



PRODUCT

USE INSTRUCTIONS



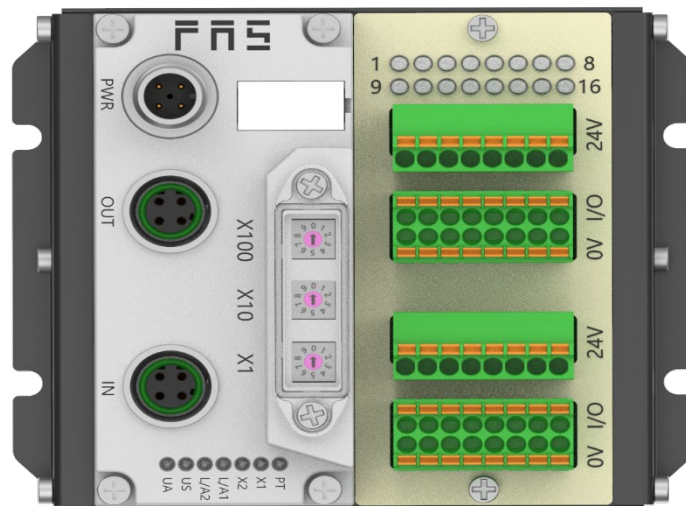
Ordering code: 009B13

Part number: FNI MPL-116-002-K54

FNI MPL-116-002-K54

16 DI/DO PNP

IP20 module user manual



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■ Expected use

This manual describes as decentralized input and output modules for connecting to an industrial network.

■ Installation and start-up

Precautions!

Installation and start-up may only be performed by trained personnel. A qualified individual is one who is familiar with the installation and operation of the product and has the necessary qualifications to perform such operations. Any damage caused by unauthorized operation or illegal and improper use is not covered by the manufacturer's warranty. The equipment operator is responsible for ensuring that appropriate safety and accident prevention regulations are observed.

■ Corrosion resistance

Precautions!

FNI modules generally have good chemical and oil resistance. When used in corrosive media (e.g. high concentrations of chemicals, oils, lubricants, coolants and other material media (i.e. very low water content), these media must be checked before the corresponding application material compatibility. If a module fails or is damaged due to this corrosive medium, a defect claim cannot be made.

■ Dangerous voltage

Precautions!

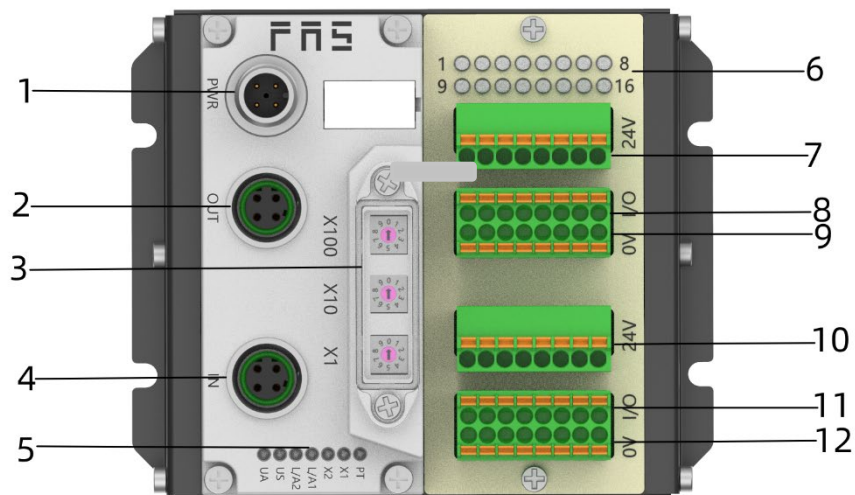
Disconnect all power before using the device!

■ General security

Debugging and inspection	Fault	Owner/operator obligations	Expected use
Before debugging, read the user manual carefully.	If the defect or equipment failure cannot be corrected, the operation of the equipment must be stopped to avoid damage that may be caused by unauthorized use.	This equipment is an EMC Class A compliant product. This device produces RF noise.	The warranty and limited liability statement provided by the manufacturer does not cover damage caused by: ·Unauthorized tampering ·Improper use operation ·The instructions provided in the user manual explain the use, installation and handling of discrepancies
This system cannot be used in an environment where the safety of personnel depends on the functionality of the equipment.	Only after the housing is fully installed can the intended use be assured.	The owner/operator must take appropriate precautions to use this equipment. This device can only use the power supply that matches this device, and can only connect cables approved for application.	

1. Getting Started Guide

1.1 Module overview



- 1 Power supply interface
- 2 Network output port
- 3 DIP switch
- 4 Network input port
- 5 Module status indicator
- 6 Signal status indicator

- 7 Sensor actuator power supply +24V
- 8 1-8 signal interface
- 9 Sensor actuator power supply 0V
- 10 Sensor actuator power supply +24V
- 11 9-16 signal interface
- 12 Sensor actuator power supply 0V

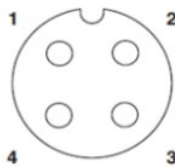
1.2 Mechanical connection

The module is installed using 4 M4 bolts or DIN35 rail snaps.

1.3 Electrical connection

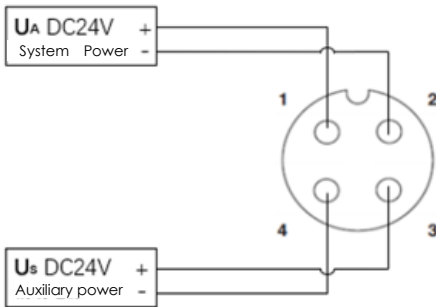
1.3.1Power interface (A-coded)

Power port definition



Pin	Function	Description
1	Ua+	+24V(Brown)
2	Ua-*	0V(White)
3	Us+	+24V(Blue)
4	Us-*	0V(Black)

Power port

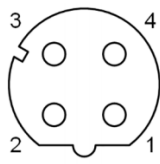


Note:

- 1. It is recommended to provide US power supply and UA power supply separately.
- 2. The total current of Actuator power supply is <4A, and the total current of Bus power supply is <1A;
- 3. The FE connection from the housing to the machine must be low impedance and kept as short as possible.

1.3.2 Network interface (D-coded)

Pin	Function	
1	Tx+	Send data+

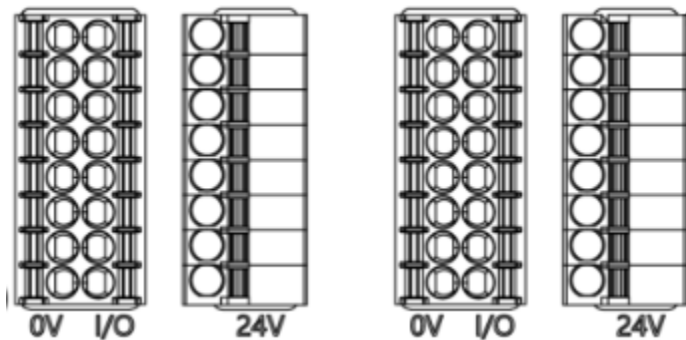


2	Rx+	Receive data+
3	Tx-	send data-
4	Rx-	Receive data-

Note:

Unused I/O port sockets must be covered with end caps to meet IP67 protection rating

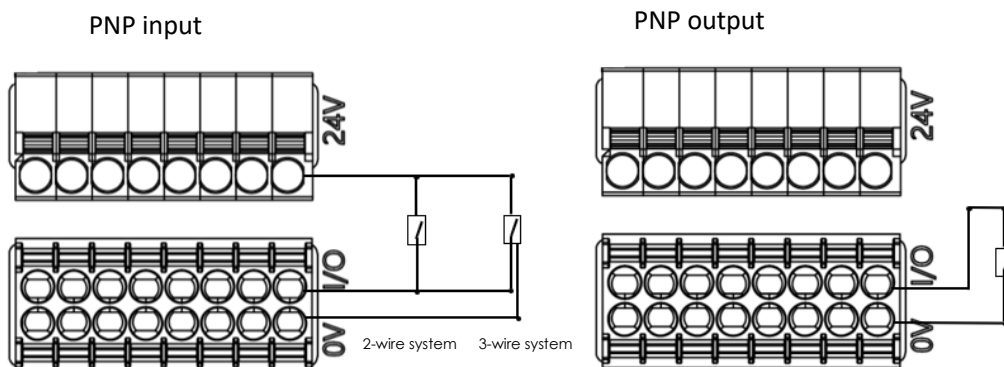
1.3.3 Signal port (screw-free spring-type terminal block)



Note:

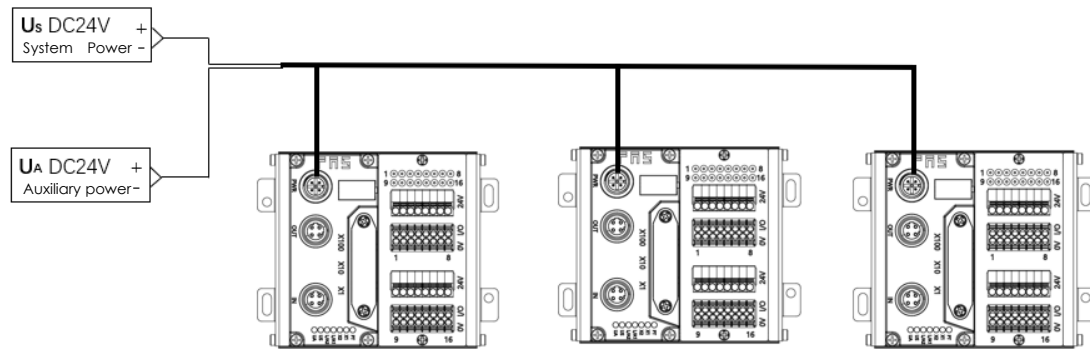
1. Input and output signal types supported: three-wire PNP, two-wire PNP, dry contact;
2. Pin +24V single-channel output current maximum 350mA. The total module current is <4A;
3. The total current of every 8 channels (1~8, 9~16) is <1A

Normal I/O



1.3.4 IP20 module wiring method

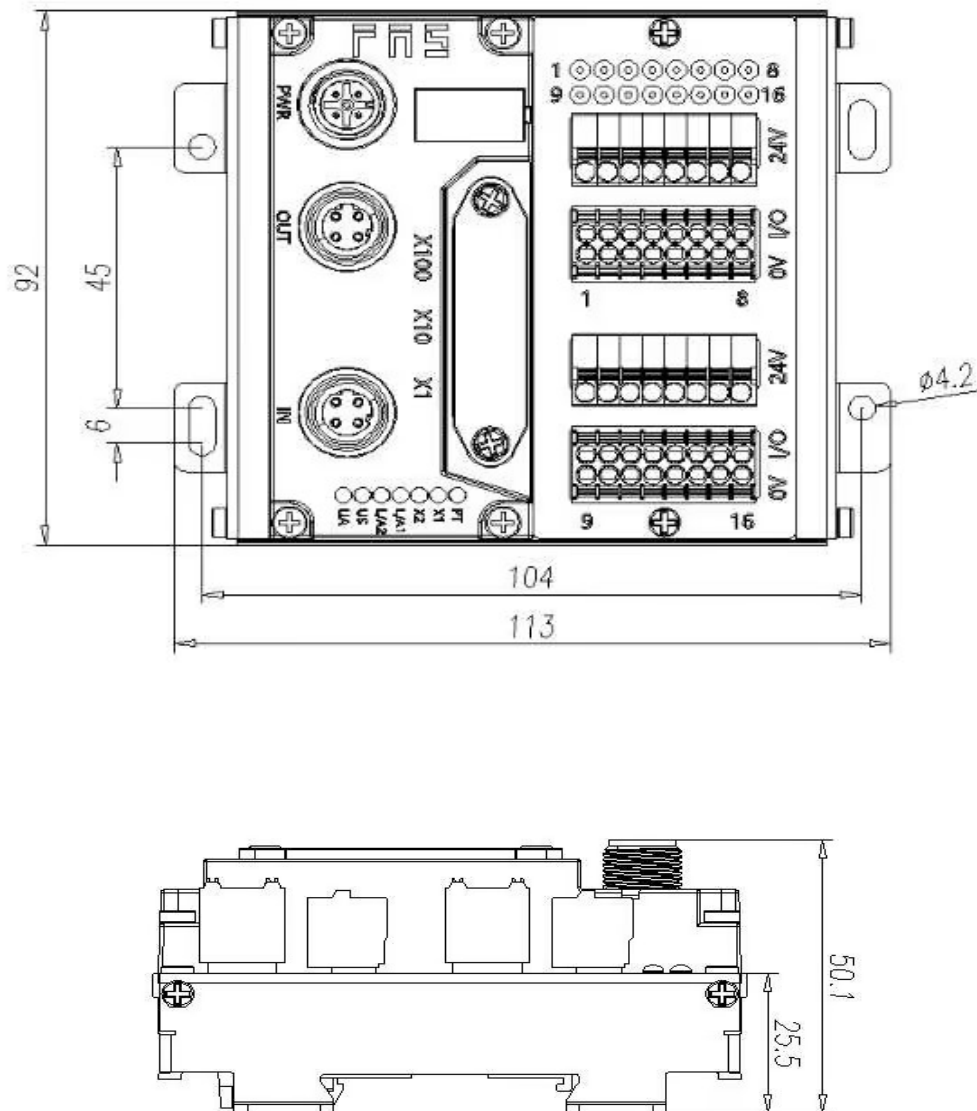
Independent power supply



In independent power supply mode, the maximum current of each module can reach 4A.

2. Technical data

2.1 Size



2.2 Mechanical data

Shell material	Aluminum shell
Housing rating according to IEC 60529	IP20

Power interface	A-Coded
Input port/output port	Pluggable screw-free quick connect terminals
Size(W*H*D)	113mm*92mm*50.1mm
Installation type	Screw fixing or DIN35 rail mounting
Weight	About 670g

2.3 Operating conditions

Operating temperature	-5°C ~ 80°C
Storage temperature	-25°C ~ 85°C

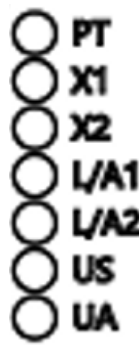
2.4. Electrical data

Voltage	18~30V DC, conform to EN61131-2
Voltage fluctuation	<1%
Input current when power supply voltage is 24V	<130mA

2.5 Network port

Port	2 x 10Base-/100Base-Tx
Port connection	M12, D-Coded
IEEE 802.3 compliant cable types	Shielded twisted pair, minimum STP CAT 5/STP CAT 5e
Data transfer rate	10/100Mbit/s
Maximum cable length	100m
Flow control	Half working condition/full working condition (IEEE 802.3-PAUSE)

2.6 Function indicator



PT	Green	EtherNet/IP communication protocol
	Yellow	ProfiNet communication protocol

	White	CC-Link IE Field basic communication protocol
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CIEBS communication protocol module status

LED	Show	Function
X1	Green light off	Module not connected
	Green light flashes 2.5HZ	Module has no communication
	Green light flashes 1HZ	Module not configured
	Steady green	Running: The device is running
X2	Closure	Module works fine
	Red light always on	Communication error
L/A1	Green light is always on	Device (IN) connected to Ethernet
	Yellow light flashes	Device (IN) sends/receives Ethernet frames
	Green close	Device (IN) is not connected to Ethernet
L/A2	Green light is always on	Device (OUT) connected to Ethernet
	Yellow light flashes	Device (OUT) sends/receives Ethernet frames
	Green close	Device (OUT) is not connected to Ethernet
US	Green	Input voltage is normal
	Flashing red	Input voltage low (< 18 V)
UA	Green	Output voltage is normal
	Flashing red	Output voltage low (< 18 V)
	Red always on	No output voltage present (< 11 V)

PN communication protocol module status

LED	Show	Function
X1	Closure	Working fine
	Flashing red 3s 1HZ	Bus start
	Red always on	System error
X2	Closure	Working fine
	Flashing red 2HZ	No data exchange
	Red always on	No configuration; or low speed physical link; or no physical link
L/A1	Green light is always on	Device (IN) connected to Ethernet
	Yellow light flashes	Device (IN) sends/receives Ethernet frames
	Green close	Device (IN) is not connected to Ethernet
L/A2	Green light is always on	Device (OUT) connected to Ethernet

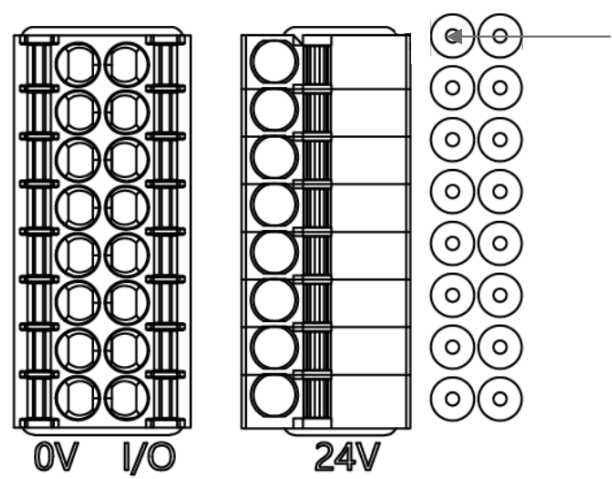
	Yellow light flashes	Device (OUT) sends/receives Ethernet frames
	Green close	Device (OUT) is not connected to Ethernet
US	Green	Input voltage is normal
	Flashing red	Input voltage low (< 18 V)
UA	Green	Output voltage is normal
	Flashing red	Output voltage low (< 18 V)
	Red always on	No output voltage present (< 11 V)

EIP communication protocol module status

LED	Show	Function
X1	Green light is always on	Working status: The equipment is running normally
	Green light flashes 1HZ	Standby: The device is not configured
	Flashing green, red and green alternately	Self-test: The device is undergoing a power-on test.
	Flashing red 1HZ	Recoverable faults:
	Red light always on	Unrecoverable failure
	Closure	US no input voltage
X2	Green light is always on	Connected
	Green light flashes 1HZ	Not connected:
	Flashing green and red alternately	Self-test: The device is undergoing a power-on test.

	Red light flashes 1HZ	Connection timed out
	Red light always on	Duplicate IP:
	Closure	USNo input voltage or no IP address
L/A1	Green light is always on	Device (IN) connected to Ethernet
	Yellow light flashes	Device (IN) sends/receives Ethernet frames
	Green close	Device (IN) is not connected to Ethernet
L/A2	Green light is always on	Device (OUT) connected to Ethernet
	Yellow light flashes	Device (OUT) sends/receives Ethernet frames
	Green close	Device (OUT) is not connected to Ethernet
US	Green	Input voltage is normal
	Flashing red	Input voltage low (< 18 V)
UA	Green	Output voltage is normal
	Flashing red	Output voltage low (< 18 V)
	Red always on	No output voltage present (< 11 V)

I/O port status



LED	Status	Function
1	Closure	The status of an I/O pin input or output is 0
1	Yellow	The status of an I/O pin input or output is 1

3.Integrated

3.1 Module configuration

3.1.1 Restoring factory settings and switching communication protocols

LED indicator light PT color indicates the current protocol

Steps:

1.

When

device

Serial number	X100	X10	X1	letter of agreement	PT
1	0~2	0~9	0~9	ETHERNET/IP	Green light
2	3	—	—	PROFINET	Orange light
3	5~7	0~9	0~9	CIEBS	White

the
is

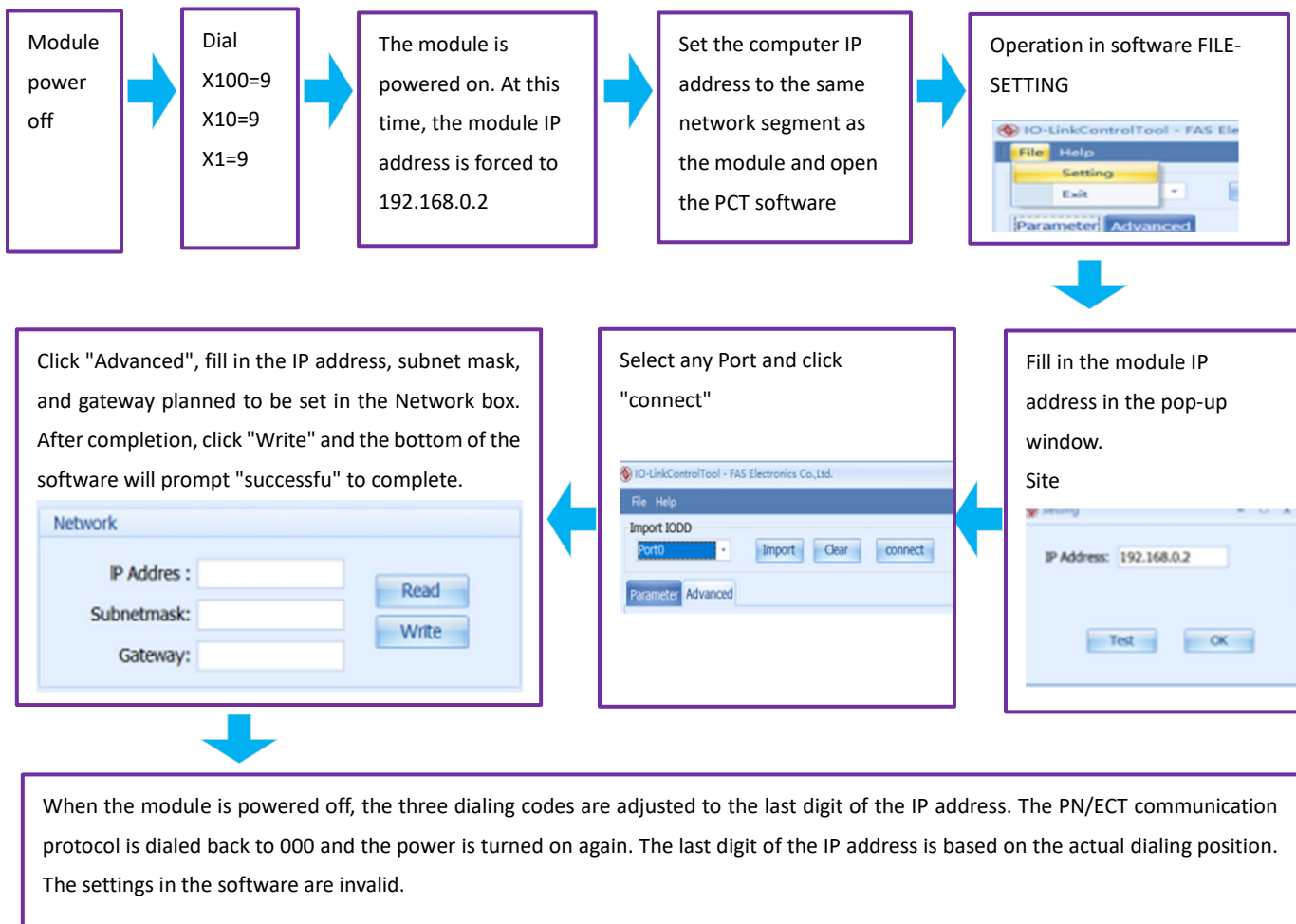
powered off, dial 900;

2. Power on the device and wait 5 seconds;

3. When the device is powered off, dial the code according to different protocols and the last digit of IP (can be set directly);

4. Power on the device and wait 30 seconds until the PF light turns to the corresponding protocol color;

3.1.2 Network segment modification (**only applicable to EIP, CCIEBS**)



3.2 Data mapping

EIP communication protocol process output data

Byte	Function description								
	Function description	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	1~8 signal output 0=off, 1=on	Route 8	Route 7	Route 6	Route 5	Route 4	Route 3	Route 2	Route 1
1	9~16 signal output 0=off, 1=on	Route 16	Route 15	Route 14	Route 13	Route 12	Route 11	Route 10	Route 9

EIP communication protocol process input data

Byte	Function description								
	Function description	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	1~8 signal input 0=off, 1=on	Route 8	Route 7	Route 6	Route 5	Route 4	Route 3	Route 2	Route 1
1	9~16 signal input 0=off, 1=on	Route 16	Route 15	Route 14	Route 13	Route 12	Route 11	Route 10	Route 9
2	Module status			US Overvoltage	UA Overvoltage	Operating temperature	US Under voltage	UA Under voltage	US Overvoltage

PN communication protocol process output data

Byte	Function description
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	Function description	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	Standardinput 01-08	Route 8	Route 7	Route 6	Route 5	Route 4	Route 3	Route 2	Route 1
1	Standardinput 9-16	Route 16	Route 15	Route 14	Route 13	Route 12	Route 11	Route 10	Route 9
PN communication protocol process input data									
Byte	Function description								
	Function description	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	Standardinput 01-08	Route 8	Route 7	Route 6	Route 5	Route 4	Route 3	Route 2	Route 1
1	Standardinput 9-16	Route 16	Route 15	Route 14	Route 13	Route 12	Route 11	Route 10	Route 9
PN communication protocol process detection data									
Module	Function description								
	Status description	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Device Status	Module status				US Overvoltage	UA Overvoltage	Operating temperature	US Under voltage	UA Under voltage

RX 64 00000 0003F  指定软元 X 64 100 177

RX area

CIEBS communication protocol process input data								
Function description								
Function description	X107	X106	X105	X104	X103	X102	X101	X100
1~8 signal input 0=off, 1=on	Route 8	Route 7	Route 6	Route 5	Route 4	Route 3	Route 2	Route 1
Function description	X117	X116	X115	X114	X113	X112	X111	X110
9~16 signal input 0=off, 1=on	Route 16	Route 15	Route 14	Route 13	Route 12	Route 11	Route 10	Route 9

RY 64 00000 0003F  指定软元 Y 64 100 177

R/Y area

CIEBS communication protocol process output data								
Function description								
Function description	Y107	Y106	Y105	Y104	Y103	Y102	Y101	Y100
1~8 signal output 0=off, 1=on	Route 8	Route 7	Route 6	Route 5	Route 4	Route 3	Route 2	Route 1
Function description	Y117	Y116	Y115	Y114	Y113	Y112	Y111	Y110
9~16 signal output 0=off, 1=on	Route 16	Route 15	Route 14	Route 13	Route 12	Route 11	Route 10	Route 9

R/W area

R/Wr	32	00000	0001F		指定软元 v	D	v	32	100	131
------	----	-------	-------	---	---------------------------------------	---	----------------------------------	----	-----	-----

CIEBS communication protocol process detection data								
Function description								
Function description	D107	D106	D105	D104	D103	DX02	D101	D100
				US Overvoltage	UA Overvoltage	Operating temperature	US Under voltage	UA Under voltage

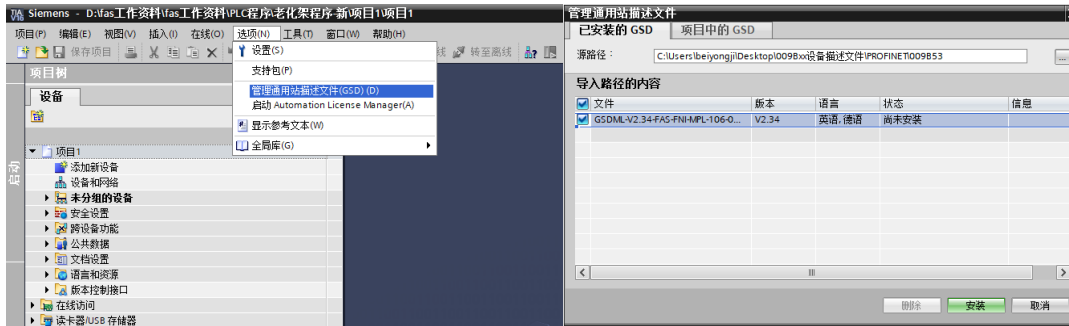
The R/W area is currently unused

3.3 PLC integration tutorial

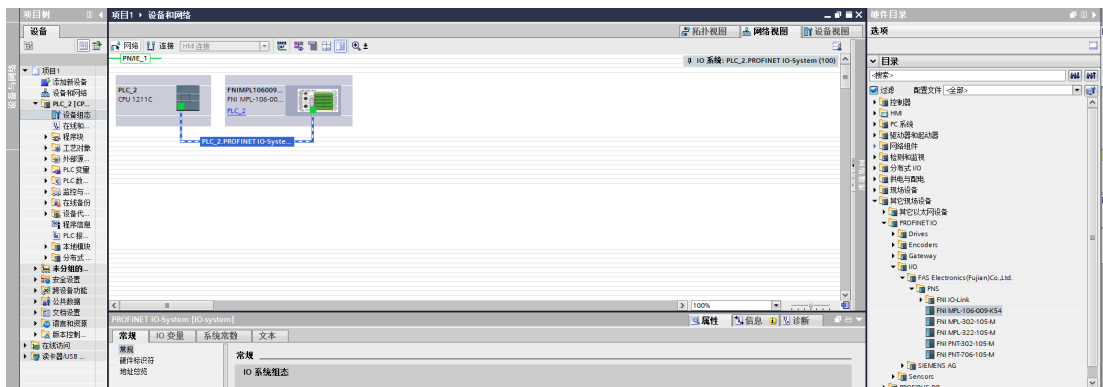
(The module communication protocol should be set before configuring the module, see 3.1.1 for details)

3.3.1 Siemens S7-1200 Portal Integration (PN)

1. Install GSD file

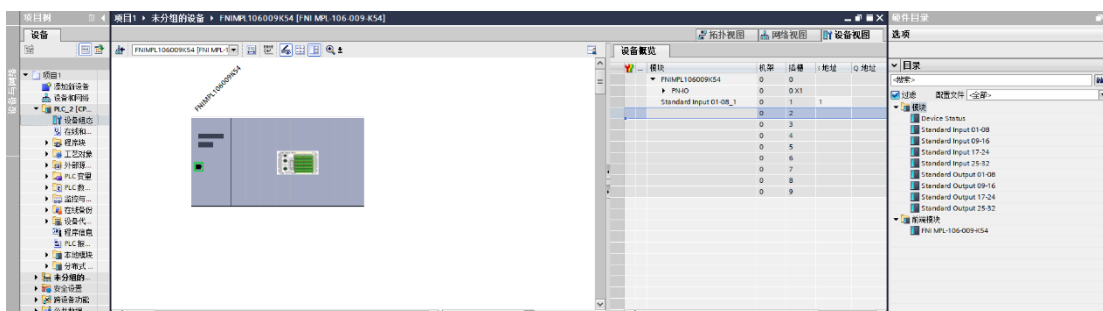


2. In PLC---Device Configuration---Network View---Hardware Catalog, select the module and drag it in, click "Unassigned", and select the PLC to be connected;

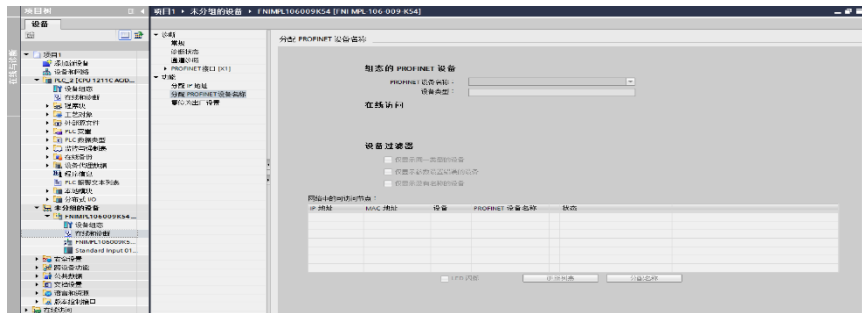


3. Double-click the module to enter the configuration.

Slot function configuration: In the hardware catalog--module, select the required data and drag it into the slot in the device overview window;



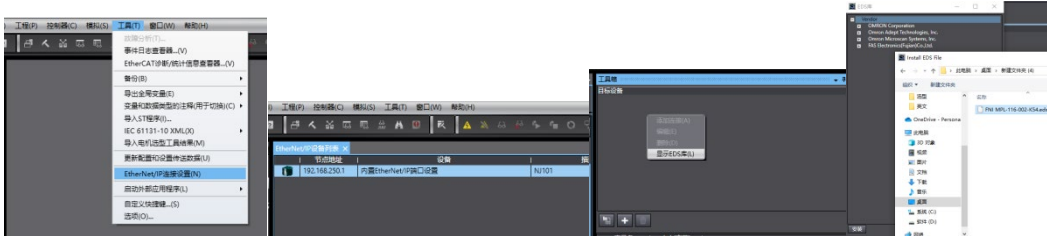
- Assign module PN name: PLC switches to online state, select "Ungrouped Device" --- Click on the module name --- Select Online and Diagnostic --- Function --- Assign PROFINET device name --- -Select the module to be assigned in the list (should be selected based on the physical MAC)---Click "Assign Name" to complete the configuration!



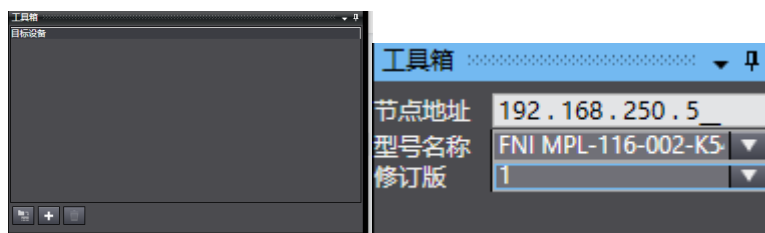
3.3.2 Omron NX1P2 Sysmac Studio integration (EIP)

Omron NX1P2 Sysmac Studio Integrated (EIP)

1. Install the EDS file: Tools---ETHERNET/IP Connection Settings---Double-click the PLC in the window---right-click the blank space of the toolbox on the right and select "Show EDS Library", click "Install" in the pop-up window, and select EDS File installation

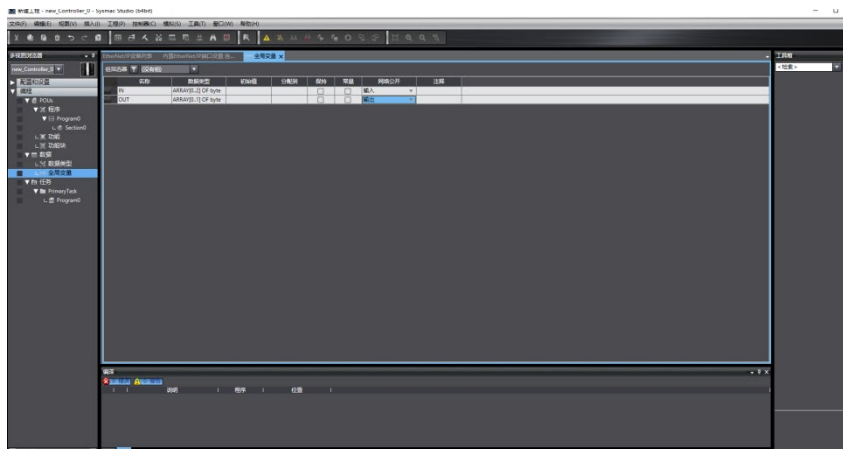


2. Create a module: Click "+" in the toolbox window, fill in the module IP address, model name, and version, click "Add" below, and the module creation is completed;

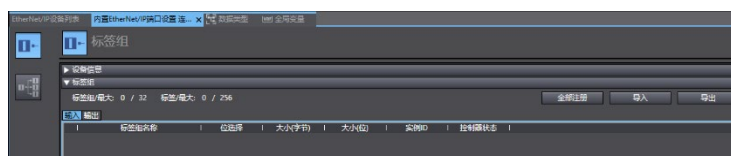


3. Create variable association:

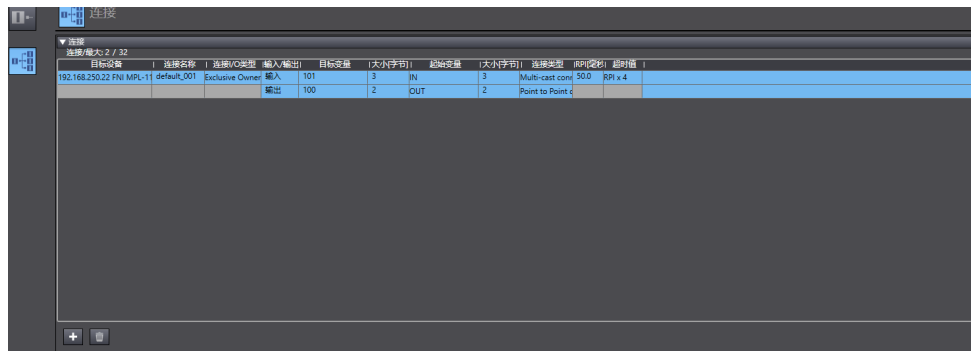
- (1) Programming--Data--Global variables create two arrays, output 2 bytes and input 3 bytes. The corresponding input and output should be configured in the network disclosure;



- (2) In the built-in ETHERNET/IP port setting window--select the first icon (label) on the left---click "Register All"

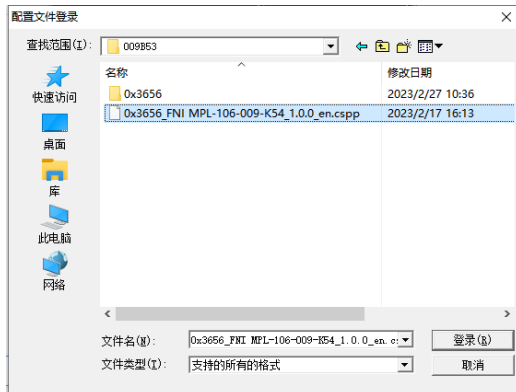


(3) In the built-in ETHERNET/IP port setting window--select the second icon on the left (connection)---click "+", select the previously configured module for the target device, select EXCLUSIVE Owner for the IO type, and select the corresponding For input and output, the target variable must be filled in 101,100; then select the corresponding starting variable and go online after completion. Select "Transfer to controller" and the configuration is complete!

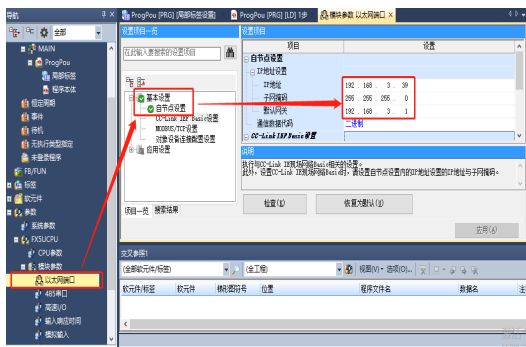


3.3.3 Mitsubishi FX5U Work2 Integration (CIE)

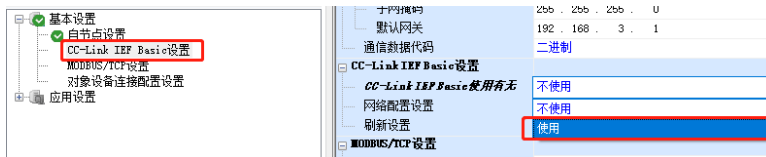
1. Install the CCSP file: First open GX WORKS 3-Tools-Configuration File Management-Login-CSPP file (the project must be closed to import the file)



2. Click Project on the left - Parameters - FX5UCPU - Module parameters - Ethernet port, Basic settings - Self-node settings. Set own node IP



3. Click CC-Link IEF Basic settings - select whether to use CC-Link IEF Basic - click Use



4. Click CC-Link IEF Basic settings-select network configuration settings-detailed settings;



5. Automatic detection of connected devices - occupies 1 station, IP address is set using DIP switch - reflects the setting and closes

连接设备的自动检测		链接扫描设置													
总连接台数		1													
台数	型号	站号	站类型	RX/RXr设置			RW/RWr设置			组No.	保留站	IP地址	子网掩码	MAC地址	注释
				点数	起始	结束	点数	起始	结束						
0	本站	0	主站	64(占用1站)			0000	003F	32	0000	001F	1	无设置	192.168.3.3	255.255.255.0
1	FNI MPL-106-009-K54	1	从站											192.168.3.1	255.255.255.0

6. To refresh the target, select the specified device-software name M-assign the device address-application, and the configuration is completed!

链接侧					CPU侧					
软元件名	点数	起始	结束		刷新目标	软元件名	点数	起始	结束	
RX	64	00000	0003F	↔	指定软元	X	64	100	177	
RY	64	00000	0003F	↔	指定软元	Y	64	100	177	
RWr	32	00000	0001F	↔	指定软元	D	32	100	131	
RWw	32	00000	0001F	↔	指定软元	D	32	200	231	

4. Appendix

4.1 Ordering information

Product ordering code	Ordering code
FNI MPL-116-002-K54	009B13

■ High Quality Product / Sincere Service



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