

FCEN-16UP-MP4 Module

----EtherNet/IP System Manual



Preface

1. Scope of this manual:

This manual applies to the FCEN-16UP-MP4 module of ELCO.

The information in this manual enables you to run the FCEN-16UP-MP4 module on EtherNet/IP as a distributed I/O device.

2. Basic knowledge requirements

This manual presumes a general knowledge in the field of automation engineering and describes the components based on the data valid at the time of its release.

ELCO reserves the right of including a product information for each new component, and for each component of a later version.

3. Guide:

This manual introduces the hardware and usage of the FCEN-16UP-MP4 module for the EtherNet/IP protocol.

Covered topics are:

- Installation and wiring
- Commissioning and diagnostics
- Components
- Article numbers
- Technical specifications

4. Technical support:

Please contact your local ELCO representative or dial 400-608-4005 if you have any questions about the products described in this manual.

Additional information about ELCO products is available:

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

5. Disclaimer of liability:

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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1. Product overview

1.1 Introduction

The FCEN-16UP-MP4 module supporting I/O signals is a new type of distributed I/O system with IP67. This series of products adopts a fully sealed design structure and can be directly installed in industrial sites, including harsh working environments where liquids, dust, and vibrations may occur.

1.2 Applications

The standard Compact67 I/O module provides a reliable and trustworthy solution for fieldbus I/O systems that connect controllers and are applied in harsh field environments.

The Compact67 module based on a 60mm wide IP67 protective housing can be installed in a standardized manner and operate safely and reliably in harsh working environments where water, dust, and vibration may occur. These characteristics make them suitable for various application scenarios, such as material conveying systems, automated assembly systems, etc.

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

1.3 Features

- Up to IP67 protection class
- Compact design saves space for direct installation of mechanical equipment
- Fast and reliable connector connection
- Can connect multiple input or output switch signals
- LED status display
- Channel level protection and diagnosis

1.4 Type

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No.	Type	Description
1	FCEN-16UP-MP4	EtherNet/IP I/O module 8 female, M12 A-Code signal ports 2 male+female, 7/8" 4-PIN power supply 2 female, M12 D-Code fieldbus interface

2. Technical characteristics

2.1 Hardware

FCEN-16UP-MP4

ARTICLE PROPERTIES

PRODUCT TYPE	Compact67	OPERATING MODES	Auto-negotiation, Auto-MDI/MDI-X
DESCRIPTION	16 DI / DO, 8*M12	TRANSFER RATE	10 / 100 Mbps
PROTOCOL	EtherNet/IP	ADDRESS SETTINGS	DHCP, BOOTP

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
SYSTEM&INPUT SUPPLY	Us, max. 8 A	INPUT TYPE	PNP sensors, mechanical switches, dry contacts, etc.
OUTPUT SUPPLY	Ua, max. 8 A	INPUT DELAY	1.6 ms
ELECTRICAL ISOLATION	Us and Ua: 24 V separated 0 V connected	OUTPUT CHANNELS	Max. 16
POWER SUPPLY	2 x 7/8" 4 pin, Male + Female	OUTPUT CURRENT	Max. 2 A per channel, total max. 12 A
BUS COMMUNICATION	2 x M12 D-code 4 pin, Female	OUTPUT TYPE	Lamps, solenoidvalve, etc.
SIGNAL CONNECTION	8 x M12 A-code 5 pin, Female	OUTPUT FREQUENCY	Resistive load 100Hz, Inductive load 5Hz
COMMUNICATION INDICATION	LED indication, communication message	COMMUNICATION INDICATOR	Green LED
VOLTAGE DETECTION	Support, low voltage alarm	POWER INDICATOR	Green LED
SHORT-CIRCUIT & OVERLOAD	Support, LED indication	IO STATUS INDICATOR	Green LED

FUNCTIONAL SAFETY

MTTF (40 °C)	60a
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GENERAL DATA

HOUSING MATERIAL	Casting zinc alloy	OPERATING TEMPERATURE	-25 ... +70 °C
PROTECTION CLASS	IP67	STORAGE TEMPERATURE	-40 ... +85 °C
WEIGHT	708.7 g	DIMENSIONS	60 x 230 x 37.8 mm

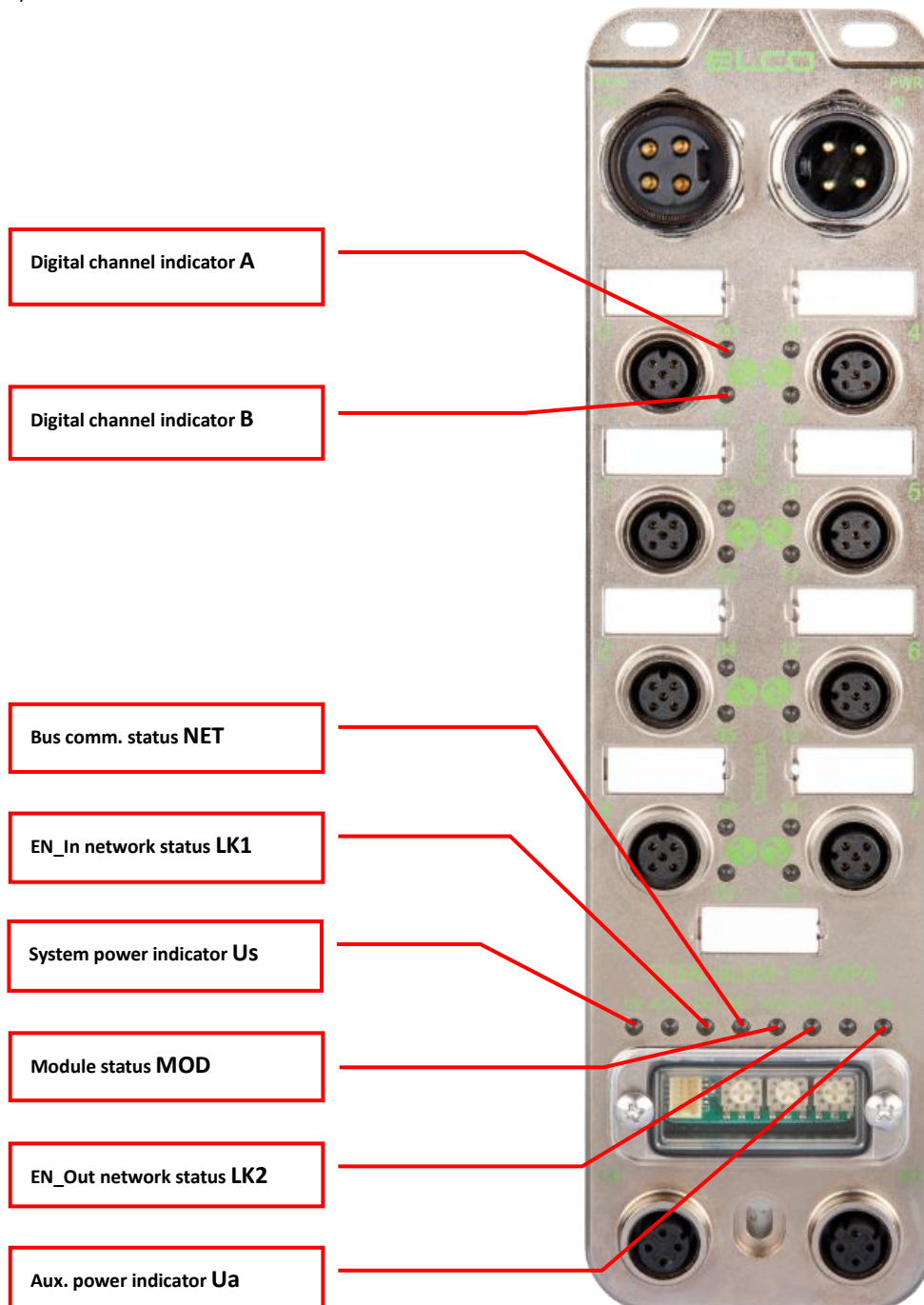
APPROVALS



2.2 LED indicator

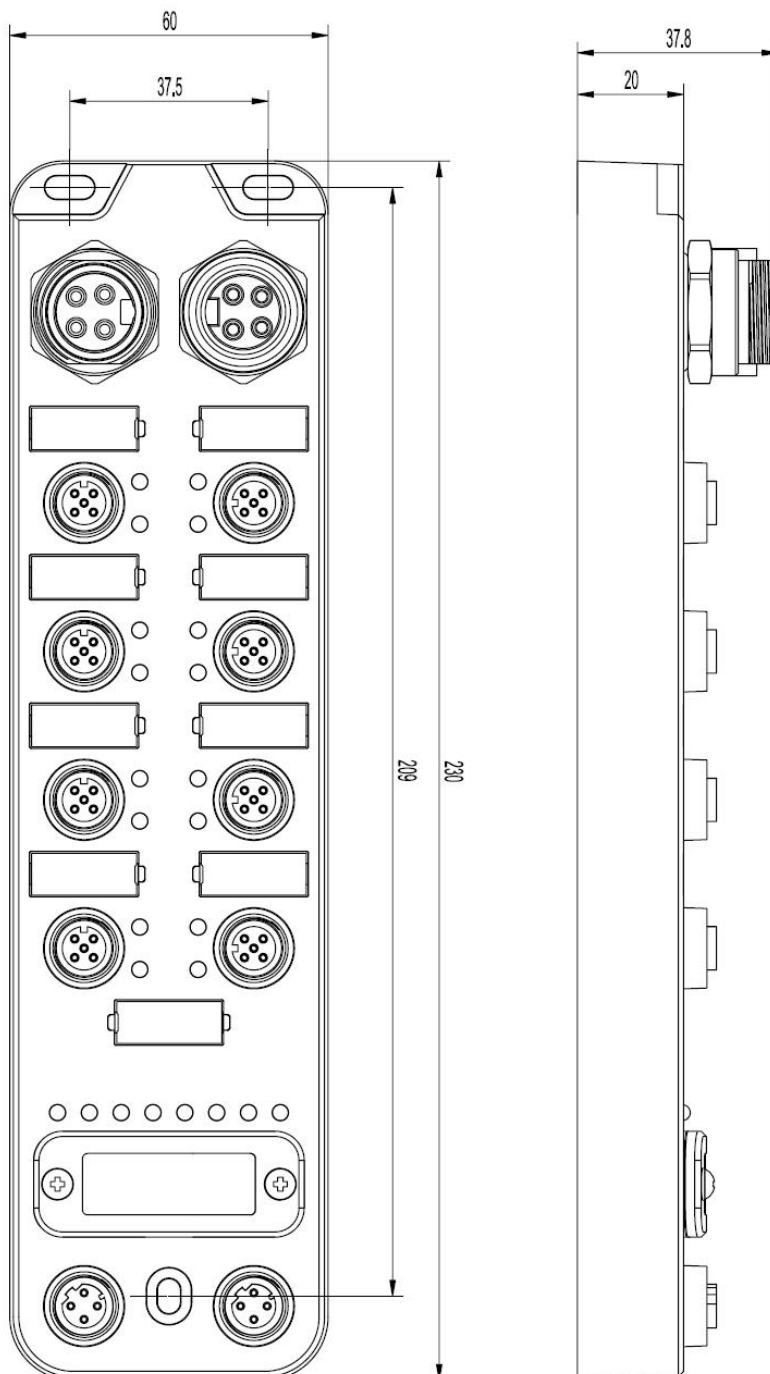
The module's indicator can clearly indicate its operating status. For specific fault indications and solutions, please refer to Section 6.1 "LED Fault Indicator".

I/O module indicator



3. Installation wiring

3.1 Installation dimensions



3.2 Installation position and size

Thanks to IP67 high protection level and excellent resistance to vibration and interference, FCEN-16UP-MP4 can be installed in almost any location.

The FCEN-16UP-MP4 module adopts a compact design to maximize installation space savings. The following table shows the module installation dimensions:

	FCEN-16UP-MP4
Installation width	60 mm
Installation height	230 mm
Installation depth	37.8 mm

3.3 Wiring guidance

Please make sure to cut off power supply when wiring to ensure safety.

3.3.1 Connecting module to protective earth (PE)

- Always connect the module to protective earth.
- The module also requires this connection to protective earth in order to discharge any interference currents to ground, and for EMC compatibility.
- Always make sure you have a low-impedance connection to protective earth.

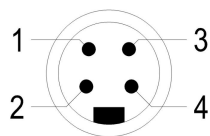
3.3.2 Module power supply

FCEN-16UP-MP4 module adopts 24VDC power supply and can supply power to the connected sensors or actuators through signal connection lines. The input voltage range is 18-30VDC, standard 7/8" 4-PIN connector.

The power supply of I/O module is divided into two parts: System and sensor power supply U_s (+24V, 0V), and auxiliary power supply U_a (P24, N24). U_s is used for module chips and input signal power supply, while U_a is used for output signal power supply.

For FCEN-16UP-MP4, the two power supply are partially isolated, electrical isolation between U_{s+} and U_{a+} , and internally connected between U_{s-} and U_{a-} .

1) Power in connector (Male)



2) Power out connector (Female)



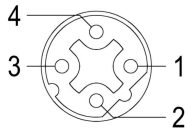
3) Power definition

Terminal	Function	Power supply
1	Output power supply Ua+	24V
2	System and input power supply Us+	24V
3	System and input power supply Us-	0V
4	Output power supply Ua-	0V

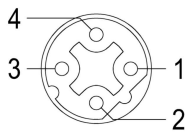
3.3.3 Module BUS connection

FCEN-16UP-MP4 module, supporting EtherNet/IP protocol, transmits signals by a shielded cable, M12 D-Code connector.

1) BUS-In (Female)



2) BUS-Out (Female)



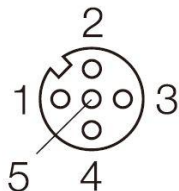
3) Bus definition

Terminal	Function	Cable color
1	Transmit Data (TD+)	Yellow
2	Receive Data (RD+)	White
3	Transmit Data (TD-)	Orange
4	Receive Data (RD-)	Blue

3.3.4 I/O signal port cable connection

All Compact67 series I/O signals are connected through standard 5-pin M12 connectors, and each M12 port can connect up to 2 switch signals (input or output).

- 1) I/O port connector (Female)



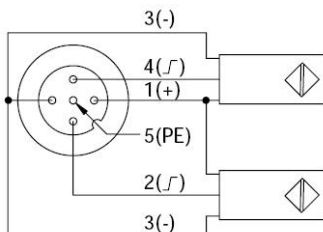
- 2) I/O port pin definition

Terminal	Class-A
1	Power supply 24V+
2	Signal input/output B
3	Power supply GND
4	Signal input/output A
5	Protection Earth PE

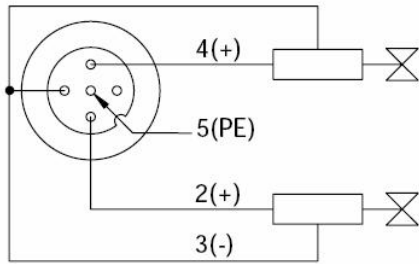
3) The power supply (Pin1 and Pin3) and signal input power supply come from the system power supply U_s , and the signal output (Pin4 or Pin2) power supply come from the auxiliary power supply U_a .

- 4) Wiring example

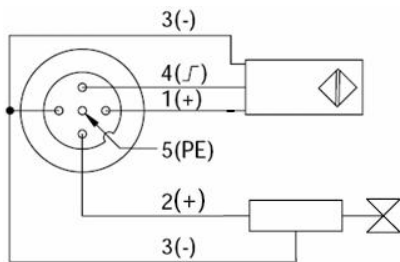
a) Dual input signal - one connector is connected to two switch input signals, the FCEN-16UP-MP4 product supports this form of connection.



b) Dual output signal - one connector is connected to two switch output signals, the FCEN-16UP-MP4 product supports this form of connection.



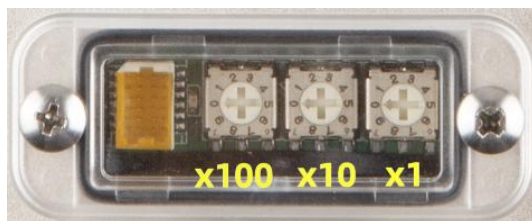
c) Input and output signals - one connector connected to one digital input and one digital output signal, the FCEN-16UP-MP4 product supports this form of connection.



3.4 Setting the IP Address of module

The FCEN-16UP-MP4 module can set the operation mode of receiving network parameters (such as IP address, subnet mask, etc.) through its built-in rotary code switch. The module will read the status of the switch and update the corresponding network parameter operation mode when re powered on.

Note: Please operate the rotary code switch when the module is powered off, and it will take effect when powered on again.



The following table describes the operating modes represented by the rotary code switch settings:

Rotary code switch	Function
000	<p>Activate DHCP and BOOTP functions.</p> <p>In this mode, IP addresses can be assigned through specialized software such as Rockwell's built-in BOOTP-DHCP server and other tools. Please refer to the example for explanation.</p>
001~254	<p>The last three digits of an IP address.</p> <p>In this mode, network information such as IP addresses can be modified by accessing the Webserver module through a browser. Only the first 9 digits can be set, and the last 3 digits are based on the rotary switch.</p> <p>If the module has already been assigned an IP address through DHCP of 000, it needs to be reset using 999 before the IP address in this mode can take effect.</p>
255~299	<p>Illegal address, invalid setting.</p> <p>The original network parameters of the module will not be changed.</p>
300~998	<p>Multiple protocol switching related functions, please do not select.</p>
999	<p>Module reset.</p> <p>This mode needs to be maintained for more than 5 seconds after power on, and when the module port indicator lights scroll and flash, it indicates a successful reset.</p> <p>This operation will clear network parameters such as module IP address and restore to factory settings. Please operate with caution.</p>

The default factory settings for the module are:

IP address: 192.168.250.xxx

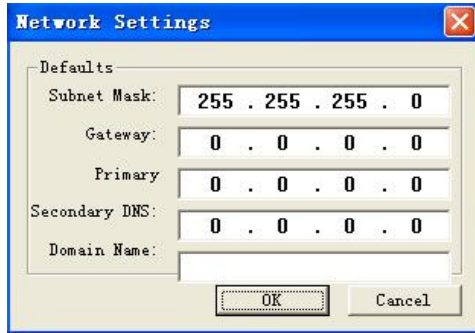
Subnet Mask: 255.255.255.000

You can change the IP address by DHCP (section 3.4.1) or Webserver (section 3.4.2).

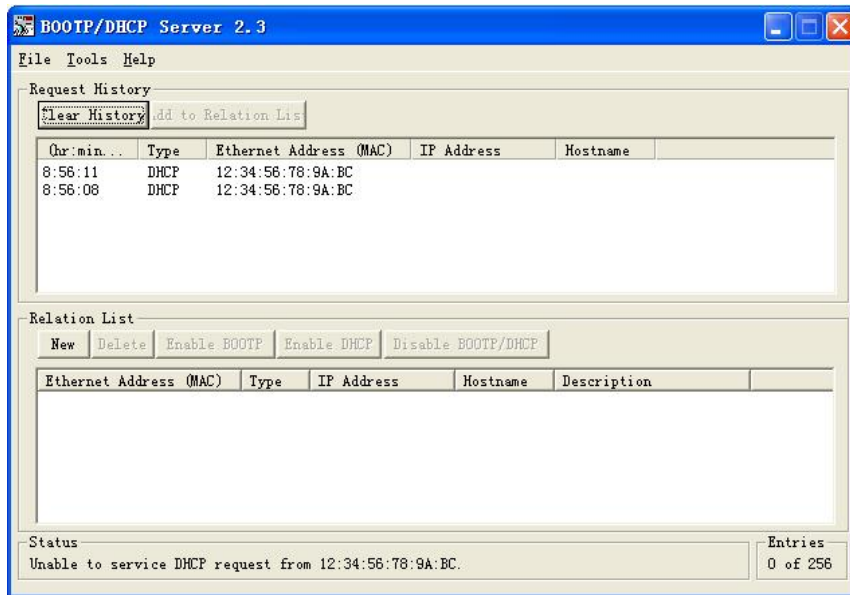
3.4.1 Setting IP through DHCP software (Code: 000)

When the rotary code switch is selected as 000, the FCEN-16UP-MP4 module allocates network parameters such as IP addresses and subnet masks through DHCP software. This section takes the BOOTP-DHCP server tool that comes with Rockwell software as an example to demonstrate how to allocate IP addresses.

First open the BOOP-DHCP server, click on Tools->Network Settings to set the network parameters and fill in the Subnet Mask.

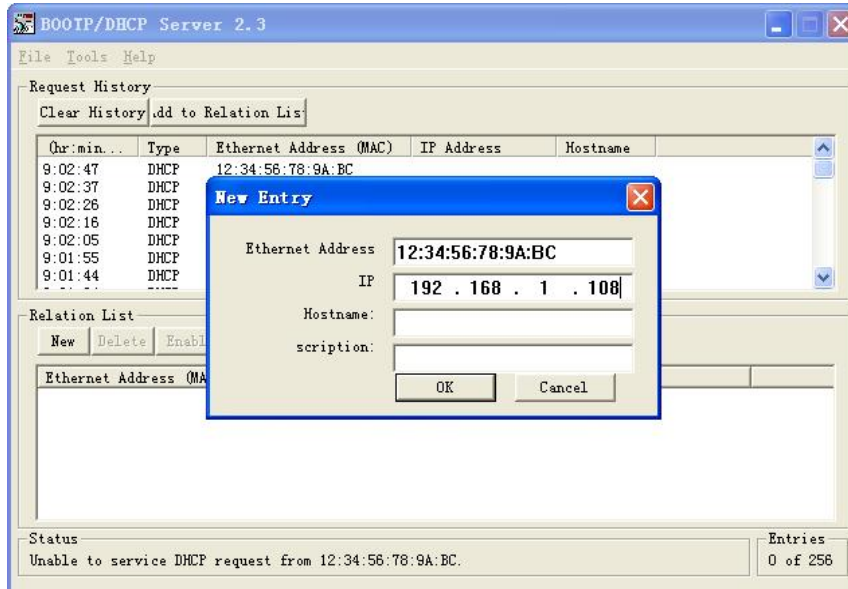


Then the DHCP server will find current gateway that has no IP address assigned on the network, and then click the gateway MAC address that needs to be assigned IP.



Then click Add to Relation List, or double-click MAC address, in the pop-up window, fill in IP address in IP bar, such as 192.168.1.108.

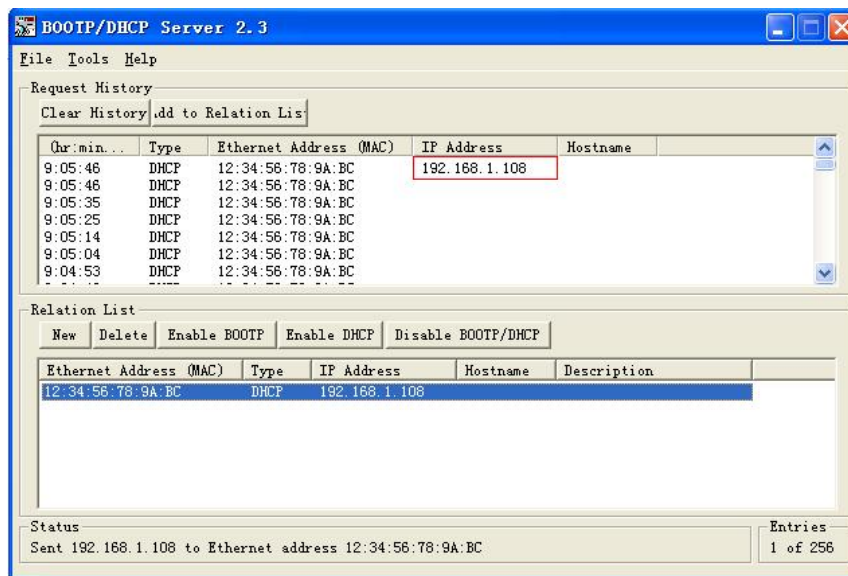
As follows:



Note: the assigned IP address needs to be in the same IP segment as the local computer.

After the assigned IP address appears in the IP Address column in the list, the IP address of the device is assigned successfully.

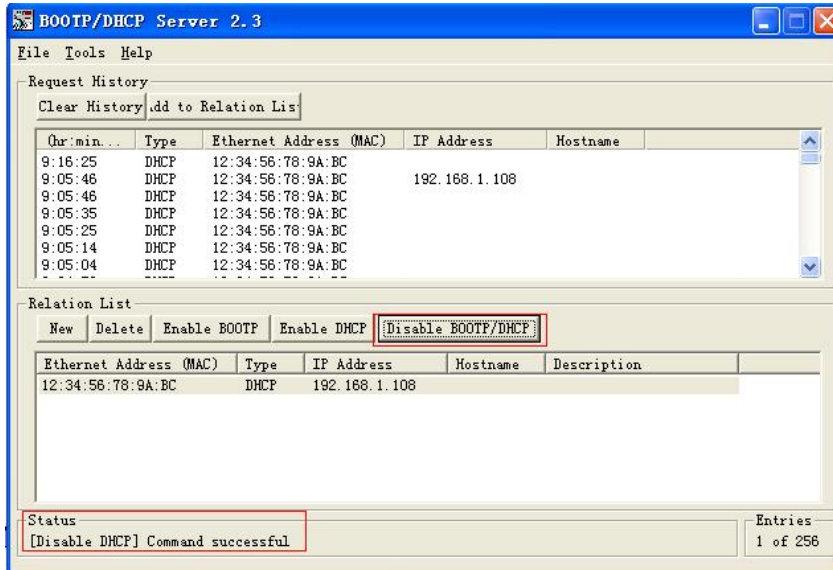
As follows:



After the IP address is assigned, the device can work normally on the network. However, if the device is powered off and restarted, the assigned IP address will be lost. Follow the above steps to process IP address allocation. If the IP address to be distributed is solidified to the gateway and its power-off IP address is not lost, you need to click the Disable BOOTP/DHCP button in the following figure. After the Command Successful appears in the Status column, the IP address is successfully

solidified. If you click the Status column and there is no success message, you need to click again until the command succeeds.

As follows:



Note: If the module has already been assigned an IP address and BOOTP/DHCP is disabled, it will not be able to be automatically searched. There are two ways to reset the IP address.

- 1) You need to click the "New" button, manually add the MAC and original IP address of the module, and then click the "Enable DHCP" button. Once successful, you can search for this module. Then close the software and power on the module again to assign a new IP.**
- 2) In the event of a power outage, turn the rotary code back to 999 and then power on again for 5 seconds. Wait for the module port indicator light to scroll and flash, then power off again and switch back to 000 to reassign.**

3.4.2 Setting IP through Webserver (Code: 001~254)

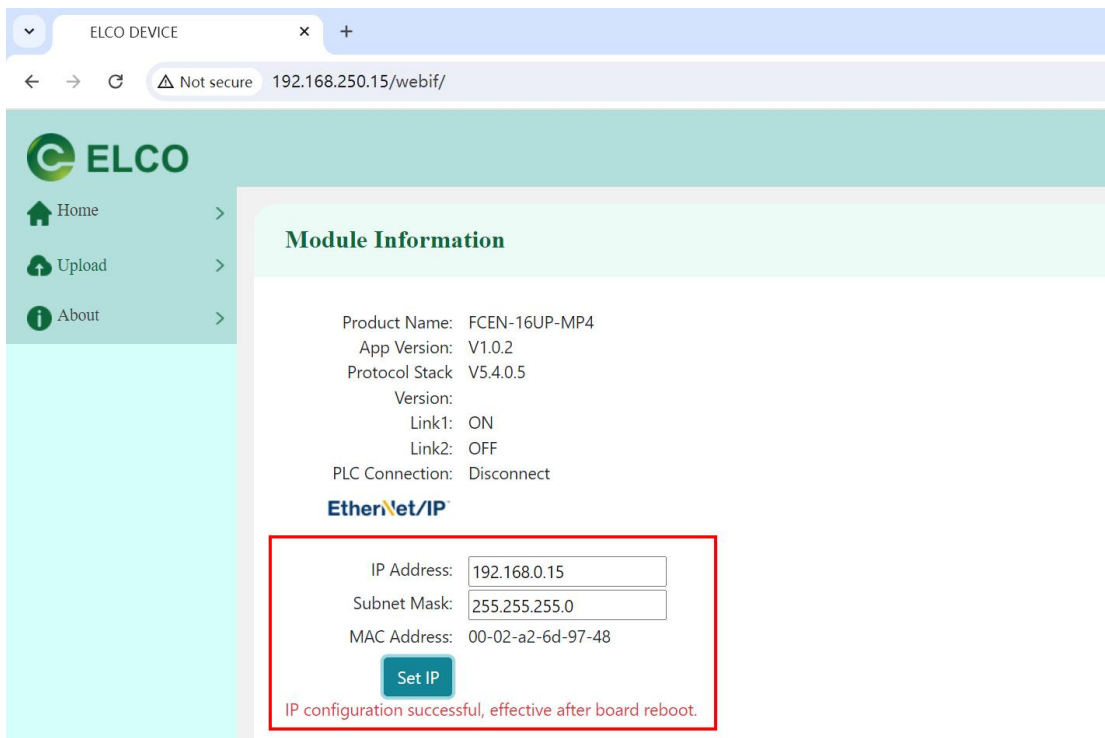
When the rotary code switch is selected from 001 to 254, the FCEN-16UP-MP4 module accesses the web server through a browser to allocate network parameters such as IP addresses and subnet masks.

The default value of the module or after resetting through code 999, the default IP address is 192.168.250.xxx (depending on the rotary switch value). When the computer and module IP addresses are in the same network segment, you can use a browser to enter <http://192.168.250.xxx/webif/> to access the module and modify the first 9 digits of the IP address.



You can see the IP address setting interface on the homepage, modify the values of the IP address and subnet mask, and click the "Set IP" button.

After successful setup, "IP configuration successful" will display under the button, The prompt "effective after board reboot" indicates that the new IP address will take effect after the power reboot.



4. Module Address Assignment

This section mainly introduces the signal point arrangement order and address assignment of the FCEN-16UP-MP4 module, mainly to indicate the clear sequence of signals. Due to the different addressing methods in different PLC systems, this article explains them in Bytes, and systems in Word or DWord units can be arranged in the same order.

4.1 Connection type and address assignment

The FCEN-16UP-MP4 module supports multiple connection types such as Exclusive owner, Input only, Listen only, etc. By default, the Exclusive owner type that supports input and output signals is used. The data size and instance encoding are shown in the table below:

Data size	Instance ID	Length of data
INPUT	101	8 bytes
OUTPUT	100	6 bytes
CONFIG	102	34 bytes

The default connection name is "I/O Connection Point", which includes the input and output signals and status indicators. There will be detailed descriptions in the subsequent chapters.

4.2 INPUT data address assignment

The FCEN-16UP-MP4 module occupies a total of 8 bytes (Bytes 0-7) of input data. The following table lists the mapping of input data occupied by the I/O module respectively:

INPUT	Description
Byte 0	Input Signal Data of Port 0~3
Byte 1	Input Signal Data of Port 4~7
Byte 2	Short Circuit Diagnosis of Port 0~3
Byte 3	Short Circuit Diagnosis of Port 4~7
Byte 4	Overload Diagnosis of Port 0~3
Byte 5	Overload Diagnosis of Port 4~7
Byte 6	Power Supply Diagnosis
Byte 7	Reserved

For a detailed description of the INPUT, please refer to the following text:

Byte 0~1 (Input Signal Data)

This section consists of 2 Bytes, used to represent the state when the signal port is connected to a switch signal.

Byte 0	Digital input status of port 0~3							
Bit	Bit_7	Bit_6	Bit_5	Bit_4	Bit_3	Bit_2	Bit_1	Bit_0
No.	07	06	05	04	03	02	01	00
Pin	Port3 Pin2	Port3 Pin4	Port2 Pin2	Port2 Pin4	Port1 Pin2	Port1 Pin4	Port0 Pin2	Port0 Pin4
Byte 1	Digital input status of port 4~7							
Bit	Bit_7	Bit_6	Bit_5	Bit_4	Bit_3	Bit_2	Bit_1	Bit_0
No.	15	14	13	12	11	10	09	08
Pin	Port7 Pin2	Port7 Pin4	Port6 Pin2	Port6 Pin4	Port5 Pin2	Port5 Pin4	Port4 Pin2	Port4 Pin4

Byte 2~3 (Short Circuit Diagnosis)

When a short circuit fault occurs between pins Pin1 and Pin3 of the signal port, the corresponding point indicates 1, otherwise the point indicates 0.

Byte 2	Short Circuit Diagnosis of Port 0~3							
Bit	Bit_7	Bit_6	Bit_5	Bit_4	Bit_3	Bit_2	Bit_1	Bit_0

Port	Port3		Port2		Port1		Port0	
Byte 3	Short Circuit Diagnosis of Port 4~7							
Bit	Bit_7	Bit_6	Bit_5	Bit_4	Bit_3	Bit_2	Bit_1	Bit_0
Port	Port7		Port6		Port5		Port4	

Byte 4~5 (Overload Diagnosis)

When an overload fault occurs between the signal port pins Pin4/Pin2 and Pin3, the corresponding point indicates 1, otherwise the point indicates 0.

Byte 4	Overload Diagnosis of Port 0~3							
Bit	Bit_7	Bit_6	Bit_5	Bit_4	Bit_3	Bit_2	Bit_1	Bit_0
Pin	Port3 Pin2	Port3 Pin4	Port2 Pin2	Port2 Pin4	Port1 Pin2	Port1 Pin4	Port0 Pin2	Port0 Pin4
Byte 5	Overload Diagnosis of Port 4~7							
Bit	Bit_7	Bit_6	Bit_5	Bit_4	Bit_3	Bit_2	Bit_1	Bit_0
Pin	Port7 Pin2	Port7 Pin4	Port6 Pin2	Port6 Pin4	Port5 Pin2	Port5 Pin4	Port4 Pin2	Port4 Pin4

Byte 6 (Power Supply Diagnosis)

When there is an abnormality in the power supply of the module, according to the fault status of overvoltage and undervoltage of the voltage value, the corresponding point indication is 1, otherwise the point is 0.

Byte 3	Power Supply Diagnosis							
Bit	Bit_7	Bit_6	Bit_5	Bit_4	Bit_3	Bit_2	Bit_1	Bit_0
Mean	-	-	-	-	-	-	Ua_L Low voltage	Us_L Low voltage

4.3 OUTPUT data address assignment

The FCEN-16UP-MP4 module occupies a total of 6 bytes (Bytes 0-5) of output data. The following table lists the mapping of output data occupied by the I/O module respectively:

INPUT	Description
Byte 0	Output Signal Data of Port 0~3
Byte 1	Output Signal Data of Port 4~7
Byte 2	Reserved
Byte 3	Reserved
Byte 4	Reserved
Byte 5	Reserved

For a detailed description of the OUTPUT, please refer to the following text:

Byte 0~1 (Output Signal Data)

This section consists of 2 Bytes, used to represent the output of the signal port control switch signal.

Byte 0	Digital output status of port 0~3							
Bit	Bit_7	Bit_6	Bit_5	Bit_4	Bit_3	Bit_2	Bit_1	Bit_0
No.	07	06	05	04	03	02	01	00
Pin	Port3 Pin2	Port3 Pin4	Port2 Pin2	Port2 Pin4	Port1 Pin2	Port1 Pin4	Port0 Pin2	Port0 Pin4
Byte 1	Digital output status of port 4~7							
Bit	Bit_7	Bit_6	Bit_5	Bit_4	Bit_3	Bit_2	Bit_1	Bit_0
No.	15	14	13	12	11	10	09	08
Pin	Port7 Pin2	Port7 Pin4	Port6 Pin2	Port6 Pin4	Port5 Pin2	Port5 Pin4	Port4 Pin2	Port4 Pin4

4.4 CONFIG data address assignment

The FCEN-16UP-MP4 module occupies a total of 34 bytes (Bytes 0-33) of config data. The following table lists the mapping of config data occupied by the I/O module:

CONFIG	Description
Byte 0	Reserved
Byte 1...16	Pin4&Pin2 Type of Port 0~7
Byte 17...32	Pin4&Pin2 Safe State of Port 0~7
Byte 33	Reserved

For a detailed description of port settings, please refer to the following:

Byte 1...16 (Pin4&Pin2 Type)

This section is used to set the properties of Pin4&Pin2 in each port of the I/O module, which can control the I/O function of the ports.

Each port occupies 2 bytes of data, one is for Pin4 and the other is for Pin2. The default is 3, which means I/O Universal;

Can be set to 0, means INPUT mode; Can be set to 1, means OUTPUT mode.

Byte 1...16	Pin4&Pin2 Type of Port 0~7
Byte 1	Pin4 type of Port 0 (0=DI, 1=DO, 3=I/O Universal)
Byte 2	Pin2 type of Port 0 (0=DI, 1=DO, 3=I/O Universal)
Byte 3	Pin4 type of Port 1 (0=DI, 1=DO, 3=I/O Universal)
Byte 4	Pin2 type of Port 1 (0=DI, 1=DO, 3=I/O Universal)
Byte 5	Pin4 type of Port 2 (0=DI, 1=DO, 3=I/O Universal)
Byte 6	Pin2 type of Port 2 (0=DI, 1=DO, 3=I/O Universal)
Byte 7	Pin4 type of Port 3 (0=DI, 1=DO, 3=I/O Universal)
Byte 8	Pin2 type of Port 3 (0=DI, 1=DO, 3=I/O Universal)
Byte 9	Pin4 type of Port 4 (0=DI, 1=DO, 3=I/O Universal)
Byte 10	Pin2 type of Port 4 (0=DI, 1=DO, 3=I/O Universal)
Byte 11	Pin4 type of Port 5 (0=DI, 1=DO, 3=I/O Universal)
Byte 12	Pin2 type of Port 5 (0=DI, 1=DO, 3=I/O Universal)
Byte 13	Pin4 type of Port 6 (0=DI, 1=DO, 3=I/O Universal)
Byte 14	Pin2 type of Port 6 (0=DI, 1=DO, 3=I/O Universal)
Byte 15	Pin4 type of Port 7 (0=DI, 1=DO, 3=I/O Universal)
Byte 16	Pin2 type of Port 7 (0=DI, 1=DO, 3=I/O Universal)

Byte 17...32 (Pin4&Pin2 Safe State)

This section is used to set the safety status of Pin4&Pin2 output in each port of the I/O module. When the I/O module experiences network disconnection or other abnormalities, the Pin2 output signal will switch to the set value.

Each port occupies 1 bytes of data, which is an SINT variable. The default is 0, which means the output is turned off in case of an exception; Can be set to 1, which means the output is turned on in case of an exception; It can be set to 2, which means the output will maintain the last value in case of an exception.

Byte 17...32	Pin4&Pin2 Safe State of Port 0~7
Byte 17	Pin4 safe state of Port 0 (0=SetTo0, 1=SetTo1, 2=HoldLast)
Byte 18	Pin2 safe state of Port 0 (0=SetTo0, 1=SetTo1, 2=HoldLast)
Byte 19	Pin4 safe state of Port 1 (0=SetTo0, 1=SetTo1, 2=HoldLast)
Byte 20	Pin2 safe state of Port 1 (0=SetTo0, 1=SetTo1, 2=HoldLast)
Byte 21	Pin4 safe state of Port 2 (0=SetTo0, 1=SetTo1, 2=HoldLast)
Byte 22	Pin2 safe state of Port 2 (0=SetTo0, 1=SetTo1, 2=HoldLast)
Byte 23	Pin4 safe state of Port 3 (0=SetTo0, 1=SetTo1, 2=HoldLast)
Byte 24	Pin2 safe state of Port 3 (0=SetTo0, 1=SetTo1, 2=HoldLast)
Byte 25	Pin4 safe state of Port 4 (0=SetTo0, 1=SetTo1, 2=HoldLast)
Byte 26	Pin2 safe state of Port 4 (0=SetTo0, 1=SetTo1, 2=HoldLast)
Byte 27	Pin4 safe state of Port 5 (0=SetTo0, 1=SetTo1, 2=HoldLast)
Byte 28	Pin2 safe state of Port 5 (0=SetTo0, 1=SetTo1, 2=HoldLast)
Byte 29	Pin4 safe state of Port 6 (0=SetTo0, 1=SetTo1, 2=HoldLast)

Byte 30	Pin2 safe state of Port 6 (0=SetTo0, 1=SetTo1, 2=HoldLast)
Byte 31	Pin4 safe state of Port 7 (0=SetTo0, 1=SetTo1, 2=HoldLast)
Byte 32	Pin2 safe state of Port 7 (0=SetTo0, 1=SetTo1, 2=HoldLast)

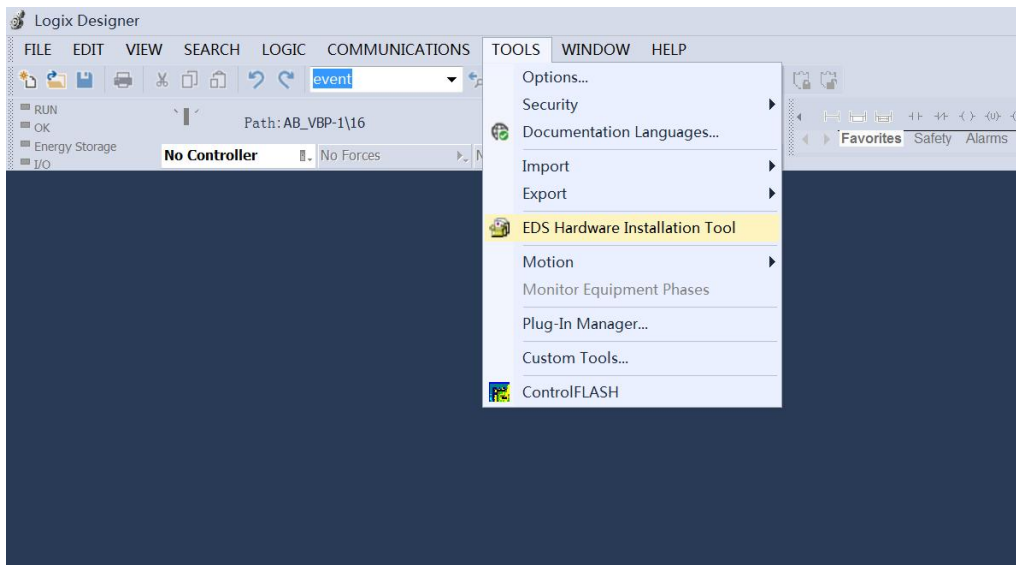
5. Configuration Commissioning (AB PLC)

5.1 Installing EDS files

Use EDS files to configure the EtherNet/IP protocol I/O module, which is used to integrate the EtherNet/IP protocol module as a standard EtherNet/IP slave into your system. You can visit the ELCO company website to obtain the latest EDS files or call the customer service hotline to contact technical personnel.

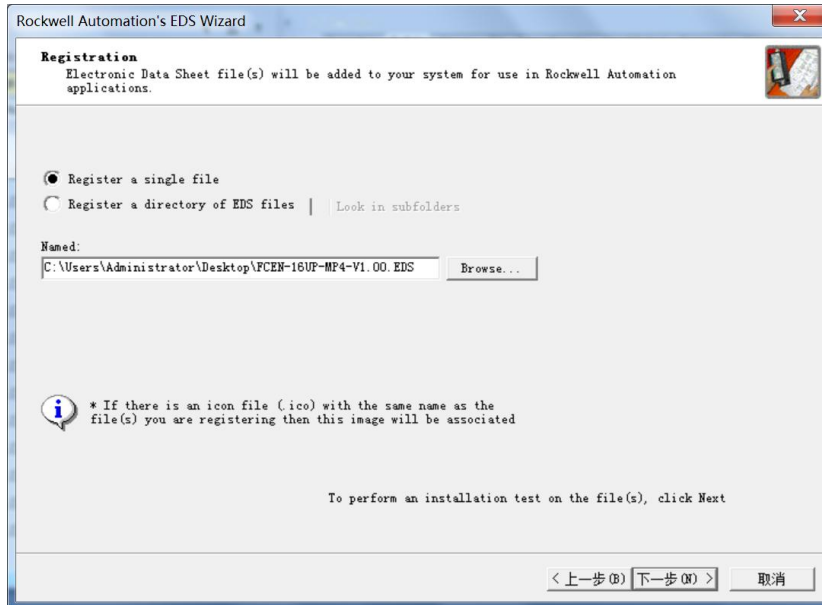
The integration of EDS files into the system depends on the configuration software you are using. Typically, the Rockwell Studio5000 programming software used for the EtherNet/IP protocol integrates EDS files according to the following steps:

- 1) Run "Logix Designer" software and select "TOOLS>EDS Hardware Installation Tool" in the menu bar.

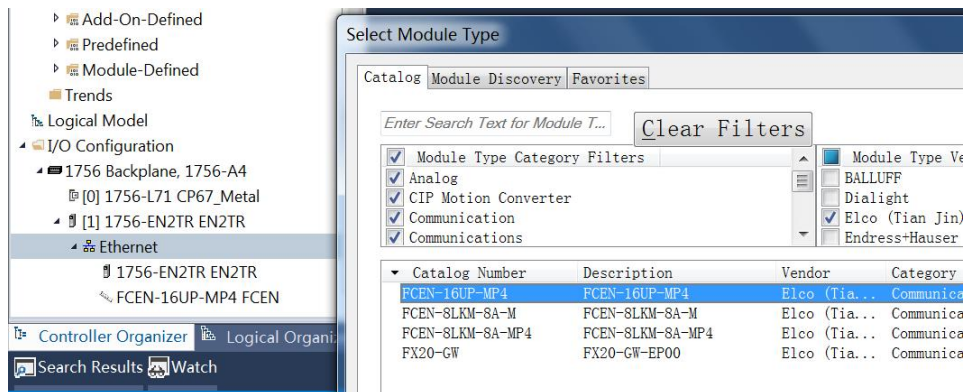


- 2) In the open dialog box, select "Register an EDS file" to proceed to the next step, select the EDS file to be installed, and then click "Next" to proceed with the installation operation.





- 3) The newly installed I/O module can be found when adding network devices and is displayed in the "New Module" interface. By filtering the "Module Type Vendor Filter" and selecting "Elco (Tianjin) Electronic", this module can be found and added in the Catalog.

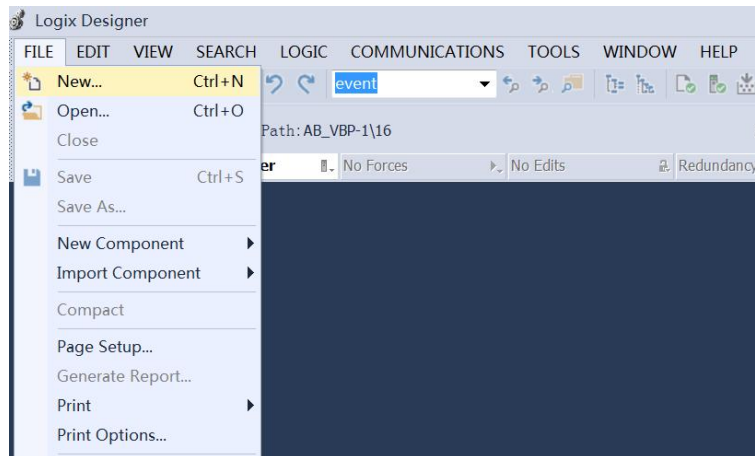


5.2 Configuration example in Logix Designer

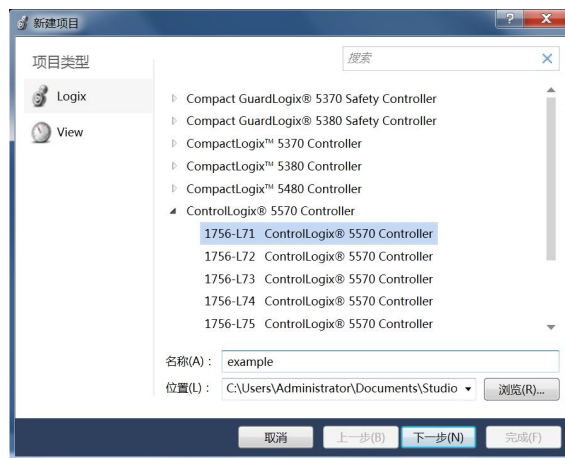
This section provides users with a comprehensive understanding of the actual use of the I/O module in the EtherNet/IP protocol through a configuration connection process. This example uses ELCO's FCEN-16UP-MP4 module as the EtherNet/IP slave to connect Rockwell's 1756-L71 controller and 1756-EN2TR network adapter. By default, all power supply and bus connections have been completed.

We show the specific software configuration process in the form of pictures:

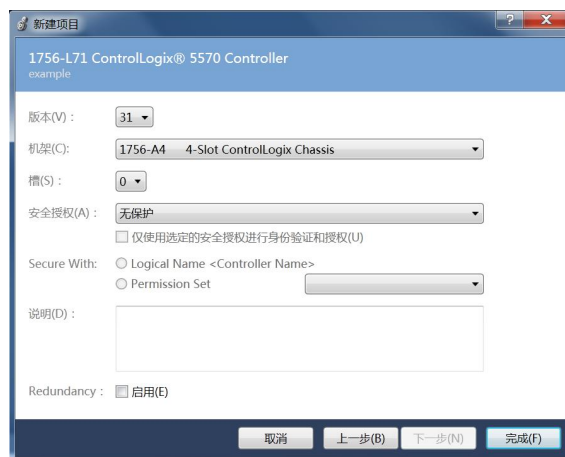
- 1) Create a new Studio5000 project.
 - A) Open the "Logix Designer" software and click "File>New...".



B) In the pop-up interface, select the PLC type to use and click "Next".

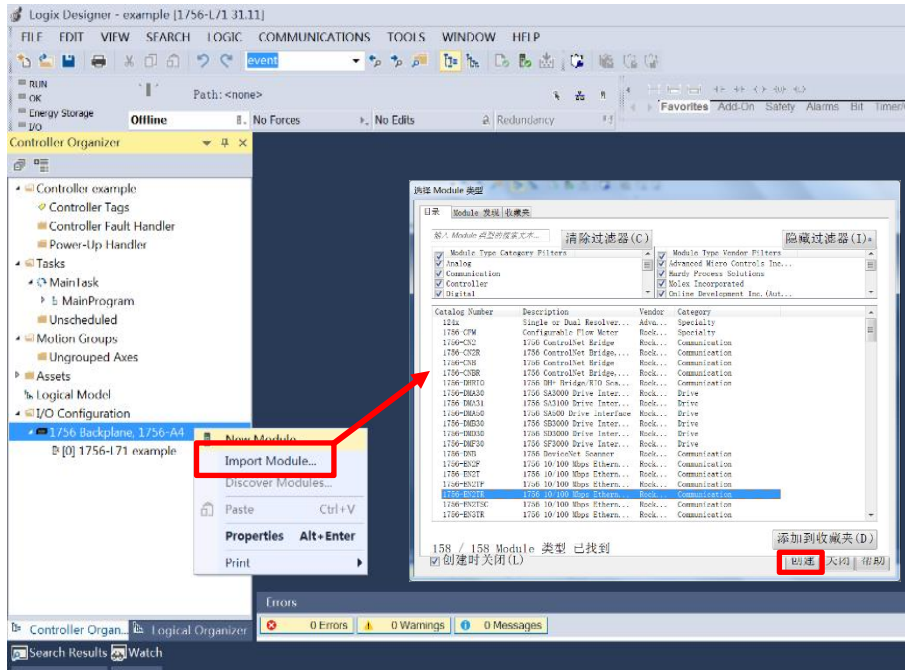


C) Select PLC version, rack, slot number, etc., and click "Finish".

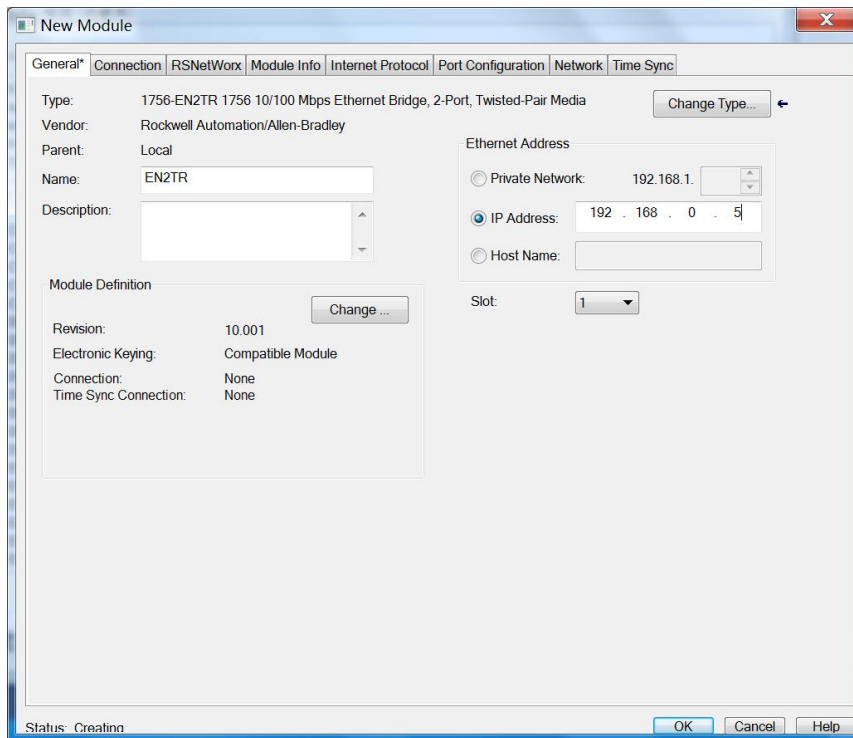


2) Add the 1756-EN2TR network module and set the IP address.

A) In the left Controller Organizer navigation bar, right-click on "1756-A4", select "New Module...", select "1756-EN2TR" in the open interface, and click "Create".

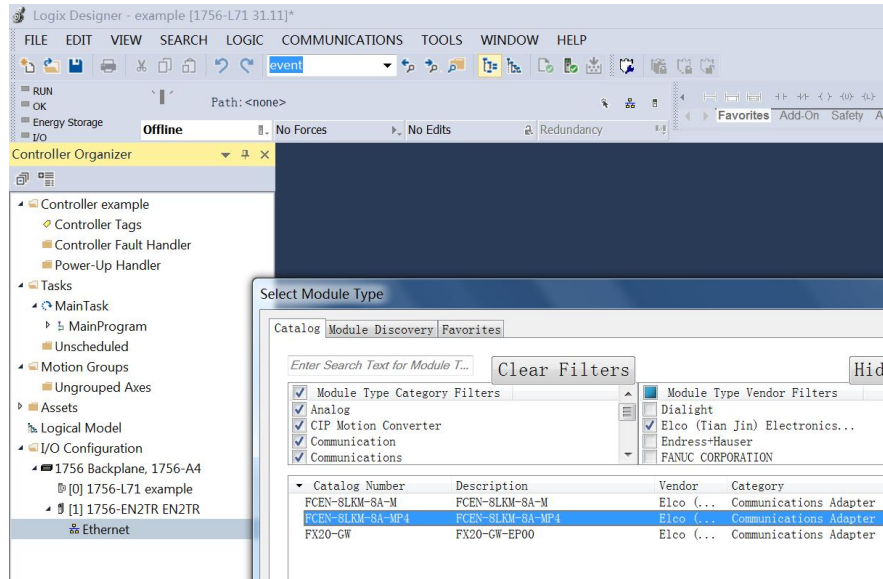


B) In the pop-up interface, fill in the IP address 192.168.0.5 of the module and provide the required name for the module, such as EN2TR. Click "OK" to complete the network adapter configuration.

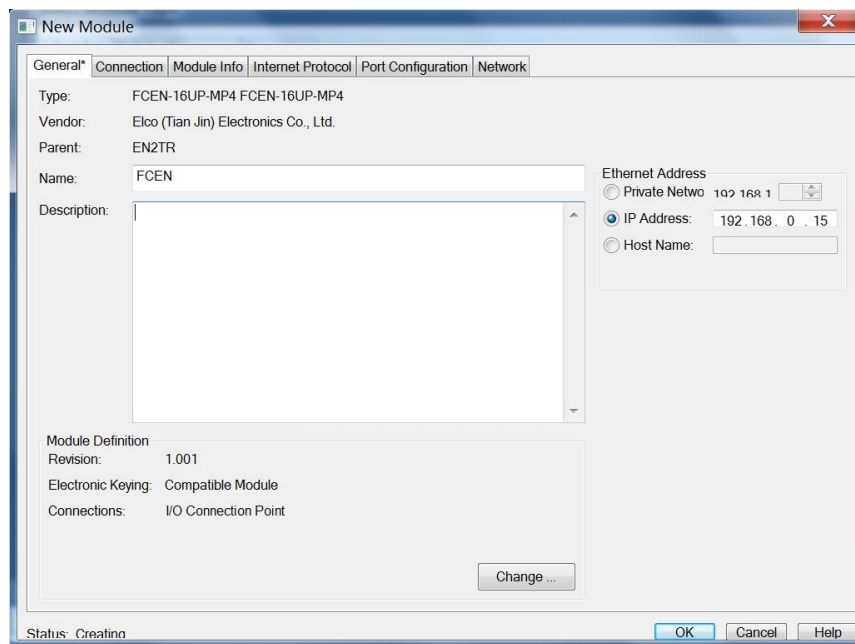


3) Add the FCEN-16UP-MP4 module and set the IP address.

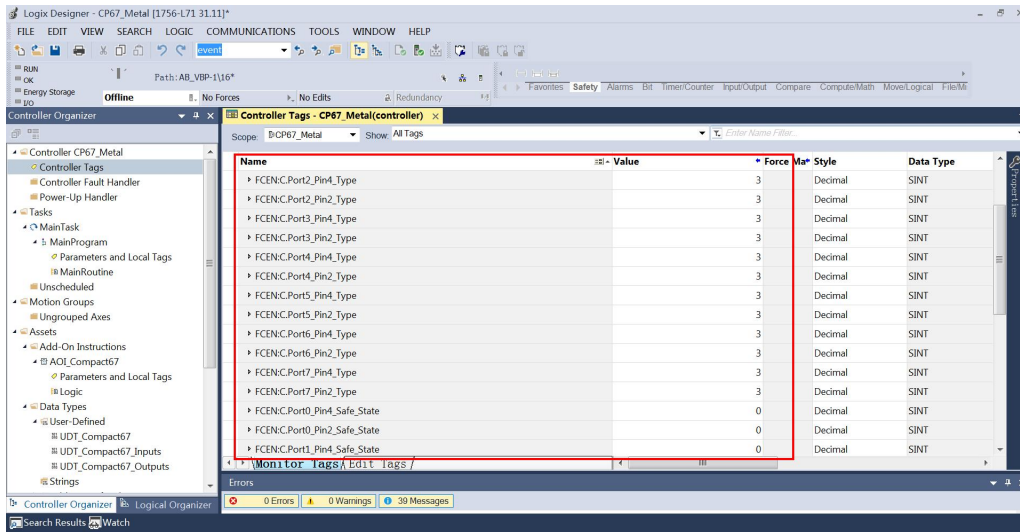
A) In the left Controller Organizer navigation bar, right-click on Ethernet under 1756-EN2TR, select "New Module...", filter ELCO in the open interface, select module model FCEN-16UP-MP4, and click "Create".



B) In the pop-up interface, fill in the IP address 192.168.0.15 of the module and provide the required name for the module, such as FCEN. Click "OK" to complete the configuration of the I/O module.

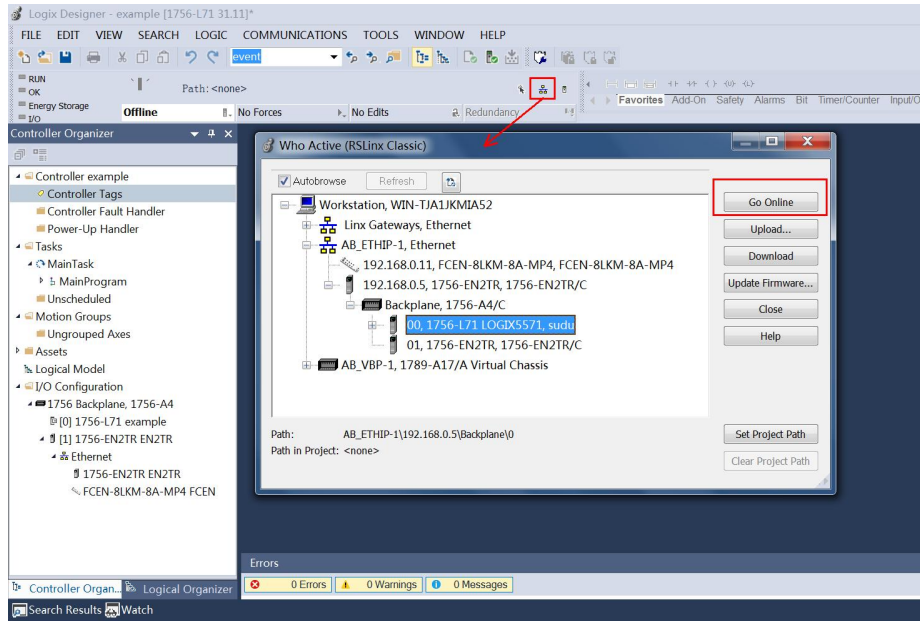


4) After completing the configuration of the hardware module, it is necessary to map the ports and other parameters of the I/O module. You can refer to Section 4.4 for the allocation of data addresses. The default signal type for each port is “I/O Universal” mode, and the safety status value for the output point is “Set-0”, which can be set as needed.



Note: If the value of the CONFIG parameter is modified after network connection, the I/O module must be powered on or connected back to the network in order for the newly modified parameters to take effect.

5) Select the already set connection in the RSLinx Classic. In this example, connect through the AB_ETHIP network and select the "Go Online" button to switch the software to online mode. At the same time, a pop-up interface will pop up and select "Download" to download the program to the PLC.



6) After completing the download operation, the NET light of FCEN-16UP-MP4 module will turn green, indicating that the EtherNet/IP connection between the module and the PLC is successful. The input and output signals of the control module can be read and controlled through the Controller Tags variable table or by programming.

Name	Value	Force Ma	Style	Data Type
FCEN:C		(...)	(...)	_04D0:FCEN_16UP_MP4_69F26...
FCEN:I		(...)	(...)	_04D0:FCEN_16UP_MP4_F211A...
FCEN:I.ConnectionFaulted		0	Decimal	BOOL
FCEN:I.Data		(...)	(...)	Decimal
FCEN:I.Data[0]		0	Decimal	SINT
FCEN:I.Data[1]		0	Decimal	SINT
FCEN:I.Data[2]		0	Decimal	SINT
FCEN:I.Data[3]		0	Decimal	SINT
FCEN:I.Data[4]		0	Decimal	SINT
FCEN:I.Data[5]		0	Decimal	SINT
FCEN:O		(...)	(...)	_04D0:FCEN_16UP_MP4_E771E...
FCEN:O.Data		(...)	(...)	Decimal
FCEN:O.Data[0]		0	Decimal	SINT
FCEN:O.Data[1]		0	Decimal	SINT
FCEN:O.Data[2]		0	Decimal	SINT
FCEN:O.Data[3]		0	Decimal	SINT
FCEN:O.Data[4]		0	Decimal	SINT
FCEN:O.Data[5]		0	Decimal	SINT

7) All configuration work has been completed and can be used normally.

5.3 Webservice

The FCEN-16UP-MP4 module integrates Webservice internally. Users can access the Webservice through the IP address to set module parameters and read or write input/output signals. (When the module is connected to the PLC, only the IO signal status can be read.)

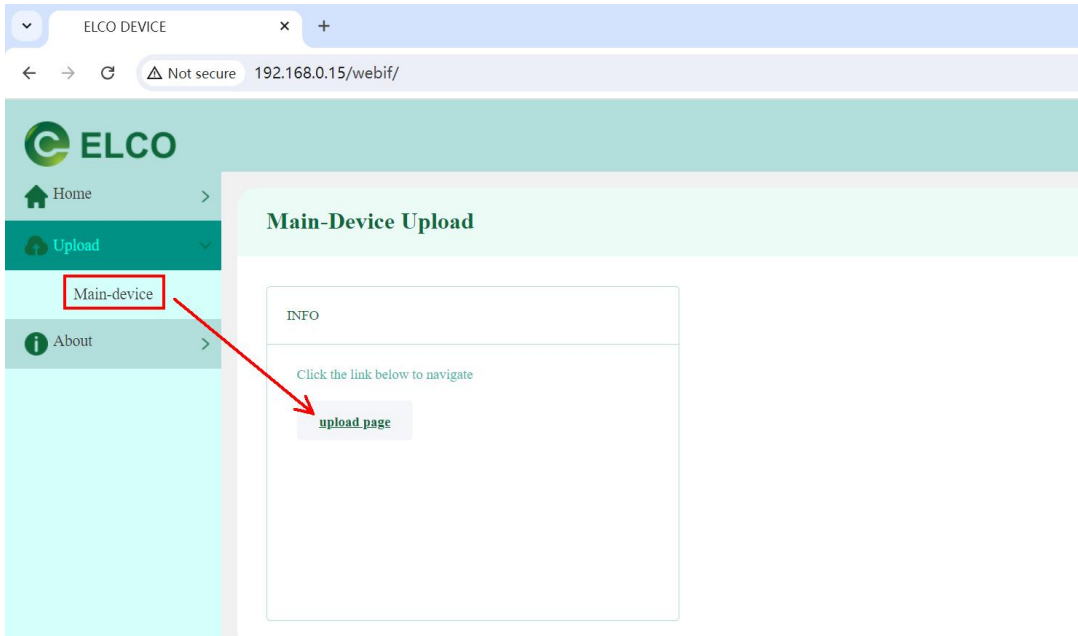
In order to access the Webservice of the module, users need to first assign an IP address to the module. The method of assigning an IP address can be referred to in Section 3.4. Then, using the latest version of Chrome, Edge, or Safari browser, enter <http://xxx.xxx.xxx.xxx/webif/> to access the module. (xxx.xxx.xxx.xxx is the IP address assigned by the module)

In this example, the IP of FCEN-16UP-MP4 module has been pre assigned to 192.168.0.15. Without connecting to the PLC, demonstrate how to read and control signal points, upgrade module firmware programs, etc..

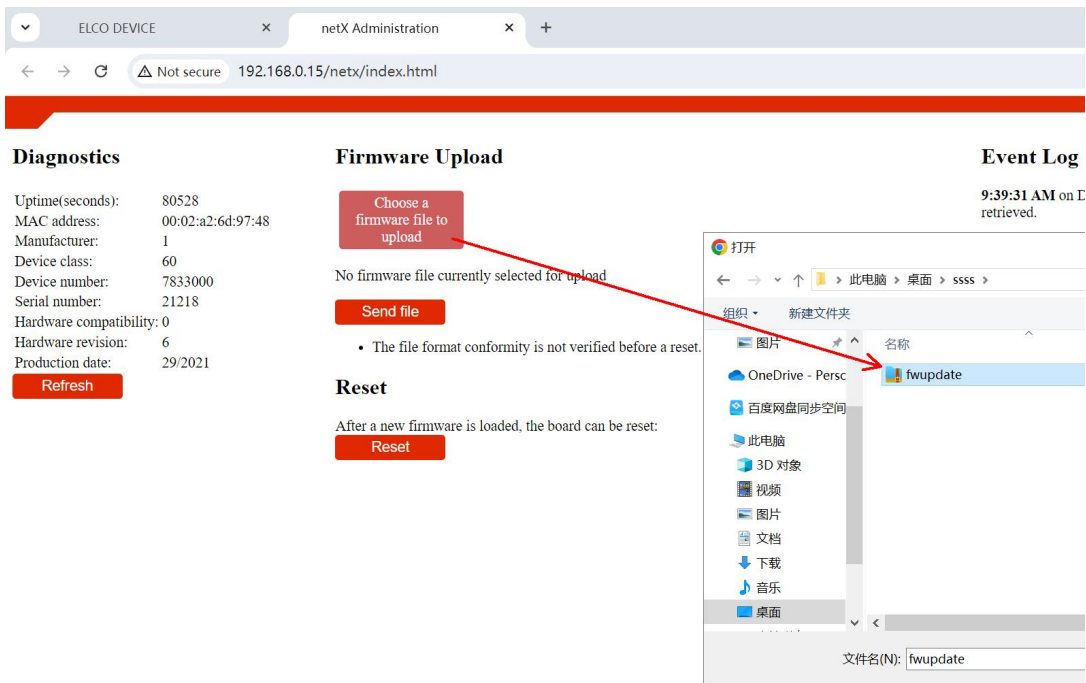
- 1) Set the IP address of the computer to 192.168.0.xxx on the same network segment as the FCEN-16UP-MP4 module. Then open the browser and enter in the address bar <http://192.168.0.15/webif/> . You can see the homepage of the module Webservice.



2) Click on the “Main-device” project under the “Upload” column to enter the “Main-Device Upload” interface. Click the “upload page” button to enter the firmware upload page.

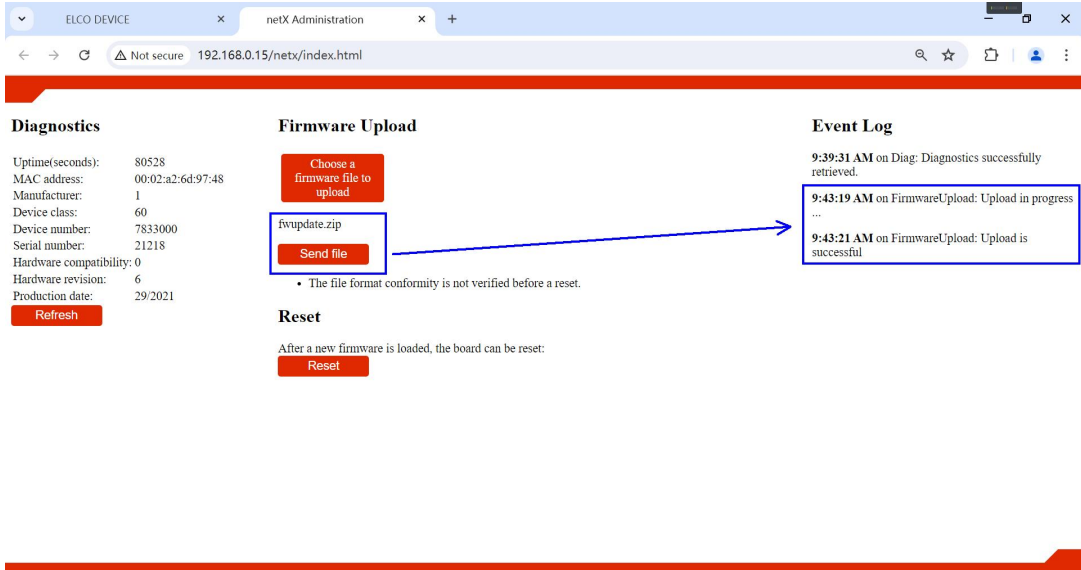


3) On the “Firmware Upload” page, click the “Choose a firmware file to upload” button, select the firmware upgrade file “fwupdate.zip”, and click “OK”.

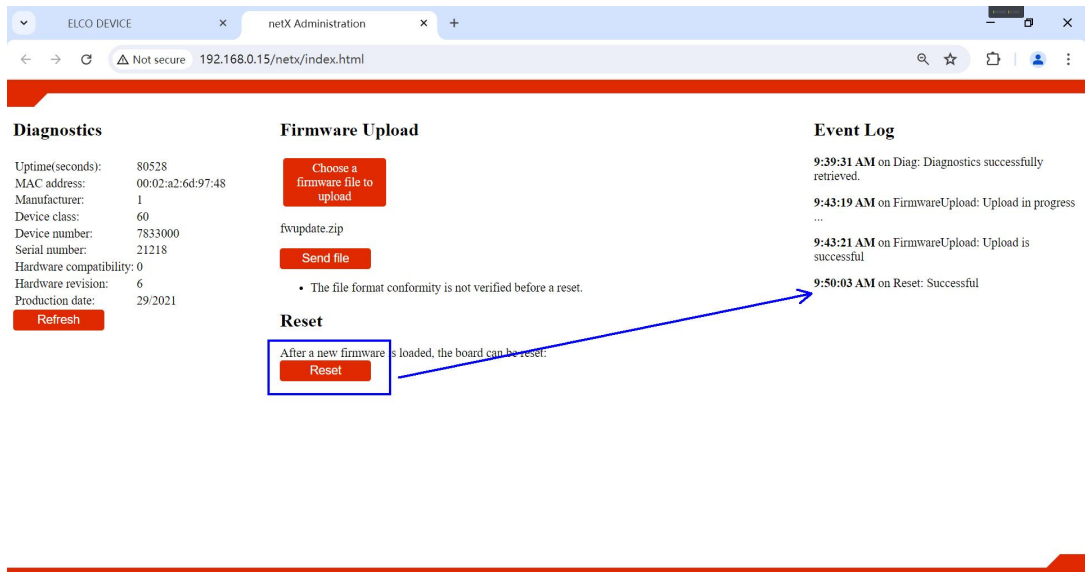


4) After successfully selecting the upgrade file, you can see the file name to be upgraded. At this point, click the “Send file”

button, and the module will start upgrading the program. After about 5 seconds, you can see a prompt in the “Event Log” on the right that the upgrade was successful, indicating that the upgrade was successful.



5) Click the “Reset” button, and the module will restart, completing the entire upgrade process.



6. Alarm diagnosis

6.1 LED fault indicator

With the LED indicator on the FCEN-16UP-MP4 module, users can easily and quickly determine the current working status of the module. (For the appearance of the indicator, please refer to Section 2.2 "LED Indication Function")

Name	Status	Meaning	Fault cause
I/O channel Indicator 00~15	Green	Have signal	–
	Red	1. Short circuit 2. Output signal overload	1. Check the cable connection 2. Module channel is damaged
	OFF	No signal	–
Module status Indicator MOD	Green	Work normally	–
	Red	Working abnormally	1. Power supply is abnormal 2. Channel abnormal (short circuit, overload, etc.) 3. Module is damaged
Comm. status Indicator NET	Green	Communication normal	–
	Red	Communication abnormal	1. Network cable failure 2. Check the configuration 3. Module is damaged
Network status Indicator LK1, 2	Green	Network Cable connects normal.	–
	Off	Network cable connects error.	1. Network cable failure 2. Module is damaged
Comm. data Indicator ACT1, 2	Yellow flash	Data exchange.	-
	Off	No data exchange.	1. Check the configuration 2. Check the network hardware
Power supply Indicator Us, Ua	Green	Supply voltage normal	–
	Red	Supply voltage abnormal	1. Overvoltage or undervoltage 2. Module is damaged
	Off	No power supply	1. Power supply cable failure 2. Module is damaged

6.2 FCEN Module Address Assignment

The default connection name for the FCEN-16UP-MP4 module is “I/O Connection Point”. This connection contains the input and output signals and status of the I/O module. It contains 8 bytes of INPUT, 6 bytes of OUTPUT, and 34 bytes of CONFIG. The table below lists the various data classifications, which can be found in Chapter 4 for details.

INPUT	Description
Byte 0...1	Input Signal Data of Port 0~7
Byte 2...3	Short Circuit Diagnosis of Port 0~7
Byte 4...5	Overload Diagnosis of Port 0~7
Byte 6	Power Supply Diagnosis
Byte 7	Reserved
OUTPUT	Description
Byte 0...1	Output Signal Data of Port 0~7
Byte 2...3	Reserved
Byte 4	Reserved
Byte 5	Reserved
CONFIG	Description
Byte 0	Reserved
Byte 1...16	Pin4&Pin2 Type of Port 0~7
Byte 17...32	Pin4&Pin2 Safe State of Port 0~7
Byte 33	Reserved