGNAL CONNECTION	8 x M12 A-code 4pin, Female	**OUTPUT SIG NAL TYPE**	Indicator, miniature sole-noid valve, etc.
COMMUNICATION INDICA-TION	LED indication, communication message	**OUTPUT FREQUENCY**	Resistive load 100 Hz, Inductive load 5 Hz
VOLTAGE DETECTION	Support, low voltage alarm	**PROCESS DATA IN**	2 bytes
SHORT-CIRCUIT & OVERLOAD	Support, LED indication	**PROCESS DATA OUT**	2 bytes
COMMUNICATION INDICA-TOR	Green LED		
POWER INDICATOR	Green LED		
IO STATUS INDICATOR	Green LED		

FUNCTIONAL SAFETY

MTTF (40 °C)	55a

GENERAL DATA

MOUNTING METHOD	4-hole screw mounting	**OPERATING TEMPERATURE**	-25 ... +70 °C
PROTECTION CLASS	IP67	**STORAGE TEMPERATURE**	-40 ... +85 °C
WEIGHT	483 g	**DIMENSIONS**	60 x 220 x 39 mm

APPROVALS

CE

FCCL-16UP-M12

ARTICLE PROPERTIES

PRODUCT TYPE	Compact67 CC-Link	**OPERATING MODES**	Remote device station (4 station)
DESCRIPTION	16 configurable input / output, PNP, 8 x M12	**TRANSFER RATE**	156 Kbps ... 10 Mbps
PROTOCOL	CC-Link	**ADDRESS SETTINGS**	1 … 64, rotary switch

ELECTRICAL DATA

SUPPLY VOLTAGE	24 V DC (18 ... 30 V DC)	**INPUT CHANNELS**	Max.16
MODULE CONSUMPTION CURRENT	Max. 200 mA	**INPUT SUPPLY CURRENT**	Max. 200 mA per channel
OUTPUT SUPPLY CU RRENT	Total max. 8 A	**INPUT SIGNAL TYPE**	PNP sensor, stroke switch, dry contact, etc.
ELECTRICAL ISOLATION	Module / Ui and Uo voltage isolation	**INPUT DELAY**	2.5 ms
POWER SUPPLY	2 x 7/8'' 5pin, Male + Female	**OUTPUT CHANNELS**	Max.16
BUS COMMUNICATION	2 x M12 A-code 5pin, Male + Female	**OUTPUT RATED CURRENT**	Max. 2 A per channel, total max. 8 A
SIGNAL CONNECTION	8 x M12 A-code 4pin, Female	**OUTPUT SIG NAL TYPE**	Indicator, miniature sole-noid valve, etc.
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VOLTAGE DETECTION	Support, low voltage alarm	**PROCESS DATA IN**	2 bytes
SHORT-CIRCUIT & OVERLOAD	Support, LED indication	**PROCESS DATA OUT**	2 bytes
COMMUNICATION INDICA-TOR	Green LED		
POWER INDICATOR	Green LED		
IO STATUS INDICATOR	Green LED		

FUNCTIONAL SAFETY

MTTF (40 °C)	55a

GENERAL DATA

MOUNTING METHOD	4-hole screw mounting	**OPERATING TEMPERATURE**	-25 ... +70 °C
PROTECTION CLASS	IP67	**STORAGE TEMPERATURE**	-40 ... +85 °C
WEIGHT	483 g	**DIMENSIONS**	60 x 220 x 39 mm

APPROVALS

CE

FCCL-0808N-M12

ARTICLE PROPERTIES

PRODUCT TYPE	Compact67 CC-Link	**OPERATING MODES**	Remote device station (4 station)
DESCRIPTION	8 input + 8 output, NPN, 8 x M12	**TRANSFER RATE**	156 Kbps ... 10 Mbps
PROTOCOL	CC-Link	**ADDRESS SETTINGS**	1 … 64, rotary switch

ELECTRICAL DATA

SUPPLY VOLTAGE	24 V DC (18 … 30 V DC)	**INPUT CHANNELS**	8
MODULE CONSUMPTION CURRENT	Max. 200 mA	**INPUT SUPPLY CURRENT**	Max. 200 mA per channel
OUTPUT SUPPLY CU RRENT	Total max. 8 A	**INPUT SIGNAL TYPE**	NPN sensor, stroke switch, dry contact, etc.
ELECTRICAL ISOLATION	Module / Ui and Uo voltage isolation	**INPUT DELAY**	2.5 ms
POWER SUPPLY	2 x 7/8'' 5pin, Male + Female	**OUTPUT CHANNELS**	8
BUS COMMUNICATION	2 x M12 A-code 5pin, Male + Female	**OUTPUT RATED CURRENT**	Max. 2 A per channel, total max. 8 A
SIGNAL CONNECTION	8 x M12 A-code 4pin, Female	**OUTPUT SIG NAL TYPE**	Indicator, miniature sole-noid valve, etc.
COMMUNICATION INDICA-TION	LED indication, communication message	**OUTPUT FREQUENCY**	Resistive load 100 Hz, Inductive load 5 Hz
VOLTAGE DETECTION	Support, low voltage alarm	**PROCESS DATA IN**	1 bytes
SHORT-CIRCUIT & OVERLOAD	Support, LED indication	**PROCESS DATA OUT**	1 bytes
COMMUNICATION INDICA-TOR	Green LED		
POWER INDICATOR	Green LED		
IO STATUS INDICATOR	Green LED		

FUNCTIONAL SAFETY

MTTF (40 °C)	57a

GENERAL DATA

MOUNTING METHOD	4-hole screw mounting	**OPERATING TEMPERATURE**	-25 ... +70 °C
PROTECTION CLASS	IP67	**STORAGE TEMPERATURE**	-40 ... +85 °C
WEIGHT	483 g	**DIMENSIONS**	60 x 220 x 39 mm

APPROVALS

CE

FCCL-0808P-M12

ARTICLE PROPERTIES

PRODUCT TYPE	Compact67 CC-Link	**OPERATING MODES**	Remote device station (4 station)
DESCRIPTION	8 input + 8 output, PNP, 8 x M12	**TRANSFER RATE**	156 Kbps ... 10 Mbps
PROTOCOL	CC-Link	**ADDRESS SETTINGS**	1 … 64, rotary switch

ELECTRICAL DATA

SUPPLY VOLTAGE	24 V DC (18 ... 30 V DC)	**INPUT CHANNELS**	8
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PROTECTION CLASS	IP67	**STORAGE TEMPERATURE**	-40 ... +85 °C
WEIGHT	483 g	**DIMENSIONS**	60 x 220 x 39 mm

APPROVALS

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FCCL-1600N-M12

ARTICLE PROPERTIES

PRODUCT TYPE	Compact67 CC-Link	**OPERATING MODES**	Remote device station (4 station)
DESCRIPTION	16 input NPN, 8 x M12	**TRANSFER RATE**	156 Kbps ... 10 Mbps
PROTOCOL	CC-Link	**ADDRESS SETTINGS**	1 … 64, rotary switch

ELECTRICAL DATA

SUPPLY VOLTAGE	24 V DC (18 … 30 V DC)	**INPUT CHANNELS**	16
MODULE CONSUMPTION CURRENT	Max. 200 mA	**INPUT SUPPLY CURRENT**	Max. 200 mA per channel
OUTPUT SUPPLY CU RRENT	Total max. 8 A	**INPUT SIGNAL TYPE**	NPN sensor, stroke switch, dry contact, etc.
ELECTRICAL ISOLATION	Module / Ui and Uo voltage isolation	**INPUT DELAY**	2.5 ms
POWER SUPPLY	2 x 7/8'' 5pin, Male + Female	**OUTPUT CHANNELS**	-
BUS COMMUNICATION	2 x M12 A-code 5pin, Male + Female	**OUTPUT RATED CURRENT**	Max. 2 A per channel, total max. 8 A
SIGNAL CONNECTION	8 x M12 A-code 4pin, Female	**OUTPUT SIG NAL TYPE**	Indicator, miniature sole-noid valve, etc.
COMMUNICATION INDICA-TION	LED indication, communication message	**OUTPUT FREQUENCY**	Resistive load 100 Hz, Inductive load 5 Hz
VOLTAGE DETECTION	Support, low voltage alarm	**PROCESS DATA IN**	2 bytes
SHORT-CIRCUIT & OVERLOAD	Support, LED indication	**PROCESS DATA OUT**	0 bytes
COMMUNICATION INDICA-TOR	Green LED		
POWER INDICATOR	Green LED		
IO STATUS INDICATOR	Green LED		

FUNCTIONAL SAFETY

MTTF (40 °C)	59a

GENERAL DATA

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FCCL-1600P-M12

ARTICLE PROPERTIES

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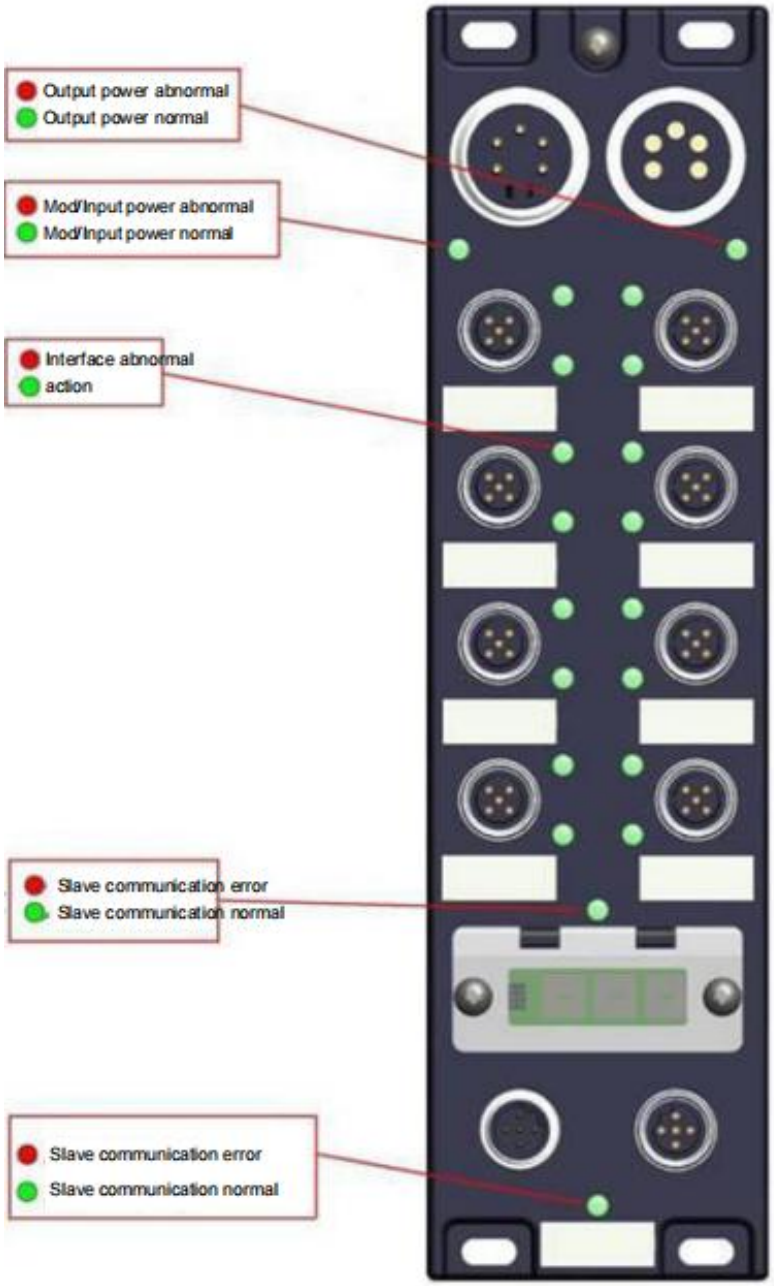
WEIGHT	483 g	**DIMENSIONS**	60 x 220 x 39 mm

APPROVALS

CE

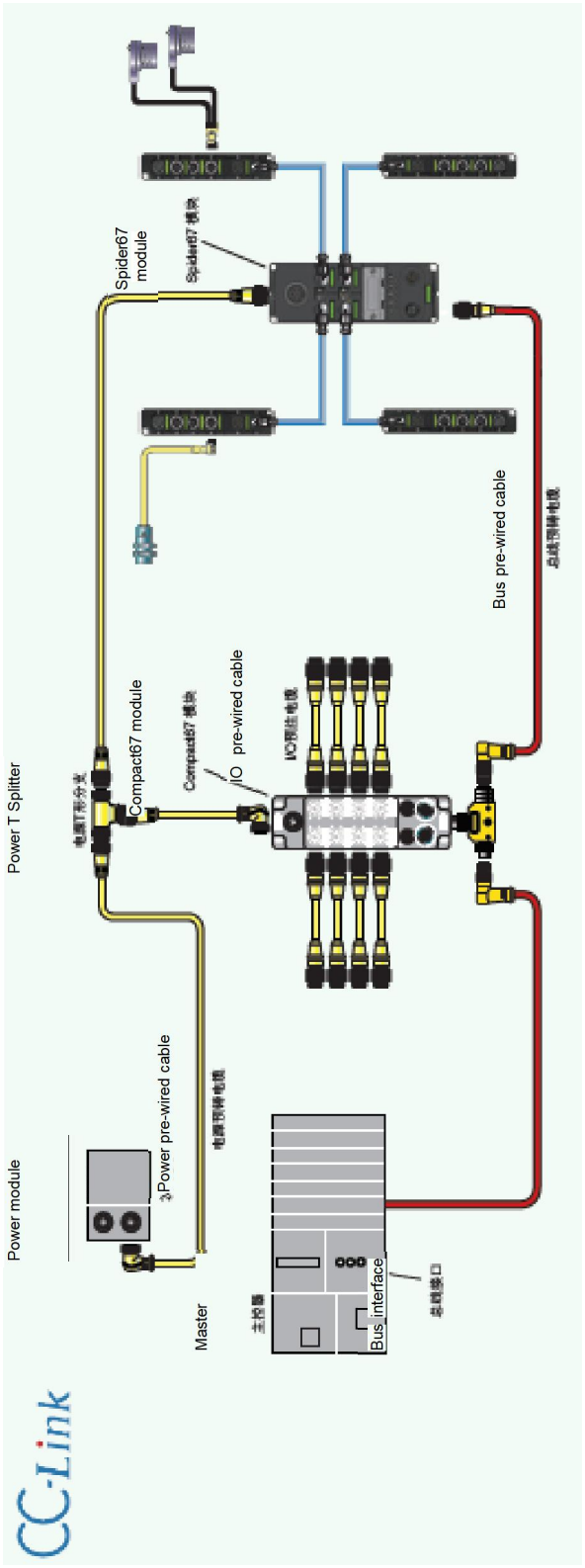
2.2 LED Indication Function

The operating status of the module can be displayed by the LED indicator.



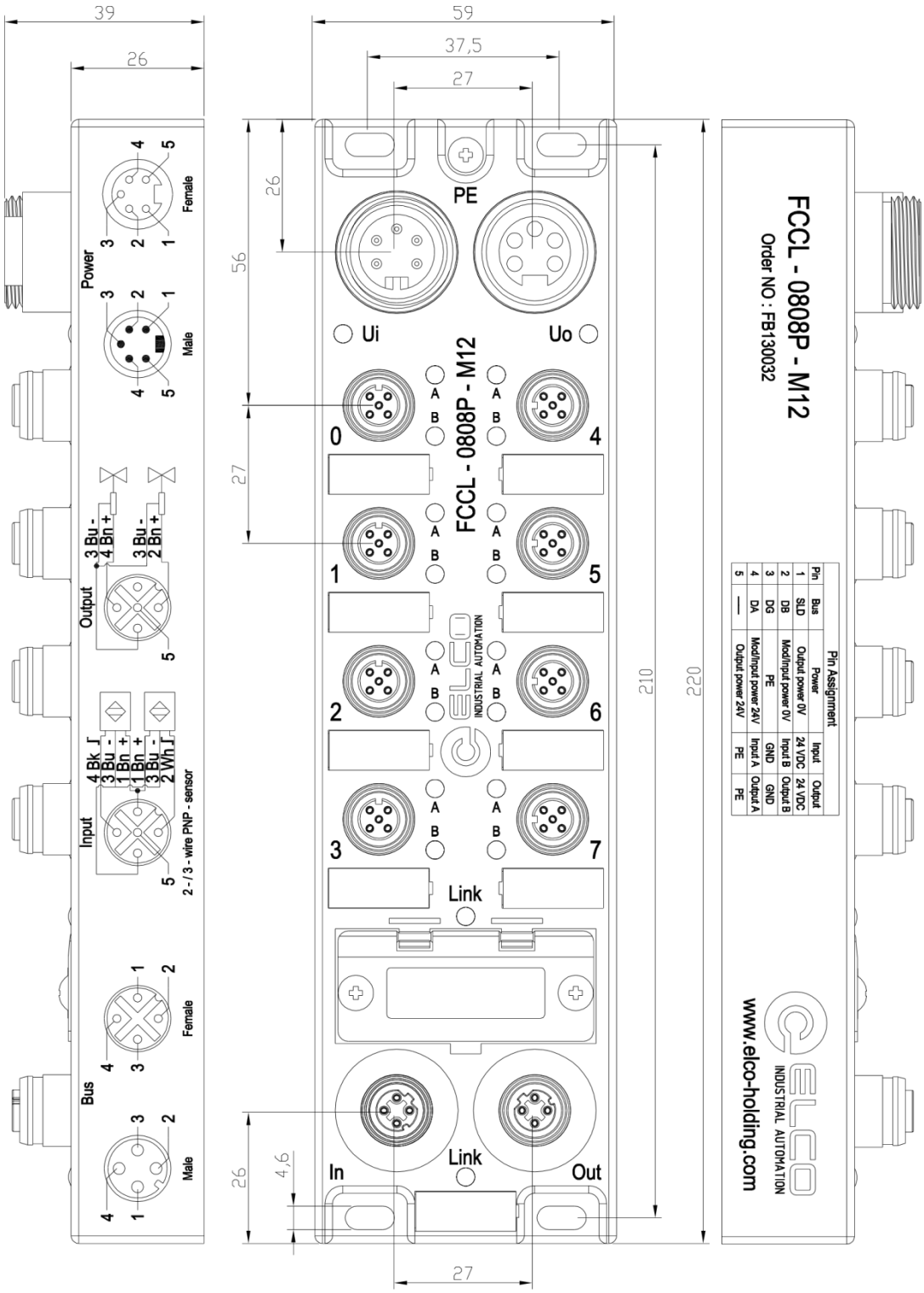
2.3 Conventional System Layout

The following figure shows the conventional CC-Link system module connection by an example. The module is powered by the 24VDC power supply. The CC-Link network is connected to the module by cascading. Further modules can also use more repeaters to extend the connection distance.



3. Installation wiring

3.1 Installation dimension drawing



3.2 Installation position and dimension

Thanks to the high degree of protection of IP67 and excellent resistance to vibration and interference, the Compact67 can be installed in almost any

position.

The Compact67 module has a uniform dimensions and the table below shows the module's mounting dimensions:

	Size
Mounting width	60mm
Installation height	220mm
Installation depth	39mm (No connector)

3.3 Set CC-Link Compact67 gateway address and baud rate

The CC-Link address specifies the address of the Compact67 distributed I/O device of the CC-Link slave station on the network. It needs to open the plastic protective

cover of the DIP switch to set the CC-Link address of the Compact67. To adjust the CC-Link address of the module, pay attention to the following points:

1) The address setting is determined by the rotary code and needs to be powered off.

2) The slave address located in the same CC-Link network is unique and cannot be repeated

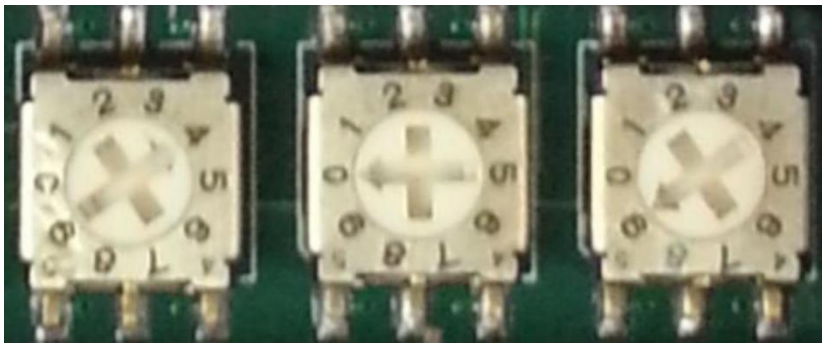
3) The dialing address of the module must be the same as the setting address of the module in the configuration tool.

4) Address setting range: 1-64

5) The module will accept the changed CC-Link address only when the module is powered on.

There are a total of three rotary switches on the front of the module. Three rotations from left to right are the transmission rate, station number switch × 10, station number switch × 1. The current value is indicated by an arrow.

For example, CC-Link is set to a baud rate of 10M and the station number is 9 as shown below:



Baud rate setting:

0：156Kbps 1：625Kbps

2：2.5Mbps 3：5Mbps

4：10Mbps 5~9：Transmission rate setting error Station number setting:

Within 1~64 stations: station number (normal)

0 or 65 above: station number setting error

3.4 Compact67 wiring guide

Please connect according to the basic electrical specifications. For personal and equipment safety, we recommend disconnecting the power supply during the

wiring operation.

3.4.1 Compact67 Protective grounding (PE)

· A grounding screw PE is provided on the upper part of each module.

· Connecting the module to a protective ground can release the interference current to the ground and ensure module safety and EMC compatibility.

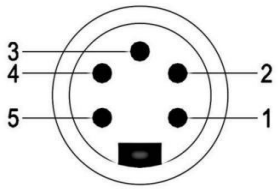
· Be sure to guarantee a low impedance connection to the protective ground

3.4.2 Compact67 power supply connection

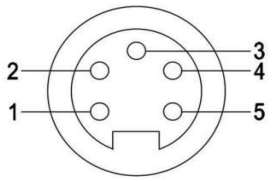
All Compact67 modules are powered by standard 24VDC power supply with an input voltage range of 18~30VDC and are connected using standard 7/8" connectors.

The power supply is divided into two parts: module and input signal power Ui (1L+, 1M), and output load power Uo (2L+, 2M). The positive poles of the two power sources are electrically isolated from 1L+ and 2L+, and the common points are internally connected between 1M and 2M.

1) Power access connector view (Male)



2) Power outlet connector view (Female)



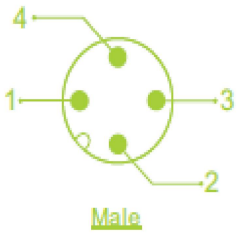
3) Power interface definition

Interface terminal number	Interface function	Voltage
1	Output load power supply 2M	0V
2	Module and input signal power supply 1M	0V
3	Protected ground PE	
4	Module and input signal power 1L+	24V
5	Output load power 2L+	24V

3.4.3 Compact67 bus cable connection

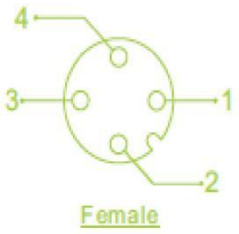
The Compact67 gateway supporting the CC-Link protocol transmits signals via a standard shielded cable and is connected using the A-Code type M12 connector.

1) Bus Access BUS In Connector View (Female)



Male

2) BUS Out Connector View (Female)



Female

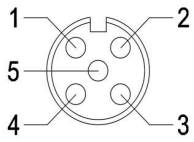
3) Bus interface definition

Interface terminal number	Interface function	Cable color
1	SLD	Shielded wire
2	DB	White
3	DG	Yellow
4	DA	Blue

3.4.4 Compact67 I/O cable connection

All Compact67 module I/O signals are connected via a standard 5-pin M12 connector with up to two signals (input or output) per port.

1) Signal Receiver I/O Connector View (Female)

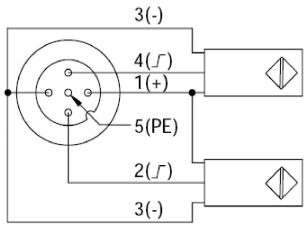


2) Bus interface definition

Interface terminal No.	Interface function	Remarks
1	Signal power supply 24V+	
2	Signal input B	Second signal
3	Signal power supply GND	
4	Signal input A	First signal
5	Shield grounding PE	

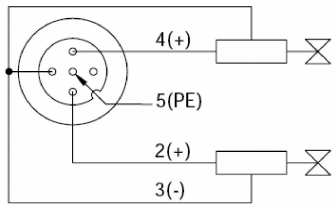
3) Wiring example

a) Dual input signal - that is, one connector is connected to two digital input signals. FCCL-1600P-M12, FCCL-0808P-M12, and FCCL-16UP-M12 support this type of connection.

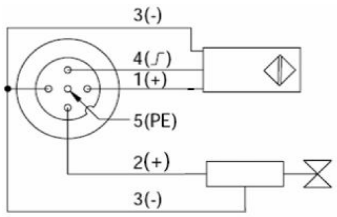


b) Dual output signal - that is, 1 connector is connected to 2 digital output signals,

FCCL-0808P-M12, FCCL-16UP-M12 support this form of connection.



c) Input and output signals - 1 connector for 1 digital input plus 1 digital output signal, FCCL-16UP-M12 supports this form of connection.

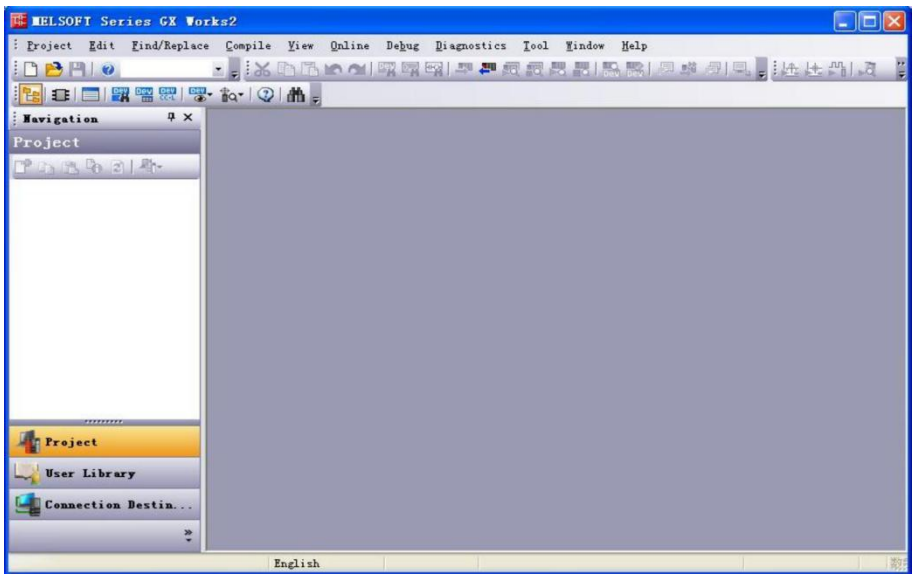


4. Configuration Commissioning

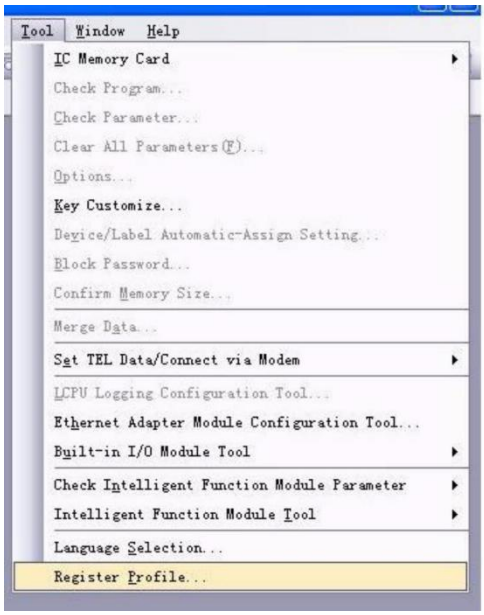
4.1 Installation of configuration files

PLC programming software is programmed by GX Works2. Import configuration files, then create project file and set network configuration.

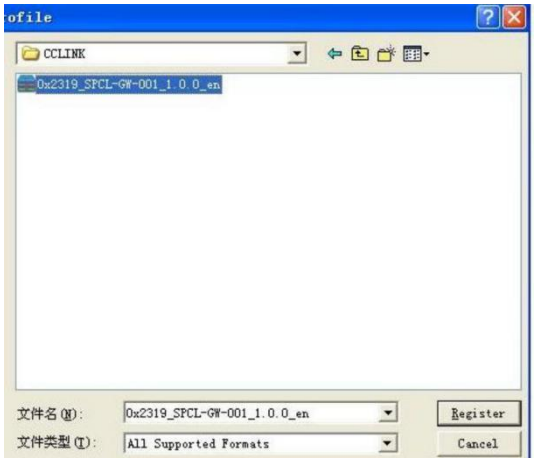
Software interface:



Open 'Tool' - click 'Register Profile'.



Find gateway configuration file



Select 0x2319_FCCL-XXXX-M12_1.0.0_en.zip, click 'Register'.

When above message pops up, it's completed.

4.2 Signal address assignment

Each Compact67 module has 8 connectors (Con0-Con7) for connecting signals,

Each connector has five pins (Pin1-Pin5). The following table indicates the matchup between signal status and bytes transmitted of CC-Link.

1) 16-bit input module FCCL-1600P-M12 & FCCL-1600N-M12

Byte	Bit	connector	e. g.
Input Byte 0	Bit 0	Con0.Pin4	X100
	Bit 1	Con0.Pin2	X101
	Bit 2	Con1.Pin4	X102
	Bit 3	Con1.Pin2	X103
	Bit 4	Con2.Pin4	X104
	Bit 5	Con2.Pin2	X105
	Bit 6	Con3.Pin4	X106
	Bit 7	Con3.Pin2	X107
Input Byte 1	Bit 0	Con4.Pin4	X108
	Bit 1	Con4.Pin2	X109
	Bit 2	Con5.Pin4	X10A
	Bit 3	Con5.Pin2	X10B
	Bit 4	Con6.Pin4	X10C
	Bit 5	Con6.Pin2	X10D
	Bit 6	Con7.Pin4	X10E
	Bit 7	Con7.Pin2	X10F

2) 8-bit input 8-bit output module FCCL-0808P-M12 & FCCL-0808N-M12

Byte	Bit	connector	e. g.
Input Byte 0	Bit 0	Con0.Pin4	X100
	Bit 1	Con0.Pin2	X101
	Bit 2	Con1.Pin4	X102
	Bit 3	Con1.Pin2	X103
	Bit 4	Con2.Pin4	X104
	Bit 5	Con2.Pin2	X105
	Bit 6	Con3.Pin4	X106
	Bit 7	Con3.Pin2	X107
Output Byte 0	Bit 0	Con4.Pin4	Y100
	Bit 1	Con4.Pin2	Y101
	Bit 2	Con5.Pin4	Y102
	Bit 3	Con5.Pin2	Y103
	Bit 4	Con6.Pin4	Y104
	Bit 5	Con6.Pin2	Y105
	Bit 6	Con7.Pin4	Y106
	Bit 7	Con7.Pin2	Y107

3) 16-bit input/output configurable module FCCL-16UP-M12 & FCCL-16UN-M12

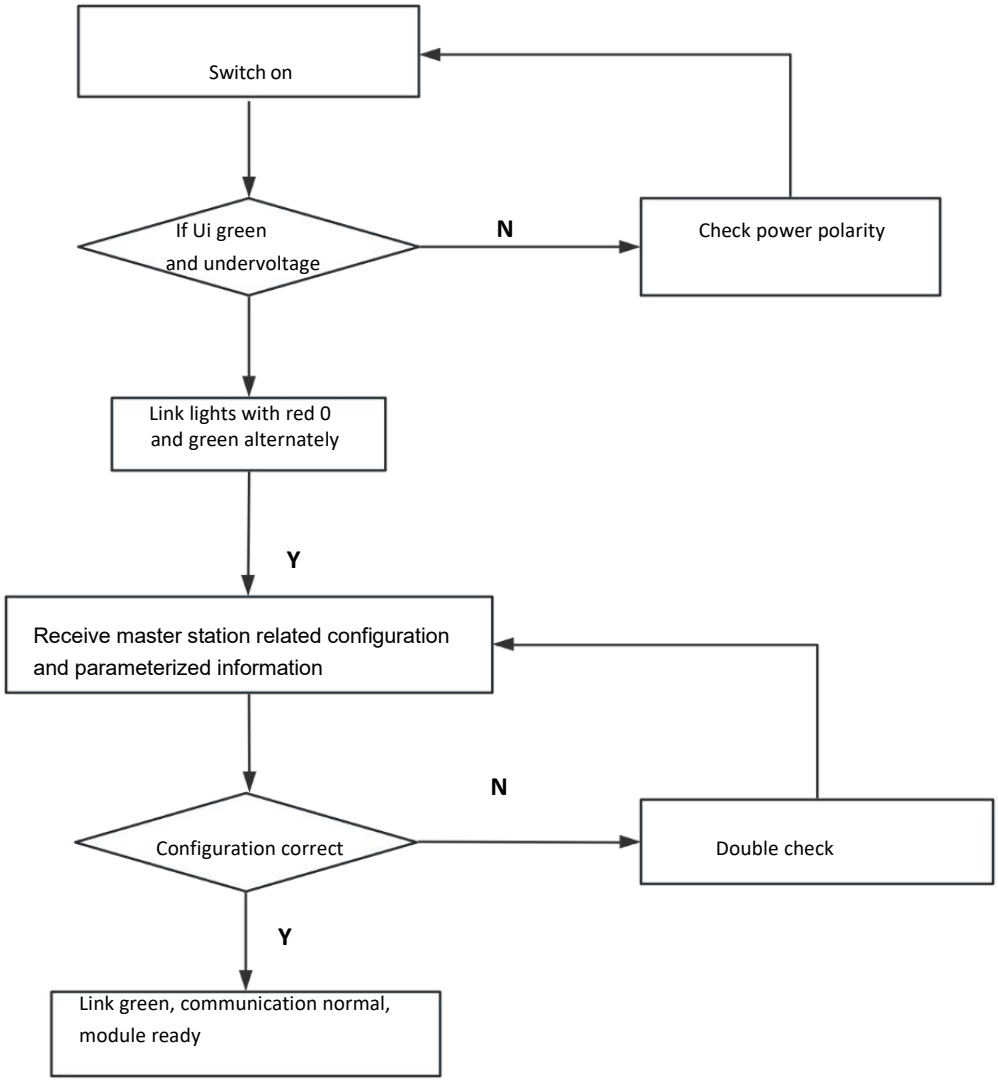
Byte	Bit	connector	e. g.
Input/Output Byte 0	Bit 0	Con0.Pin4	X100 Y100
	Bit 1	Con0.Pin2	X101 Y101
	Bit 2	Con1.Pin4	X102 Y102
	Bit 3	Con1.Pin2	X103 Y103
	Bit 4	Con2.Pin4	X104 Y104
	Bit 5	Con2.Pin2	X105 Y105
	Bit 6	Con3.Pin4	X106 Y106
	Bit 7	Con3.Pin2	X107 Y107
Input/Output Byte 1	Bit 0	Con4.Pin4	X108 Y108
	Bit 1	Con4.Pin2	X109 Y109
	Bit 2	Con5.Pin4	X10A Y10A
	Bit 3	Con5.Pin2	X10B Y10B
	Bit 4	Con6.Pin4	X10C Y10C
	Bit 5	Con6.Pin2	X10D Y10D
	Bit 6	Con7.Pin4	X10E Y10E
	Bit 7	Con7.Pin2	X10F Y10F

4.3 Module Startup Process

Check whether the following requirements for the startup of the Compact67 distributed I/O module system are met:

- Compact67 module is power, bus and signal wired.
- The module address is set by software.
- Compact67 is configured and downloaded into the controller.
- Supply voltage for controller is switched on.

Startup of Compact67:



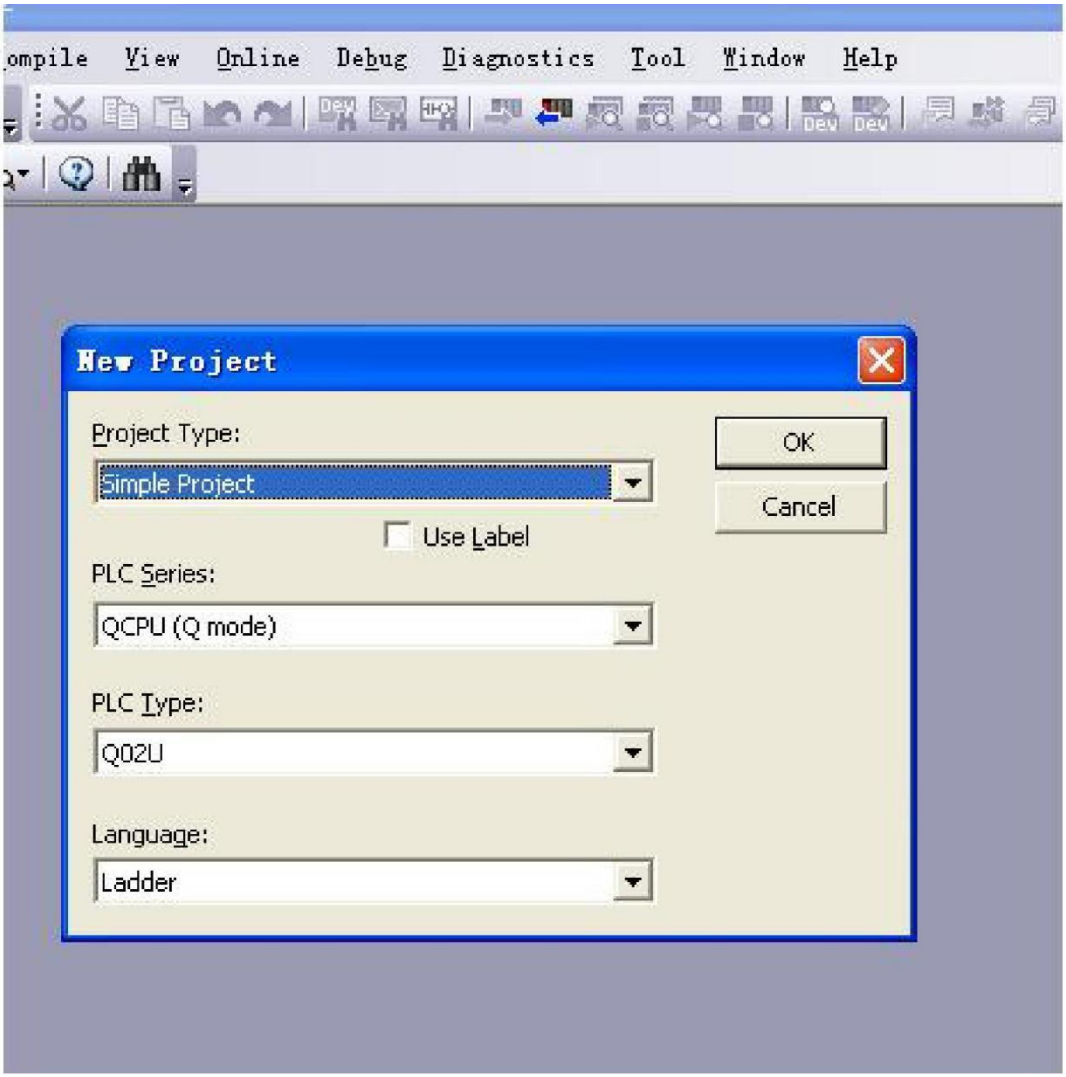
4.4 Module Configuration

This chapter makes users realize Compact67 distributed I/O system through configuration operation. In the example, ELCO Compact67, as CC-Link slave, connects CC-Link controller Q02UCPU and QJ61BT11N of MITSUBISHI.

We assume that power and bus are wired.

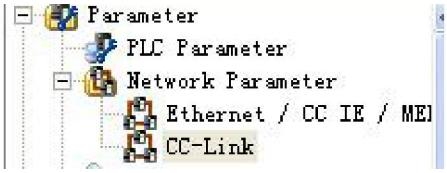
We show the specific software configuration and debugging process in the form of pictures.

1) Create a new project

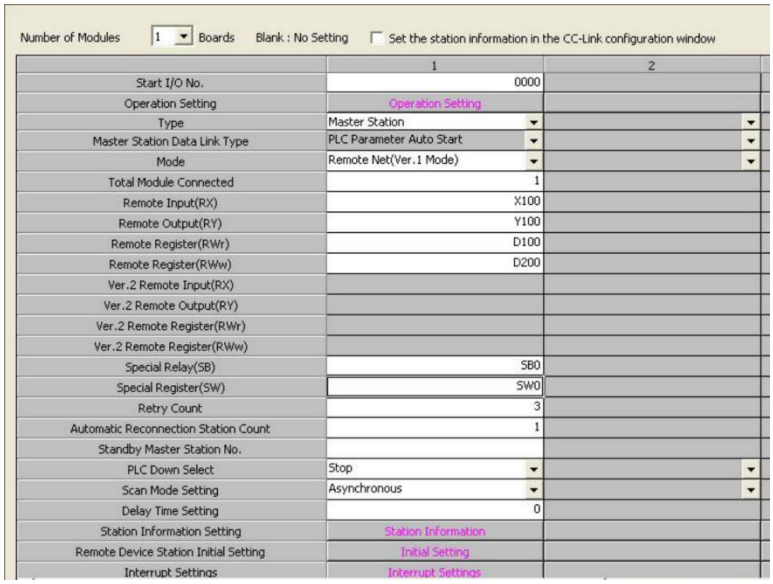


2) CCLINK network parameter setting

CCLINK parameter settings are set up with the CC-Link in the first column of the software parameter.



Double click to open



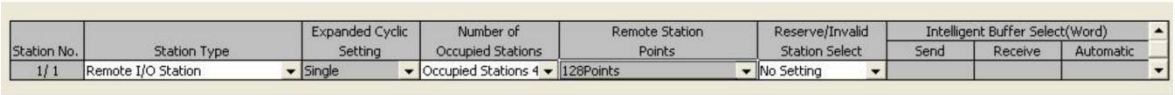
As shown in the figure above, number of modules 1, Start I/O No.: 0000;

Type: Master station; Mode: Remote net (Ver.1 mode);

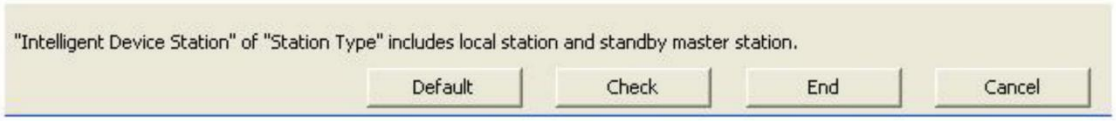
Total Module Connected: 1 (depends on actual quantity of connected module).;

Remote Input (RX): X100; Remote Output (RY): Y100; Remote Register (RWr): D100; Remote Register (RWw): D200; Special Relay (SB): SB0; Special Register (SW): SW0;

Retry Count: 3; Automatic Reconnection Station Count: 1; Make no change for other items. Click 'Station Information'



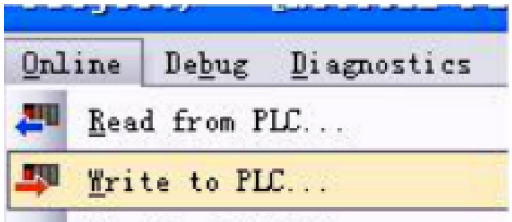
Station Type: Remote I/O Station; Number of Occupied Stations: Occupied Stations 1.

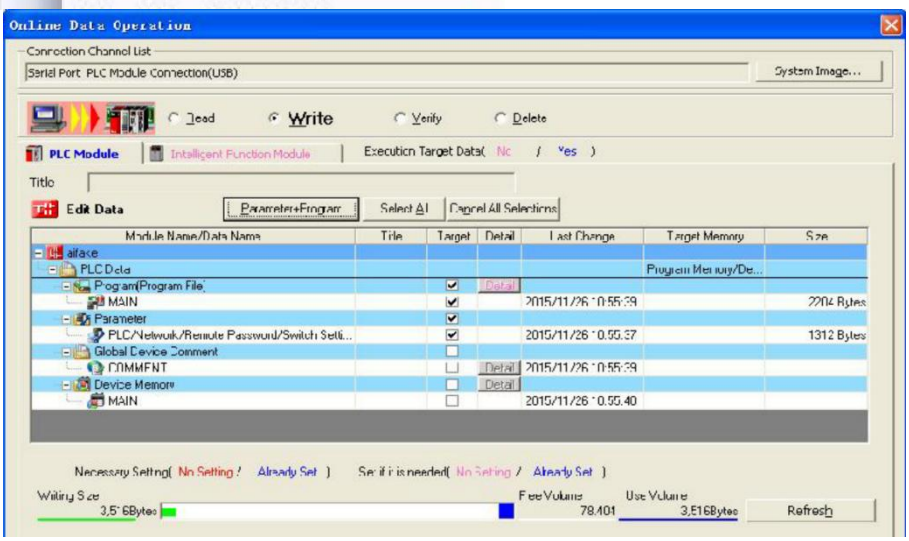


Click 'End' to return to main setting interface.

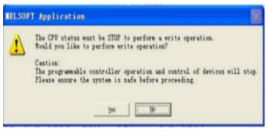
Click 'Check',

,if there's no fault, click 'End'. Download, click 'Online' - Write to PLC

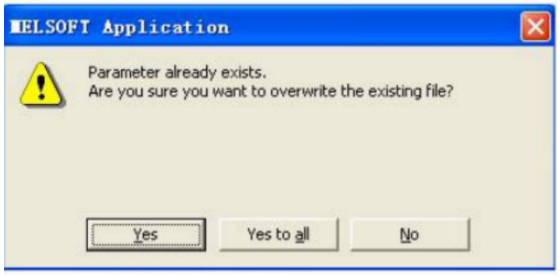




Choose ‘Parameter+Program’, click ‘Execute’

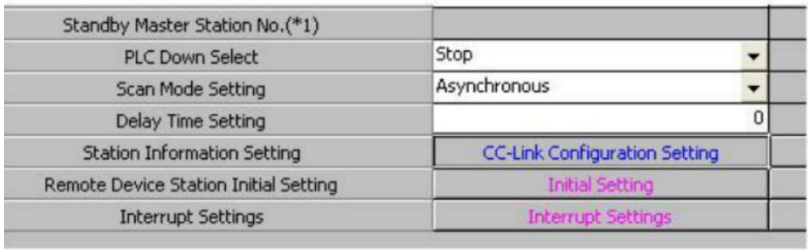


click ‘Yes’



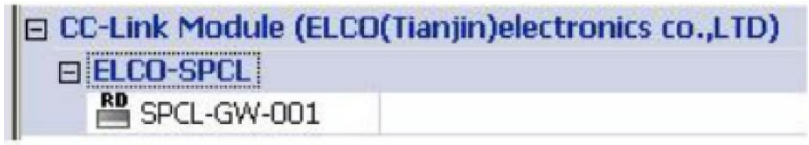
Choose ‘Yes to all’; Click ‘Close’ after download. Configuration completed.

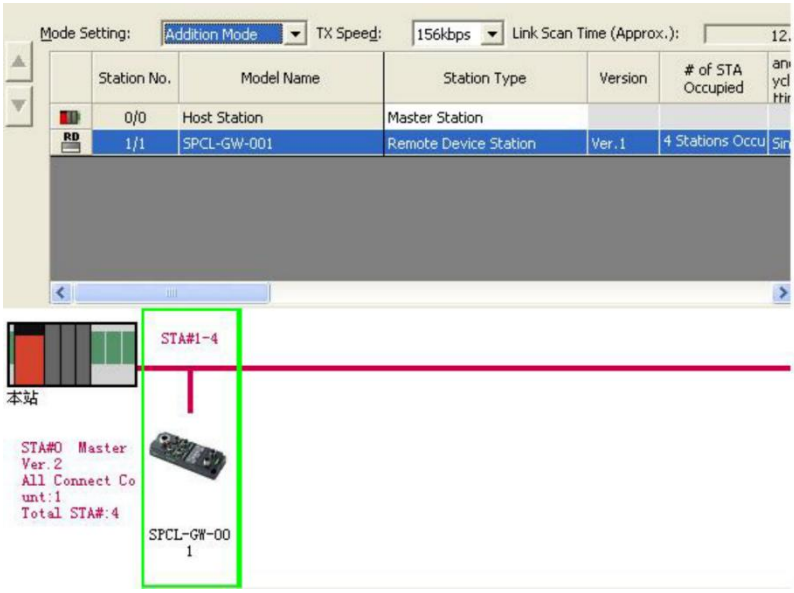
Another way for configuration. Check as follows: Pick up "Set the Station Information in the CC-Link Configuration Window"



Previous station information changed to CC-Link configuration setting,

click and find SPCL-GW-001，drag it into network;





Then execute configuration download. The same as above.

5. Alarm

5.1 LED display

Users can realize the status of module by LED display of Compact67 distributed I/O.

Gateway LED Indication					Meaning	Solution
U MOD	U SP	SD	RD	MOD		
Red	-	-	-	-	Power supply of gateway module low than 18V	Check module power supply
-	Red	-	-	-	Power supply of module load low than 18V	Check auxiliary power supply
-	-	-	-	Red	I/O short-circuit or overload	Check sensor or load
					The actual setting of the extended module is different from the configuration	Check configuration
					Other module failure	Contact technical supports
Green	Green	OFF	OFF	Red	Normal module and auxiliary power supply, but fail to communicate with CC-Link master	Check CC-Link cable
						Check CC-Link address set
						Check slave configuration
Green	Green	Green	Green	Green	Module ready	-

Module LED indication				Meaning	Solution
ADD In	ADD Out	Link	MOD		
Red	Red	-	-	Wrong address assignment of extension module	Re-power supply for gateway
-	-	Red	-	Wrong extension module connection	Check extensible cable connection
				Extension module is communicating with gateway configuration	Waiting for recovery
-	-	-	Red	I/O short-circuit or overload	Check sensor or load
				The actual setting of the extended module is different from the configuration	Check configuration
				Other module failure	Contact technical supports
Green	Green	Green	Green	Module ready	-