

category	content
key word	ZSW-80 Series EtherCAT Junction、 User Manual、 Data Sheet
abstract	This document provides relevant instructions for the ZSW-80 series EtherCAT Junction products, including hardware interface descriptions, operating

Revision history

edition	date	reason
V0.90	2025/6/26	Document release
V0.91	2025/12/18	Added models ZSW-8006 and ZSW-8008, and updated to the series product manual.
V0.92	2026/4/16	Modified product electrical parameters; added EtherCAT trademark and terminology descriptions.

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1. Product Introduction

1.1 Product Introduction

The ZSW-80 series is an Cather Junction Product introduced by Guangzhou ZHIYUAN Electronics Co., Ltd. It supports various topologies such as daisy chain, star, and tree, making it suitable for complex and diverse EtherCAT networks. It can expand EtherCAT ports and optimize network topologies. The entire product series supports 35mm DIN rail mounting, among which the ZSW-8006 and ZSW-8008 additionally support mounting ear installation.



Figure1.1 ZSW-80 series EtherCAT Junction Product Figure

1.2 Naming Rules

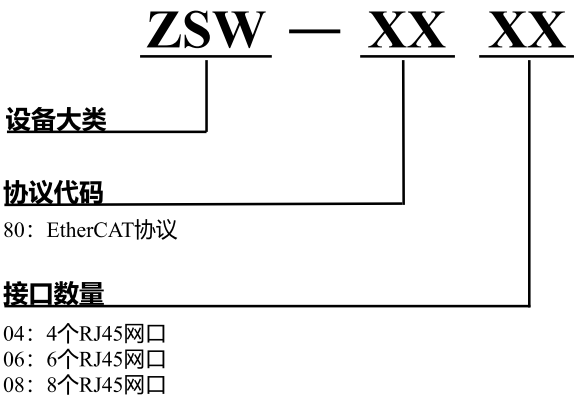


Figure1.2 Naming Rules for Series Products

1.3 Ordering Information

Table1.1 Ordering Information

Product model	Protocol conversion type	Installation method
ZSW-8004	4-port EtherCAT Junction (1 IN 3 OUT)	35mm DIN Rail
ZSW-8006	6-port EtherCAT Junction (1 IN 5 OUT)	35mm DIN Rail/Mounting Ear
ZSW-8008	8-port EtherCAT Junction (1 IN 7 OUT)	35mm DIN Rail/Mounting Ear

1.4 Hardware Features

Table1.2 Product Hardware Characteristics

Product model	ZSW-8004	ZSW-8006	ZSW-8008
input voltage	9 ~ 36VDC		
	60mA @ 24VDC	100mA @ 24VDC	140mA @ 24VDC
Power protection	Reverse Polarity Protection、Short Circuit Protection		
Power isolation	500VDC（Power Interface/EtherCAT Port）		
Shell material	Metal		
Dimensions	125.00mm×76.00mm×28.00mm （bare metal）	110.00mm×75.20mm×44.20mm （bare metal）	
Installation method	Standard 35mm DIN Rail	Standard 35mm DIN Rail/Mounting Ear	
Working temperature	-40 to 85° C（-40 to 185° F）		
Storage temperature (including packaging)	-40 to 85° C（-40 to 185° F）		
relative humidity	5 to 95% (non condensing)		
EMI	EN55032, CLASS A		
EMC	IEC/EN 61000-4-2 ESD: Contact: 4.0 kV; Air: 8.0 kV IEC/EN 61000-4-4 EFT: Power : 1.0 kV; Signal: 0.5 kV IEC/EN 61000-4-5 Surge: Power: Common Mode 1.0 kV, Differential Mode 0.5 kV; Signal: 0.5 kV IEC/EN 61000-4-6 CS（150 kHz to 80 MHz）: Power: 3 V/m; Signal: 3 V/m		

1.5 Software Features

Table1.3 Software Features

EtherCAT Features	The address is assigned by the master
	Transmission Distance ≤ 100m (Distance between nodes)
	Communication Rate 100MBits/s
	Support Distributed Clocks

2. Hardware Description

2.1 Product Appearance



Figure2.1 ZSW-80 Series Product Figure

ZSW-8004 Product has 1 power port on the top; the front panel features 2 LED indicators and 4 EtherCAT network ports (1 IN / 3 OUT);

The ZSW-8006 Product features 1 power port, 3 LED indicators, and 6 EtherCAT network ports on the front panel (1 IN / 5 OUT);

The ZSW-8008 Product features 1 power port, 4 LED indicators, and 8 EtherCAT network ports on the front panel (1 IN / 7 OUT).

Note: For specific definitions and usage of the LEDs and ports, please refer to Section 2.2 Indicator Light Description and Section 2.3 Interface Definition.

2.2 Indicator Light Description

The ZSW-80 series products have several LED indicators on the front panel. For specific details, refer to Table 2.1, Table 2.2, and Table 2.3.

Table2.1 ZSW-8004 Product Indicator Light Description

Label	Definition	Status	Description
PWR	Power Indicator	Off	System power abnormal
		Solid On	System power normal
RUN	Junction ESC Status Indicator	Off	ESC is disconnected or in INIT state
		Flashing	ESC is in PRE-OP or SAFE-OP state
		Solid on	ESC is in OP state

Table2.2 ZSW-8006 Product Indicator Light Description

Label	Definition	Status	Description
PWR	Power Indicator	off	System power abnormal
		Solid on	System power normal
RUN1	Junction ESC1 Status Indicator	off	ESC1 is disconnected or in INIT state
		Flashing	ESC1 is in PRE-OP or SAFE-OP state
		Solid on	ESC1 is in OP state
RUN2	Junction ESC2 Status Indicator	off	ESC2 is disconnected or in INIT state
		Flashing	ESC2 is in PRE-OP or SAFE-OP state
		Solid on	ESC2 is in OP state

Table2.3 ZSW-8008 Product Indicator Light Description

Label	Definition	Status	Description
PWR	Power Indicator	off	System power abnormal
		Solid on	System power normal
RUN1	Junction ESC1 Status Indicator	off	ESC1 is disconnected or in INIT state
		Flashing	ESC1 is in PRE-OP or SAFE-OP state
		Solid on	ESC1 is in OP state
RUN2	Junction ESC2 Status Indicator	off	ESC2 is disconnected or in INIT state
		Flashing	ESC2 is in PRE-OP or SAFE-OP state
		Solid on	ESC2 is in OP state
RUN3	Junction ESC3 Status Indicator	off	ESC3 is disconnected or in INIT state
		Flashing	ESC3 is in PRE-OP or SAFE-OP state
		Solid on	ESC3 is in OP state

2.3 Interface Definition

2.3.1 Power Interface

The power supply supports a wide voltage input of 9~36V. Customers can select a power supply within this voltage range to power the device according to the on-site environment. The physical form of the power interface connector is an OPEN3 3.81mm pitch locking socket, and the housing is silkscreened with "9V~36V". The power supply requirements for the Product are shown in Table 2.4.

Table2.4 Input Power Specifications of the Power Interface

Parameter	Min	Typ	Max	Unit
Operating Voltage	9.0	24.0	36.0	V
Operating Current (4-port/6-port/8-port)	—	60/100/140	—	mA
Product Power Consumption (4-port/6-port/8-port)	—	1.44/2.4/3.36	—	W



Figure2.2 Power Interface Schematic Diagram

2.3.2 EtherCAT Interface

The ZSW-8004 is a 1-in-3-out EtherCAT Junction, providing four RJ45 ports as EtherCAT interfaces. For the RJ45 interface indicators, the yellow light on the left is the port Active light, and the green light on the right is the port Link light. The EtherCAT interfaces from top to bottom are: IN0, OUT1, OUT2, OUT3. The data frame processing sequence is IN0 → OUT1 → OUT2 → OUT3.

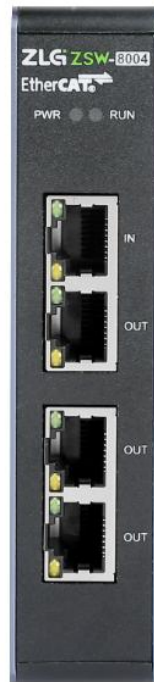


Figure2.3 ZSW-8004 Front Panel Interface Diagram

The ZSW-8006 is a 1-in-5-out EtherCAT Junction, providing six RJ45 ports as EtherCAT interfaces. For the RJ45 interface indicators, the yellow light on the left is the port Active light, and the green light on the right is the port Link light. The EtherCAT interfaces from top to bottom are: IN0, OUT1, OUT2, OUT3, OUT4, OUT5. The data frame processing sequence is IN0 → OUT1 → OUT2 → OUT3 → OUT4 → OUT5.



Figure2.4 ZSW-8006 Front Panel Interface Diagram

The ZSW-8008 is a 1-in-7-out EtherCAT Junction, providing eight RJ45 ports as EtherCAT interfaces. For the RJ45 interface indicators, the yellow light on the left is the port Active light, and the green light on the right is the port Link light. The EtherCAT interfaces from top to bottom

are: IN0, OUT1, OUT2, OUT3, OUT4, OUT5, OUT6, OUT7. The data frame processing sequence is IN0 → OUT1 → OUT2 → OUT3 → OUT4 → OUT5 → OUT6 → OUT7.



Figure2.5 ZSW-8008 Front Panel Interface Diagram

For detail operating instructions and topology types of the EtherCAT Junction, please refer to Chapter 3.

3. Operating Instructions

The ZSW-80 series product support various topologies, Daisy chain、star、tree (take the ZSW-8004 as an example) as shown in the Figure3.1、Figure3.2、Figure3.3。

3.1 Daisy chain topology

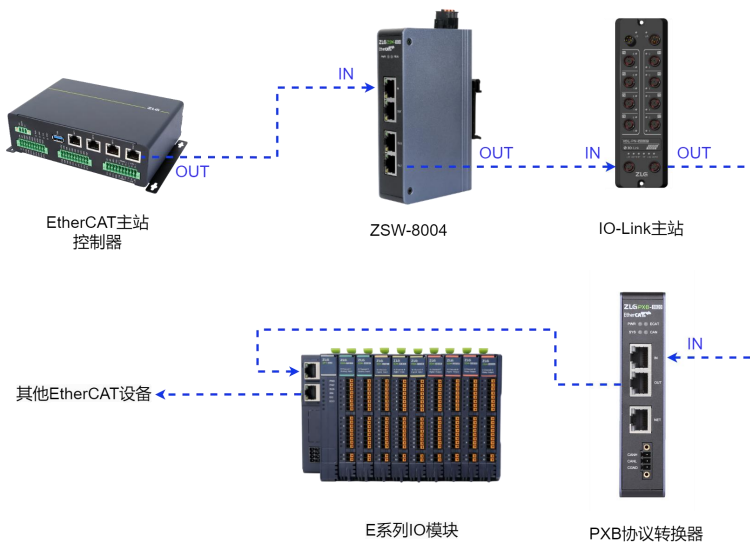


Figure3.1 Daisy chain topology diagram

3.2 Star topology

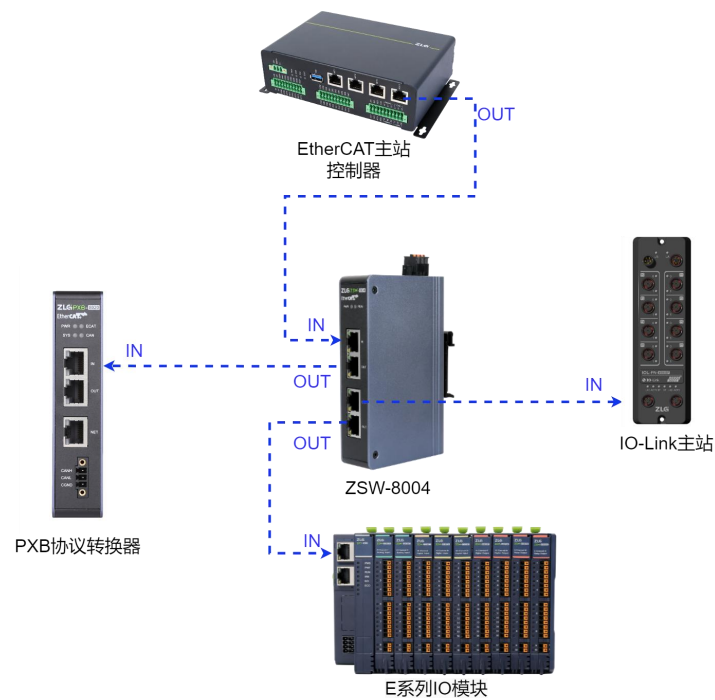


Figure3.2 Star topology diagram

3.3 Tree topology

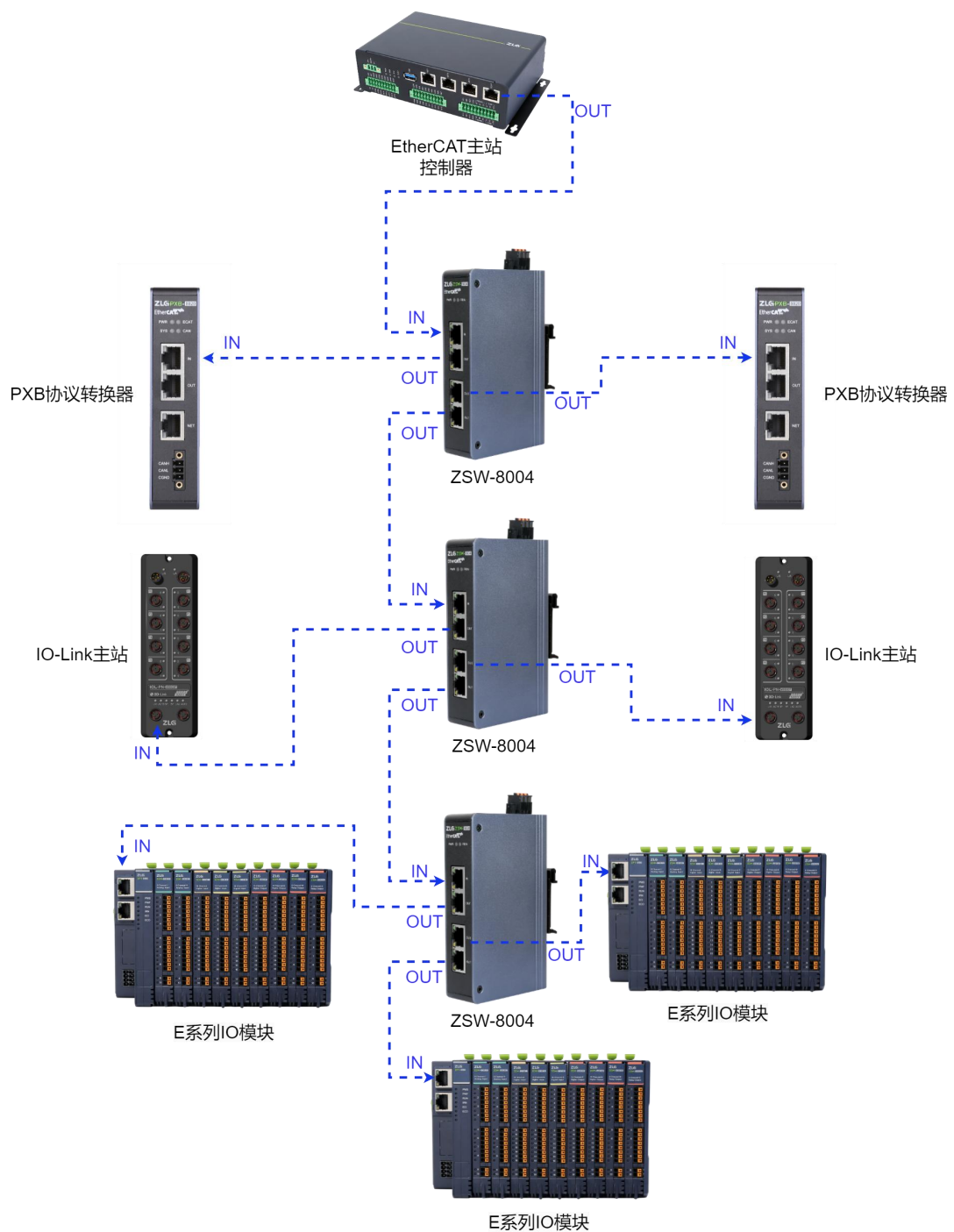


Figure3.3 Tree topology diagram

4. Product Demo

4.1 Preparation

This document uses the ZSW-8004 as an example to briefly introduce the operating procedure of the ZSW-80 series EtherCAT Junction products. The OUT1 and OUT2 ports are connected to two PXB-8020 units respectively, and a demonstration is conducted based on the TwinCAT 3 software. The tools used are as follows:

【Hardware Tools】 :

- ◆ ZSW-8004 and corresponding power terminals;
- ◆ Two PXB-8020;
- ◆ PC, 24V switching power supply;
- ◆ Cat5 or higher shielded Ethernet cables (SF/UTP, S/FTP, etc.).

【Software Tools】 :

- ◆ ESI file, downloaded from the ZLG official website: :
<https://www.zlg.cn/Ethercatnet/Down/down/id/400.html>
- ◆ TwinCAT 3 software, used to simulate an EtherCAT master on a PC.

Note: The network interface chip of the PC must support TwinCAT for stable operation. For TwinCAT 3.1, you can check the Tel8254x.inf and TCL8255x.inf files in the installation directory (TwinCAT3.1\driver\System) to see the supported network cards. You can also check the Beckhoff official website:

https://infosys.beckhoff.com/english.php?content=../content/1033/tc3_overview/9309844363.html

【Hardware Connection】 :

Connect the IN0 port of the ZSW-8004 Junction to the PC master, and connect OUT1 and OUT2 to one PXB-8020 each.

4.2 Configuring the ZSW Junction

4.2.1 Importing the ESI File

Copy the ESI file of the ZSW-8004 to the directory: C:\TwinCAT3.1\Config\Io\EtherCAT.

此电脑 > 系统 (C:) > TwinCAT > 3.1 > Config > Io > EtherCAT

名称	修改日期	类型	大小
Beckhoff EtherCAT Evaluation	2024/8/7 23:51	Microsoft Edge ...	12 KB
Beckhoff EtherCAT Terminals	2024/8/7 23:51	Microsoft Edge ...	54 KB
Beckhoff FB1XXX	2024/8/7 23:51	Microsoft Edge ...	49 KB
Beckhoff FCxxx	2024/8/7 23:51	Microsoft Edge ...	21 KB
Beckhoff FM3xxx	2024/8/7 23:51	Microsoft Edge ...	367 KB
Beckhoff ILxxx-B110	2024/8/7 23:51	Microsoft Edge ...	8 KB
Beckhoff PS2xxx	2024/8/7 23:51	Microsoft Edge ...	457 KB
ZDM-E0400P3-V1.0.1-20251110	2025/11/10 11:03	Microsoft Edge ...	35 KB
ZDM-E0800TC-V1.0.1-20251110	2025/11/20 9:18	Microsoft Edge ...	46 KB
ZLG_ECOT_IO-103ect	2025/7/1 16:22	Microsoft Edge ...	46 KB
ZLG-ZDM_E0008I-V1.0.1-20251110	2025/11/20 9:14	Microsoft Edge ...	82 KB
ZLG-ZDM_E0008V-V1.0.1-20251110	2025/11/20 9:17	Microsoft Edge ...	82 KB
ZLG-ZDM_E0800I-V1.0.1-20251110	2025/11/20 9:18	Microsoft Edge ...	82 KB
ZLG-ZDM-E0800V-V1.0.1-20251110	2025/11/10 16:19	Microsoft Edge ...	82 KB
ZLG-ZIOC-E0800PT-V1.0.0-20251205	2025/12/5 14:42	Microsoft Edge ...	45 KB
ZLG-ZSW-8004-V1.0.0-20250617	2025/6/19 10:20	Microsoft Edge ...	6 KB

Figure4.1 ESI File Directory

4.2.2 New Project

Launch the installed TwinCAT3 software to enter the development environment:

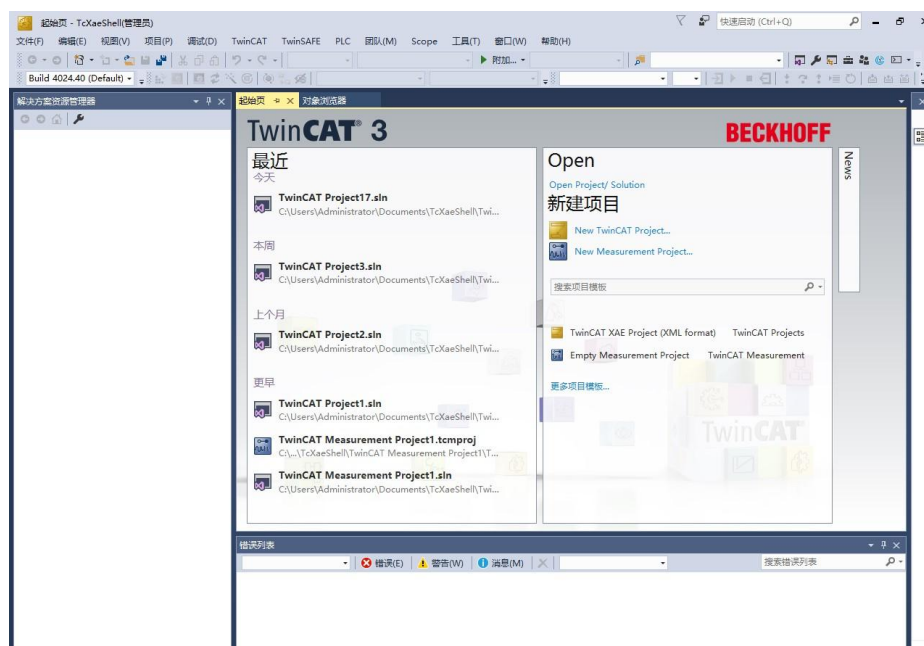


Figure4.2 TwinCAT3 software development interface

In the top-left menu bar, select: "File" -> "New (N)" -> "Project (P)...";



Figure4.3 New Project Interface

Select "TwinCAT Project", modify the project name, choose a suitable location to save the project, and click "OK";

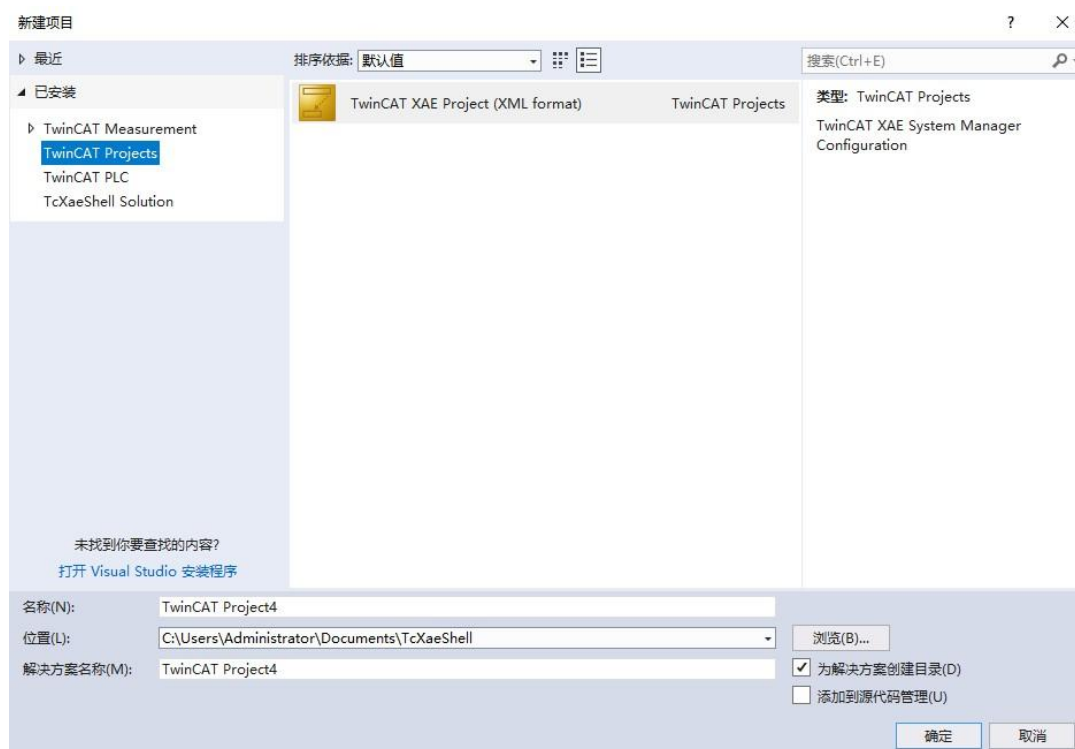


Figure4.4 Project Information Modification Interface

After the project is successfully created, the displayed interface is as follows:

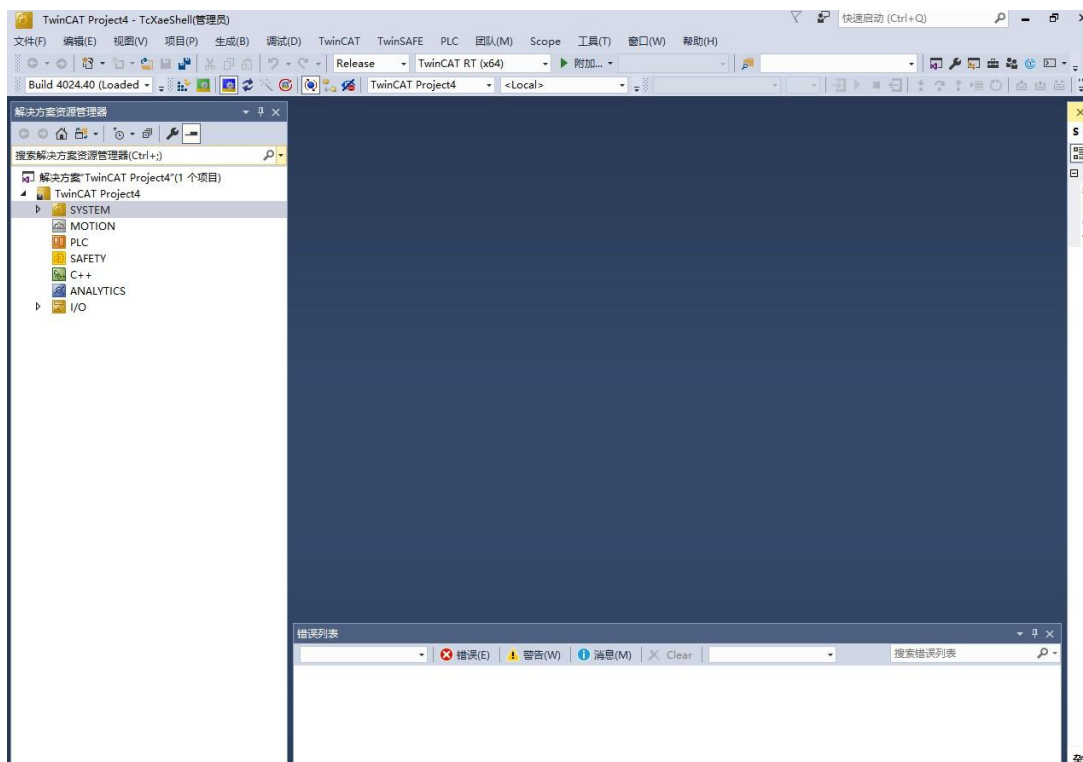


Figure4.5 Successful Project Creation Interface

Install the EtherCAT master network card driver in TwinCAT 3. Click "Show Realtime-Ethernet-Compatible-Devices..." under the "TwinCAT" menu in the main menu bar, select the local network card, and click "Install";

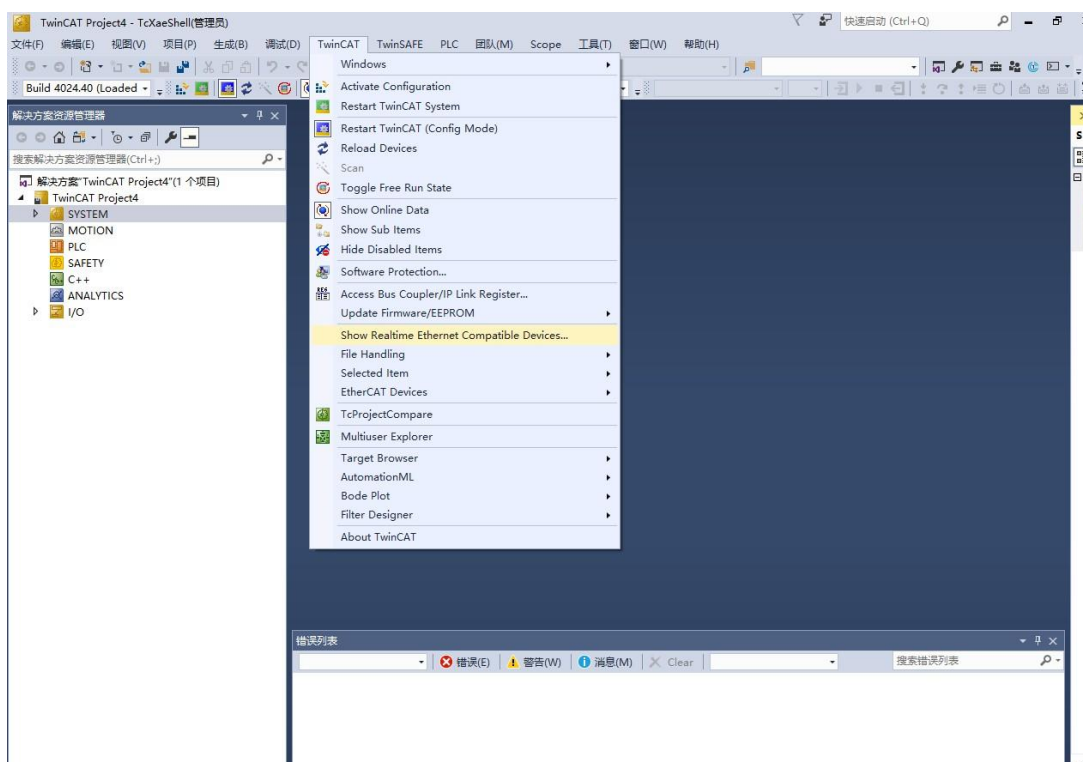


Figure4.6 Network Card Installation Interface

The interface after the network card is successfully installed is shown in the Figure below:

Note: When using real-time protocols such as EtherCAT, the network port requires the TwinCAT RT driver. Therefore, the EtherCAT master has compatibility requirements for the network card. For details, please refer to the description in the "Supported Network Controllers" section of the TwinCAT 3 Overview on the Beckhoff official website.

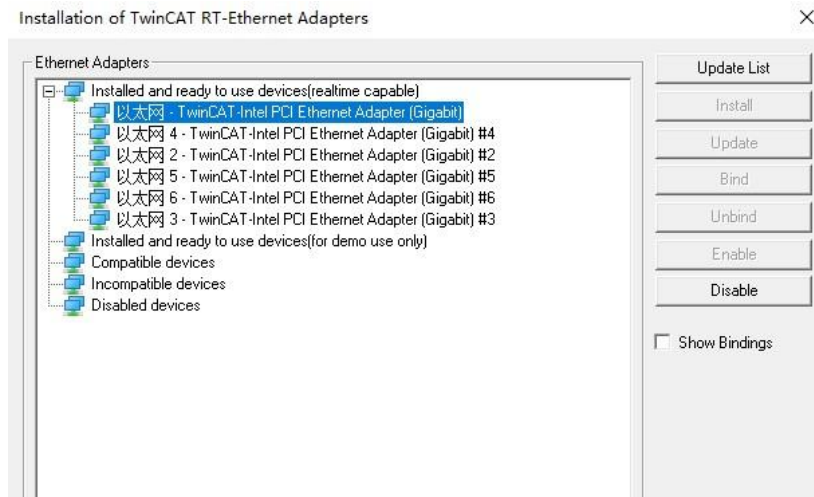


Figure4.7 Network Card Driver Ready Interface

4.2.3 Scanning Devices

In the project directory, expand "I/O", select "Device", right-click and select "Scan" to scan for connected slave devices. Before performing this operation, you must ensure that the ZSW-8004 Junction is properly powered on and that the "IN" port is properly connected to the EtherCAT master device using an Ethernet cable;

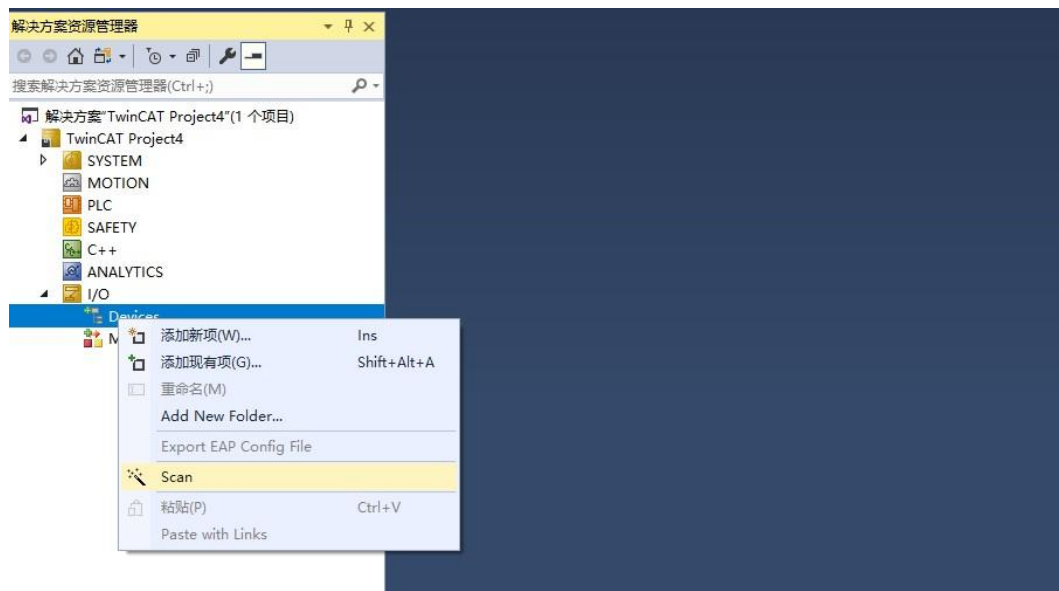


Figure4.8 网卡驱动正常界面

The following dialog box pops up. Click the "OK" button:

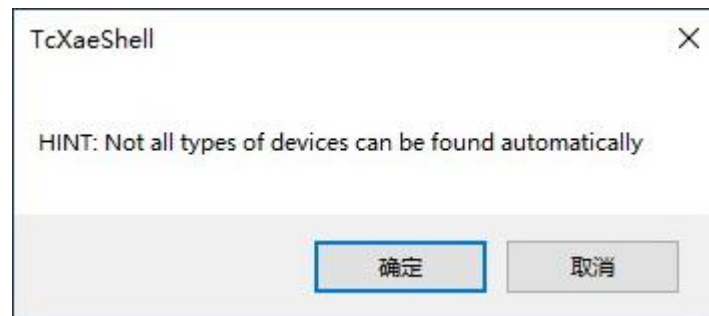


Figure4.9 Prompt Dialog Box

The "6 new I/O devices found" dialog box pops up. Select the required Ethernet interface and click "OK", as shown in the Figure below:

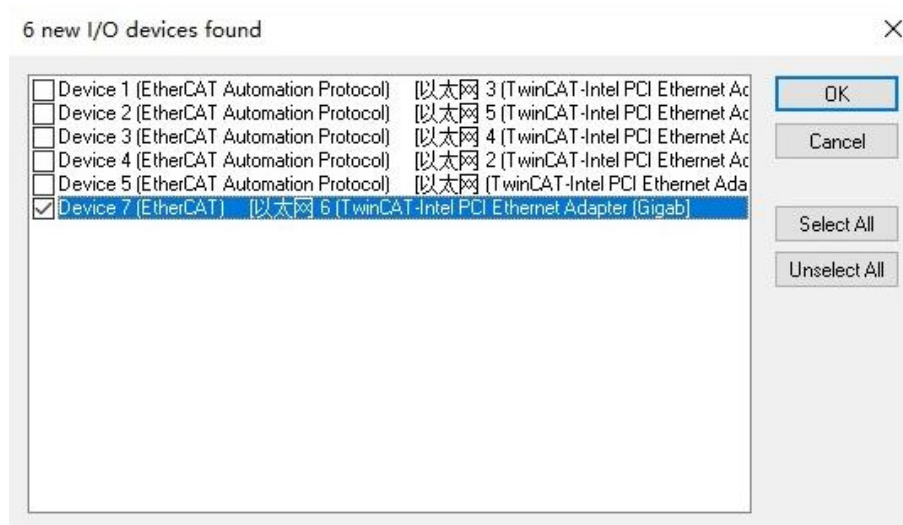


Figure4.10 Selecting the Network Card Connected to the Slave Devices

Click "Yes (Y)" to scan for slave devices:

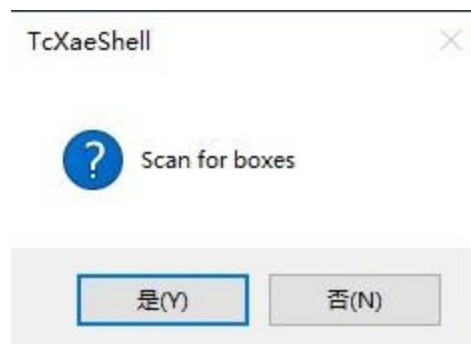


Figure4.11 Selecting to Scan for Slave Devices

Choose whether to enter "Activate Free Run" and click "Yes":



Figure4.12 Prompt Dialog Box

The following devices are scanned successfully:

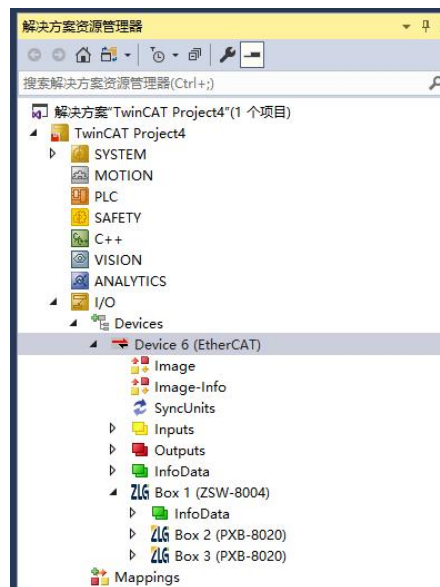


Figure4.13 Successful Device Scan Interface

It can be seen that "ZSW-8004" and "PXB-8020" have been scanned. This indicates that the Junction and the connected devices have been successfully recognized by the master.

5. Product ESI File Flashing Instructions

This section uses the ZSW-8008 as an example to demonstrate how to flash the ESI file of an EtherCAT slave via TwinCAT 3.1. The ESI files for ZSW-80xx series products are flashed by default at the factory and can be used directly. If there is no actual need to update the ESI file, you can skip this chapter.

1. Copy the ESI file to be flashed to the path: C:\TwinCAT3.1\Config\Io\EtherCAT. As shown in Figure 5.1.

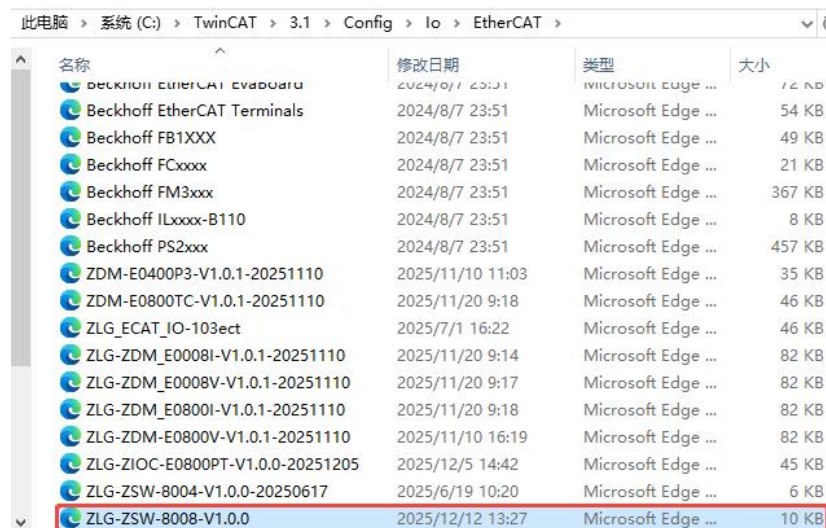


Figure 5.1 ESI File Storage Location

2. Open TwinCAT3 and click to scan for devices. After scanning is complete, select the scanned Device. In the General tab, select the slave device whose EEPROM needs to be flashed. Right-click and click "EEPROM-Update...", as shown in Figure 5.2.

Note: The ZSW-8008 can scan 3 slave devices, the ZSW-8006 can scan 2 slave devices, and the ZSW-8004 can scan 1 slave device. The ESI file for each model contains all slave devices. Simply select the corresponding slave device name to flash the ESI.

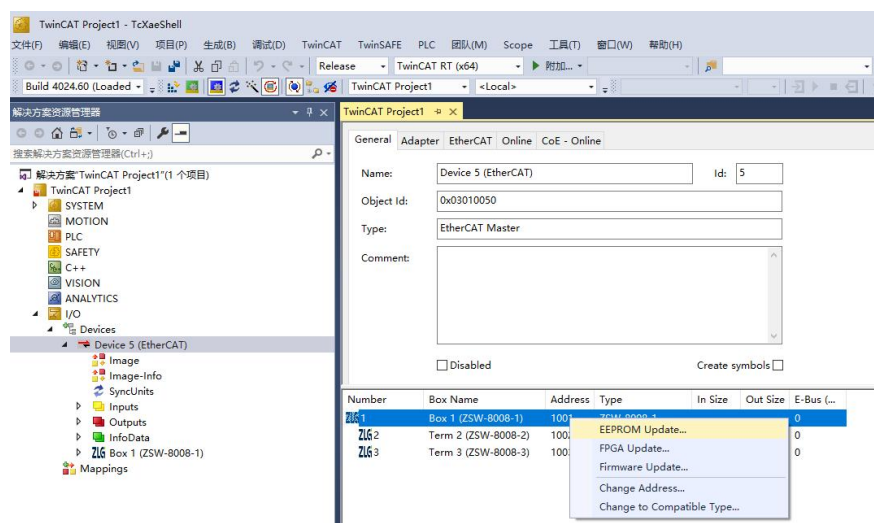


Figure5.2 Select Device for EEPROM Update

3. Navigate to the flashing interface, select the corresponding ESI file, and click OK to start flashing the ESI file, as shown in Figure 5.3.

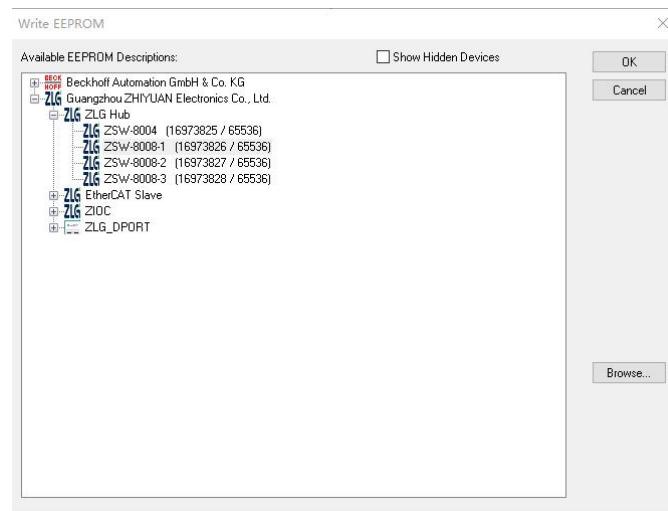


Figure5.3 Writing the ESI File to EEPROM

4. After ensuring that the ESI file is successfully flashed in Step 3, remove the device and rescan for devices. If the TwinCAT3 interface does not display according to the ESI, please restart TwinCAT3 and the device, and then scan again.

Note: When selecting the ESI file to flash, make sure that the Vendor Name, Product Code, and Revision Number match those described in the ESI file to be flashed. These pieces of information may change due to updates in the device's ESI version. If the Slave EEPROM is not updated with this information in a timely manner, errors may occur when scanning the slave, such as error reports or missing channel parameters.

6. Product Mounting

6.1 Mechanical Dimensions

ZSW-8004 Product Dimensions: 125.00mm×76.00mm×28.00mm (bare metal)。

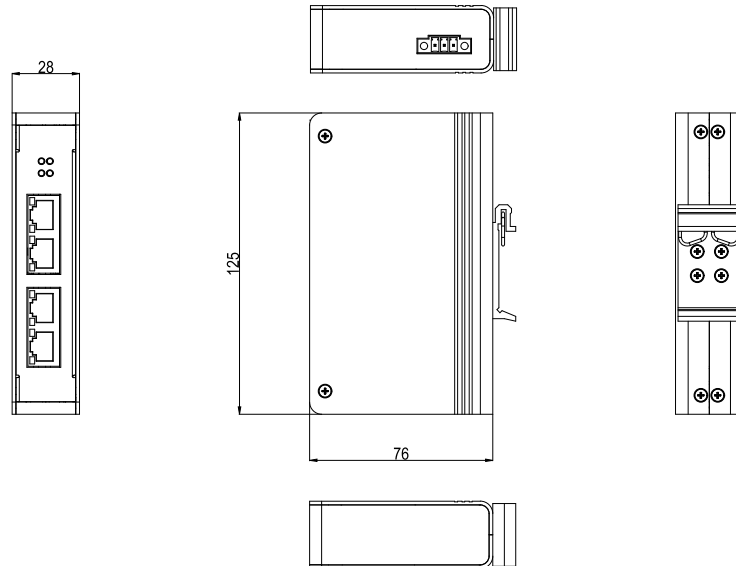


Figure6.1 ZSW-8004 Product Dimensions Figure

ZSW-8008 and ZSW-8006 Product Dimensions : 110.00mm×75.20mm×44.20mm (bare metal)。

注：ZSW-8006 and ZSW-8008 Product Dimensions and mounting dimensions are identical.

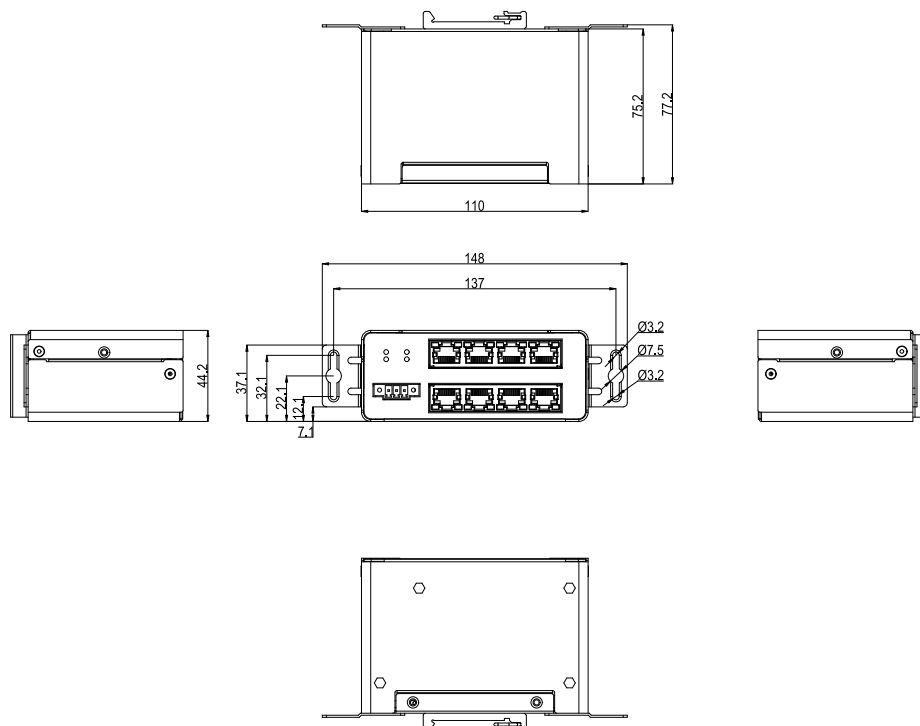


Figure 6.2 ZSW-8008 Product Dimensions Figure

6.2 Mounting Methods

For the DIN rail mounting method of the product, please refer to the official website document-- 《Installation Instructions for DIN Rail PXB Series Products》。

The mounting ear installation method for the ZSW-8006 and ZSW-8008 is shown in Figure 6.3。

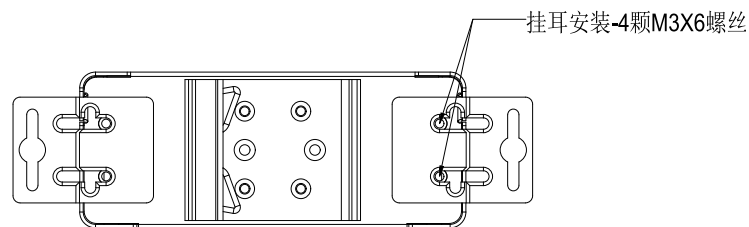


Figure6.3 Mounting Ear Installation Diagram for ZSW-8006 and ZSW-8008

7. Product Maintenance and Precautions

- EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.
- Before powering on the Product, please check whether the power input voltage is within the required range, whether the wiring is correct, and whether there are any short circuits or misconnected signal lines, etc.
- The Product has no IP protection rating requirement. Prevent water from entering the Product, as water ingress may affect its normal operation.

8. Appendix

8.1 Product Packing List

Table 8.1 ZSW-8004 Product Packing List

Serial number	name	quantity	unit
1	ZSW-8004 EtherCAT Junction	one	台
2	3P power terminal	one	只
3	certificate	one	张

Table 8.2 ZSW-8006 Product Packing List

Serial number	name	quantity	unit
1	ZSW-8006 EtherCAT Junction	one	台
2	3P power terminal	one	只
3	Mounting Ear Installtion Kit	one	套
4	certificate	one	张

Table 8.3 ZSW-8008 Product Packing List

Serial number	name	quantity	unit
1	ZSW-8008 EtherCAT Junction	one	台
2	3P power terminal	one	只
3	Mounting Ear Installtion Kit	one	套
4	certificate	one	张

9. Disclaimer

In accordance with the principle of providing better services to users, Guangzhou Zhiyuan Electronics Co., Ltd. (hereinafter referred to as "Zhiyuan Electronics") will present detailed and accurate product information to users as much as possible in this manual. However, due to the timeliness of the content in this manual, Zhiyuan Electronics cannot fully guarantee the timeliness and applicability of this document at any time. Zhiyuan Electronics reserves the right to update the content of this manual without prior notice. To obtain the latest version of information, please visit the official website of Zhiyuan Electronics regularly or contact Zhiyuan Electronics staff. Thank you for your tolerance and support!

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