FCEC-8LKM-8A-M Module

----EtherCAT System Manual

EtherCAT.

Preface

1. Scope of this manual:

This manual applies to the FCEC-8LKM-8A-M module of ELCO.

The information in this manual enables you to run the FCEC-8LKM-8A-M module on EtherCAT 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 FCEC-8LKM-8A-M module for the EtherCAT 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 call the hotline if you have any questions about the product 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.

Contents

1. Product overview

1.1 Introduction

The FCEC-8LKM-8A-M module, which supports IO-Link functionality, is a new distributed I/O system with an IP67 protection rating.

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

IO-Link is an IO communication technology from the controller to the lowest level of automation. Through the IO-Link master, information such as sensors and actuators is transmitted to the controller via the fieldbus network so as to improve work efficiency and reduce production costs.

FCEC-8LKM-8A-M module supporting IO-Link communication, as an IO-Link master, does not require a dedicated communication cable, and can achieve efficient communication with IO-Link device through traditional non-shielded industrial cables. Each IO-Link master can support a maximum of 8 IO-Link interfaces. It meets the requirements of IO-Link v1.1 and supports three transmission rate COM1 (4.8kbps), COM2 (38.4kbps), COM3 (230.4kbps). It can easily connect IO-Link sensors of various brands and other IO-Link devices, as well as sensors and actuators of ordinary switching signals.

1.3 Features

- Up to IP67 protection class
- Designed with IO-Link v1.1.3 specification
- The IO-Link master supports three communication rates of COM1, 2 and 3
- Interface type Class-A or Class-B is optional
- Connects various IO-Link standard devices and standard switch signals
- LED status display, channel protection and diagnosis

1.4 Type

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No.	Type	Description
1	FCEC-8LKM-8A-M	EtherCAT IO-Link master module 8 IO-Link interfaces (8*Class-A) 2 Male + Female, M12 L-Code power supply 2 Female, M12 D-Code fieldbus interface

2. Technical characteristics

2.1 IO-Link master

Each FCEC-8LKM-8A-M module occupies an EtherCAT slave address. Depending on the type, up to 8 IO-Link devices can be connected. As an EtherCAT slave, the FCEC-8LKM-8A-M module is automatically assigned a specific address by the EtherCAT master to meet the communication requirements of the EtherCAT network. The customer can set the IO-Link interface to the communication mode that meets the requirements of IO-Link v1.1.3 or the SIO mode used as standard digital input and output in the programming software as required.

The IO-Link interface supports a total of three transmission rate: COM1 (4.8kbps), COM2 (38.4kbps) and COM3 (230.4kbps). The rate will be adaptive according to the characteristics of the IO-Link device.

2.2 IO-Link sensor hub

The Compact67 series IO-Link signal hub can be used as an IO-Link device to connect with the IO-Link master of ELCO or other brands. It conforms to the IO-Link v1.1.3 standard and supports COM2 (38.4kbps) transmission rate. Each IO-Link interface of the IO-Link master module can be extended with an IO-Link hub to collect input and output signals. That is, an 8-port IO-Link master plus 8 IO-Link hubs which can connect up to 128 digital signals.

IO-Link signal hub has different types to choose from, there are products that support Class-A or Class-B standards, and also include two different signal interface - M12 (A-Code, 2 digital or 1 analog are available) and M8 (3-pin, 1 digital is available).

2.3 IO-Link cable

According to the IO-Link protocol, point-to-point transmission is used between the IO-Link master and device. With the ordinary unshielded industrial cables (such as sensor cables), an extended distance of 20 meters can be reached.

According to the IO-Link protocol standard, ordinary 3-core cables can meet transmission requirements, and the 4-core or 5-core cables are used for specific functions. The Compact67 series IO-Link module needs to determine what kind of cable connection to use according to the interface type and IO type of the IO-Link hub.

1) Class-A IO-Link interface, because only three pins are defined, the fourth pin (PIN2) can be used as auxiliary power supply, so input IO-Link hub can use 3-core cable, output IO-Link hub requires a 4-core cable.

2) Class-B IO-Link interface, because all five pins are defined, when using this IO-Link hub to connect to the IO-Link master, a 5-core cable should be used.

2.4 Hardware

ARTICLE PROPERTIES

PRODUCT TYPE	IO-Link Master	**PROTOCOL**	EtherCAT
DESCRIPTION	IO-Link master for EtherCAT, Metal housing, 8 IO-Link master ports	**OPERATING MODES**	Auto-negotiation, Auto-MDI/MDI-X
		TRANSFER RATE	10/100 Mbps

ELECTRICAL DATA

SUPPLY VOLTAGE	24 V DC (18 ... 30 V DC)	**IO-LINK PORTS**	8
CURRENT CONSUMPTION	Max. 200 mA	**IO-LINK TYPE**	8*Class-A
SYSTEM & INPUT SUPPLY	Us, Max. 12 A	**IO-LINK VERSION**	IO-Link V1.1.3
OUTPUT SUPPLY	Ua, Max. 12 A	**IO-LINK COMMUNICATION RATES**	COM1 (4.8 kbps), COM2 (38.4 kbps), COM3 (230.4 kbps)
ELECTRICAL ISOLATION	Us and Ua : 24 V separated, 0 V connected	**INPUT CHANNELS**	Max. 16 (8*Pin4 + 8*Pin2)
POWER SUPPLY	2 × M12 L-code 5 pin, Male + Female	**INPUT SUPPLY CURRENT**	Pin1 & Pin3: 1.6 A per channel
FIELDBUS	2 × M12 D-code 4 pin, Female	**INPUT TYPE**	PNP sensors, mechanical switches, dry contacts, etc.
SIGNALS	8 × M12 A-code 5 pin, Female	**INPUT DELAY**	1.6 ms
COMMUNICATION INDICATION	LED indication, communication message	**OUTPUT CHANNELS**	Max. 8 (8*Pin2)
VOLTAGE DETECTION	Support, low voltage alarm	**OUTPUT CURRENT**	Max. 2 A per channel
SHORT-CIRCUIT & OVERLOAD	Support, LED indication	**OUTPUT TYPE**	Lamps, solenoidvalve, etc.
ACTUATOR SUPPLY UA INDICATOR	Green LED	**OUTPUT FREQUENCY**	Resistive load 100 Hz, Inductive load 5 Hz
IO-LINK COMMUNICATION INDICATOR	Yellow LED		
SENSOR SUPPLY US INDICATOR	Green LED		

GENERAL DATA

HOUSING MATERIAL	Casting Zinc Alloy	**OPERATING TEMPERATURE**	-25 ... +70 °C
PROTECTION	IP67	**STORAGE TEMPERATURE**	-40 ... +85 °C
DIMENSIONS	60 × 230 × 32.6 mm		

APPROVALS

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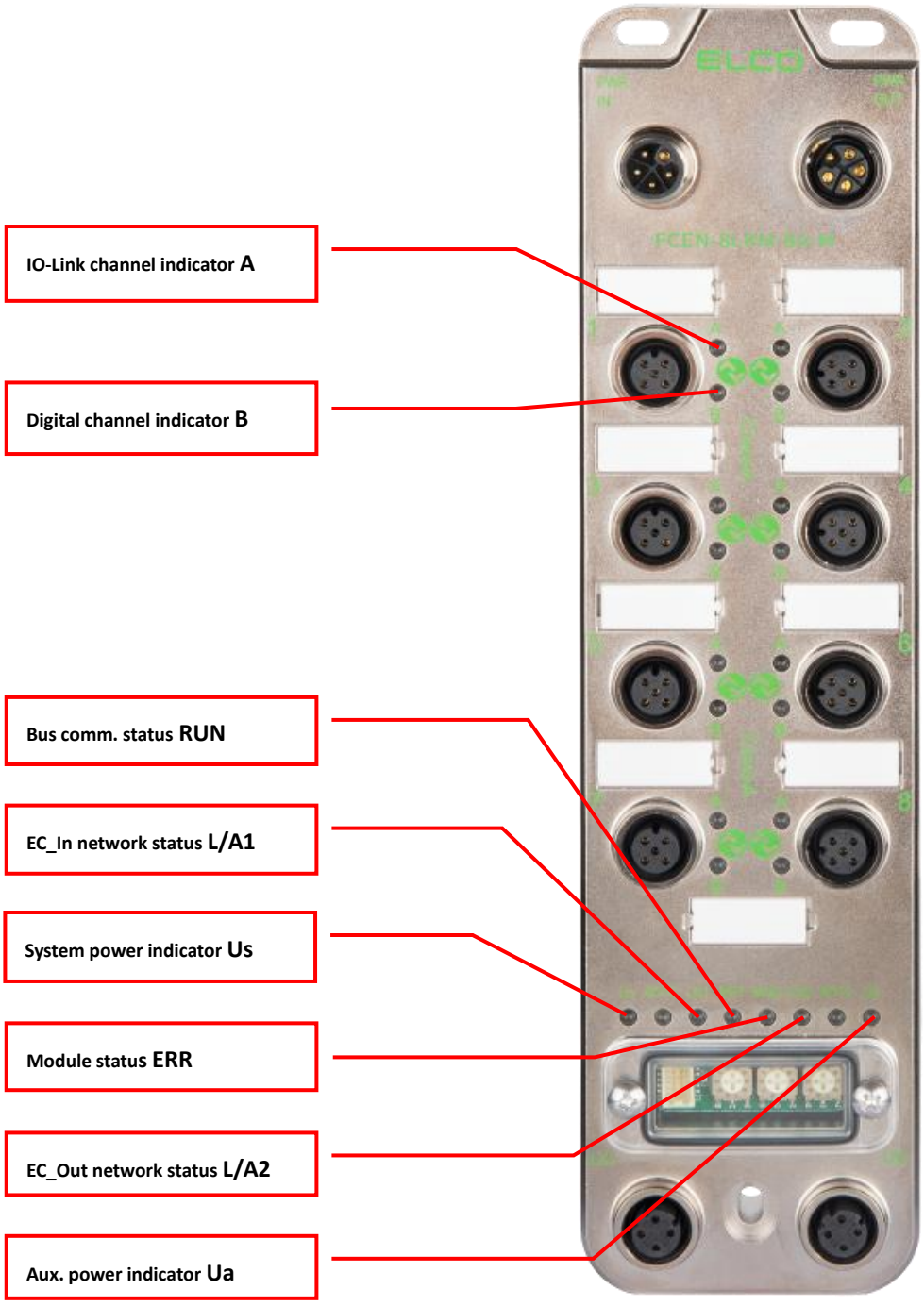
2.5 LED indicator

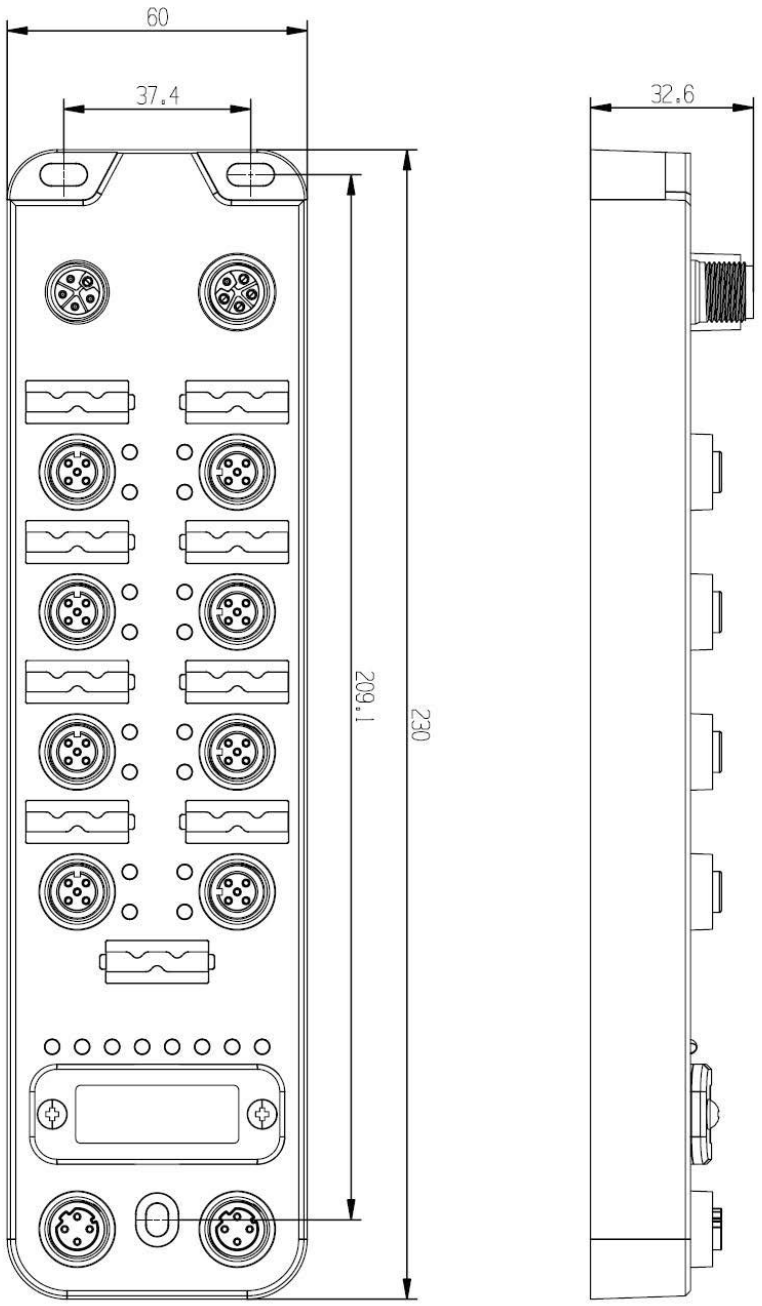
The module's indicator can clearly indicate its operating status. For specific fault indications and solutions, please refer to Section 6.1 “LED Fault Indicator”.

IO-Link master indicator



3. Installation and wiring

3.1 Installation dimensions



3.2 Installation position and size

Thanks to IP67 high protection level and excellent resistance to vibration and interference, FCEC-8LKM-8A-M can be installed in almost any location.

FCEC-8LKM-8A-M uses a compact design to minimize installation space. Its IO-Link master module and IO-Link signal hub use standard dimensions. The following table shows the module installation dimensions:

	FCEC-8LKM-8A-M
Installation width	60 mm
Installation height	230 mm
Installation depth	32.6 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.

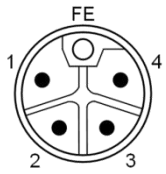
3.3.2 Module power supply

FCEC-8LKM-8A-M module adopts 24VDC power supply, and power IO-Link signal hub by extensible cable, voltage range 18~30VDC, standard M12 L-Code connector.

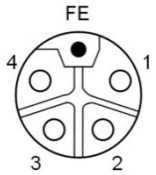
The power supply of IO-Link master is divided into two parts: System and sensor power supply Us (+24V, 0V), and auxiliary power supply Ua (P24, N24). Us is used for module chips and input signal power supply, while Ua is used for output signal power supply.

For FCEC-8LKM-8A-M, the two power supply are partially isolated, electrical isolation between Us+ and Ua+, and internally connected between Us- and Ua-.

1) Power in connector (Male)



2) Power out connector (Female)



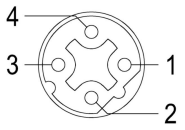
3) Power definition

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

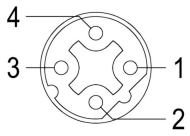
3.3.3 Module BUS connection

FCEC-8LKM-8A-M module, supporting EtherCAT protocol, transmits signals by a shielded cable, M12 D-Code connector.

1) BUS-In (Female)



2) BUS-Out (Female)



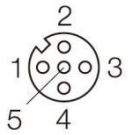
3） Bus definition

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 IO-Link master port cable connection

All Compact67 series IO-Link masters are connected through a standard 5-pin M12 connector. Each M12 port can be connected to a maximum of 1 IO-Link signal or 2 switching signals (input or output).

1) IO-Link port connector (Female)



2) IO-Link port pin definition

Terminal	Class-A
1	Power supply 24V+
2	Signal input/output B
3	Power supply GND
4	IO-Link/input A
5	Function earth FE

3) The power supply (Pin1 and Pin3) and signal input power supply come from the system power supply Us, and signal output power supply (Pin2) come from the auxiliary power supply Ua.

Note: When the master station of Class-A interface is used to connect LKHA series slaves, the output of Pin2 (i.e. signal B) can be controlled by program to meet the output power supply of LKHA slaves.

4. Configuration Commissioning

4.1 Installation of configuration files

Configuration of the Compact67 series I/O module via ESI file (XML format) and the standard EtherCAT IO ESI file for the Compact67 will be integrated into the user's system. You can visit the ELCO website to get the latest GSD file or call the hotline to contact technical support.

How to integrate the ESI file into the system depends on the user's configuration software. Take TwinCAT programming software from Beckoff for EtherCAT system for example, the process of adding ESI file is as follows:

Install TwinCAT, and then copy the ESI file (.xml file) of Compact67 to the following installation directory, for example:

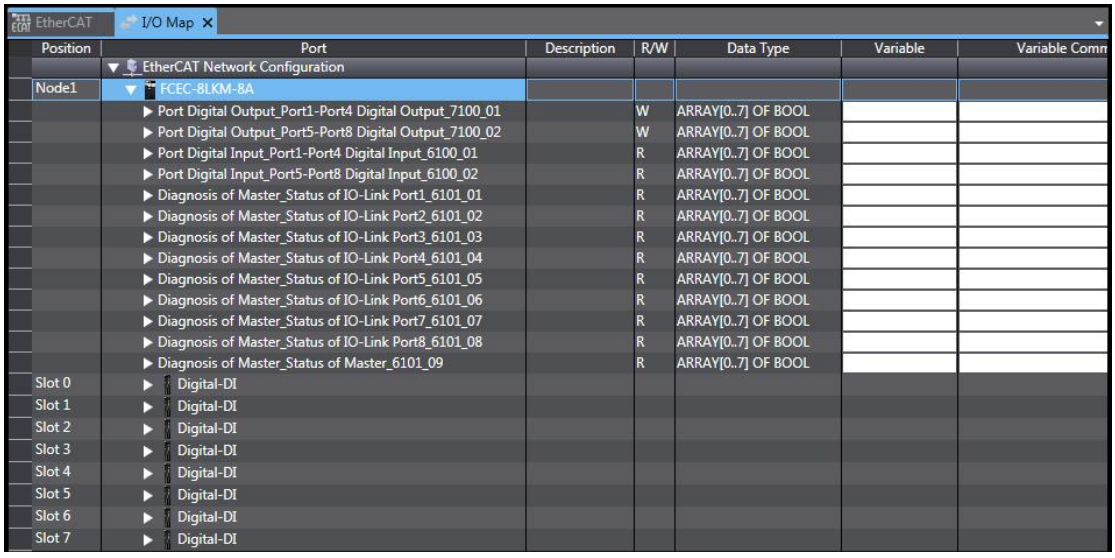
Twincat2: Install to c:\twincat\io\ethercat\

Twincat3: Install to c:\twincat\3.1\config\io\ethercat\

4.2 IO-Link master signal address assignment

Each Compact67 series IO-Link master has 8 M12 ports (Port1 ~ Port8), which are used to expand IO-Link communication or connect digital input and output. Each connector has 5 pins (Pin1 ~ Pin5) .

Each IO-Link master of EtherCAT protocol will occupy 2 Byte input and 2 Byte output as the switching signal of the IO-Link master, 8 Byte input as the IO-Link port connection status indication, and 1 Byte input to display the power supply status of the master station. The subsequent input and output bytes are determined according to the equipment configured by the IO-Link interface and are used as the signal address of the IO-Link slaves.



IO-Link master interface is configured as normal switching value input and output by default in the program, occupying 2 Byte input and 2 Byte output. The customer can set the corresponding port to the IO-Link communication mode as required. For the specific method, please refer to the description in the subsequent chapters.

The following will display the corresponding relationship between the signal status of each connector and the EtherCAT bus transmission bytes in the sub model list.

1) 8*Class-A, 8 ports IO-Link master module FCEC-8LKM-8A-M

Byte	Bit	Connector	e.g.
Input/Output Byte 0	Bit 0	Port1.Pin4	I 0.0 -
	Bit 1	Port1.Pin2	I 0.1 Q 0.1
	Bit 2	Port2.Pin4	I 0.2 -
	Bit 3	Port2.Pin2	I 0.3 Q 0.3
	Bit 4	Port3.Pin4	I 0.4 -
	Bit 5	Port3.Pin2	I 0.5 Q 0.5
	Bit 6	Port4.Pin4	I 0.6 -
	Bit 7	Port4.Pin2	I 0.7 Q 0.7
Input/Output Byte 1	Bit 0	Port5.Pin4	I 1.0 -
	Bit 1	Port5.Pin2	I 1.1 Q 1.1
	Bit 2	Port6.Pin4	I 1.2 -
	Bit 3	Port6.Pin2	I 1.3 Q 1.3

	Bit 4	Port7.Pin4	I 1.4 -
	Bit 5	Port7.Pin2	I 1.5 Q 1.5
	Bit 6	Port8.Pin4	I 1.6 -
	Bit 7	Port8.Pin2	I 1.7 Q 1.7

4.3 IO-Link sensor hub signal address assignment

Compact67 series IO-Link hubs have three dimensions: 16 signals_8 M12 ports (Port1 ~ Port8), 8 signals_8 M8 ports (Port1 ~ Port8), 8 signals_4 M12 ports (Port1 ~ Port4). Each M12 port has 5 pins (Pin1 ~ Pin5) and each M8 port has 3 pins (Pin1, Pin3, Pin4). The following table shows the matchup between the signal status of each connector and the EtherCAT bus transmission byte.

1) 8 DI modules LKHA-0800P-M12, LKHA-0800P-M8

This module takes 1 byte of input.

Byte	Bit	M12 connector LKHA-0800P-M12	M8 connector LKHA-0800P-M8	e. g.
Input Byte 0	Bit 0	P1.Pin4	P1.Pin4	I 0.0
	Bit 1	P1.Pin2	P2.Pin4	I 0.1
	Bit 2	P2.Pin4	P3.Pin4	I 0.2
	Bit 3	P2.Pin2	P4.Pin4	I 0.3
	Bit 4	P3.Pin4	P5.Pin4	I 0.4
	Bit 5	P3.Pin2	P6.Pin4	I 0.5
	Bit 6	P4.Pin4	P7.Pin4	I 0.6
	Bit 7	P4.Pin2	P8.Pin4	I 0.7

2) 4 DI 4 DO module LKHA-0404P-M8

This module takes 1 byte of input and 1 byte of output, but since each signal has only 4 pins, the input signal occupies I 0.0 ~ I 0.3, the rest I 0.4 ~ I 0.7 is useless, and the output signal occupies Q 0.4 ~ Q 0.7, the rest Q 0.0 ~ Q 0.3 is useless.

Byte	Bit	M8 connector LKHA-0404P-M8	e. g.
Input Byte 0	Bit 0	P1.Pin4	I 0.0
	Bit 1	P2.Pin4	I 0.1
	Bit 2	P3.Pin4	I 0.2
	Bit 3	P4.Pin4	I 0.3
Output Byte 0	Bit 4	P5.Pin4	Q 0.4
	Bit 5	P6.Pin4	Q 0.5
	Bit 6	P7.Pin4	Q 0.6
	Bit 7	P8.Pin4	Q 0.7

3) 8DI/ DO module LKHA-08UP-M12, LKHA-08UP-M8

The module occupies 8 bits for input and 8 bits for output; I-address and Q-address are configurable according to actual application, and the rest addresses are useless. E.g. two signals of first interface are used as input, then I 0.0 and I 0.1 are occupied; Q 0.0 and Q 0.1 are useless.

Byte	Bit	M12 connector LKHA-0800P-M12	M8 connector LKHA-0800P-M8	e. g.
Input/Output Byte 0	Bit 0	P1.Pin4	P1.Pin4	I 0.0 Q 0.0
	Bit 1	P1.Pin2	P2.Pin4	I 0.1 Q 0.1
	Bit 2	P2.Pin4	P3.Pin4	I 0.2 Q 0.2
	Bit 3	P2.Pin2	P4.Pin4	I 0.3 Q 0.3
	Bit 4	P3.Pin4	P5.Pin4	I 0.4 Q 0.4
	Bit 5	P3.Pin2	P6.Pin4	I 0.5 Q 0.5
	Bit 6	P4.Pin4	P7.Pin4	I 0.6 Q 0.6
	Bit 7	P4.Pin2	P8.Pin4	I 0.7 Q 0.7

4) 16 DI module LKHA-1600P-M12, LKHA-1600N-M12

This module takes 2 bytes of input.

Byte	Bit	M12 connector	e. g.
Input Byte 0	Bit 0	Port1.Pin4	I 0.0
	Bit 1	Port1.Pin2	I 0.1
	Bit 2	Port2.Pin4	I 0.2
	Bit 3	Port2.Pin2	I 0.3
	Bit 4	Port3.Pin4	I 0.4
	Bit 5	Port3.Pin2	I 0.5
	Bit 6	Port4.Pin4	I 0.6
	Bit 7	Port4.Pin2	I 0.7
Input Byte 1	Bit 0	Port5.Pin4	I 1.0
	Bit 1	Port5.Pin2	I 1.1
	Bit 2	Port6.Pin4	I 1.2
	Bit 3	Port6.Pin2	I 1.3
	Bit 4	Port7.Pin4	I 1.4
	Bit 5	Port7.Pin2	I 1.5
	Bit 6	Port8.Pin4	I 1.6
	Bit 7	Port8.Pin2	I 1.7

5) 8 DI + 8 DO module LKHA-0808P-M12

This module takes 1 byte of input and 1 byte of output.

Byte	Bit	M12 connector	e. g.
Input Byte 0	Bit 0	Port1.Pin4	I 0.0
	Bit 1	Port1.Pin2	I 0.1
	Bit 2	Port2.Pin4	I 0.2
	Bit 3	Port2.Pin2	I 0.3
	Bit 4	Port3.Pin4	I 0.4
	Bit 5	Port3.Pin2	I 0.5
	Bit 6	Port4.Pin4	I 0.6
	Bit 7	Port4.Pin2	I 0.7
Output Byte 0	Bit 0	Port5.Pin4	Q 0.0
	Bit 1	Port5.Pin2	Q 0.1
	Bit 2	Port6.Pin4	Q 0.2
	Bit 3	Port6.Pin2	Q 0.3

	Bit 4	Port7.Pin4	Q 0.4
	Bit 5	Port7.Pin2	Q 0.5
	Bit 6	Port8.Pin4	Q 0.6
	Bit 7	Port8.Pin2	Q 0.7

6) 16 DI/DO module LKHA-16UP-M12, LKHA-16UN-M12

The module occupies 16 bits for input and 16 bits for output; I-address and Q-address are configurable according to actual application, and the rest addresses are useless. E.g. two signals of first interface are used as input, then I 0.0 and I 0.1 are occupied; Q 0.0 and Q 0.1 are useless.

Byte	Bit	M12 connector	e. g.
Input/Output Byte 0	Bit 0	Port1.Pin4	I 0.0 Q 0.0
	Bit 1	Port1.Pin2	I 0.1 Q 0.1
	Bit 2	Port2.Pin4	I 0.2 Q 0.2
	Bit 3	Port2.Pin2	I 0.3 Q 0.3
	Bit 4	Port3.Pin4	I 0.4 Q 0.4
	Bit 5	Port3.Pin2	I 0.5 Q 0.5
	Bit 6	Port4.Pin4	I 0.6 Q 0.6
	Bit 7	Port4.Pin2	I 0.7 Q 0.7
Input/Output Byte 1	Bit 0	Port5.Pin4	I 1.0 Q 1.0
	Bit 1	Port5.Pin2	I 1.1 Q 1.1
	Bit 2	Port6.Pin4	I 1.2 Q 1.2
	Bit 3	Port6.Pin2	I 1.3 Q 1.3
	Bit 4	Port7.Pin4	I 1.4

			Q 1.4
	Bit 5	Port7.Pin2	I 1.5 Q 1.5
	Bit 6	Port8.Pin4	I 1.6 Q 1.6
	Bit 7	Port8.Pin2	I 1.7 Q 1.7

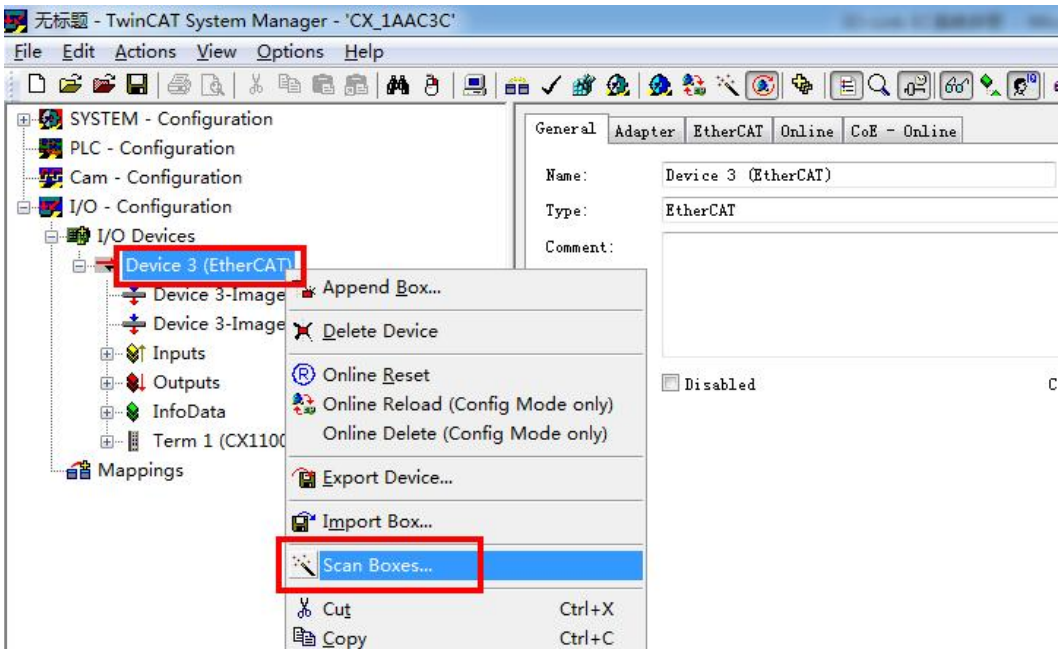
4.4 Module configuration by TwinCAT

This section, through a case of connection configuration in a current operation process, will let the users fully understand how to use the Compact67 series IO-Link module. In this case, using the FCEC-8LKM-8A-M module as EtherCAT slave to connect to the Beckhoff controller CX1020 with EtherCAT interface. By default, TwinCAT has been installed, the required network card information has been set, ESI files have been installed, and all power supply and bus connections have been completed. Please refer to TwinCAT operating instructions for the above operating procedures.

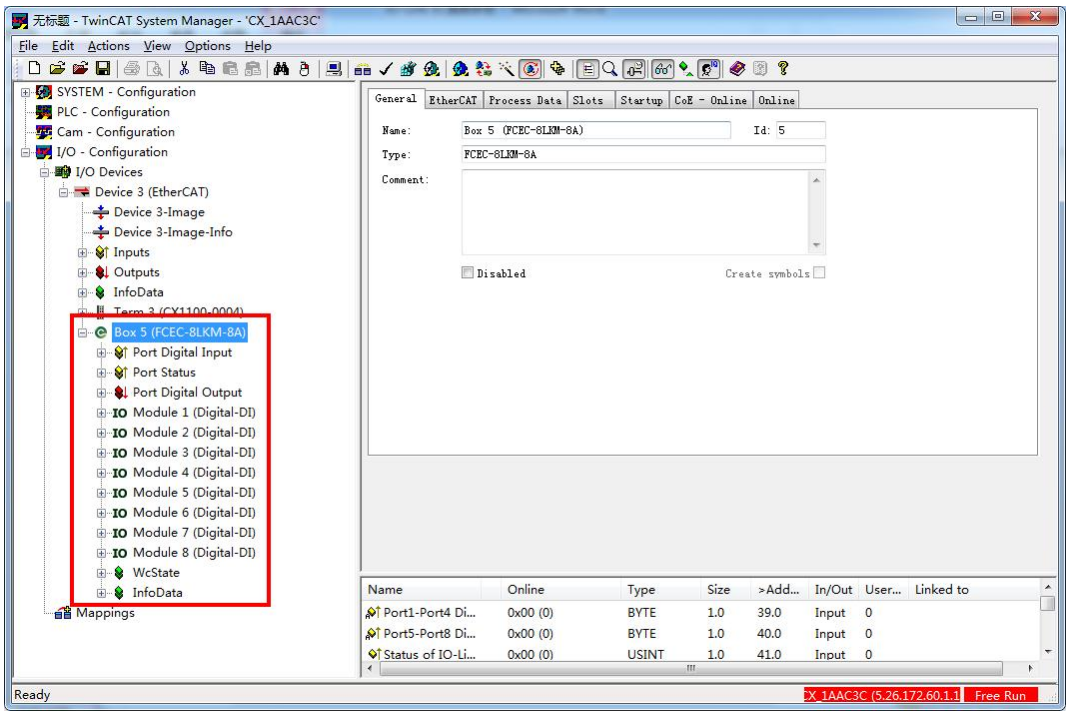
Compact67 IO-link system includes a master module FCEC-8LKM-8A-M, the master IO-Link port P1 connecting a IO-Link hub LKHA-16UP-M12, IO-Link port P2 connecting a IO-Link hub LKHA-0808P-M12, IO-Link port P6 connecting a IO-Link hub LKHA-0800P-M8. Other port interfaces Pin4 are set to input, and Pin2 is set to input/output.

The following will show the specific process of software configuration and debugging.

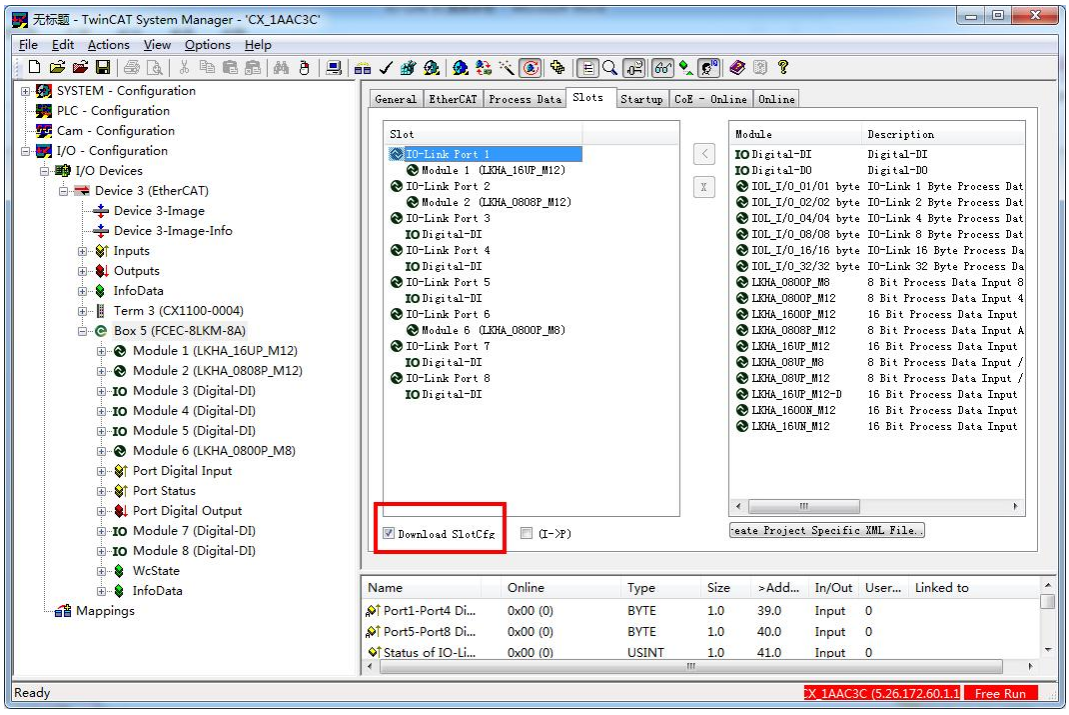
1) Create a new TwinCAT project, connect it to the PLC controller, and switch to 'Config Mode'. Then search the EtherCAT slave: right click the arrow in the figure below > Scan Boxes…



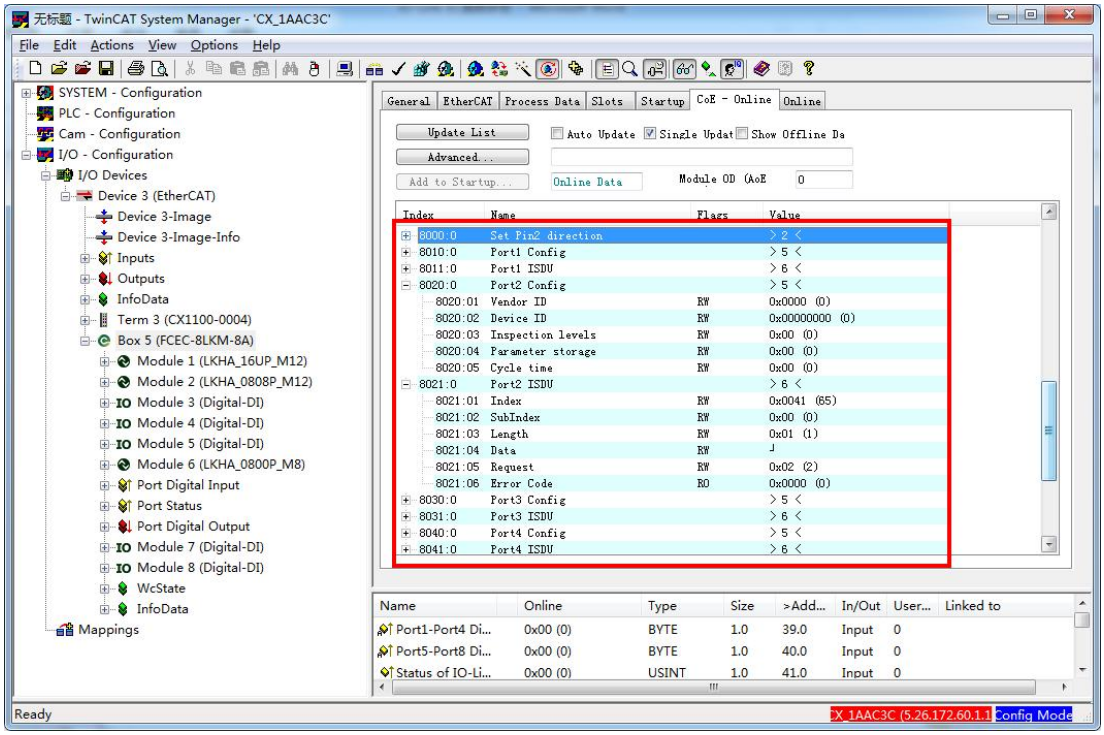
2) If the IO-Link master and PLC are normally connected, the system can automatically search for the Compact67 module, but cannot see the IO-Link slave specifically connected. As shown below:



3) Configure the slave module according to the actual connection. In order to distribute the specific module configuration to the PLC to ensure that the subsequent power on can be used normally, you need to check the "Download Slot Configuration" option in the slots tab.



4) For IO-Link hubs or other IO-Link devices that need to be configured, customers can modify them in the COE online tab. The index label 8000 represents the channel parameter setting, and 8010~8081 sets the ISDU parameters of the IO-Link slave.



5) After all settings are completed, click the "Reload I/O Devices" button to download all information to the PLC. At this time, the module should be in the connected state, and the RUN indicator turn green.

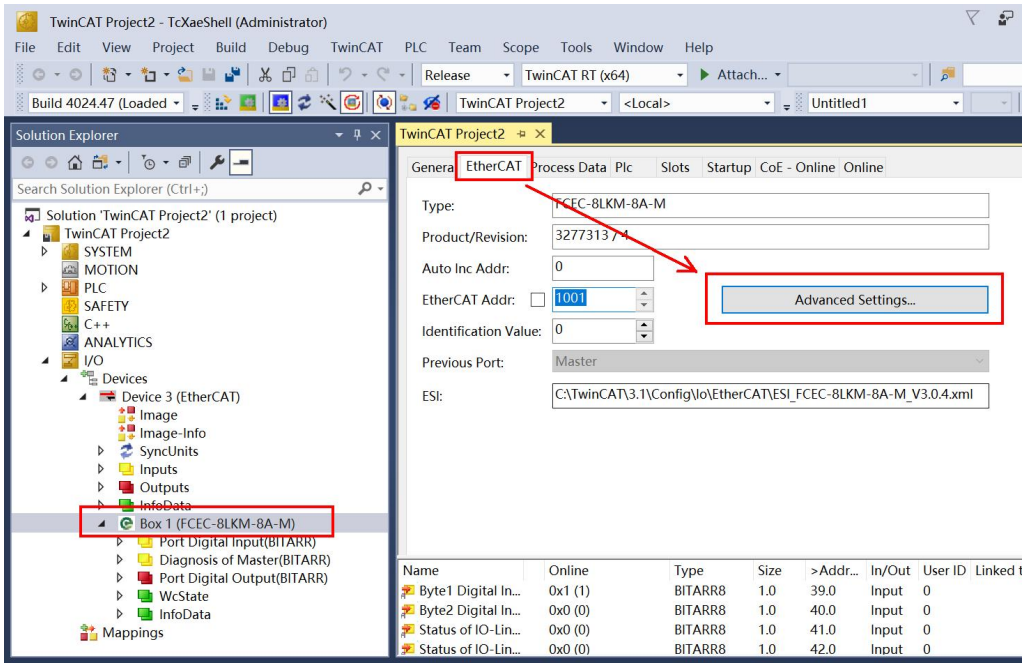
5. Webserver

The FCEC-8LKM-8A-M module integrates Webserver internally. Users can access the Webserver through the IP address, set the parameters of the module, read and write input and output signals, and set the ISDU parameters of the IO-Link device. (When the module is connected to the PLC, only the IO signal status can be read and ISDU of IO-Link device can be set.)

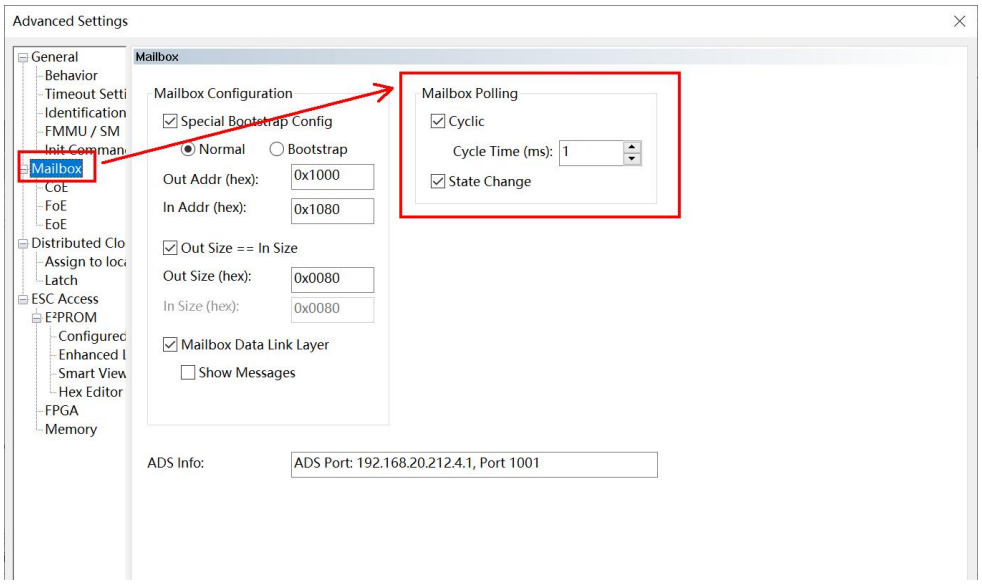
In order to access the Webserver of the module, users need to first assign an IP address to the module. Since the EtherCAT protocol itself does not include an IP address, it is necessary to allocate an IP address to the FCEC module through the EoE function. Then using the latest version of Chrome, Edge, or Safari browser, enter http://xxx. xxx. xxx. xxx/ to access the module. (xxx. xxx. xxx. xxx is the IP address assigned by the module)

In this example, the FCEC-8LKM-8A-M module is assigned an IP address of 192.168.0.11 through the EoE function. Without connecting to the PLC, Port1 is connected to the BNI007Z module of Balluff. Show how to enable port IO-Link function and allocate port properties of the Balluff module by importing an IODD file.

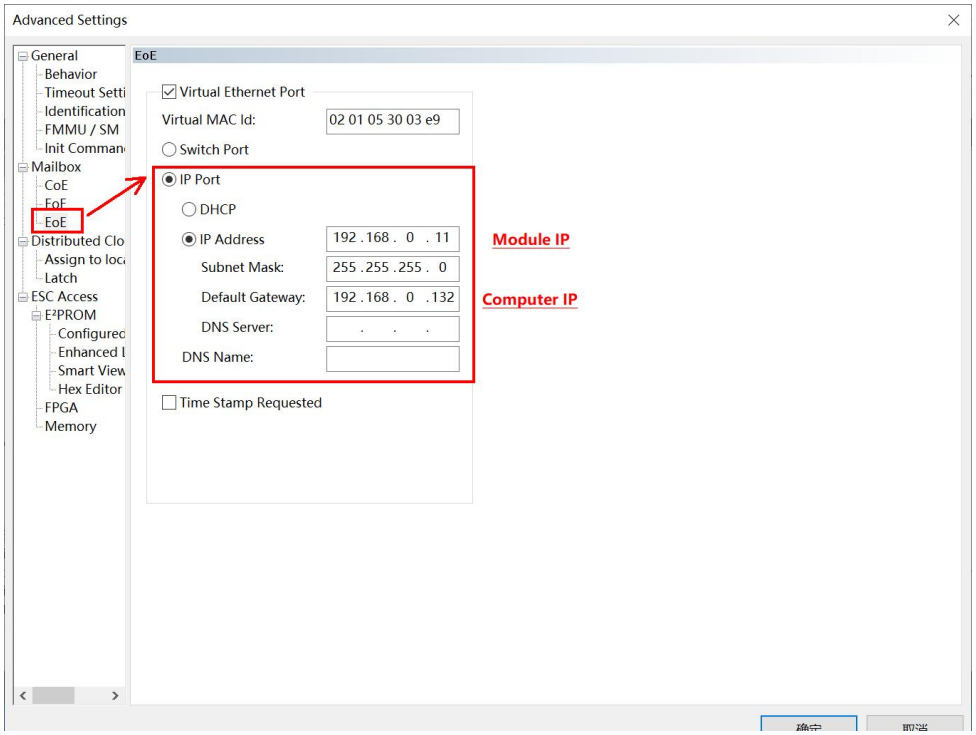
1) Disconnect the FCEC module from the PLC network and directly connect it to a computer with TwinCAT software installed. Refer to Section 4.4 Beckhoff Configuration Example to establish the connection between TwinCAT and FCEC modules. Click on the "Advanced Settings..." button in the EtherCAT tab.



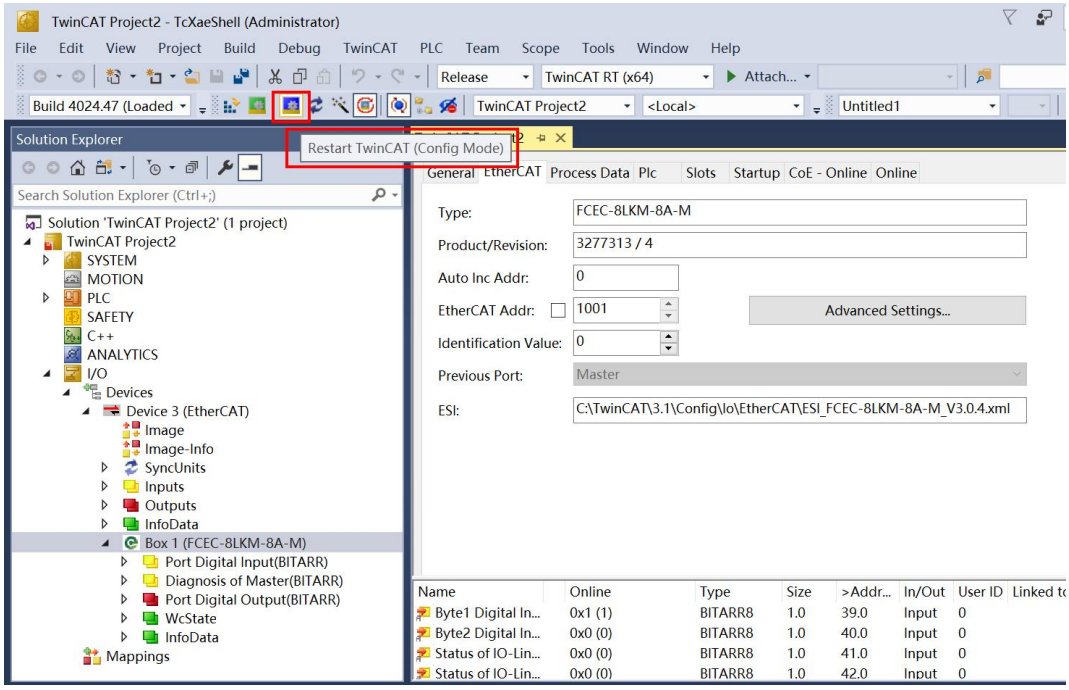
2) In the newly opened "Advanced Settings" window, select the "Mailbox" option. Adjust the polling method for communication to "Cyclic" and set the time to 1ms.

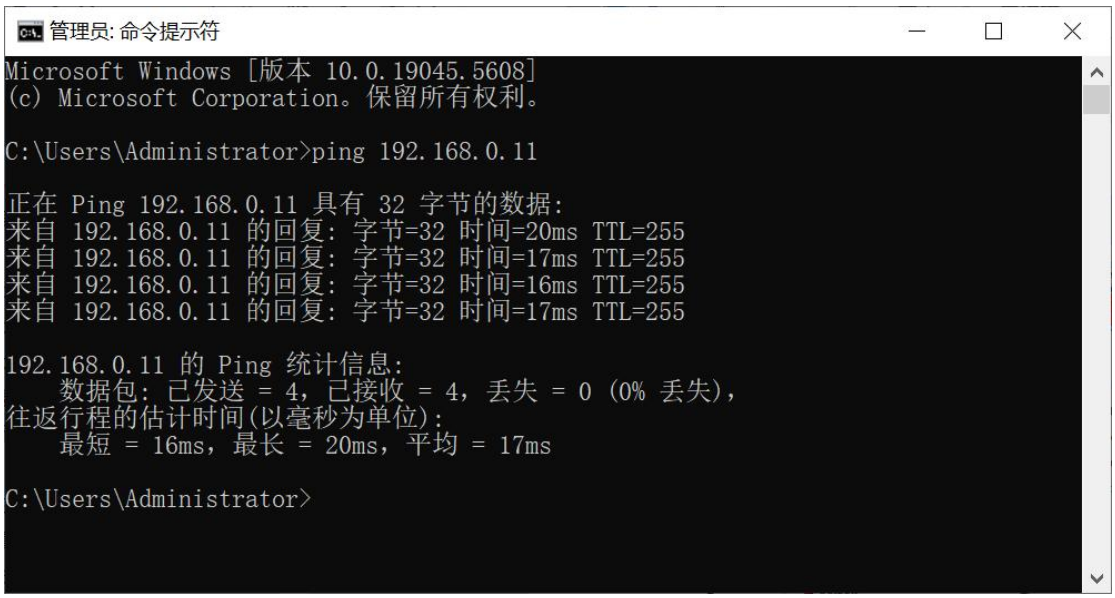


3) Select the "EoE" option, check the "Virtual Ethernet Port" option, and set the 'IP Address' of the module to 192.168.0.11 in the "IP Port". Set the value of the 'Default Gateway' to the local IP address of the computer (which needs to be in the same network segment as the module). Click the 'OK' button to complete the setup.



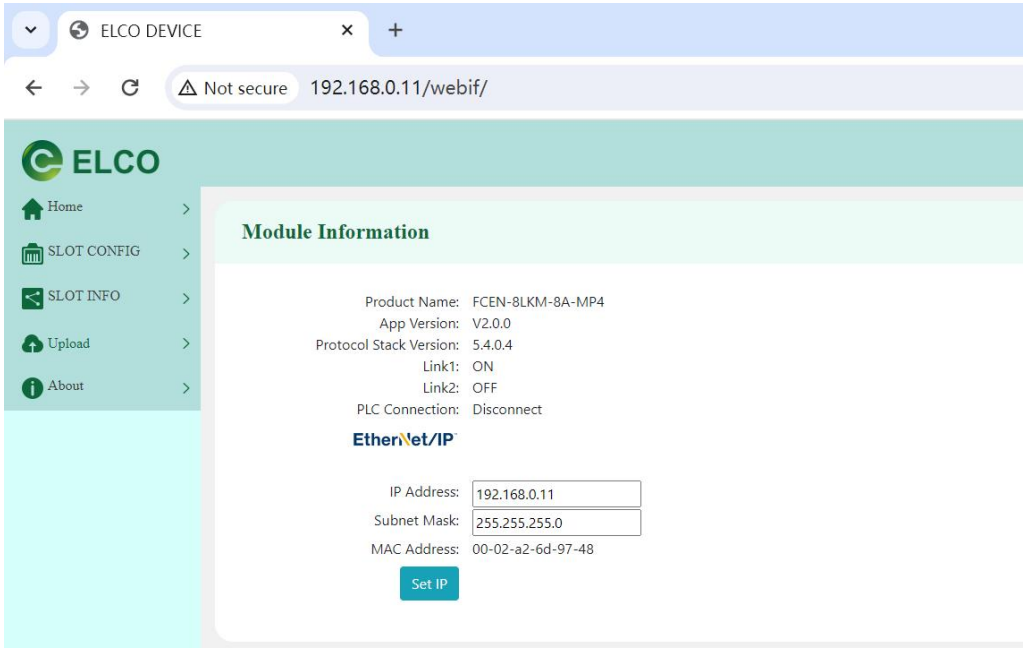
4) Click the "Restart" button in the main interface to download the settings to the module. Subsequently, you can use the 'PING' command that comes with your Windows computer to confirm if the IP has been successfully assigned.





Note: If the setting cannot be pinged after completion, it indicates that the setting was unsuccessful. You can try powering on the FCEC-8LKM-8A-M module again until the IP address can be pinged.

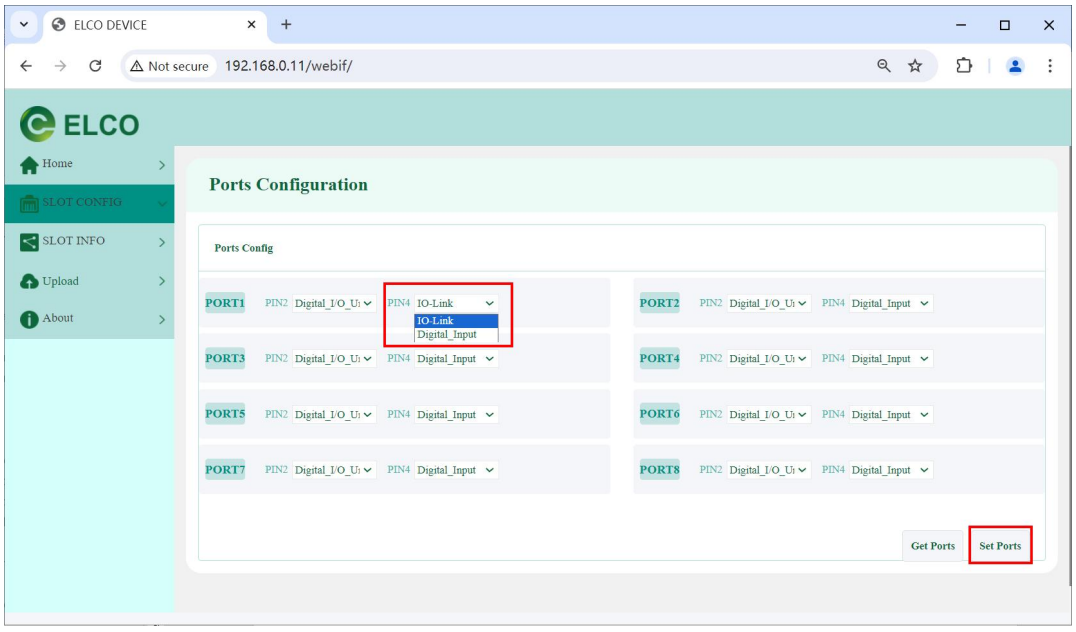
5) Open the browser and enter in the address bar **http://192.168.0.11/** . You can see the homepage of the module Webserver.



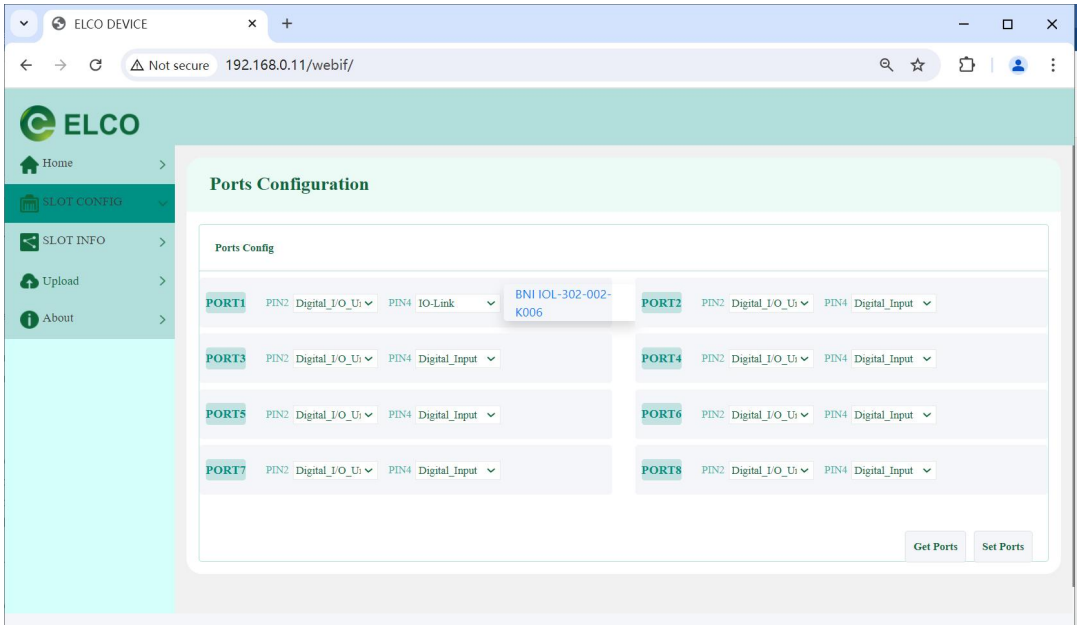
Note: The first loading time of the webpage is relatively long. If the webpage does not display for a long time, please try refreshing.

6) Click on the “SLOT CONFIG” item to enter the Ports Configuration interface, where you can read or set the port properties of 8 IO-Link interfaces.

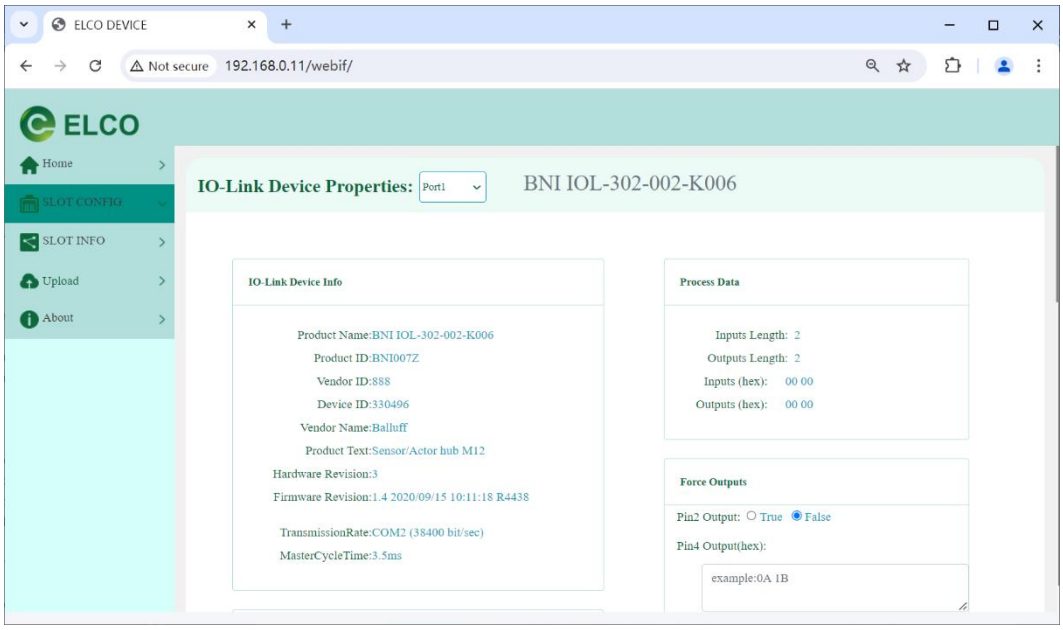
Set PIN4 of PORT1 to IO-Link and click the "Set Ports" button to make the modification effective.



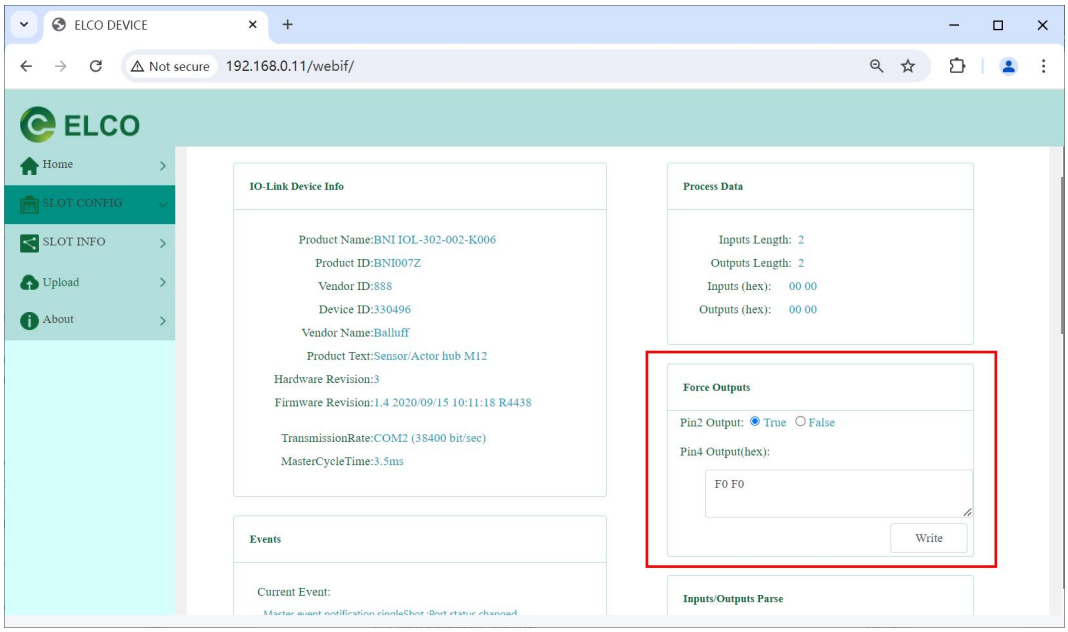
7) After successful modification, it can be seen that Port1 automatically searches for the connected IO-Link device.



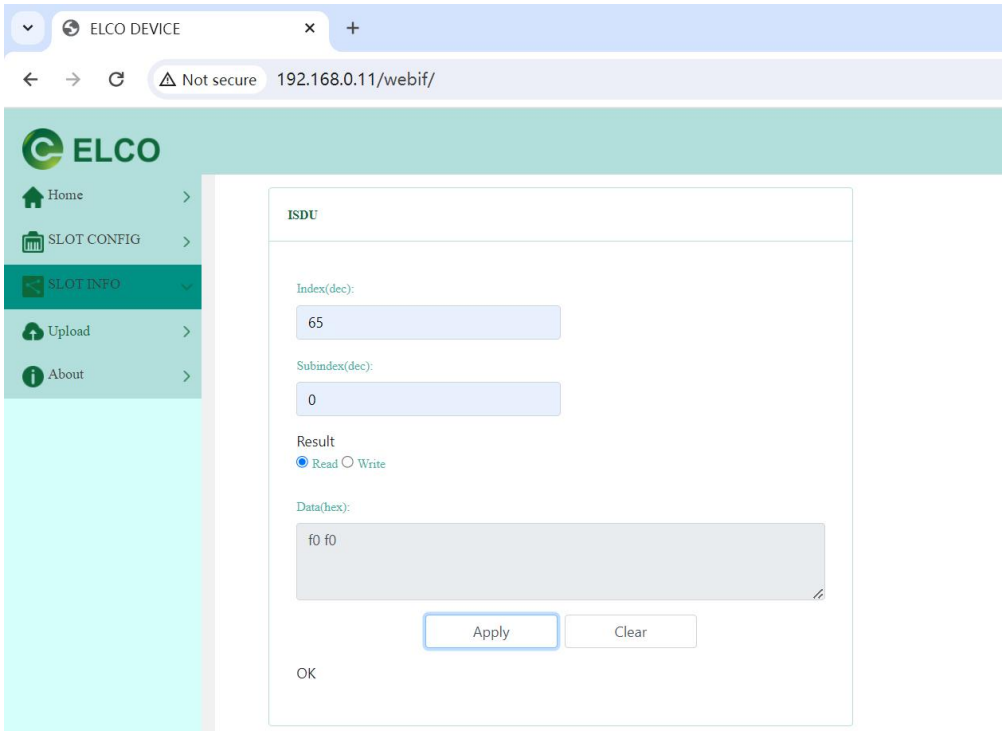
8) You can directly click on the IO-Link device found in the search, or select port Port1 through the “SLOT INFO” item to enter the details page of the IO-Link port. Basic information such as device ID, transmission rate, and process data length of the IO-Link device can be read.



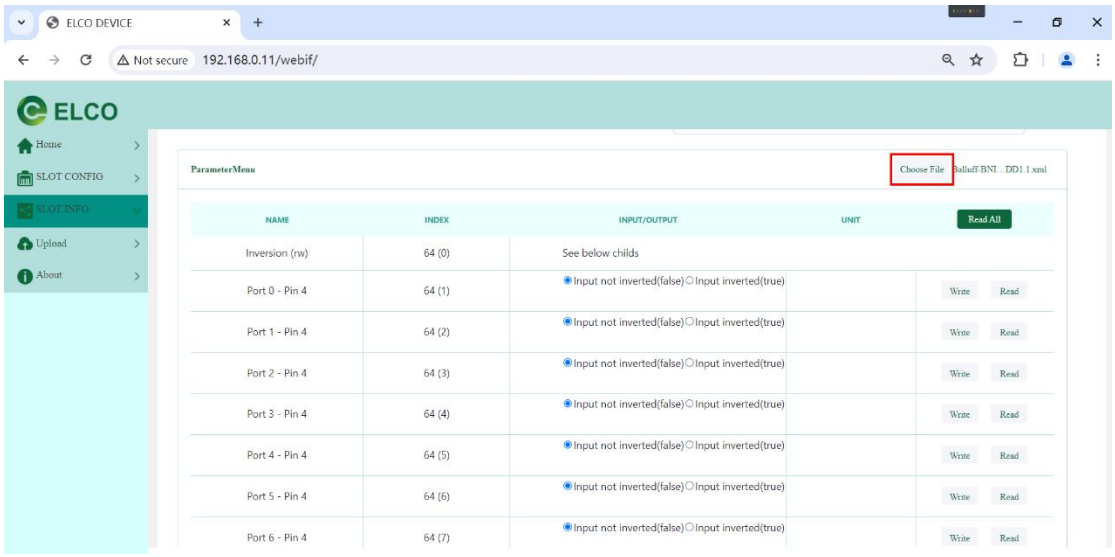
9) “Force Outputs” are used to force Pin2 output to the IO-Link master port, achieving the goal of enabling auxiliary power supply to the IO-Link slave. At the same time, the output value of the IO-Link slave can be written in the “Pin4 Output” interface. Click “Write” button to make it effective.



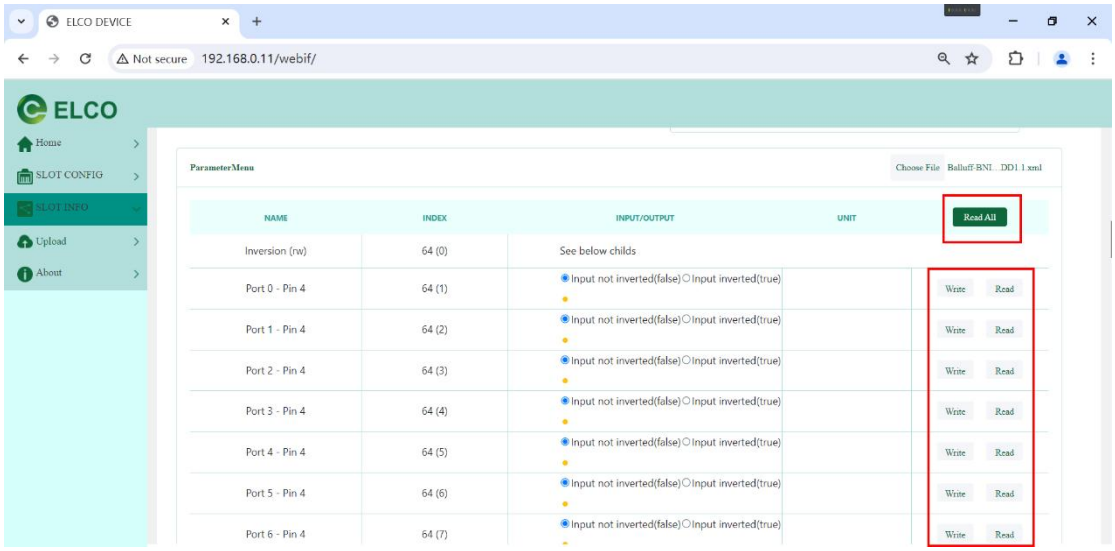
10) Users can directly use the ISDU column on the page to define the parameters of the IO-Link slave to be modified through Index and Subindex, and then read or write values in Data.



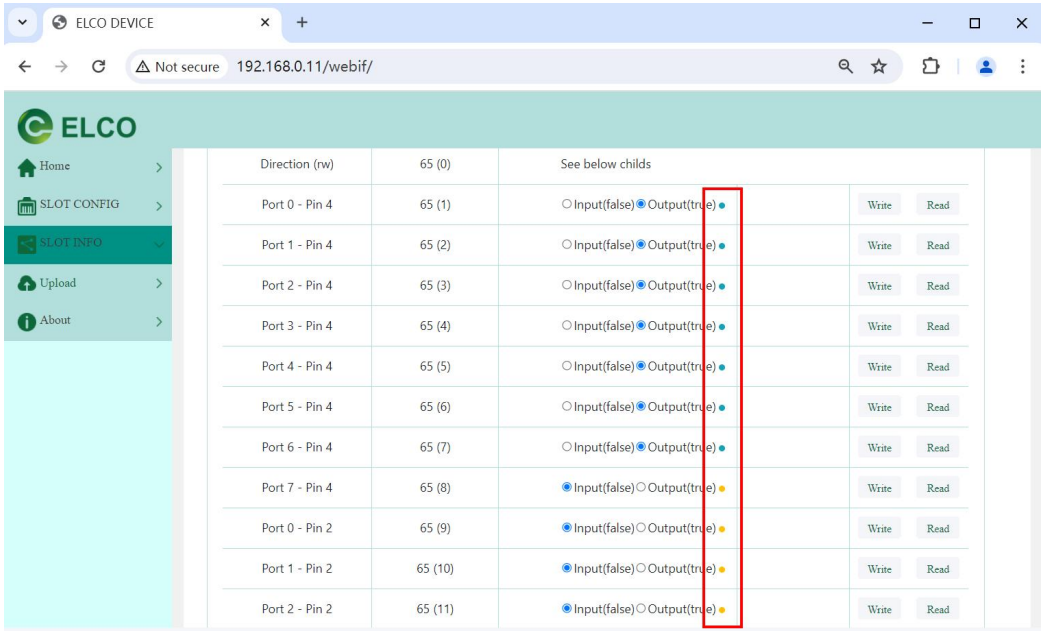
11) Users can also visually edit the ISDU parameters of IO-Link slave by importing IO-Link device IODD files. Click the "Choose File" button to import the prepared IODD file. Once successful, you can see the ISDU parameters of the IO-Link slave.



12) You can obtain all the current ISDU values of IO-Link slave by clicking the "Read All" button, but a large number of parameters can result in a long reading time. It is recommended to read and write the corresponding ISDU parameters through the “Read” or “Write” button corresponding to each parameter.



13) After each parameter, there will be corresponding colored dots to represent the status of this parameter. No dots represent offline values, green dots represent newly written values, and yellow dots represent read values.



6. Alarm diagnosis

6.1 LED fault indicator

With the LED indicator on the Compact67 series IO-Link module, users can easily and quickly determine the current working status of the module. (For the appearance of the indicator, please refer to Section 2.5 "LED Indication Function")

IO-Link master indicator

Name	Status	Meaning	Fault cause
Expansion channel Indicator IO-Link	Yellow	IO-Link connection OK	–
	Green	Ordinary digital signal	–
	Yellow flash	No IO-Link connection	Check the IO-Link cable connection
	Red	1. Short circuit 2. Output signal overload	1. Check the cable connection 2.Module channel is damaged
	Red flash	IO-Link model incorrect	1. Check the configuration 2.Check IO-Link device status
	Off	No signal	–
BUS status Indicator RUN	Green	Communication normal OP Mode	–
	Green fast flash	Pre-OP Mode	
	Green slow flash	Safe-OP Mode	
	Off	Communication abnormal	1. Network cable failure 2. Check the configuration
Gateway status Indicator ERR	Green	Work normally	–
	Red	Working abnormally	1. Power supply is abnormal 2.Channel abnormal (short circuit, overload, etc.)
EtherCAT network	Green flash	Connected to the network	–

status Indicator L/A_1, 2	Orange	Not connected to the network	1. Network cable failure 2. Module is damaged
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

IO-Link sensor hub indicator

Name	Status	Meaning	Fault cause
Module communication Indicator P	Green flash	Receive IO-Link communication	–
	Off	No IO-Link signal received	1.Expansion cable failure 2.Master IO-Link port problem 3.Slave module is damaged
Signal / status Indicator	Red	Abnormal signal	1.Signal overload or short circuit 2.Slave module is damaged
	Green	Have signal	–
	Off	No signal	–

6.2 Process image area of IO-Link Master

Each FCEC-8LKM-8A-M module will occupy 2 Byte input and 2 Byte output as the switching signal of the IO-Link master, 8 Byte input as the IO-Link port connection status indication, and 1 Byte input to display the power supply status of the master station. The subsequent input and output bytes are determined according to the equipment configured by the IO-Link interface and are used as the signal address of the IO-Link slaves.

Different types of modules occupy different process image areas of PLC, as follows:

IN	Byte	Bit_7	Bit_6	Bit_5	Bit_4	Bit_3	Bit_2	Bit_1	Bit_0
Signals	1	P4.Pin2	P4.Pin4	P3.Pin2	P3.Pin4	P2.Pin2	P2.Pin4	P1.Pin2	P1.Pin4
	2	P8.Pin2	P8.Pin4	P7.Pin2	P7.Pin4	P6.Pin2	P6.Pin4	P5.Pin2	P5.Pin4
Status1		Slave Power supply Error	Slave signal short circuit overload	IO-Link Wrong type	IO-Link Not connected	Reserved	Pin2_3 Overload	Pin4_3 Overload	Pin1_3 Short circuit
	1	IO-Link Port1 status							
	2	IO-Link Port2 status							
	3	IO-Link Port3 status							
	4	IO-Link Port4 status							
	5	IO-Link Port5 status							
	6	IO-Link Port6 status							
	7	IO-Link Port7 status							
	8	IO-Link Port8 status							
Status2	9	Ua Overvoltage	Ua Undervoltage	Us Overvoltage	Us Undervoltage	Ua Short circuit	-	Connect OK	Module Not sent
OUT	Byte	Bit_7	Bit_6	Bit_5	Bit_4	Bit_3	Bit_2	Bit_1	Bit_0
Signals	1	P4.Pin2	P4.Pin4	P3.Pin2	P3.Pin4	P2.Pin2	P2.Pin4	P1.Pin2	P1.Pin4
	2	P8.Pin2	P8.Pin4	P7.Pin2	P7.Pin4	P6.Pin2	P6.Pin4	P5.Pin2	P5.Pin4