



PRODUCT

USE INSTRUCTIONS



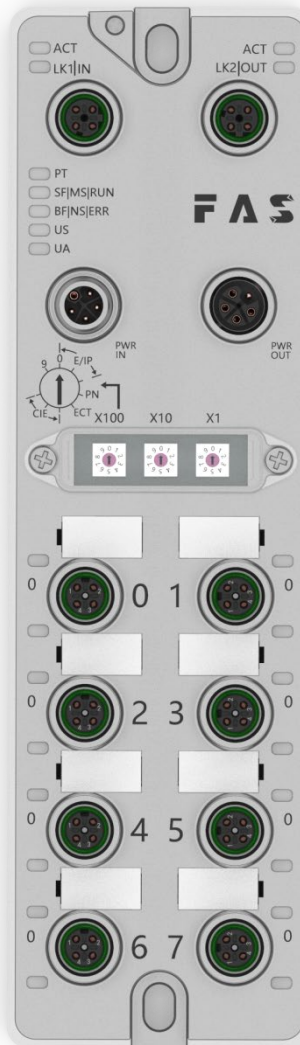
Ordering code: 007C11

Part number: FNI MPL-104-105-M

FNI MPL-104-105-M

16 DI PNP

IP67 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!

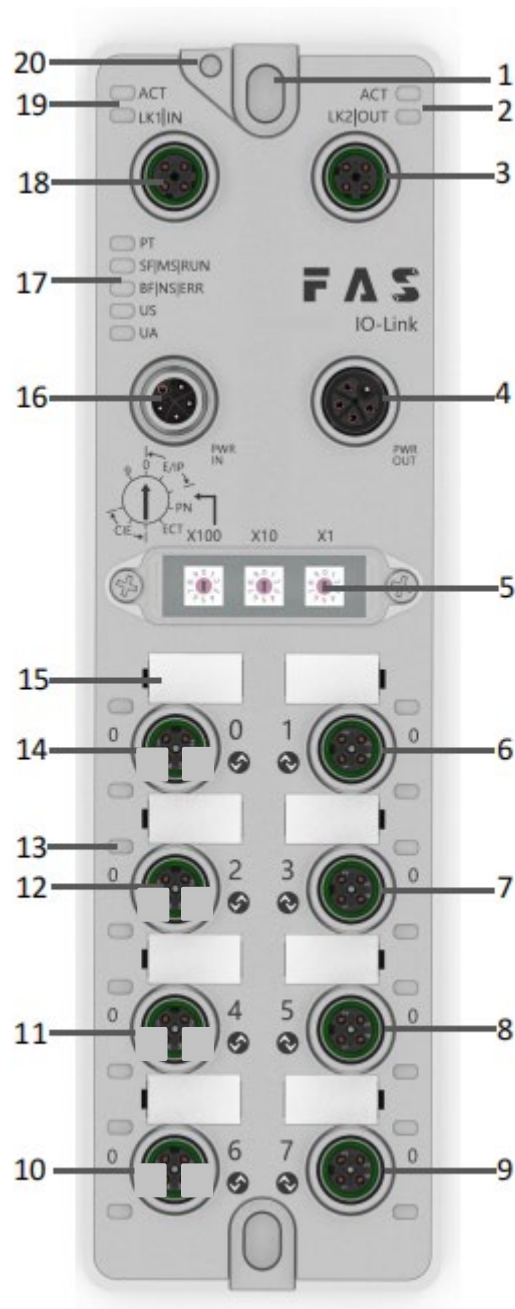
Disconnect all power before using the device!

■ 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 Mounting hole | 8 Port 5 | 15 Port identification plate |
| 2 Network port 2 status indicator | 9 Port 7 | 16 Power input port |
| 3 Network port 2 | 10 Port 6 | 17 Module indicator light |
| 4 Power output port | 11 Port 4 | 18 Network port 1 |
| 5 DIP switch | 12 Port 2 | 19 Network port 1 status indicator |
| 6 Port 1 | 13 Port status indicator | 20 Ground connection |
| 7 port 3 | 14 port 0 | |

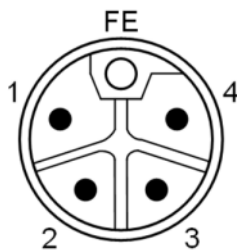
1.2 Mechanical connection

The modules are connected using 2 M6 bolts and 2 washers.
Isolation pads are available as accessories.

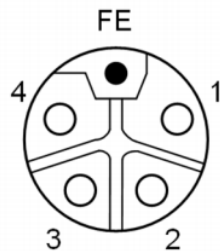
1.3 Electrical connection

1.3.1 Power interface (L-coded)

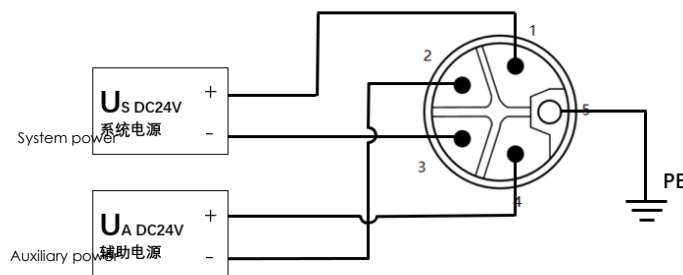
Definition of power input port



Definition of power output port



Power port



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

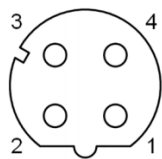
Note:

1. If possible, provide US power supply and UA power supply separately.

Total current <16A, even if the actuator power supply is daisy chained, the total current of all modules is <16A.

2. The FE connection from the housing to the machine must be low impedance and kept as short as possible.

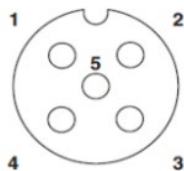
1.3.2 Network Interface(D-coded)



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

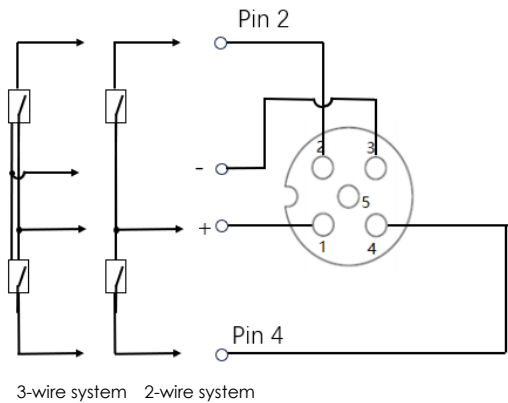
1.3.3 I/O-port (A-coded)



Pin	Function
1	+24V(Brown)
2	input(White)
3	0V(Blue)
4	Enter (Black)
5	NC

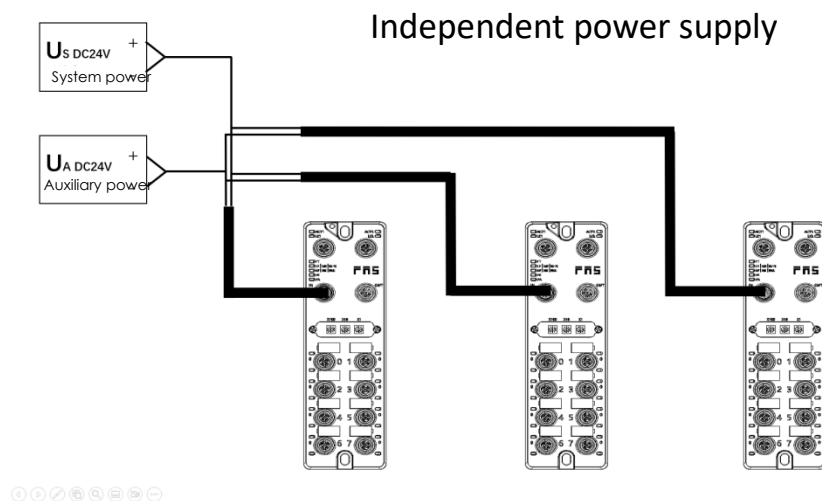
Normal I/O

PNP input

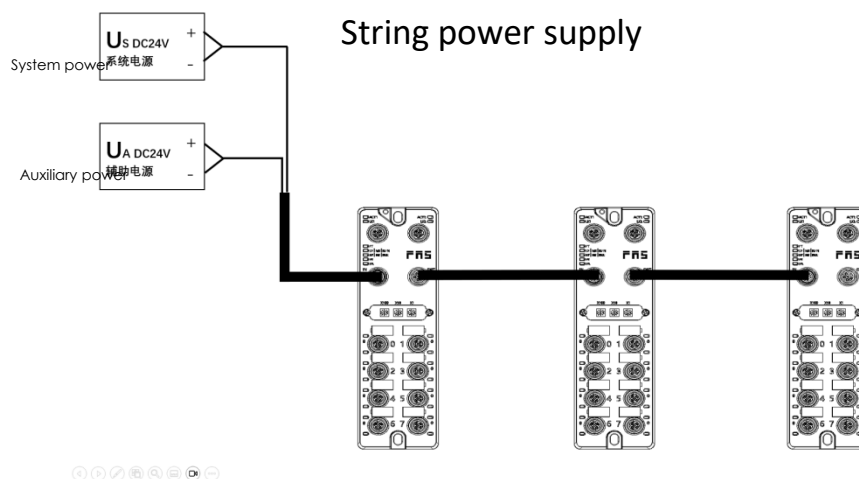


- Note:
- 1. Regarding digital sensor input, please follow the input guidance of EN61131-2, Type 2.
 - 2. Unused I/O port sockets must be covered with end caps to meet IP67 protection level.

1.3.4 Remote module wiring method



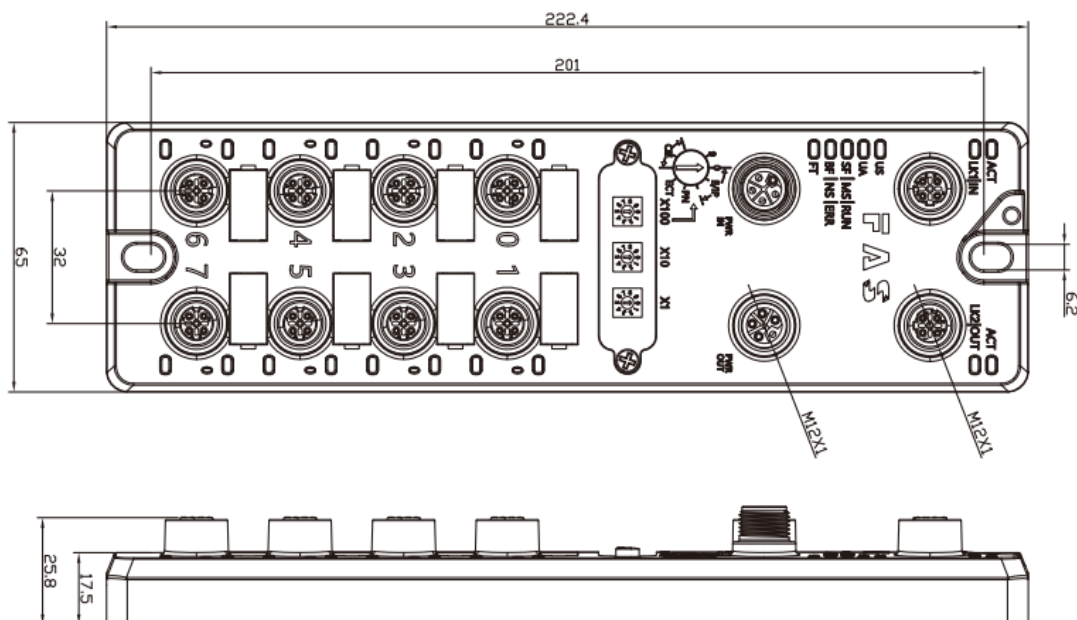
In independent power supply mode, the maximum current of each master station can reach 16A.



In the serial power supply wiring mode, if the rear module needs to be connected to the front module, the cumulative current must not exceed 16A.

2. Technical data

2.1 Size



2.2 Mechanical data

Shell material	Die-cast aluminum housing, pearl nickel plated
Housing rating according to IEC 60529	IP67 (Only in plug-in or plug type)
Power interface	L-Coded (male and female)
Input port/output port	M12, A-Coded (8*Female)
Size(W*H*D)	65mm*222mm*25.8mm
Installation type	2-Through hole mounting
Ground bus accessories	M4
Weight	About 670g

2.3 Operating conditions

Operating temperature	-5°C ~ 70°C
Storage temperature	-25°C ~ 70°C

2.4. Electrical data

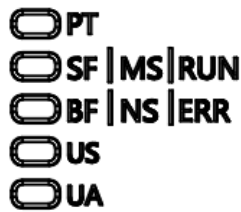
Voltage	18~30V DC, conform to EN61131-2
Voltage fluctuation	<1%
Input current when power supply	<130mA

voltage is 24V	
----------------	--

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
	Blue	EtherCat communication protocol
	White	CC-Link IE Field basic communication protocol

ECT communication protocol module status

LED	Show	Function
RUN	Green light off	Working fine
	Green light flashes 2.5HZ	Pre-operation: The device is in pre-operation state
	Flashing green 1HZ	Safe operation: The equipment is in safe operation.
	Steady green	Running: The device is running
ERR	Closure	Device EtherCAT communication is working
	Red flashing 2.5HZ	Invalid configuration
	Flashing red 1HZ	local error
	Red double flash	Application monitoring timeout
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
-----	------	----------

SF/MS/RUN	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
BF/NS/ERR	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
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

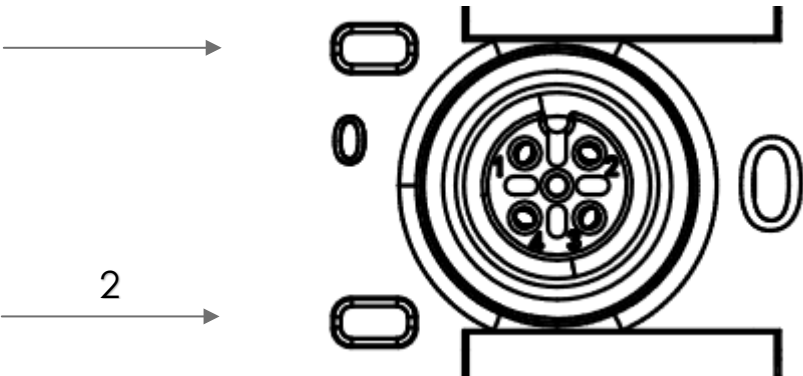
LED	Show	Function
SF/MS/RUN	Closure	Working fine

	Flashing red 3s 1HZ	Bus start
	Red always on	System error
BF/NS/ERR	Closure	Working fine
	Flashing red 2HZ	No data exchange
	Red always on	No configuration; or low speed physical link; or no physical link
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)

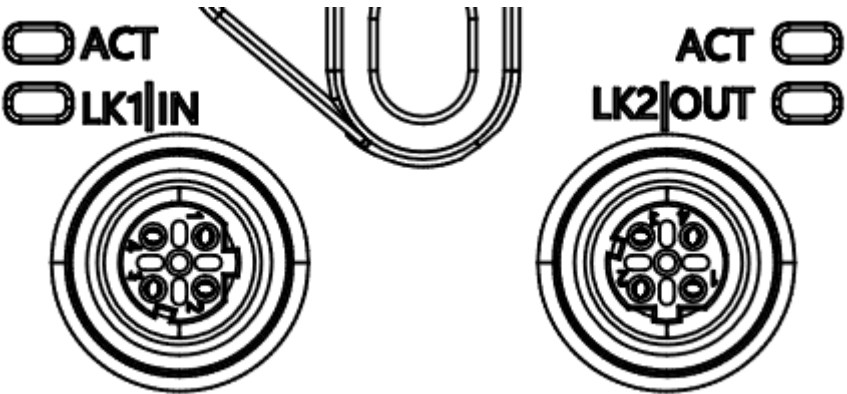
CCIEBS communication protocol module status

LED	Show	Function
SF/MS/RUN	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
BF/NS/ERR	Closure	Module works fine
	Red light always on	Communication error
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 Pin4 input is 0
1	Yellow	The status of Pin4 input is 1
1	Red	The port is configured as input: Pin1 overcurrent
2	Closure	The status of Pin2 input is 0
2	Yellow	The status of Pin2 input is 1
2	Red	The port is configured as input: Pin1 overcurrent



Network port status

LED	Status	Function
ACT	Closure	Bus rate: 10Mbit/s
	Yellow	Bus rate: 100Mbit/s
LK1 IN (ECT IN)	Flashing green	Data transfer in progress
LK2 IN (ECT OUT)	Flashing green	Data transfer in progress

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	the is
	1	0~2	0~9	0~9	ETHERNET/IP	Green light	
	2	3	—	—	PROFINET	Orange light	
	3	4	—	—	ETHERCAT	Bblue	
	4	5~7	0~9	0~9	CIEBS	White	

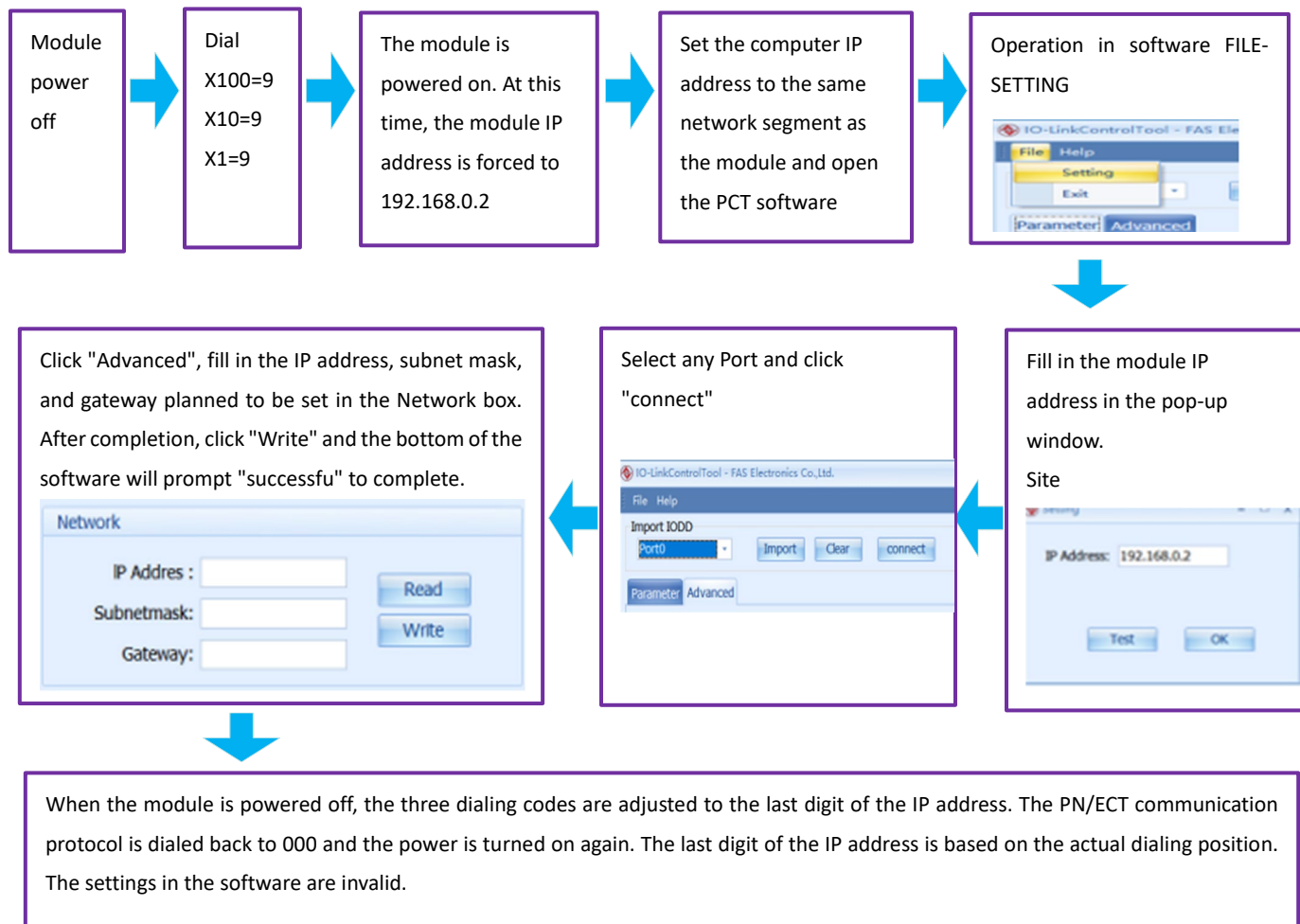
powered off, dial 900;

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)



3.1.3 EtherCAT node address setting

1. Set by dialing (1~192 or 401~499)
 - a. Switch to the EtherCAT communication protocol. The X100 dialing code is the hundreds digit of the address, the X10 dialing code is the tens digit of the address, and the X1 dialing code is the ones digit of the address.
 - b. After dialing the code while the power is on, power on again.
2. Setting through PLC
 - a. Switch to the EtherCAT communication protocol, set the X100 dial to 0, the X10 dial to 0, and the X1 dial to 0.
 - b. Set the node address through PLC software.

3.2 Data mapping

EIP ECT PN communication protocol process input data									
Byte	Function description								
	Function description	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	Standard IO input 0=no signal 1=There is signal	Port7 Pin4	Port6 Pin4	Port5 Pin4	Port4 Pin4	Port3 Pin4	Port2 Pin4	Port1 Pin4	Port0 Pin4
1	Standard IO input 0=no signal 1=There is signal	Port7 Pin2	Port6 Pin2	Port5 Pin2	Port4 Pin2	Port3 Pin2	Port2 Pin2	Port1 Pin2	Port0 Pin2
3	Pin1 overcurrent 0=no signal 1=There is signal	Port7 Pin1	Port6 Pin1	Port5 Pin1	Port4 Pin1	Port3 Pin1	Port2 Pin1	Port1 Pin1	Port0 Pin1
4	Module status	-	-	-	Us Overv oltage	Ua Overv oltage	Overh eat	Us voltag e	Ua voltag e

EIP communication protocol configuration data									
Byte	Function description								
	Function description	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	Pin4 security status settings 00 = remain at 0 01 = remain at 1 10 = keep the last value	Port3		Port2		Port1		Port0	
1		Port7		Port6		Port5		Port4	
2	Pin2 security status settings 00 = remain at 0 01 = remain at 1 10 = keep the last value	Port3		Port2		Port1		Port0	
3		Port7		Port6		Port5		Port4	

Note:

When using Omron and Delta PLC, the configuration data is set in the module properties, and AB PLC is set in the mapping data.

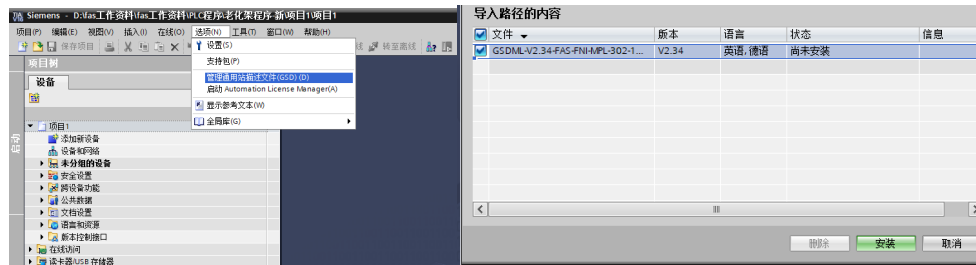
CCIEBS communication protocol process input data									
Byte	Function description								
	Function description	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	Standard IO input 0=no signal 1=There is signal	Port7 Pin4	Port6 Pin4	Port5 Pin4	Port4 Pin4	Port3 Pin4	Port2 Pin4	Port1 Pin4	Port0 Pin4
1	Standard IO input 0=no signal 1=There is signal	Port7 Pin2	Port6 Pin2	Port5 Pin2	Port4 Pin2	Port3 Pin2	Port2 Pin2	Port1 Pin2	Port0 Pin2
2	Pin1 overcurrent 0=No overcurrent 1=There is overcurrent	Port7 Pin1	Port6 Pin1	Port5 Pin1	Port4 Pin1	Port3 Pin1	Port2 Pin1	Port1 Pin1	Port0 Pin1
3	Module status	-	-	-	Us Overvo ltage	Ua Overvo ltage	Overh eat	Us voltag e	Ua voltag e

3.3 PLC integration tutorial

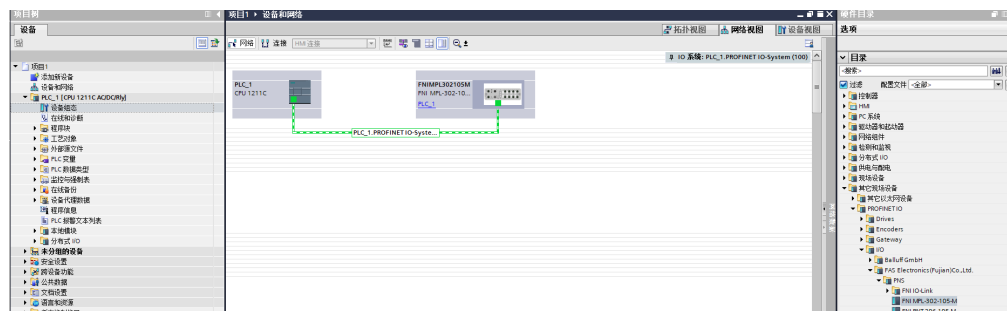
(The module communication protocol should be set before configuring the module, see 3.1.1 for details)

3.3.1 Siemens S7-1200 Portal Integration (PN)

1. Install the GSD file



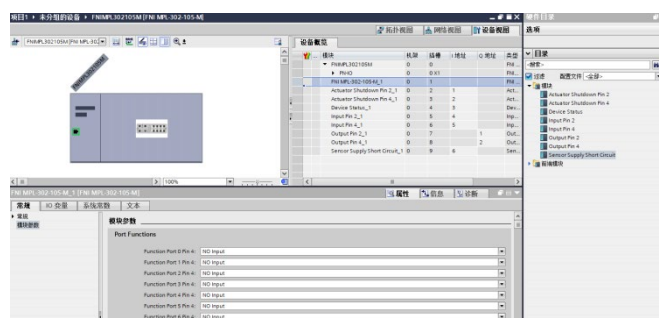
2. In PLC---Device Configuration---Network View---Hardware Catalog, select the module and drag it in, click "Unassigned", and select the PLC to be connected;



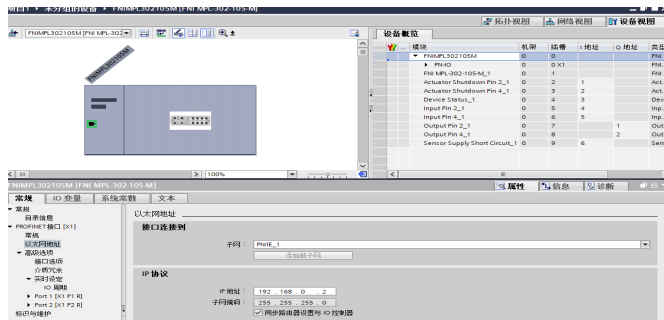
3. Double-click the module to enter the configuration.

(1) Slot function configuration: Select the required data in the hardware catalog--Module and drag it into the slot in the device overview window;

(2) Module port function configuration: Click the module icon, select "General", then click slot 1 to configure the port function

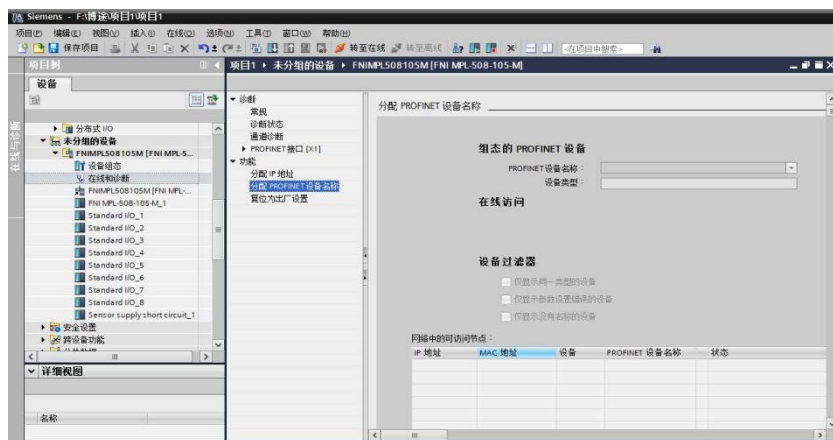


(3) Module function configuration: Click the module icon, select "General", then click slot 0 to configure the module function



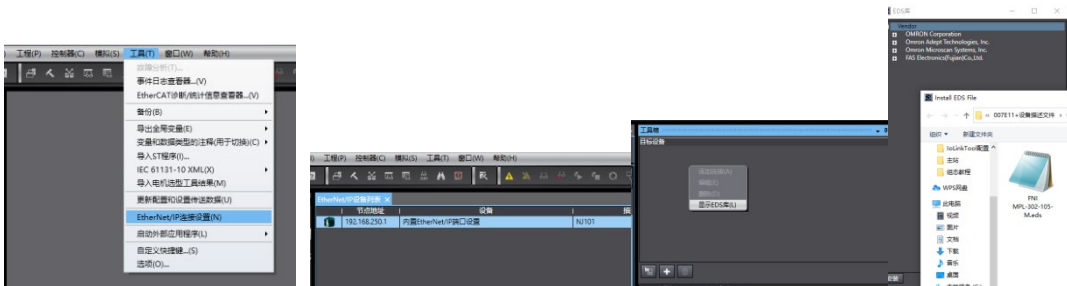
(4)After the configuration is completed, click Download in the configuration view

- Assign module PN name: PLC switches to online state, select "Ungrouped Device" --- Click on the module name --- Select Online and Diagnosis --- 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!

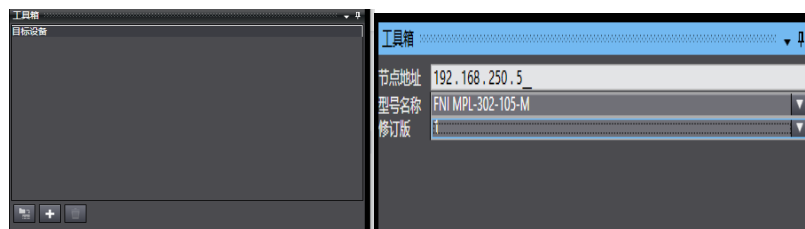


3.3.2 Omron NX1P2 Sysmac Studio integration (EIP)

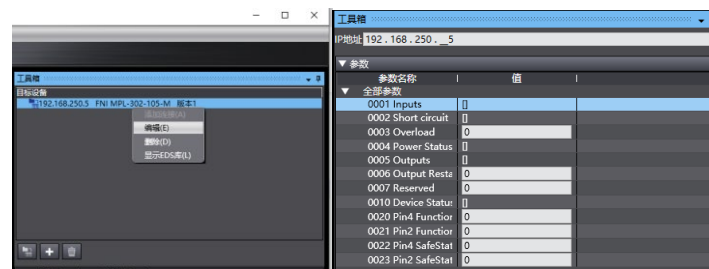
1. Install the EDS file: Tools---ETHERNET/IP Connection Settings---Double-click the PLC in the window---right-click the blank space of the toolbox on the right and select "Show EDS Library", click "Install" in the pop-up window, and select EDS File installation



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;

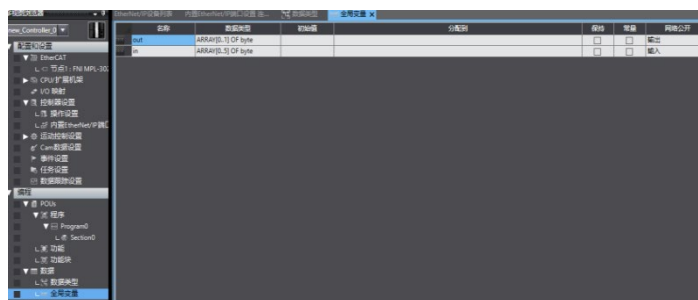


3. Configure the module: right-click the module--select "Edit"--configure the parameters according to actual needs and click OK after completing the corresponding values.

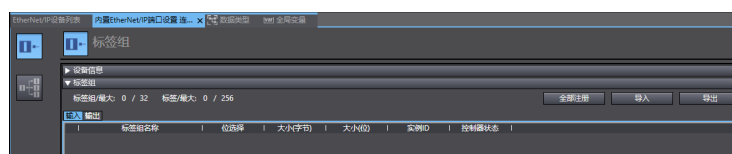


4. Create variable association:

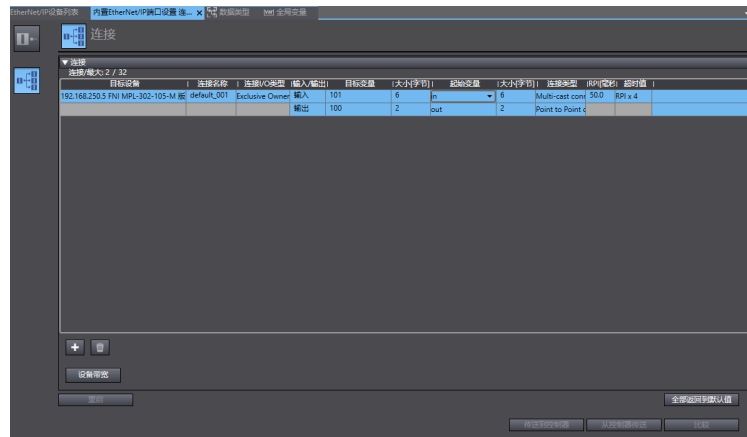
- (1) Programming--Data--Global variables create two arrays, output 2 bytes and input 6 bytes. The corresponding input and output should be configured in the network disclosure;



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

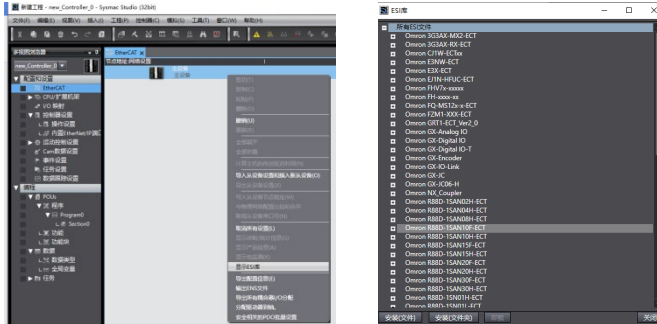


(3) In the built-in ETHERNET/IP port setting window--select the second icon on the left (connection)---click "+", select the previously configured module for the target device, select EXCLUSIVE Owner for the IO type, and select the corresponding input For output, the target variable must be filled in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

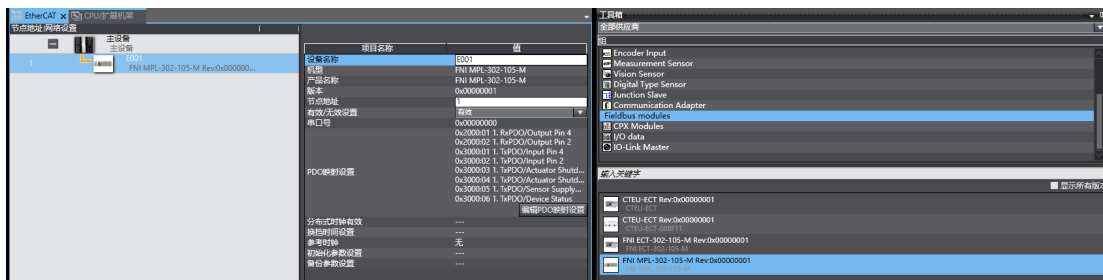


3.3.3 Omron NX1P2 Sysmac Studio integration (ECT)

1. Install the ESI file: Double-click EtherCAT in Configuration and Settings--right-click the main device--select "Show ESI Library", and select the ESI file in the pop-up window for installation.



2. Configure the module into the EtherCAT network: Find FieldBus Modules in the toolbox on the right Double-click the module model icon to join the network

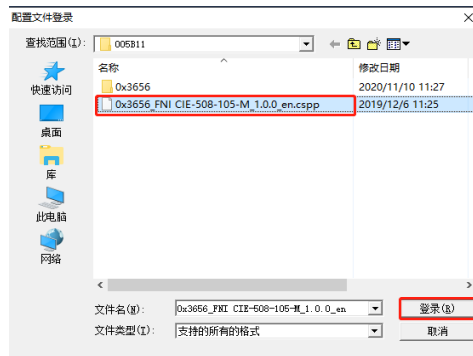


3. Switch the PLC to online mode, right-click the master device, and write the slave device node address.
4. Variable mapping: Select the configured node in the I/O mapping, fill in the name of the variable, and the configuration is completed! .

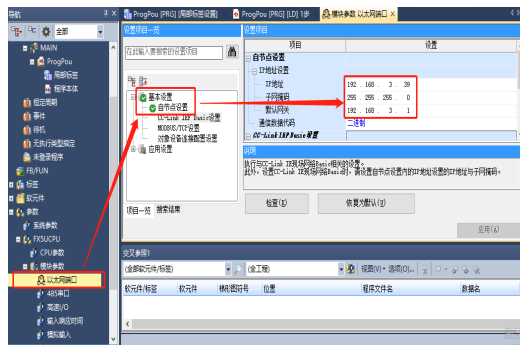


3.3.4 Mitsubishi FX5U Work2 Integration (CIE)

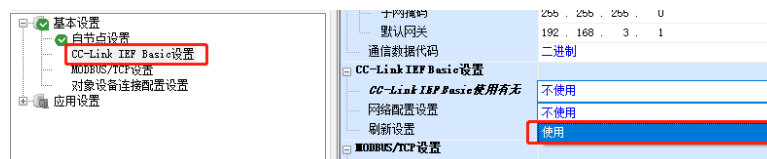
1. Install the CCSP file: First open GX WORKS 3-Tools-Configuration File Management-Login-CSPP file (the project must be closed to import the file)



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



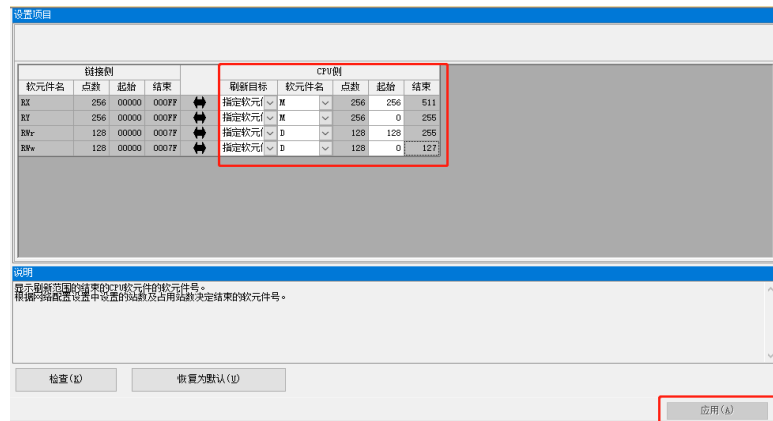
4. Click CC-Link IEF Basic settings-select network configuration settings-detailed settings;



5. Automatic detection of connected devices - occupies 4 stations, IP address is set using DIP switch - reflects the setting and closes



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

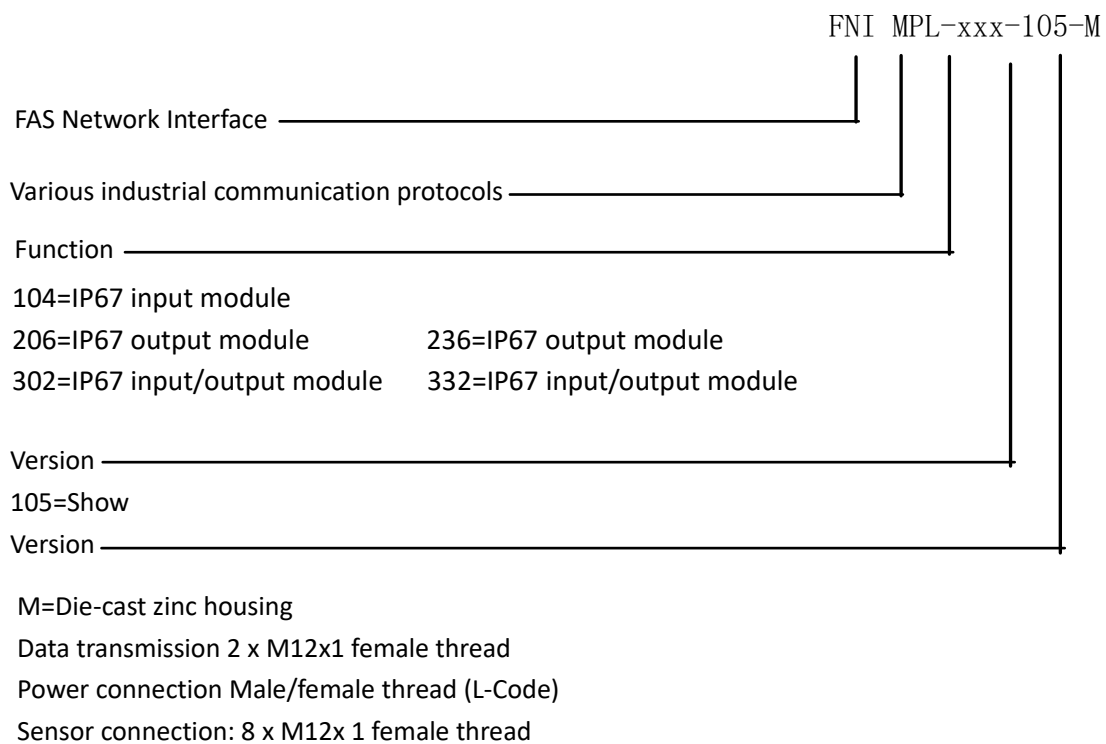


4.Appendix

4.1.Materials included

- FNI MPL contains the following parts
- I/O-Block
- 4 blind plugs M12
- Ground bus
- Thread M4x6
- 20 tags

4.2. Order code



4.3 Ordering information

Product ordering code	Ordering code
FNI MPL-104-105-M	007C11

■ High Quality Product / Sincere Service



경기도 성남시 중원구 사기막골로 124

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