XB6S- PC80

Pulse Counter Module

User Manual

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1 Product Introduction

1.1 Product Overview

XB6S-PC80 is a plug-in pulse counting module, which adopts X-bus backplane and is suitable for XB6S series coupler module of our company. The module has 8 pulse counting channels, which can sample and analyze pulse signals with frequency below 100KHz, and derive the frequency and pulse count value of each channel, and support zero counting of a single channel.

1.2 Product Characteristics

- Eight-channel pulse counting
  Eight channels can monitor pulse frequency and pulse count values completely independently.
- Supports pulse count clearing
  The data of the eight pulse counting channels can be cleared independently.
- Pulse counting frequency
  Supports pulse frequency up to 100KHz.
- Input filter
  Supports 0~15 levels of input filter.
- Small volume
  Compact and small footprint.
- Easy diagnosis
  Innovative channel indicator design, close to the channel, easy to detect and maintain.
- Easy configuration
  Simple configuration.
- Easy installation
  DIN 35 mm standard rail installation
  Adopts shrapnel terminals for easy and quick wiring.

2 Product Parameters

2.1 General parameter

Interface Parameter	
Product Model	XB6S-PC80
Bus Protocol	X-bus
Bus Input Power Supply Rated Voltage	5VDC (4.5V~5.5V)
Rated Current Consumption	80mA
Power Wastage	0.4W
Process Data Volume: Upstream	64 Bytes
Process Data Volume: Downstream	2 Bytes
Channel Type	Pulse input channels: 8 channels, PNP/NPN compatible
Refresh Rate	1 ms
Technical Parameters	
System Input Power	5VDC
Input Channel Rated Voltage (Range)	24VDC (15V~30V)
Pulse Input Frequency Range	0~100KHz
Pulse Input Count Value Range	$0\sim2^{32}-1$
External Dimensions	106.4 x 25.7 x 72.3mm
Weight	85g
Wiring Method	Screwless Quick Plugs
Operating Temperature	-20℃~+60℃
Storage Temperature	-40℃~+80℃
Relative Humidity	95%, non-condensing
Protection class	IP20

3 Panel

3.1 Panel Structure

Name of each part of the product

System indicators

Channel indicators and markings

Input and output channels
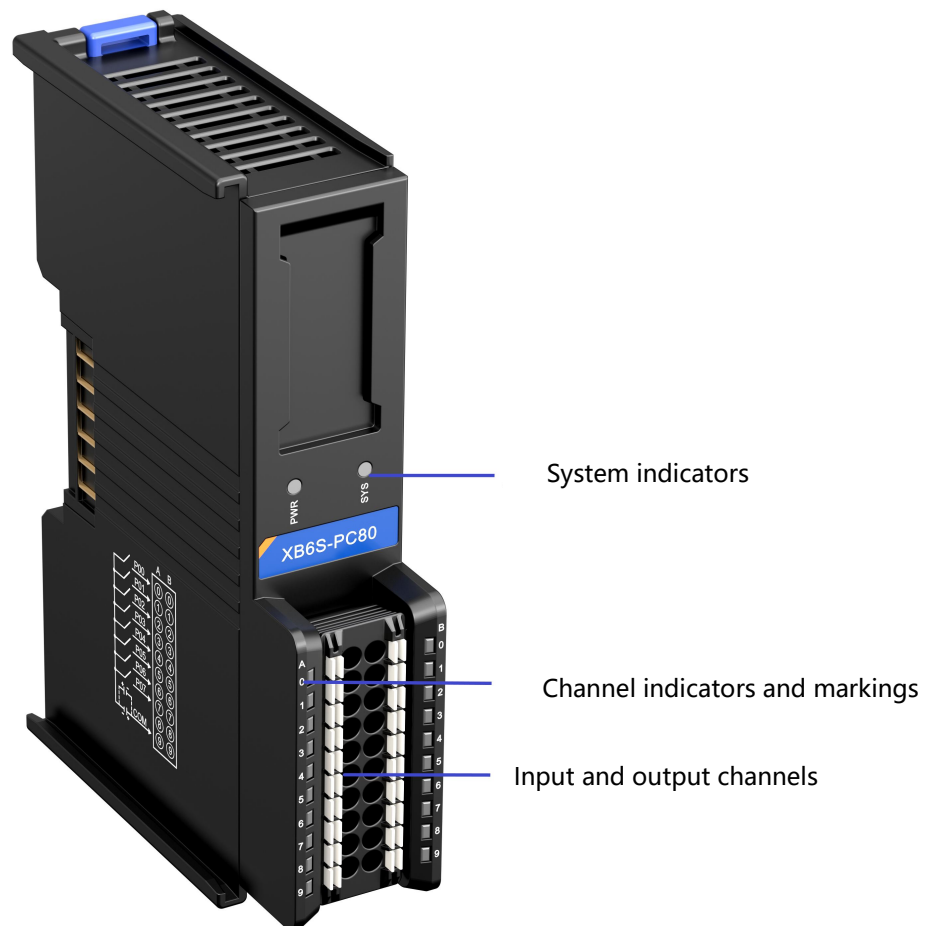
3.2 Indicator light function

Name	Markings	Color	Status	Description
Power indicator	PWR	GREEN	ON	Power supply is normal
			OFF	The product is not powered up or the power supply is abnormal
Communication Indicator	SYS	GREEN	ON	The system is functioning normally
			Flashing 1Hz	No business data interaction, waiting for business data interaction to be established
			Flashing 10Hz	Firmware Upgrade
			OFF	System not working
Pulse input channel indicator	0~7	GREEN	ON	Channels have signal inputs
			OFF	No signal input for channel

4 Installation and uninstall

4.1 External Dimensions

Form factor (unit mm)
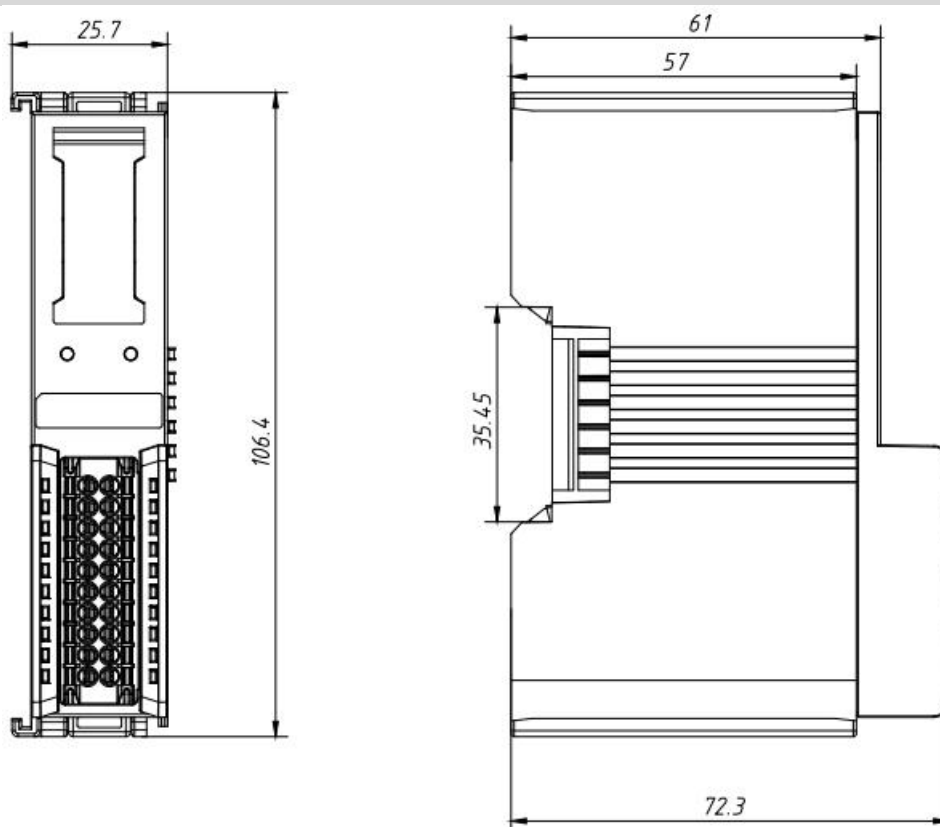
4.2 Installation Guide

Precautions for installation\uninstall

- **The module protection class is IP20 and the module needs to be installed in the cabinet for indoor use.**

- **Ensure that the cabinet is well ventilated (e.g., the cabinet is fitted with an exhaust fan).**

- **Do not install this equipment next to or above equipment that may cause overheating.**

- **Be sure to install the module vertically on the fixed rails and maintain air circulation around it (at least 50 mm air circulation space above and below the module).**

- **Once the module is installed, be sure to secure the module by installing rail mounts on both ends.**

- **Be sure to disconnect the power supply when installing/uninstalling.**

- **Once the module is installed, it is recommended that wiring and cabling be done in accordance with the top and bottom alignments.**
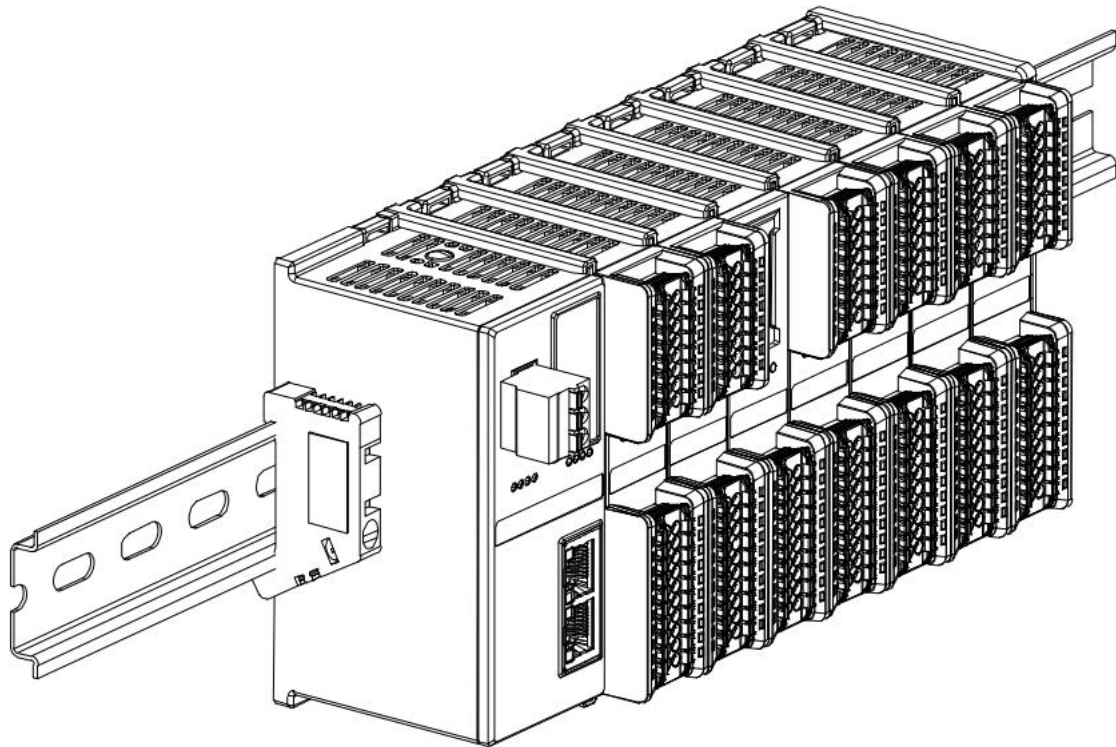
⚠️ Warnings

- The protection provided by the device may be jeopardized if it is not used in accordance with the product user manual.
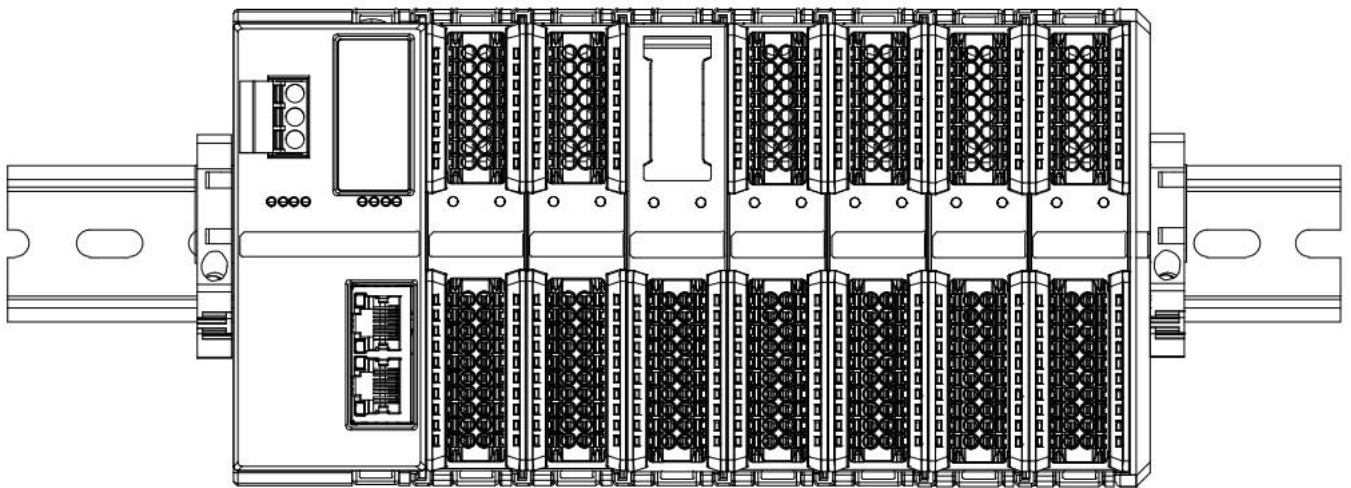
Module installation schematic, minimum clearance above and below (≥50mm)
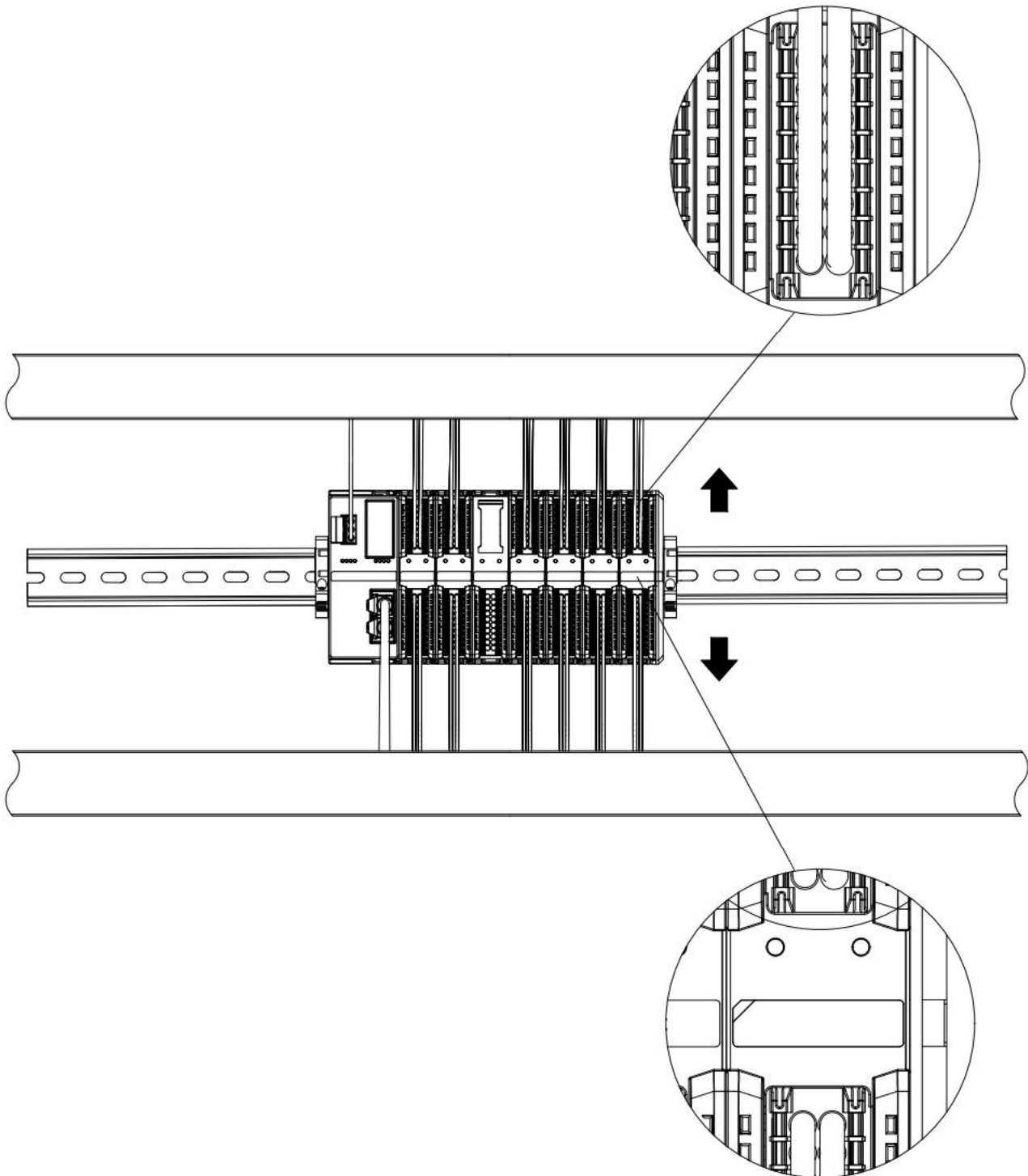
Ensure that the module is installed vertically on the fixed rail

Be sure to install the rail mounts

Schematic diagram of upper and lower wiring of the module
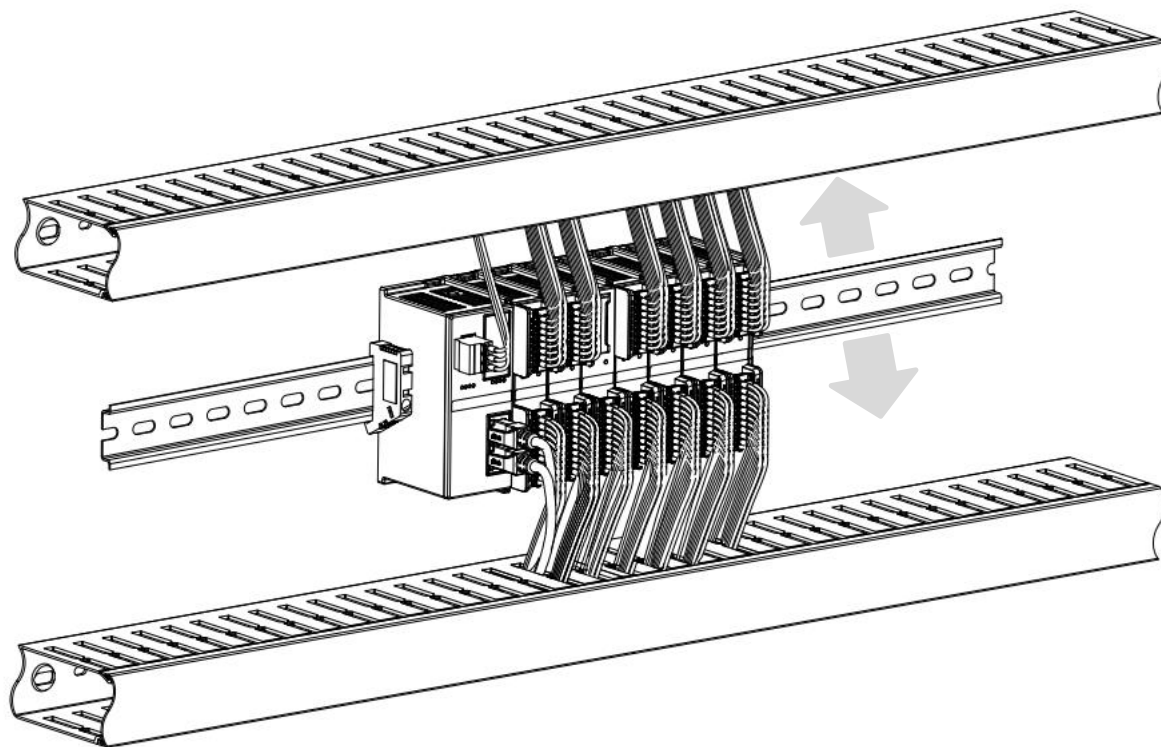
4.3 Installation and uninstall steps

Module Installation and uninstall	
Module Installation Steps	1. Install the coupler module first on the rail that has been fixed.
	2. Install the required I/O modules or function modules in order to the right of the coupler module.
	3、After installing all the required modules, install the end cap to complete the installation of the module.
	4. Install the rail fixings at both ends of the coupler module and end cap to fix the module.
Module Uninstall Steps	1. Loosen the guide rail fixings at both ends of the module.
	2. Use a slotted screwdriver to pry off the module snap.
	3. Pull out the uninstalled module.

4.4 Installation and uninstall diagram

Coupler Module Installation

■ Align the coupler module vertically in the rail slot as shown in Figure ① below.
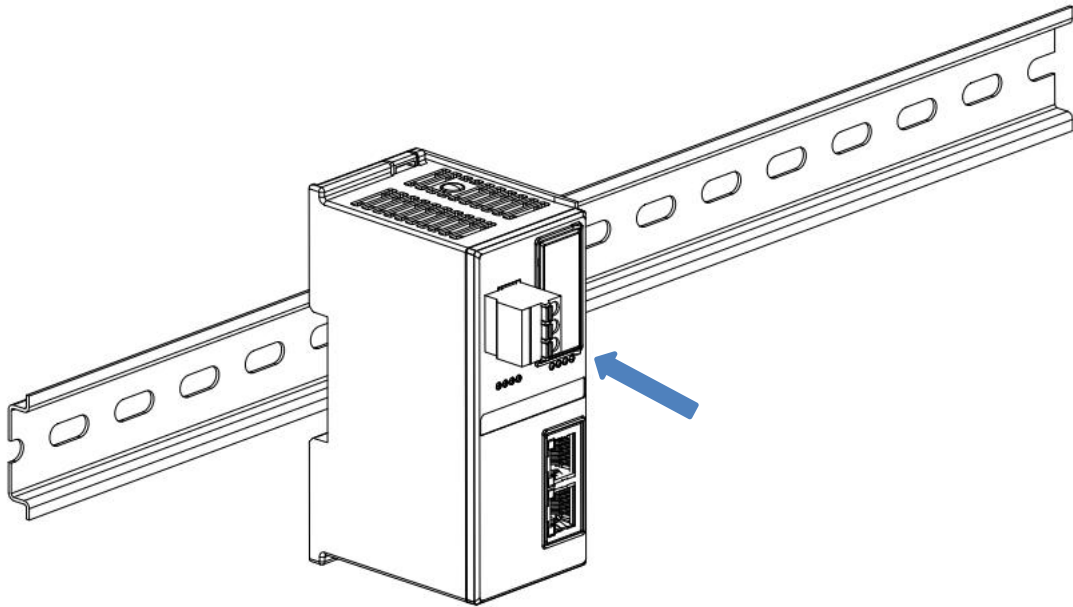
①

■ Press the coupler module in the direction of the guide rail, and when you hear a "click" sound, the module is installed in place, as shown in Figure 2 below.
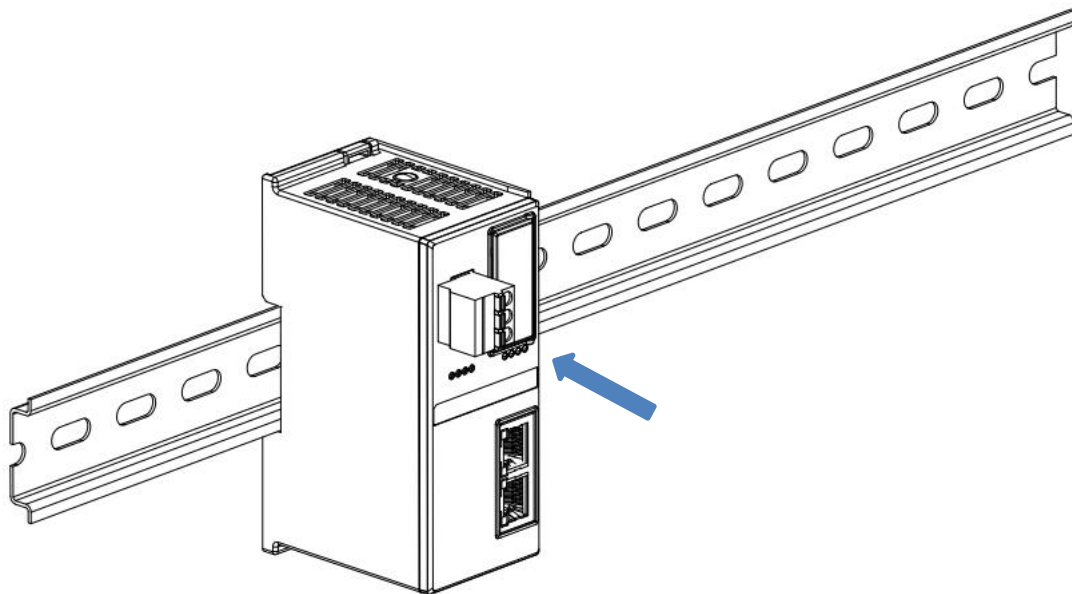
②

I/O Module Installation

■ Install the required I/O modules or function modules one by one according to the above steps of installing coupler modules as shown in Figures ③, ④ and ⑤ below, and push them in, and the modules will be installed in place when you hear the "click" sound.
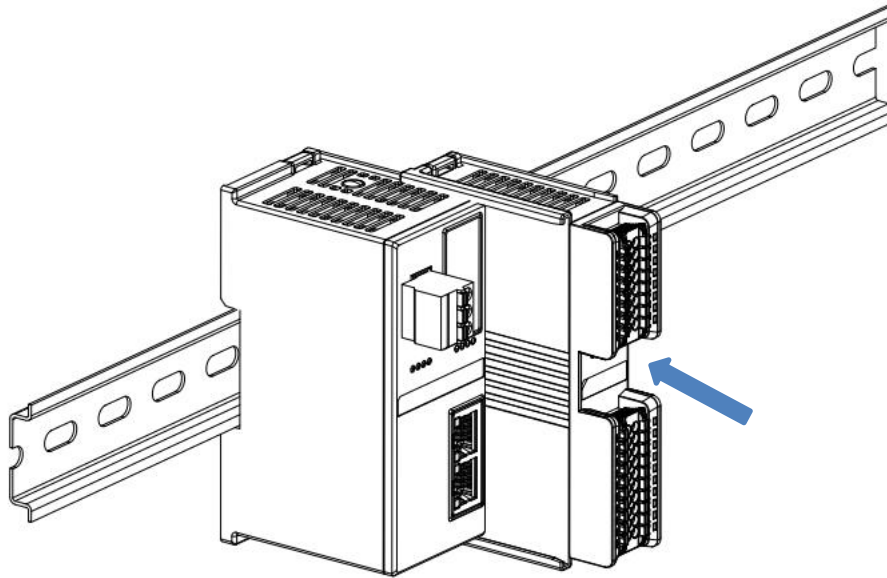
③
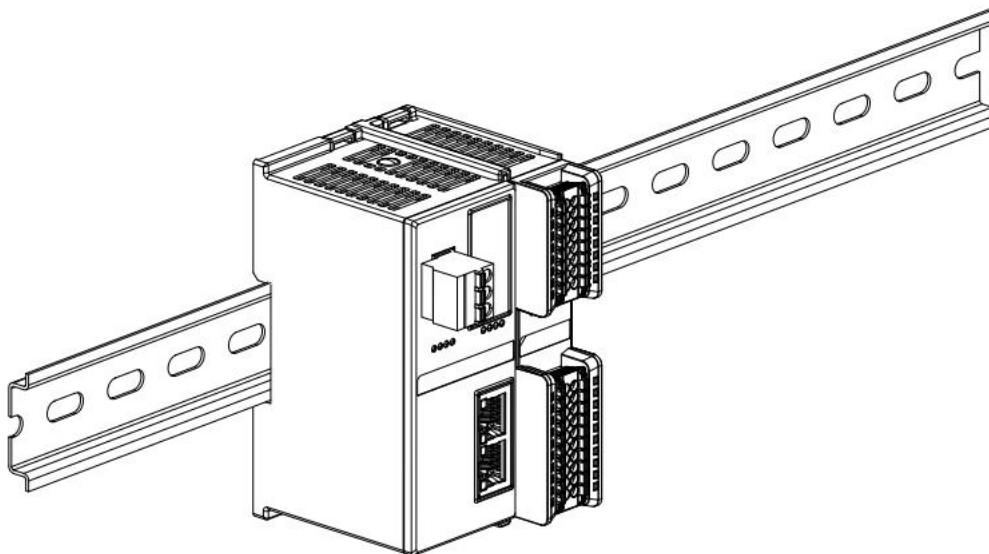
④
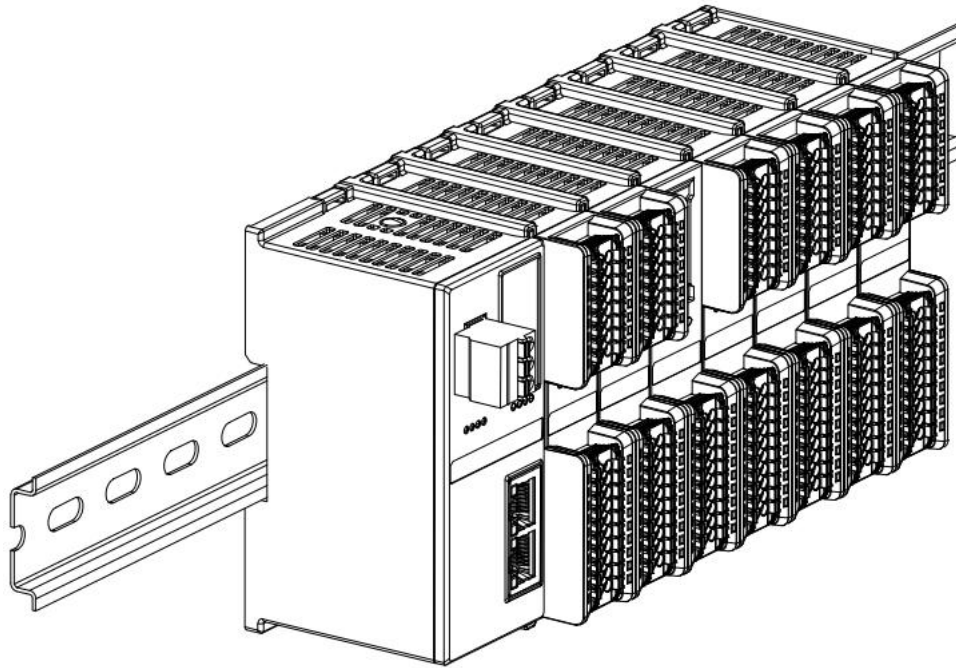
⑤

End cap installation

■ Install the end cap on the right side of the last module, with the grooved side of the end cap aligned with the guide rail. Refer to the installation method of the I/O module for the installation method, and push the end cap inward into place, as shown in Figure ⑥ below.
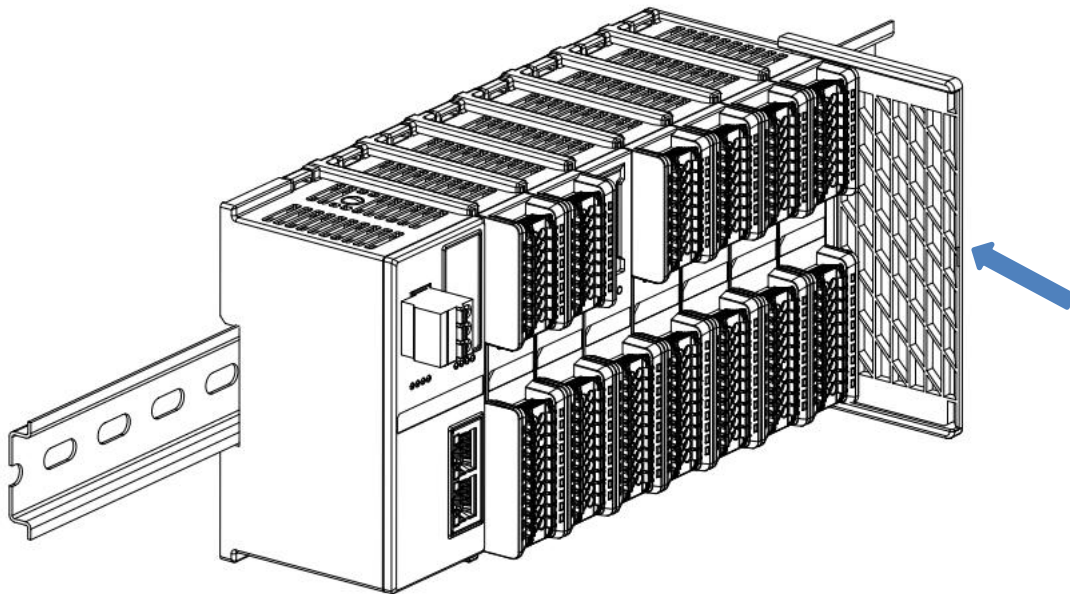
⑥

■ After the end cap is installed, check whether the entire front of the module is flat to ensure that all modules and end caps are installed in place and the front is flush, as shown in Figure ⑦ below.
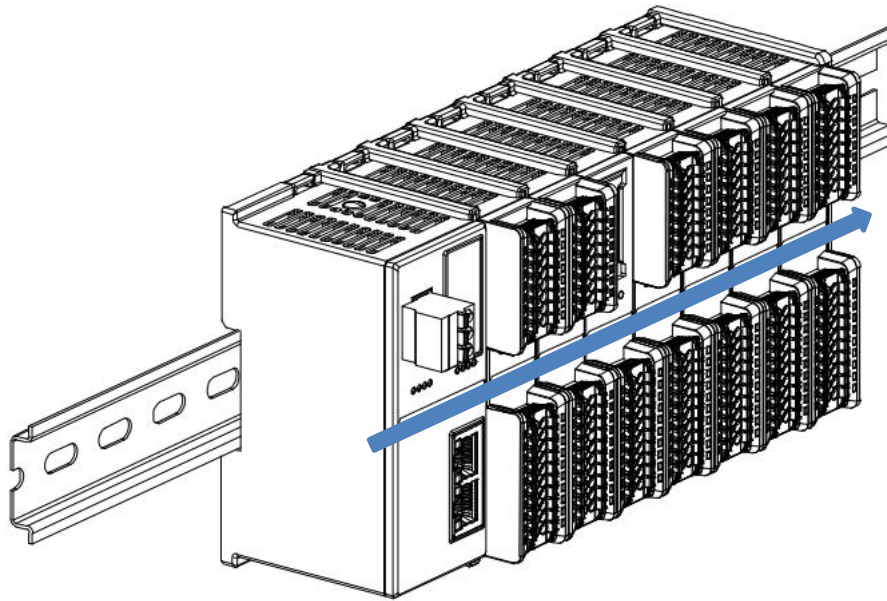
⑦

Installation of guide rail fixings

■ Install and tighten the rail fixings firmly against the left side face of the coupler as shown in Figure ⑧ below.
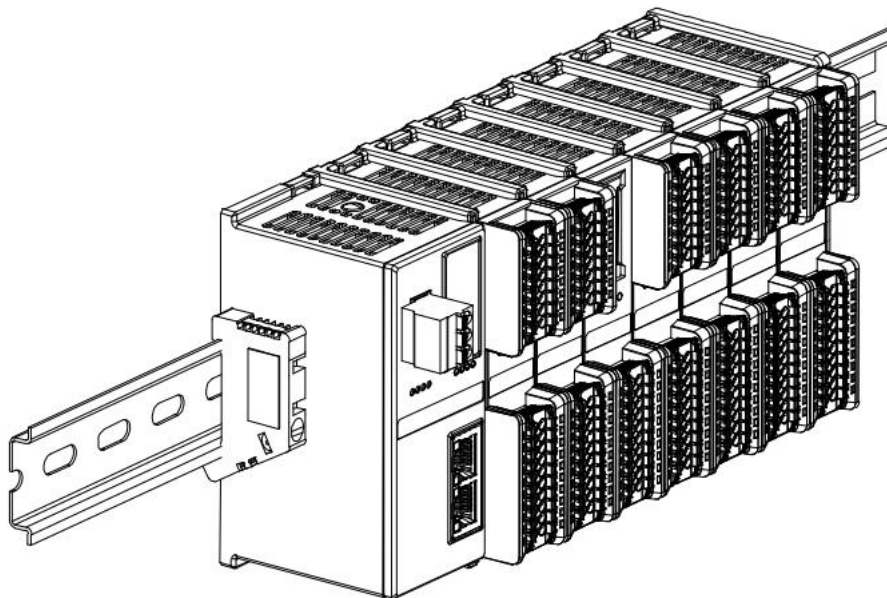
⑧

■ Install the rail fixings on the right side of the end cap, first push the rail fixings firmly in the direction of the coupler to ensure that the module is installed tightly, and lock the rail fixings with a screwdriver, as shown in Figure ⑨ below.
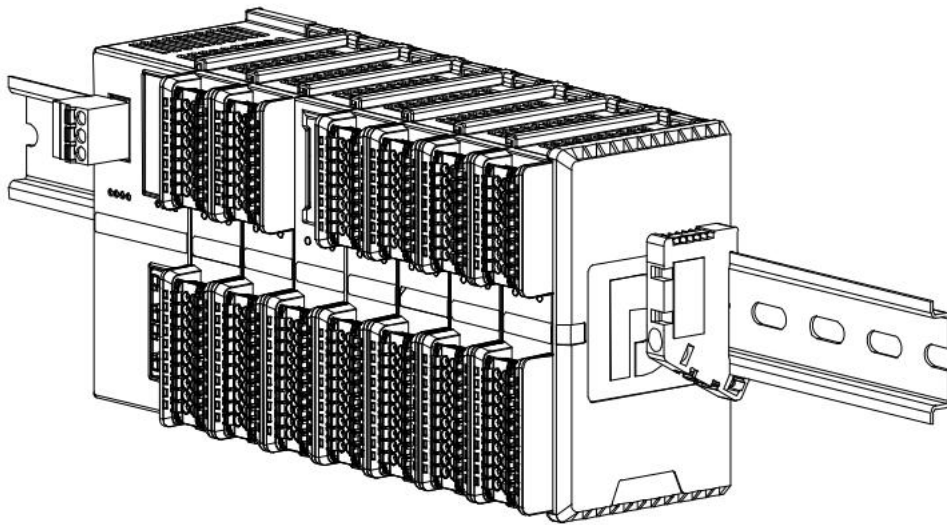
⑨

Uninstall

■ Loosen the rail fixings at one end of the module with a screwdriver and move it to one side, making sure there is clearance between the module and the rail fixings, as shown in Figure ⑩ below.
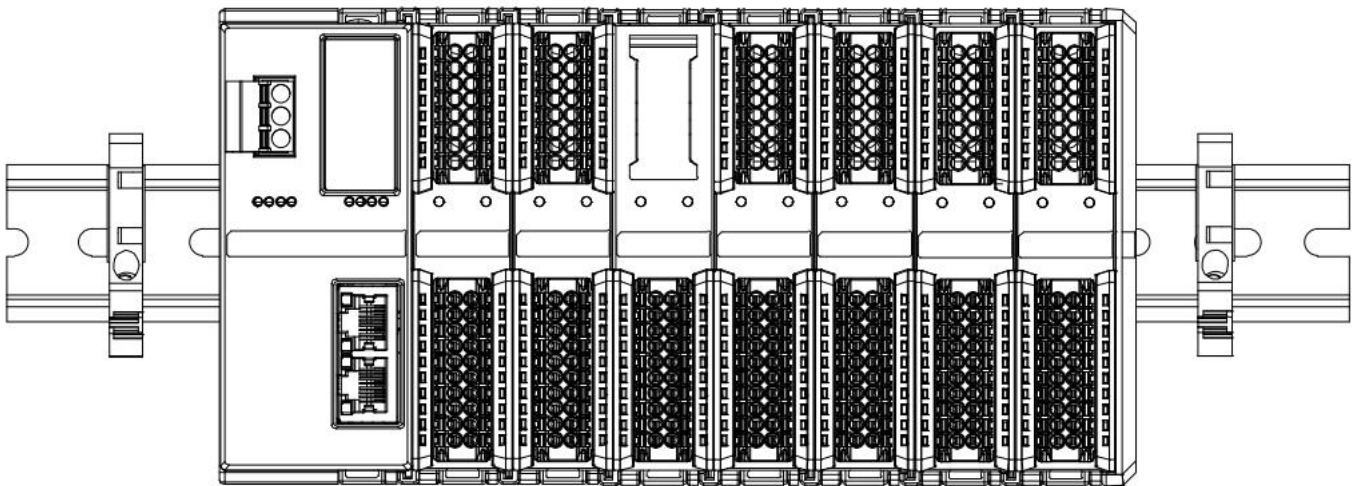
⑩

■ Insert a screwdriver into the snap of the module to be uninstalled, and apply pressure (hear the rattle) in the direction of the module sideways, as shown in the following figures ⑪ and ⑫. **Note: There is one snap on the top and bottom of each module, follow this method.**
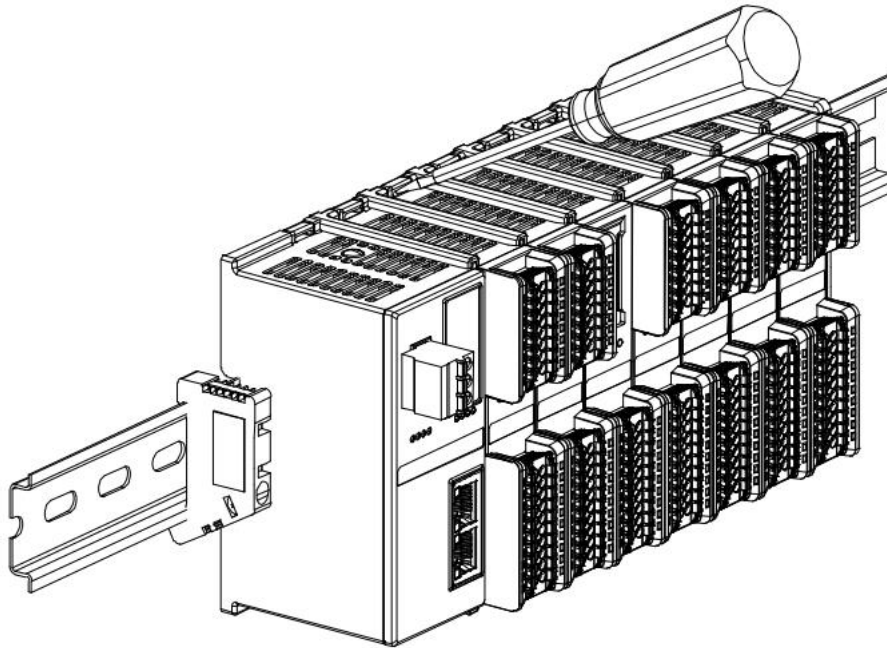
⑪
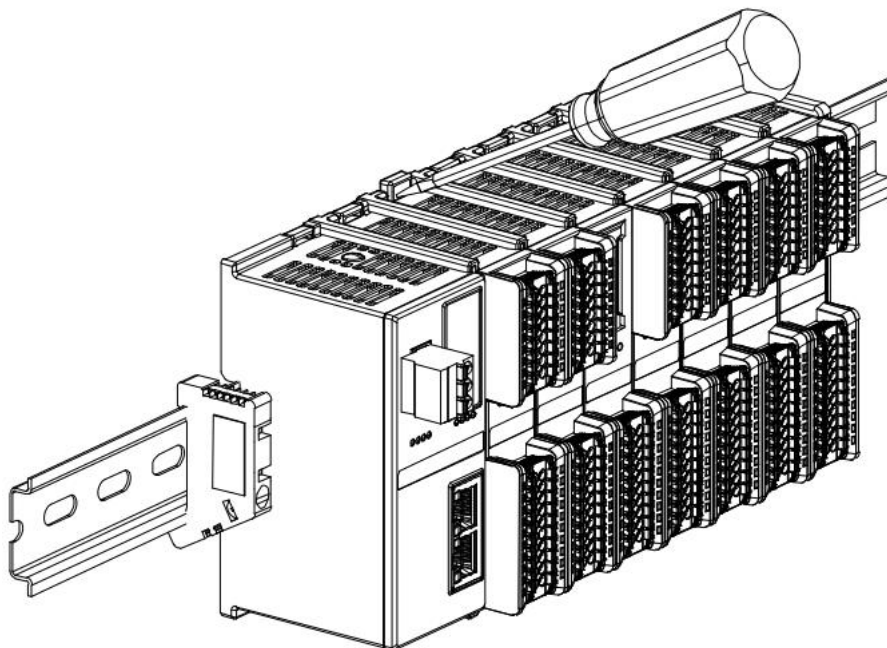
⑫

■ Uninstall the module as shown in figure ⑬ below, following the same steps as for installing the module.

⑬
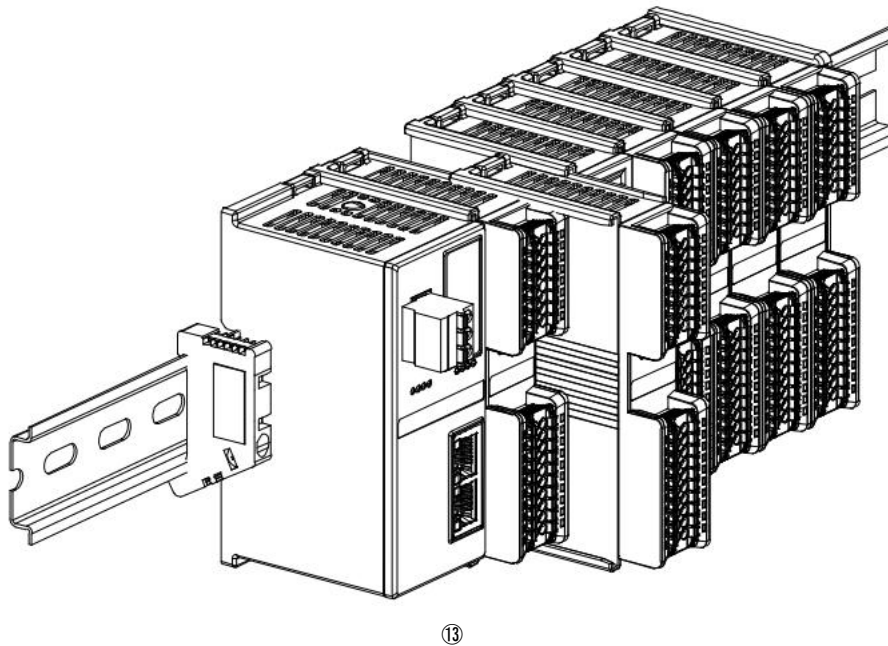
5 Wiring

5.1 Wiring diagram
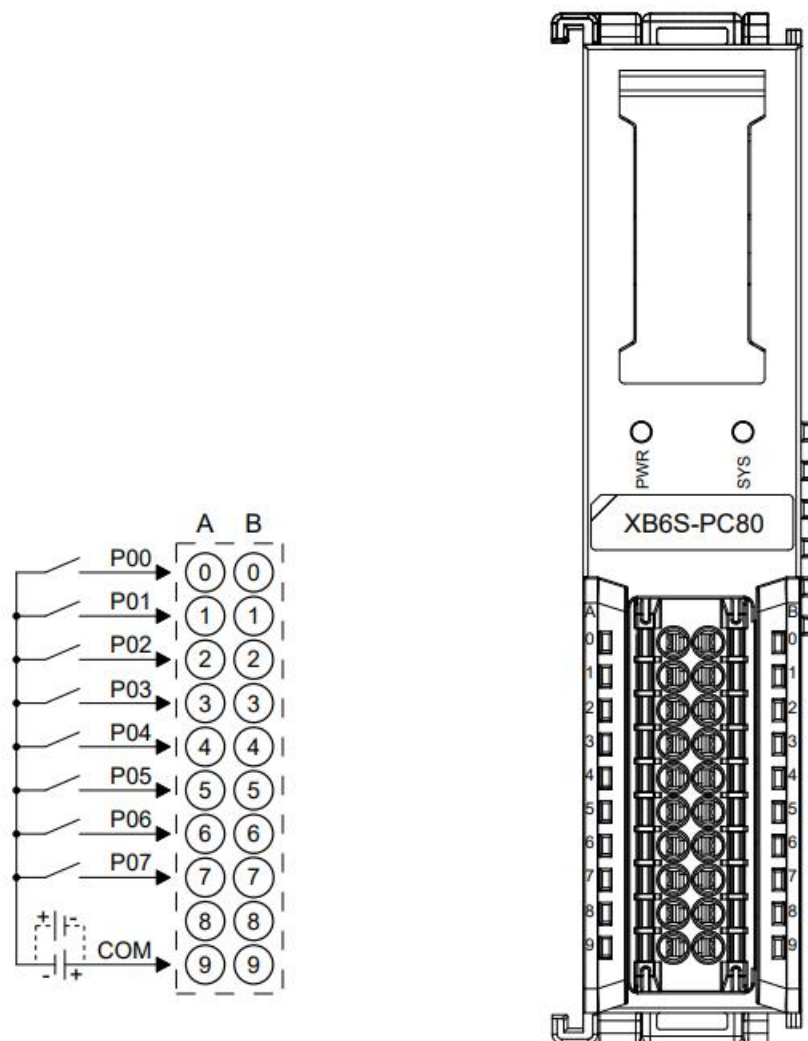
*P00~P07 NPN/PNP compatible, common terminal is COM

5.2 Terminal Block Definition

A		B	
Terminal markings	**Description**	**Terminal markings**	**Description**
0	Pulse input channel 0	0	Empty terminal
1	Pulse input channel 1	1	Empty terminal
2	Pulse input channel 2	2	Empty terminal
3	Pulse input channel 3	3	Empty terminal
4	Pulse input channel 4	4	Empty terminal
5	Pulse input channel 5	5	Empty terminal
6	Pulse input channel 6	6	Empty terminal
7	Pulse input channel 7	7	Empty terminal
8	empty terminal	8	Empty terminal
9	Input Common	9	Input common

6 Operation

6.1 Configuration Parameter Definitions

There is a total of 1 parameter for module configuration, and the 8 channel configuration parameters are the same and can be set independently. Take channel 0 as an example to introduce the configuration parameters, as shown in the table below.

Functionality	Parameter Name	Range Of Values	Default Value
Filter Level Configuration	CH0 Filter Level	0: Filter_Level_0	7
		1: Filter_Level_1	
		2: Filter_Level_2	
		3: Filter_Level_3	
		4: Filter_Level_4	
		5: Filter_Level_5	
		6: Filter_Level_6	
		7: Filter_Level_7	
		8: Filter_Level_8	
		9: Filter_Level_9	
		10: Filter_Level_10	
		11: Filter_Level_11	
		12: Filter_Level_12	
		13: Filter_Level_13	
		14: Filter_Level_14	
		15: Filter_Level_15	

6.1.1 Filter Level Configuration

The module supports configuring the filter level of the corresponding channel in case of channel disablement, the filter level ranges from 0 to 15. The larger the filter level is, the longer the filter time is.

Note: The default filter level is Filter_Level_7. You must ensure that all channels are off (disabled) when setting the filter level parameter.

6.2 Process data

6.2.1 Upstream data

Upstream data 64 bytes (8 bytes per channel, channel [n] takes values 0 to 7)				
Name	**Meaning**	**Range Of Values**	**Data Type**	**Lengths**
CH[n] Count Value	Pulse Input Count Value	0 to 2^32-1 (units)	UDINT	4 bytes
CH[n] Frequency	Pulse Input Frequency	0~100000 (unit: Hz)	UDINT	4 bytes

Data Description:

◆ **CH[n] Count Value**

When the channel is enabled and a pulse is input to the pulse input channel, the pulse count value can be sampled and analyzed. When the clear signal is set to "1", the pulse count data is cleared to zero.

◆ **CH[n] Frequency**

When the channel is enabled and the pulse input channel has pulse input, the pulse frequency can be sampled and analyzed; when there is no pulse input, the frequency is 0.

6.2.2 Downstream Data

Downstream data 2 bytes (channel [n] takes values 0~7)				
Name	**Meaning**	**Range Of Values**	**Data Type**	**Lengths**
CH[n] Enable	Channel Enable	0: Disabled Correspondence Channel	bool	1bit
		1: Enable the corresponding channel		
CH[n] Clear Data	Pulse Data Clearing	0: Frequency and count values are displayed normally	bool	1bit
		1: Zeroing of frequency and count data		

Data Description:

◆ **CH[n] Enable**

When the channel enable of a pulse input channel is set to "1", it means that the channel starts to sample and analyze the input pulse to obtain the count value and pulse frequency.

When the channel enable of a pulse input channel is set to "0", it means that the channel stops counting and frequency measurement of the input pulse.

◆ **CH[n] Clear Data**

When the pulse data clear enable of a pulse input channel is set from "0" to "1", the frequency and count value of that channel are cleared to zero.

6.3 Module Configuration Description

6.3.1 Application in TwinCAT3 software environment

1、Preliminary

- **Hardware Environment**
  - ➢ **Module Model XB6S-PC80**
  - ➢ **EtherCAT Bus Coupler Module, End Cap**
    This description takes the XB6S-EC2002 coupler module as an example
  - ➢ **A computer with pre-installed TwinCAT3 software**
  - ➢ **Shielded cables for EtherCAT**
  - ➢ **This description takes the connection of the XB6S-PT04A module as an example.**
  - ➢ **One switching power supply**
  - ➢ **Module installation rails and rail mounts**
  - ➢ **Device Configuration Files**
    Configuration file access: https://www.solidotech.com/documents/configfile
- **Hardware configuration and wiring**
  Follow "**4 Installation and uninstall**" and "**5 Wiring**".

2、Preset Profiles

Place the ESI configuration file (EcatTerminal-XB6S_V1.19_ENUM.xml) in the TwinCAT installation directory under "C:\TwinCAT\3.1\Config\Io\EtherCAT" as shown below.

名称	修改日期	类型	大小
Beckhoff EL32xx.xml	2017/10/25 15:43	XML 文档	5,997 KB
Beckhoff EL66xx.xml	2017/10/27 8:55	XML 文档	1,820 KB
Beckhoff EKx9xx.xml	2017/11/3 9:53	XML 文档	1,223 KB
Beckhoff EP7xxx.xml	2017/11/8 9:46	XML 文档	9,290 KB
Beckhoff ATH2xxx.xml	2017/11/23 13:22	XML 文档	439 KB
Beckhoff EPP3xxx.xml	2017/12/8 8:48	XML 文档	2,099 KB
Beckhoff EPP1xxx.xml	2017/12/14 11:34	XML 文档	480 KB
Beckhoff EL34xx.xml	2017/12/15 15:35	XML 文档	5,634 KB
Beckhoff EK13xx.xml	2017/12/19 14:30	XML 文档	16 KB
Beckhoff EPP2xxx.xml	2017/12/28 12:22	XML 文档	1,811 KB
Beckhoff EJ1xxx.xml	2018/1/4 10:00	XML 文档	67 KB
Beckhoff EJ3xxx.xml	2018/1/4 10:07	XML 文档	1,169 KB
Beckhoff EJ7xxx.xml	2018/1/4 10:11	XML 文档	2,339 KB
Beckhoff EJ9xxx.xml	2018/1/4 10:23	XML 文档	160 KB
Beckhoff EJ6xxx.xml	2018/1/4 10:31	XML 文档	313 KB
Beckhoff EL30xx.xml	2018/1/11 13:03	XML 文档	11,508 KB
Beckhoff EL37xx.xml	2018/1/23 13:59	XML 文档	11,837 KB
Beckhoff EJ2xxx.xml	2018/1/23 14:21	XML 文档	239 KB
Beckhoff EL5xxx.xml	2018/1/23 15:11	XML 文档	6,307 KB
Beckhoff EJ5xxx.xml	2018/1/23 15:12	XML 文档	218 KB
Beckhoff EL2xxx.xml	2018/1/24 9:40	XML 文档	2,868 KB
Beckhoff EL33xx.xml	2018/1/26 9:34	XML 文档	6,727 KB
Beckhoff ELM3xxx.xml	2018/2/1 10:19	XML 文档	14,238 KB
Beckhoff AX5xxx.xml	2018/2/8 16:15	XML 文档	930 KB
Beckhoff EL1xxx.xml	2018/2/19 17:15	XML 文档	3,387 KB
Beckhoff EL25xx.xml	2018/2/21 10:23	XML 文档	6,543 KB
EcatTerminal-XB6S_V1.19_ENUM.xml	2024/3/19 16:49	XML 文档	1,129 KB

3、Create Project

a. Click the TwinCAT icon in the lower right corner of the desktop and select "TwinCAT XAE (VS xxxx)" to open the TwinCAT software as shown below.

b. Click "New TwinCAT Project", in the pop-up window, "Name" and "Solution name" correspond to the project name and solution name respectively, and "Location" corresponds to the project path, and these three items can be selected by default, then click "OK", the project is created successfully, as shown in the following figure.
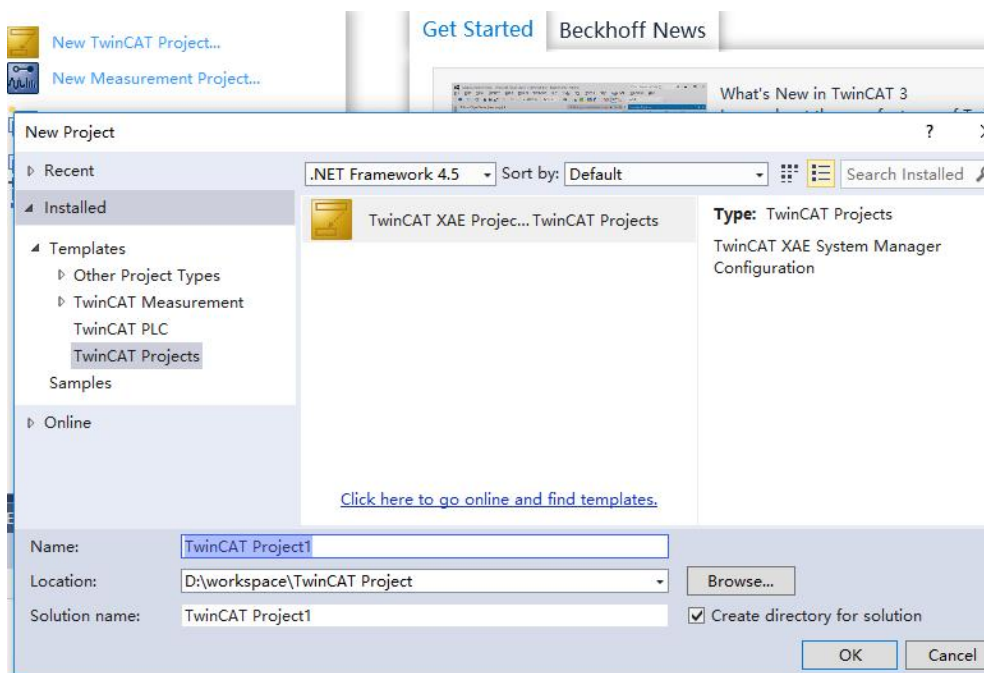
4、 Scanning device

    a.   After creating the project, right-click on the "Scan" option under "I/O -> Devices" to perform a slave device scanning, as shown in the following figure.
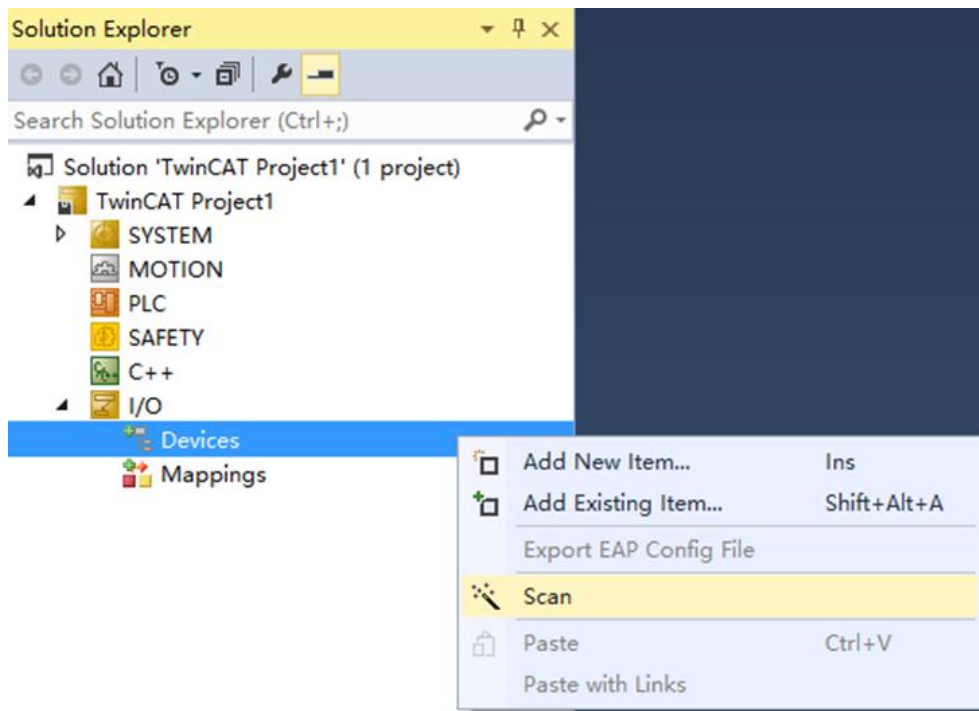
    b.   Check the "Local Connection" box, as shown in the following figure.

c. Click on the pop-up window "Scan for boxes" and select "Yes"; click on the pop-up window "Activate Free Run" and select "Yes". "Yes", as shown in the figure below.
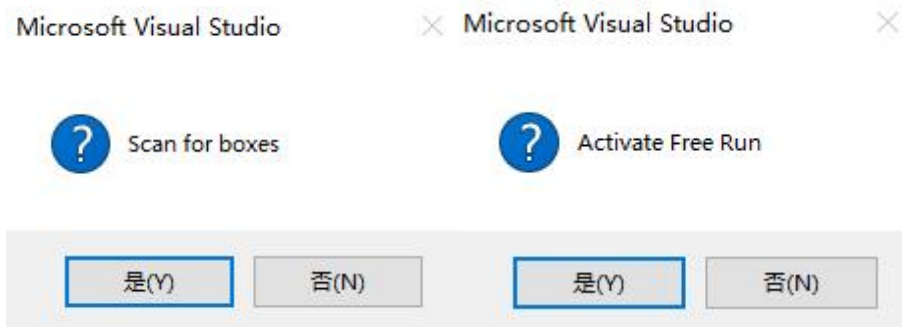
d. After scanning to the device, you can see Box1 (XB6S-EC2002) and Module1 (XB6S-PC80) and Module2 (XB6S-PT04A) in the left navigation tree, and at "Online", you can see that TwinCAT is in "OP" status, and you can observe that the RUN light of the slave device is always on, as shown below.
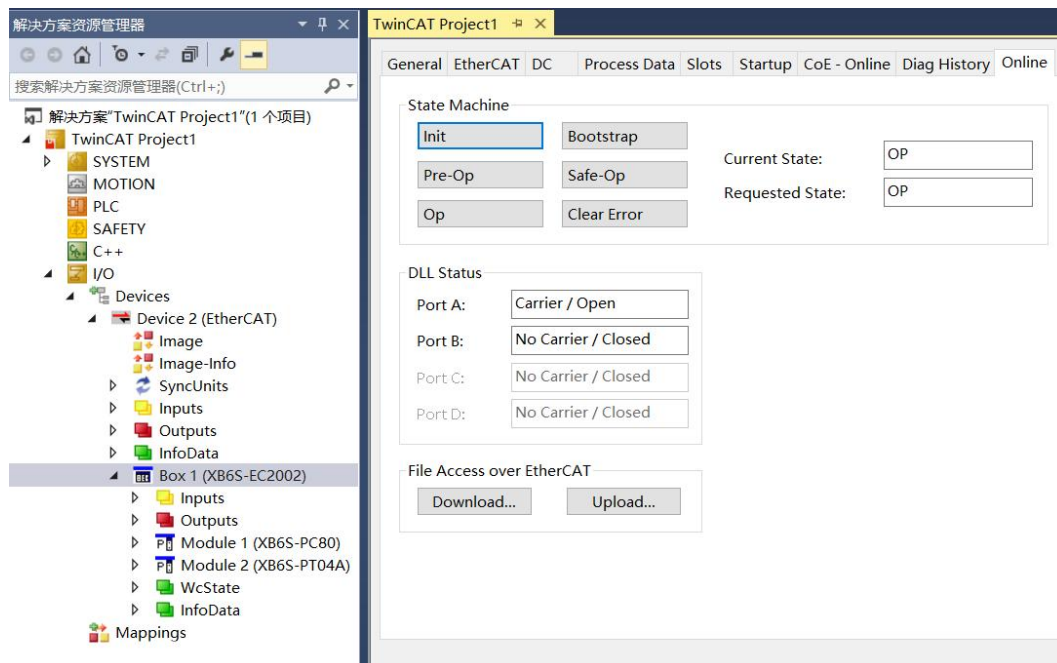
5、 **Validating Basic Functions**

a. Click "Box1 -> Startup -> New" in the left navigation tree to enter the configuration parameter editing page, as shown in the following figure.
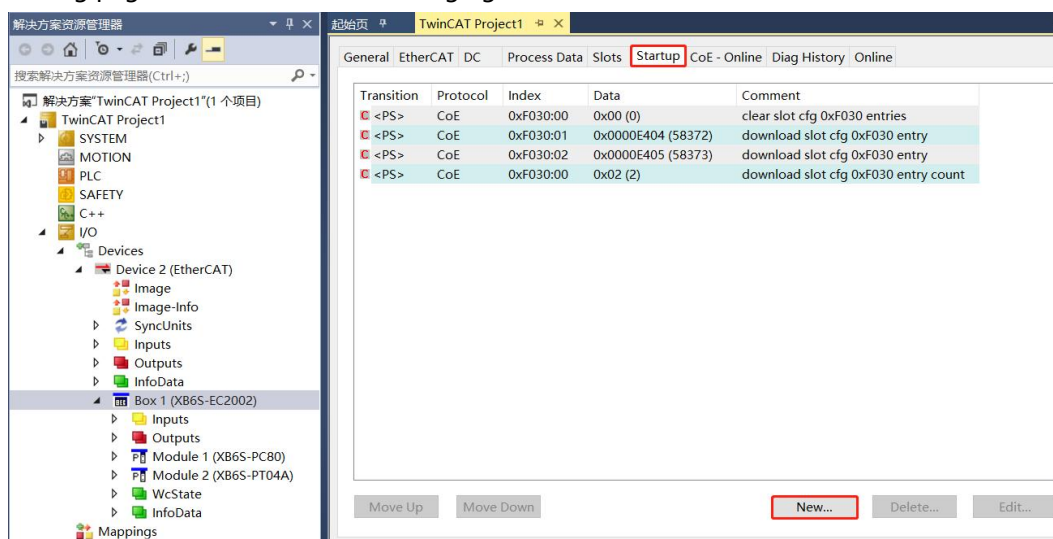
b. In the Edit CANopen Startup Entry pop-up window, click the "+" in front of Index 2000:0 to expand the Configuration Parameters menu, and click any parameter to set the related configuration, as shown in the following figure.
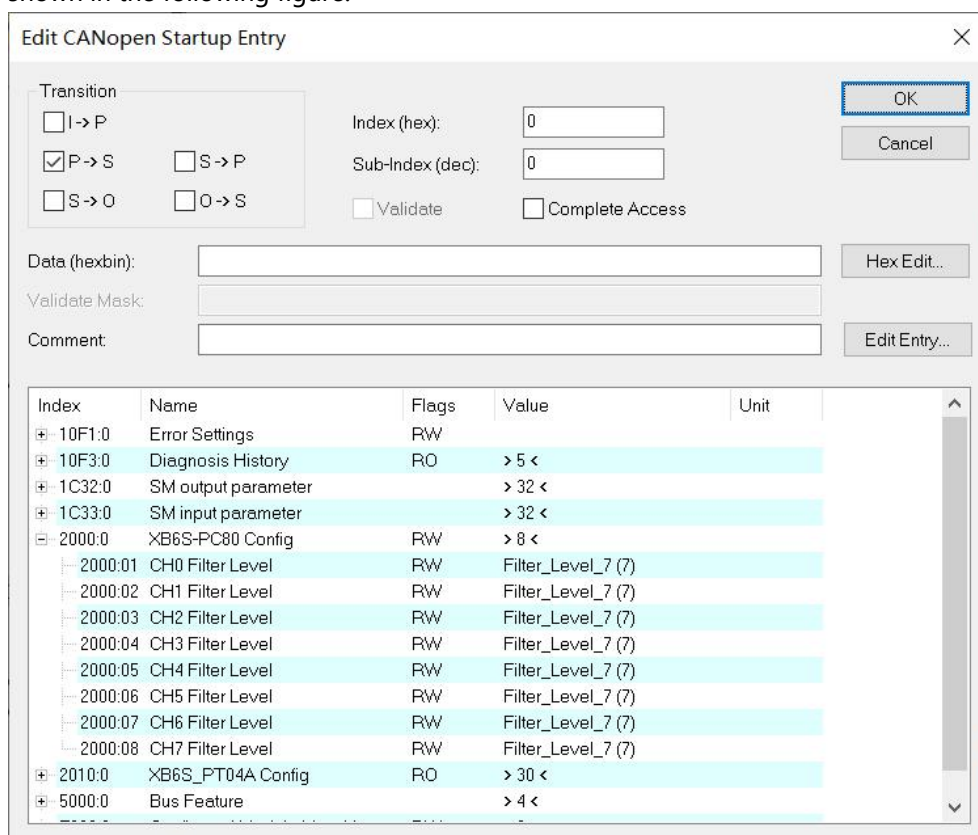
c. For example, to modify the filter level of channel 0, you can double-click "CH0 Filter Level" to modify the parameter value, as shown in the following figure.
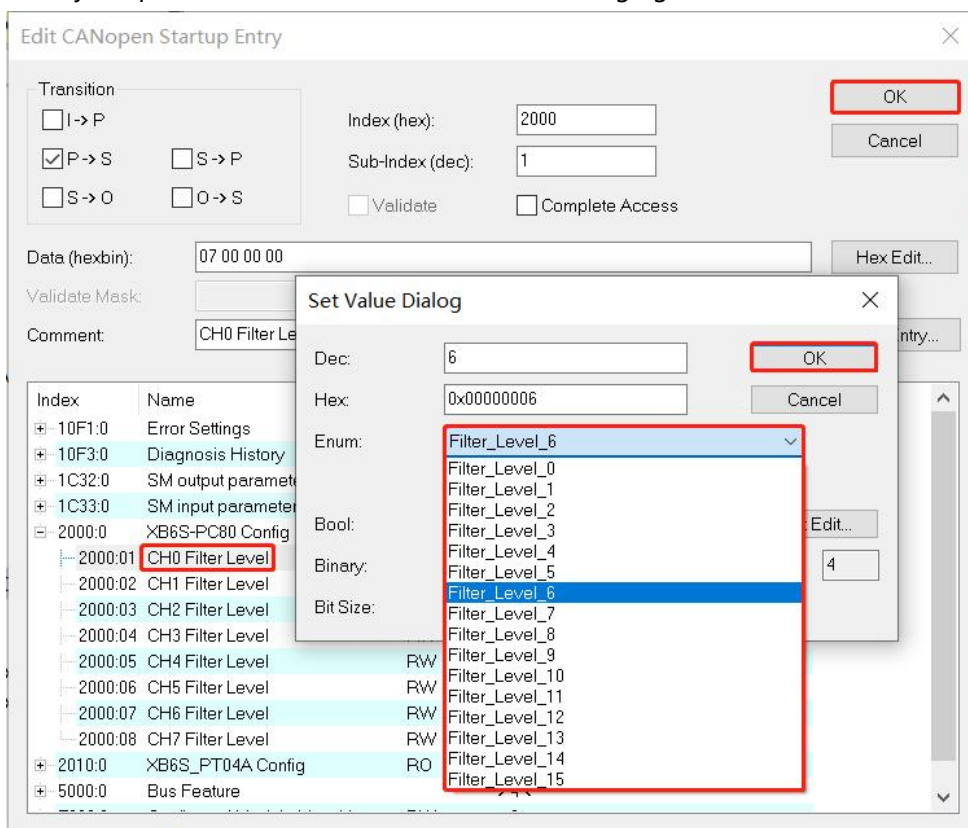
d. After the parameter modification is completed, you can see the modified parameter items and parameter values under Startup, as shown in the following figure. After the parameter setting is completed, it is necessary to carry out Reload operation and re-power up the module to realize that the master station automatically sends down the parameter setting.

e.   The left navigation tree "Module 1 -> Inputs" displays the module's upstream data, which is used to monitor the module's pulse count value and pulse frequency, as shown in the following figure.

Name	Online	Type	Size	>Address	In/Out	User ID	Linked to
CH0 Count Value	0	UDINT	4.0	41.0	Input	0	
CH0 Frequency	0	UDINT	4.0	45.0	Input	0	
CH1 Count Value	0	UDINT	4.0	49.0	Input	0	
CH1 Frequency	0	UDINT	4.0	53.0	Input	0	
CH2 Count Value	0	UDINT	4.0	57.0	Input	0	
CH2 Frequency	0	UDINT	4.0	61.0	Input	0	
CH3 Count Value	0	UDINT	4.0	65.0	Input	0	
CH3 Frequency	0	UDINT	4.0	69.0	Input	0	
CH4 Count Value	0	UDINT	4.0	73.0	Input	0	
CH4 Frequency	0	UDINT	4.0	77.0	Input	0	
CH5 Count Value	0	UDINT	4.0	81.0	Input	0	
CH5 Frequency	0	UDINT	4.0	85.0	Input	0	
CH6 Count Value	0	UDINT	4.0	89.0	Input	0	
CH6 Frequency	0	UDINT	4.0	93.0	Input	0	
CH7 Count Value	0	UDINT	4.0	97.0	Input	0	
CH7 Frequency	0	UDINT	4.0	101.0	Input	0	

Left navigation tree:
- 解决方案"TwinCAT Project1"(1 个项目)
  - TwinCAT Project1
    - SYSTEM
    - MOTION
    - PLC
    - SAFETY
    - C++
    - I/O
      - Devices
        - Device 2 (EtherCAT)
          - Image
          - Image-Info
          - SyncUnits
          - Inputs
          - Outputs
          - InfoData
          - Box 1 (XB6S-EC2002)
            - Inputs
            - Outputs
            - Module 1 (XB6S-PC80)
              - Inputs
              - Outputs
            - Module 2 (XB6S-PT04A)
            - WcState
            - InfoData
      - Mappings

f.   The left navigation tree "Module 1 -> Outputs" displays the downstream data of the module, which is used to control the pulse data clearing of the module and the channel enable as shown in the figure below.

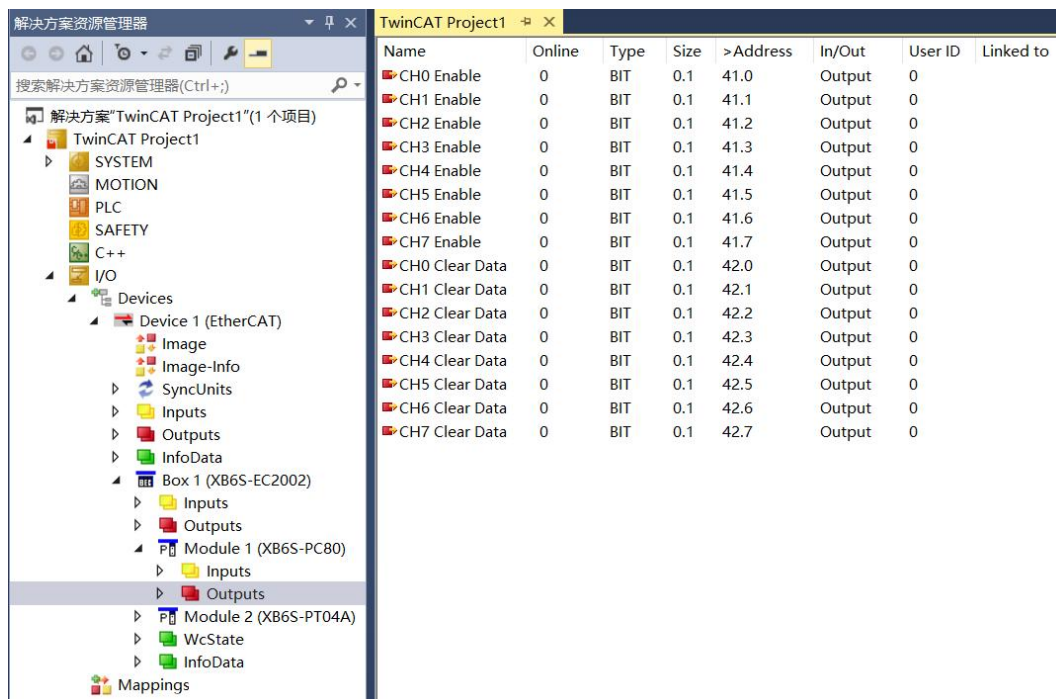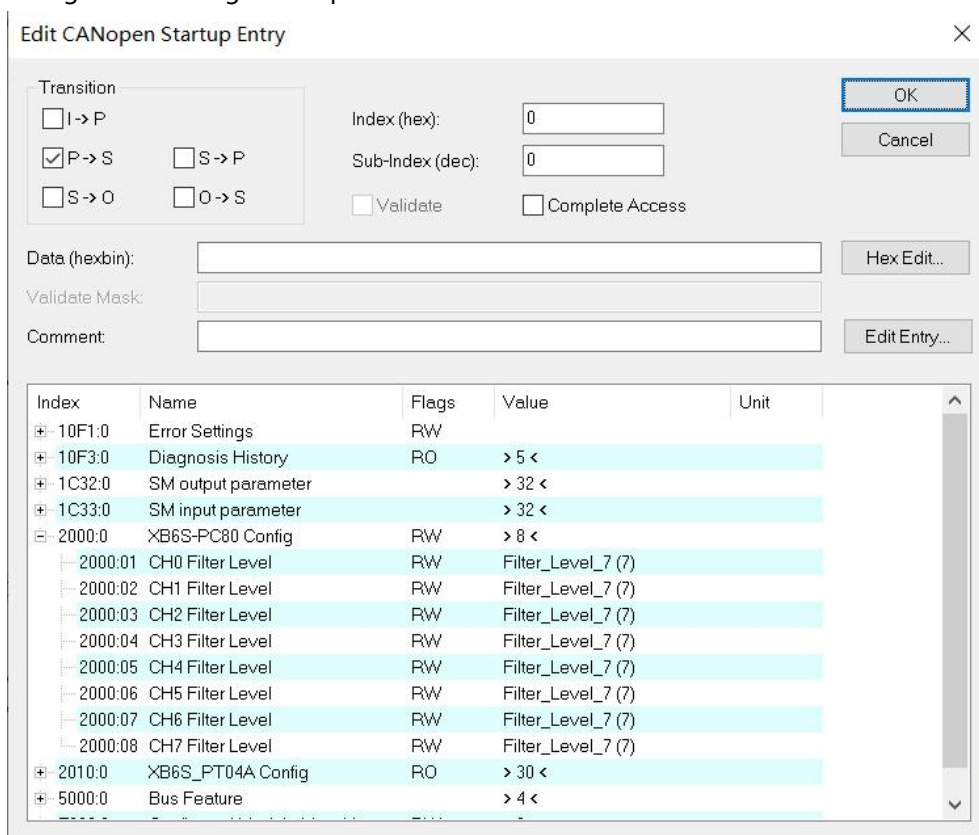| Name	Online	Type	Size	>Address	In/Out	User ID	Linked to
CH0 Enable	0	BIT	0.1	41.0	Output	0	
CH1 Enable	0	BIT	0.1	41.1	Output	0	
CH2 Enable	0	BIT	0.1	41.2	Output	0	
CH3 Enable	0	BIT	0.1	41.3	Output	0	
CH4 Enable	0	BIT	0.1	41.4	Output	0	
CH5 Enable	0	BIT	0.1	41.5	Output	0	
CH6 Enable	0	BIT	0.1	41.6	Output	0	
CH7 Enable	0	BIT	0.1	41.7	Output	0	
CH0 Clear Data	0	BIT	0.1	42.0	Output	0	
CH1 Clear Data	0	BIT	0.1	42.1	Output	0	
CH2 Clear Data	0	BIT	0.1	42.2	Output	0	
CH3 Clear Data	0	BIT	0.1	42.3	Output	0	
CH4 Clear Data	0	BIT	0.1	42.4	Output	0	
CH5 Clear Data	0	BIT	0.1	42.5	Output	0	
CH6 Clear Data	0	BIT	0.1	42.6	Output	0	
CH7 Clear Data	0	BIT	0.1	42.7	Output	0	

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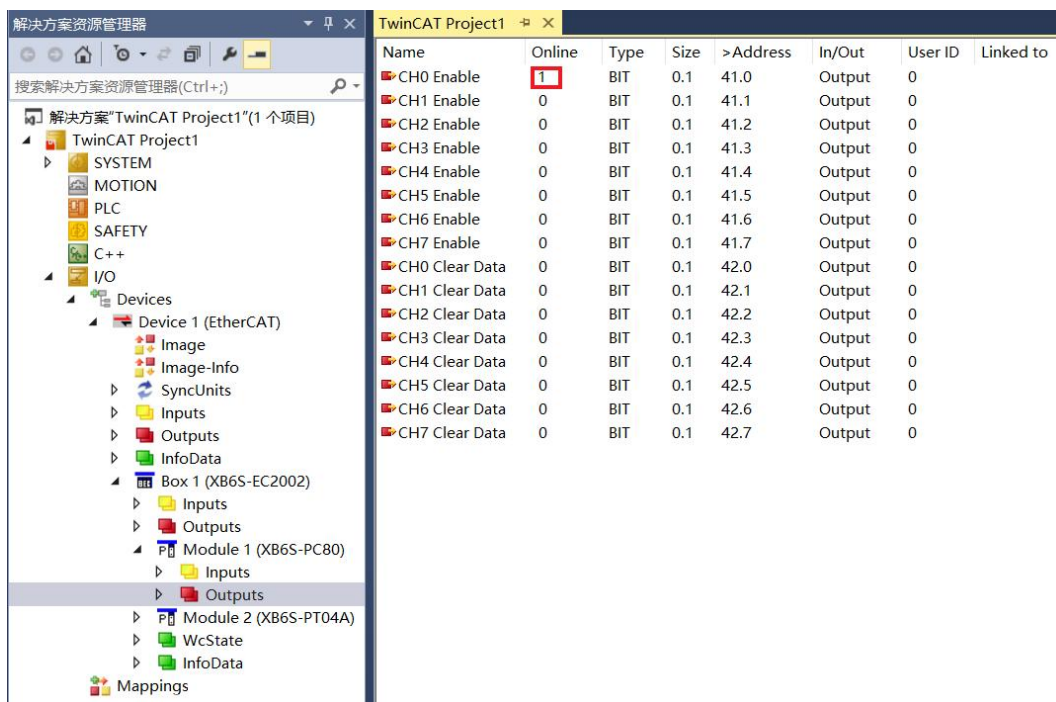   - InfoData
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Examples of Module Functions

◆ **Pulse Input channel 0 data monitoring and clearing**

    a.   Configure the configuration parameters as shown below.

    b.   Set the module channel 0 enabled when channel 0 input pulses 50000 with a frequency of 400Hz as shown below.

c. The upstream data pulse count value and pulse frequency of the module are shown below. When the pulse starts to send, the pulse count value accumulates continuously and the pulse frequency is monitored in real time. After the transmission is completed, the pulse count value accumulates to 50000; when there is no pulse input, the frequency is 0.

Name	Online	Type	Size	>Address	In/Out	User ID	Linked to
CH0 Count Value	50000	UDINT	4.0	41.0	Input	0	
CH0 Frequency	400	UDINT	4.0	45.0	Input	0	
CH1 Count Value	0	UDINT	4.0	49.0	Input	0	
CH1 Frequency	0	UDINT	4.0	53.0	Input	0	
CH2 Count Value	0	UDINT	4.0	57.0	Input	0	
CH2 Frequency	0	UDINT	4.0	61.0	Input	0	
CH3 Count Value	0	UDINT	4.0	65.0	Input	0	
CH3 Frequency	0	UDINT	4.0	69.0	Input	0	
CH4 Count Value	0	UDINT	4.0	73.0	Input	0	
CH4 Frequency	0	UDINT	4.0	77.0	Input	0	
CH5 Count Value	0	UDINT	4.0	81.0	Input	0	
CH5 Frequency	0	UDINT	4.0	85.0	Input	0	
CH6 Count Value	0	UDINT	4.0	89.0	Input	0	
CH6 Frequency	0	UDINT	4.0	93.0	Input	0	
CH7 Count Value	0	UDINT	4.0	97.0	Input	0	
CH7 Frequency	0	UDINT	4.0	101.0	Input	0	

d. Pulse input channel 0 count clear enabled as shown below.

Name	Online	Type	Size	>Address	In/Out	User ID	Linked to
CH0 Enable	1	BIT	0.1	41.0	Output	0	
CH1 Enable	0	BIT	0.1	41.1	Output	0	
CH2 Enable	0	BIT	0.1	41.2	Output	0	
CH3 Enable	0	BIT	0.1	41.3	Output	0	
CH4 Enable	0	BIT	0.1	41.4	Output	0	
CH5 Enable	0	BIT	0.1	41.5	Output	0	
CH6 Enable	0	BIT	0.1	41.6	Output	0	
CH7 Enable	0	BIT	0.1	41.7	Output	0	
CH0 Clear Data	1	BIT	0.1	42.0	Output	0	
CH1 Clear Data	0	BIT	0.1	42.1	Output	0	
CH2 Clear Data	0	BIT	0.1	42.2	Output	0	
CH3 Clear Data	0	BIT	0.1	42.3	Output	0	
CH4 Clear Data	0	BIT	0.1	42.4	Output	0	
CH5 Clear Data	0	BIT	0.1	42.5	Output	0	
CH6 Clear Data	0	BIT	0.1	42.6	Output	0	
CH7 Clear Data	0	BIT	0.1	42.7	Output	0	

e.   After the pulse input channel 0 count clear enabled, the pulse count value and pulse frequency of channel 0 are 0, as shown below.