VECTOR
威 科 达 科 技

VEC-VE controller extended hardware manual

VEEX201E

WWW.szvector.com

Preface

Thank you for purchasing VE motion controller! VE motion controller is a high-performance EtherCAT bus controller developed by our company. This manual describes the hardware description and application method of relevant extensions of VE motion controller.For more details, users can go to the official website of VECTOR:http://www.szvector.com/。

Catalogue

Chapter I Overview of extension modules

1.1 Introduction to extension modules

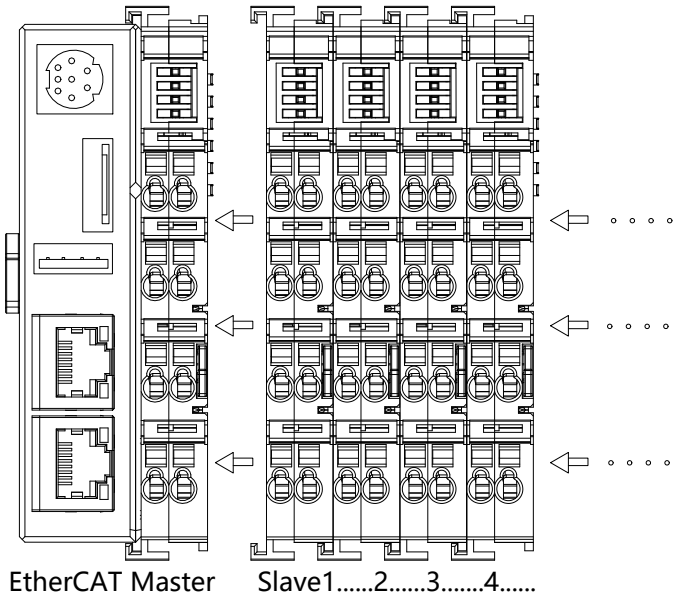
The motion controllers of VECTOR VE series integrate rich motion control modules with powerful processing and computing functions. The structure supports the expansion of distributed IO and local IO, and the function supports digital input/output module, analog AD/DA module, XY pulse module and encoder counting module etc., which can make the VE series motion controller can be widely used in temperature, flow, pressure and other process control systems .

1.1.1 Expansion Module Models and Functions

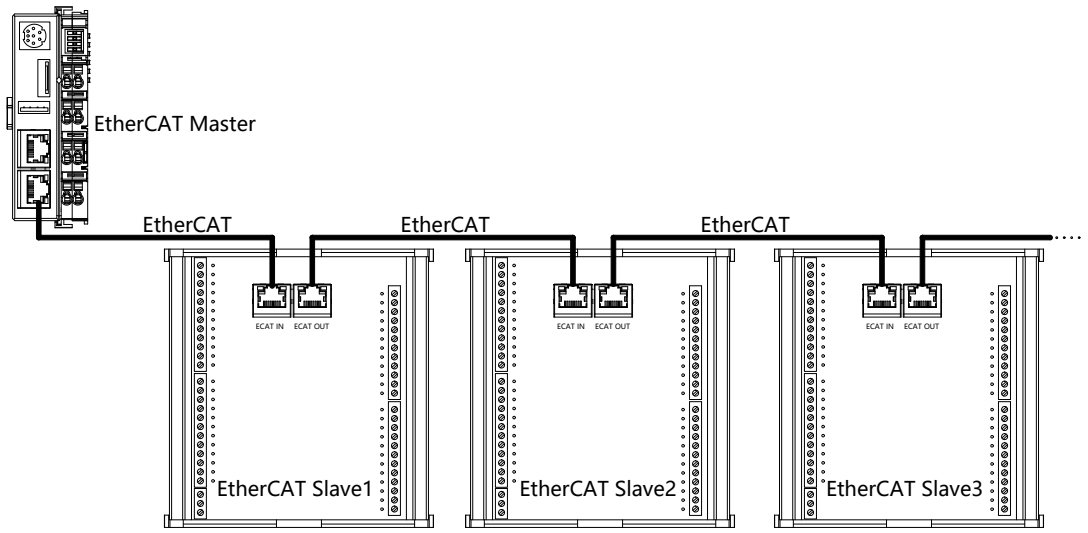
Type	Model	Function
Distributed IO extension	VEC-VE-EX-32IO-A	16-point DI input, 16-point DO output, input and output can be NPN or PNP
	VEC-VE-EX-ECAT-SUB	point DI input, 32-point DO output, input and output can be NPN or PNP 24channels of analog inputs（-10V~10V） 2 channels of analog output（-10V~+10V） 1 channel of sending pulse（XY pulse） 2 channel encoder count（AB pulse，Support probe function and pulse sending）
Local I/O extension	VEC-VE-EX-8DI-NPN	8 point NPN DI input
	VEC-VE-EX-16DI-NPN	16 point NPN DI input
	VEC-VE-EX-8DO-NPN	8 point NPN DI output
	VEC-VE-EX-16DO-NPN	16 point NPN DI input
	VEC-VE-EX-8DI-PNP	8 point PNP DI input
	VEC-VE-EX-16DI-PNP	16 point NPN DI input
	VEC-VE-EX-8DO-PNP	8 point PNP DI output
	VEC-VE-EX-16DO-PNP	16 point PNP type DO out
	VEC-VE-EX-4AD	4-way voltage and current input module
	VEC-VE-EX-4DA	4-way voltage and current output module
coupler	VEC-VE-CPR-P	When the local I/O expansion is far from the host,the local expansion IO module can be installed on the coupler, which is connected to the host through network cables

1.1.2 Module configuration

The LOCAL IO expansion module of the VE series can be installed to the right of the host unit, expansion unit, or coupler. As shown below:

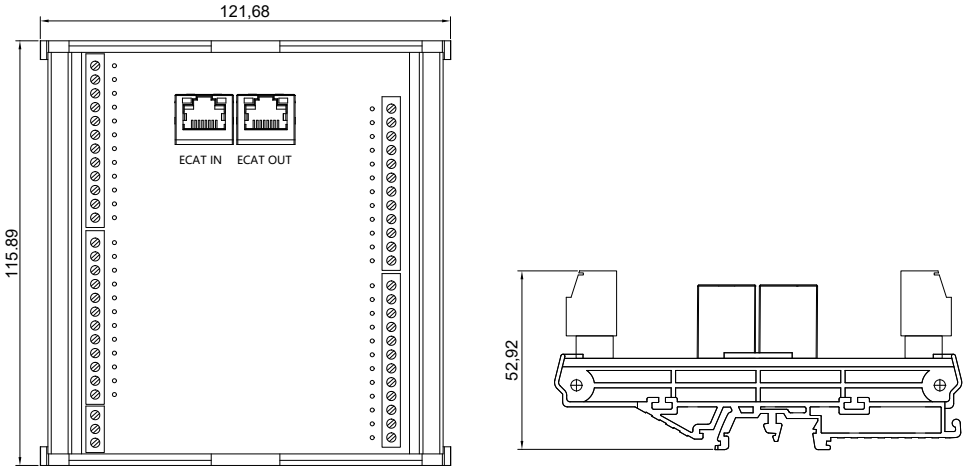


The distributed I/O expansion module can be installed anywhere and connected to the host unit through network cables. As shown below:

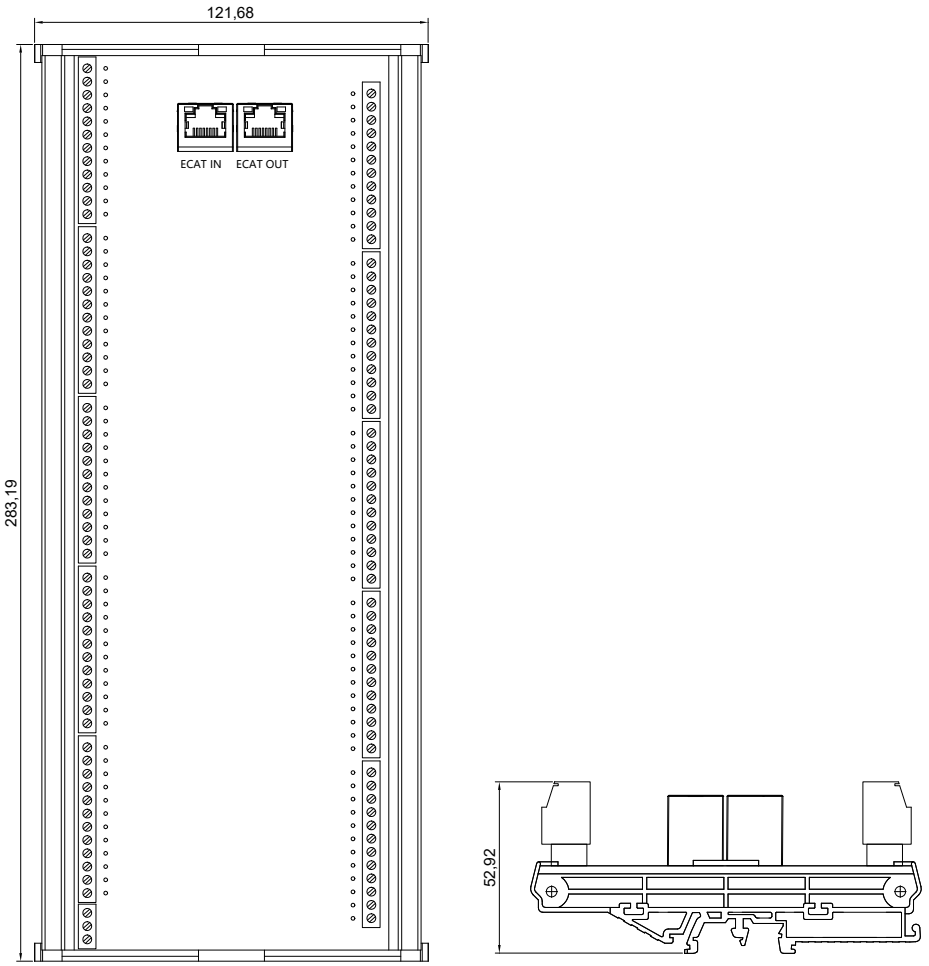


1.2 Overall dimensions

(1) VEC-VE-EX-32IO-A



(2) VEC-VE-EX-ECAT-SUB



1.3 General Specifications

1.3.1 Module Storage Environment

The product must be placed in packing box before installation; If the machine is not in use temporarily , In order to make the product can meet the company's warranty scope and future maintenance, note the following when storing:

(1) Must be placed in a dry and grime free place;

(2) The ambient temperature of the storage location must be within the range of -20℃ to +65℃;

(3) The relative humidity of the storage location must be in the range of 0% to 95%, and there is no condensation;

(4) Avoid storage in an environment containing corrosive gases and liquids;

(5) Properly packaged and stored on shelves or countertops.

1.3.2 Module Installation Environment

The operating temperature of this product is -10℃ to +40℃.

It is recommended that the ambient temperature be below +40℃ for Long hours at work. If the ambient temperature is above +40℃, place it in a well-ventilated place to ensure product reliability. If the product is installed in a distribution box, the size and ventilation conditions of the distribution box must be make sure all internal electronic devices are not in danger of overheating, and attention should be paid to whether vibration of the machine will affect the electronics of the distribution box .In addition, the conditions of use also include the following:

(1) Places without high heat generating devices;

(2) Places without water droplets, steam, dust and oily dust;

(3) Places without non-corrosive, flammable gas, liquid places;

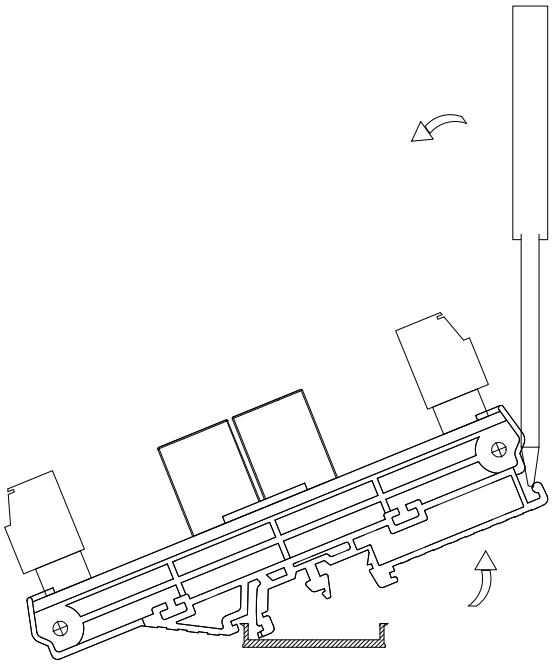
(4) Places without no- floating dust and metal particles ;

⑸ Places without vibration;

⑹ Places without electromagnetic noise interference.

1.3.3 Installation and disassembly

The installation adopts the buckle type DIN rail installation, It is very convenient to install and disassemble.



Chapter ‖ Distributed IO extension

2.1 I/O Extension Concepts

The I/O capacity of the host is limited. If the system needs more I/O control, you can connect the I/O expansion module to the host.

2.2 Product introduction

VE motion controller supports distributed IO expansion and local IO expansion. Among them, distributed IO expansion modules mainly include DIO32 (hybrid) and FIO76 (hybrid); The local IO expansion module has 6 types: 8DI, 8DO, 16DI, 16DO, 4AI, 4AO, etc. see 1.1.1 model and function of expansion module for specific models.

The following describes IO models and how to use them.

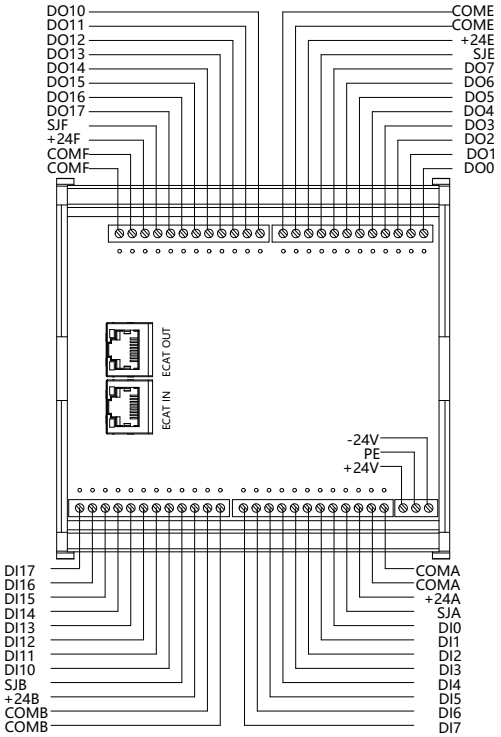
2.3 VEC-VE-EX-32IO-A

2.3.1 Product Appearance and configuration

① EtherCAT(IN) : EtherCAT network input, connected to the host output or the last extension EtherCAT(OUT)

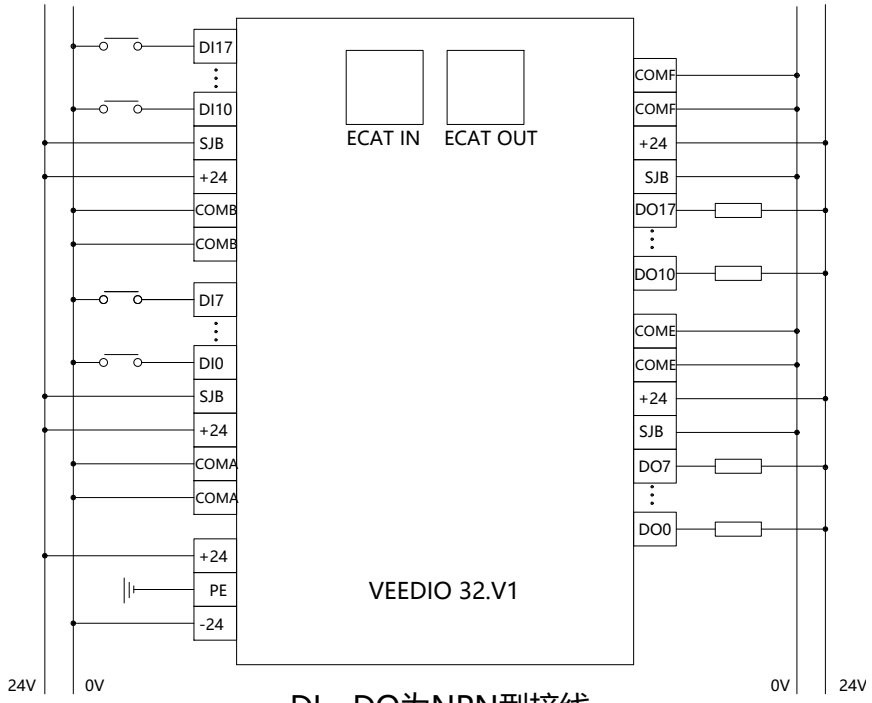
② EtherCAT(OUT) : EtherCAT network output, connected to the next extension input EtherCAT(IN) or not connected

③ External 24V power supply and DI wiring terminal. Its definition is as follows:

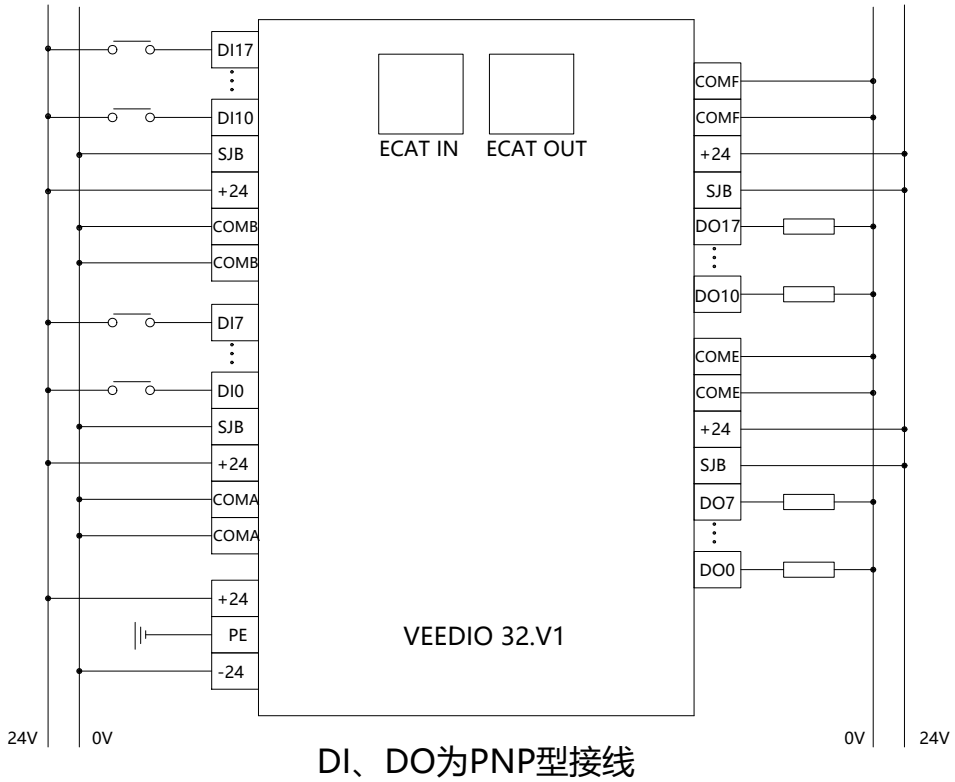


2.3.2 Product Wiring Description

You can select NPN and PNP for DI and DO based on the jumper port on the terminal. The specific connection mode is as follows:



DI、DO为NPN型接线



DI、DO为PNP型接线

2.3.3 Object description of EtherCAT

The product provides a device description file named "model.xml". Each device model has

its corresponding device description file. The file import method is performed in the master configuration,As long as the master station supports standard EtherCAT communication, the device configuration can be imported normally.

VEC-VE-EX-32IO-A extension has one RPDO (1702) and one TPDO (1B02), which contains the following objects:

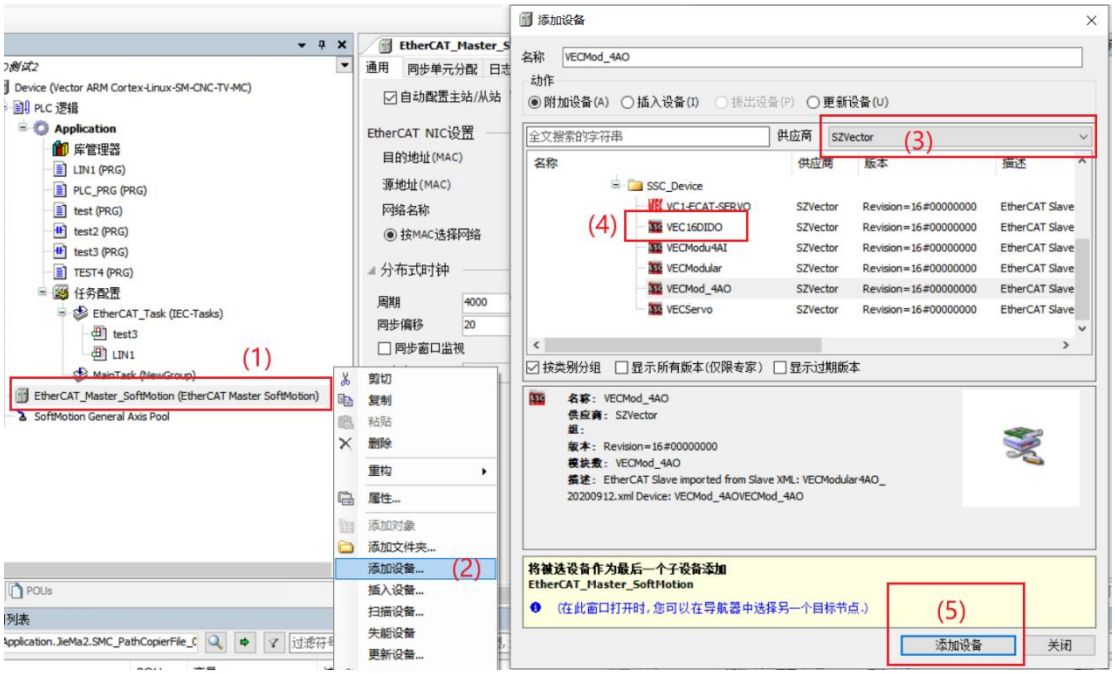
Object	Definition
1702 (RPDO259)	6300h(Write output 16-bit)：16 bit DO output
1B02 (TPDO259)	6100h(Read input 16-bit)：16 bit DO input

After importing the file device, it can be seen that the AI mapping is shown in the figure below. For the import method, see the 《VE motion controller programming manual》of VECTOR

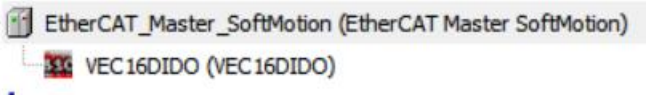
变量	映射	通道	地址	类型	单元	描述
		Write output 16-bit	%QW0	UINT		Write output 16-bit
		Read input 16-bit	%IW0	UINT		Read input 16-bit
		Pulse Counter 1	%ID1	UDINT		Pulse Counter 1
		Pulse Counter 2	%ID2	UDINT		Pulse Counter 2

2.3.4 Device Adding descriptions

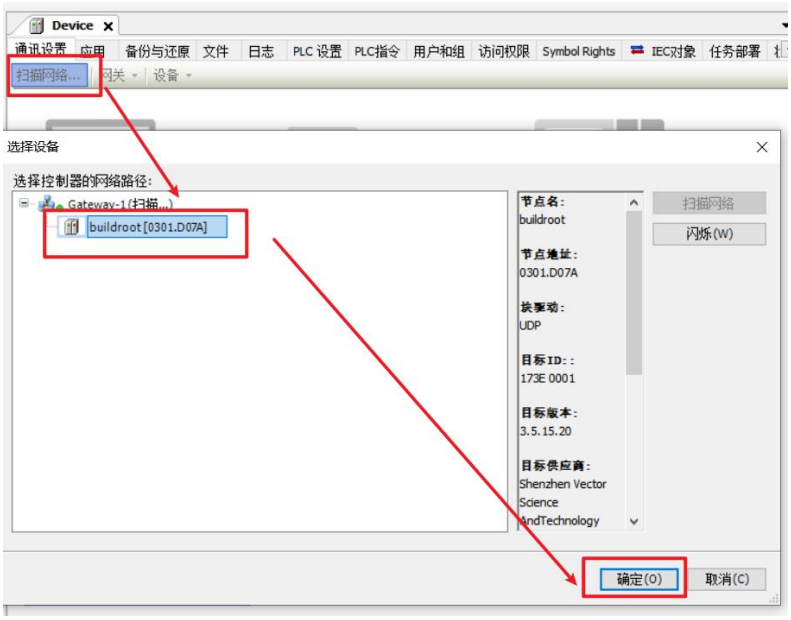
(1) Add VEC-VE-EX-32IO-A to the software



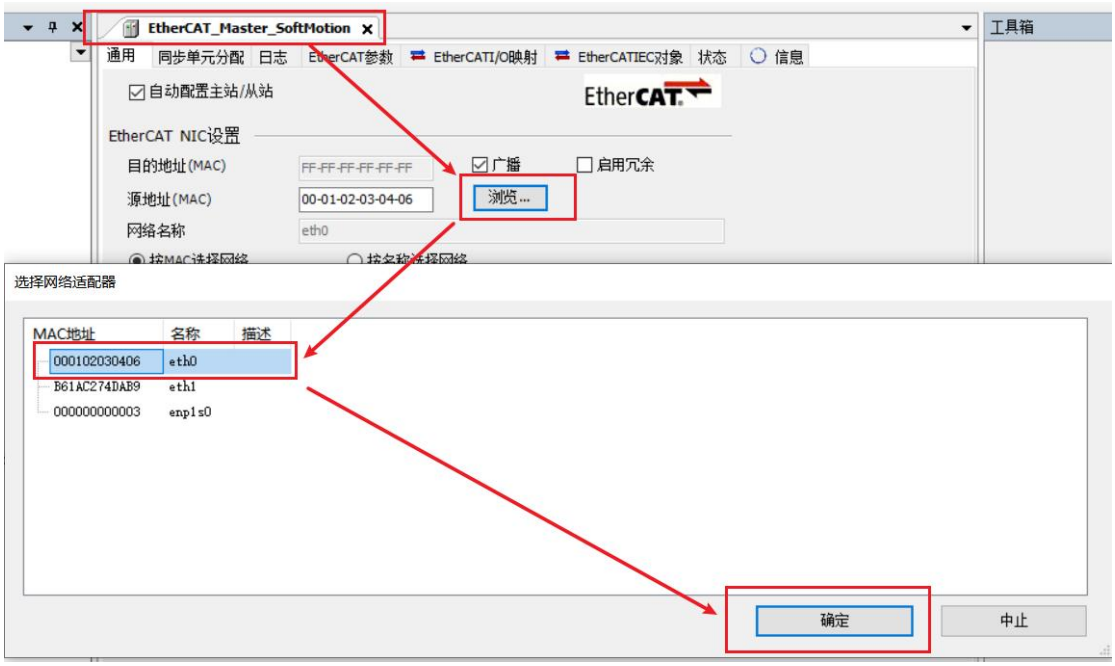
(2)As shown in the following figure, it is added successfully;



(3) Connect to the VE host and scan the network.



⑷As shown below, the EtherCAT network adapter is assigned to eth0

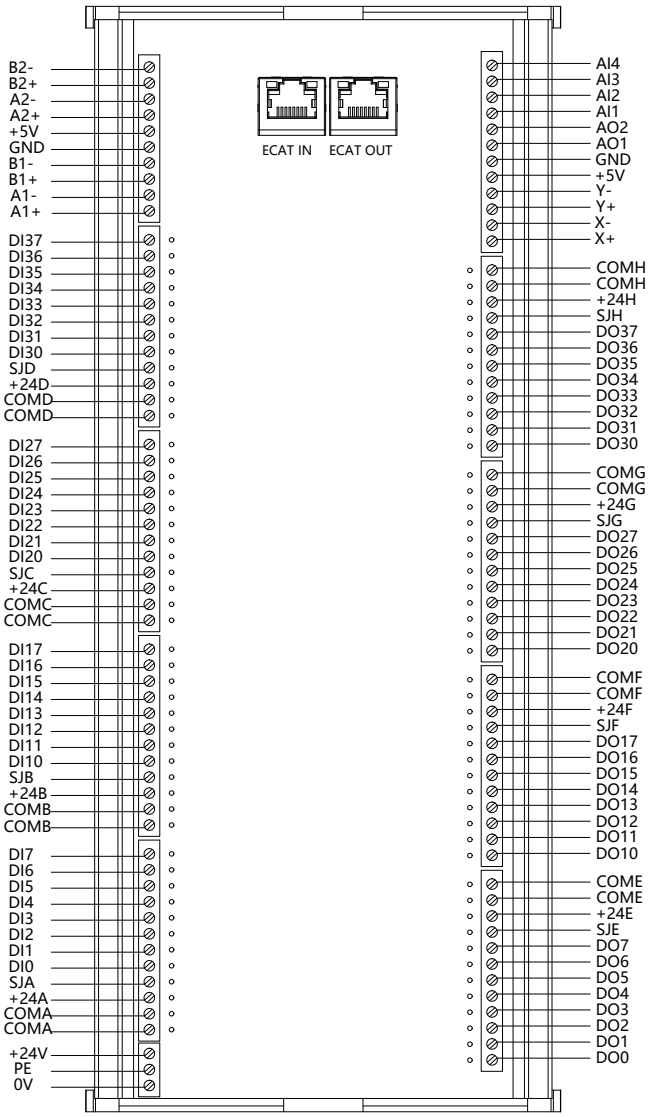


(5) It can then be used according to the above object description;

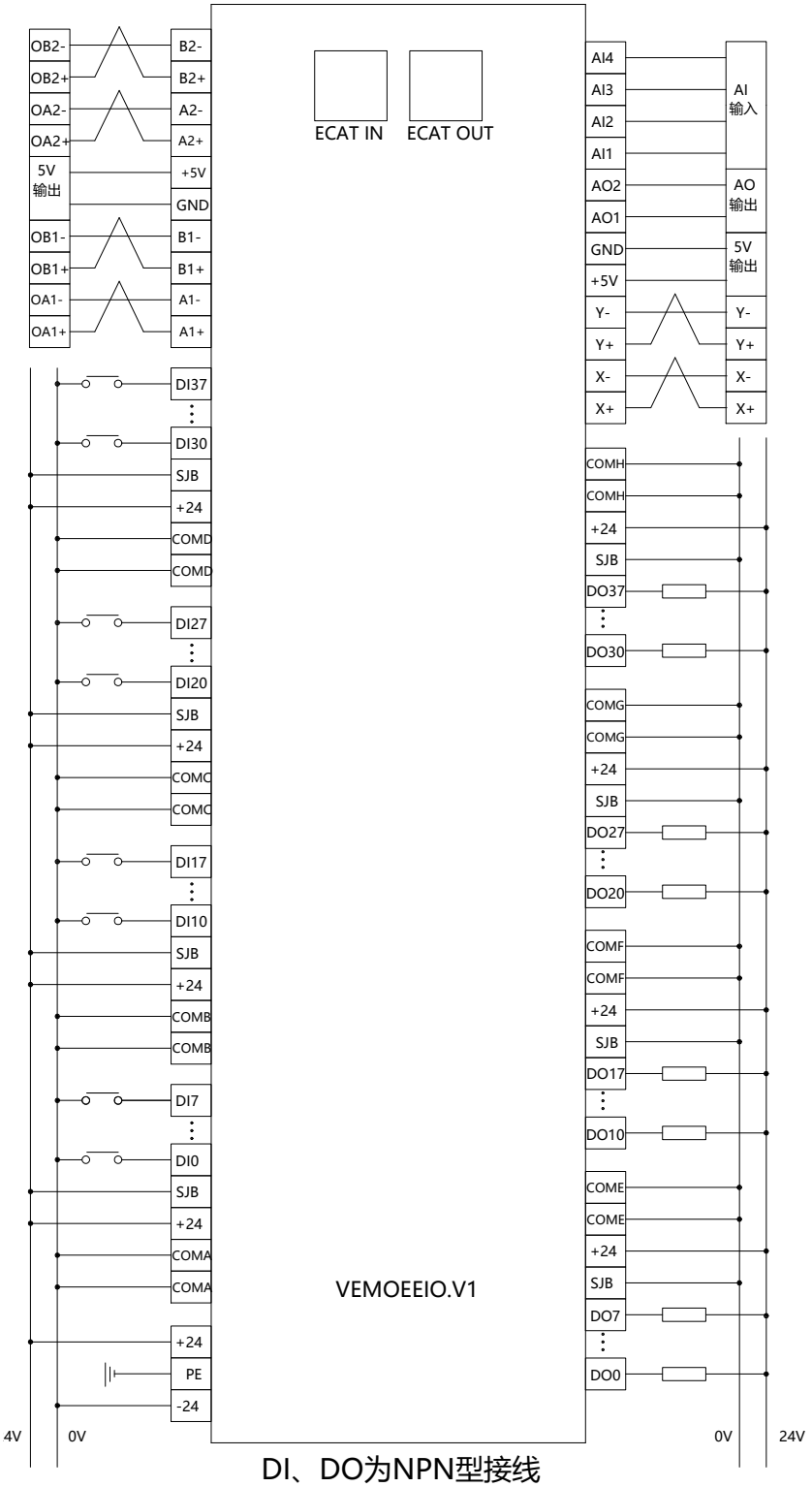
2.4 VEC-VE-EX-ECAT-SUB（mix）

2.4.1 Product Appearance and Configuration introduction

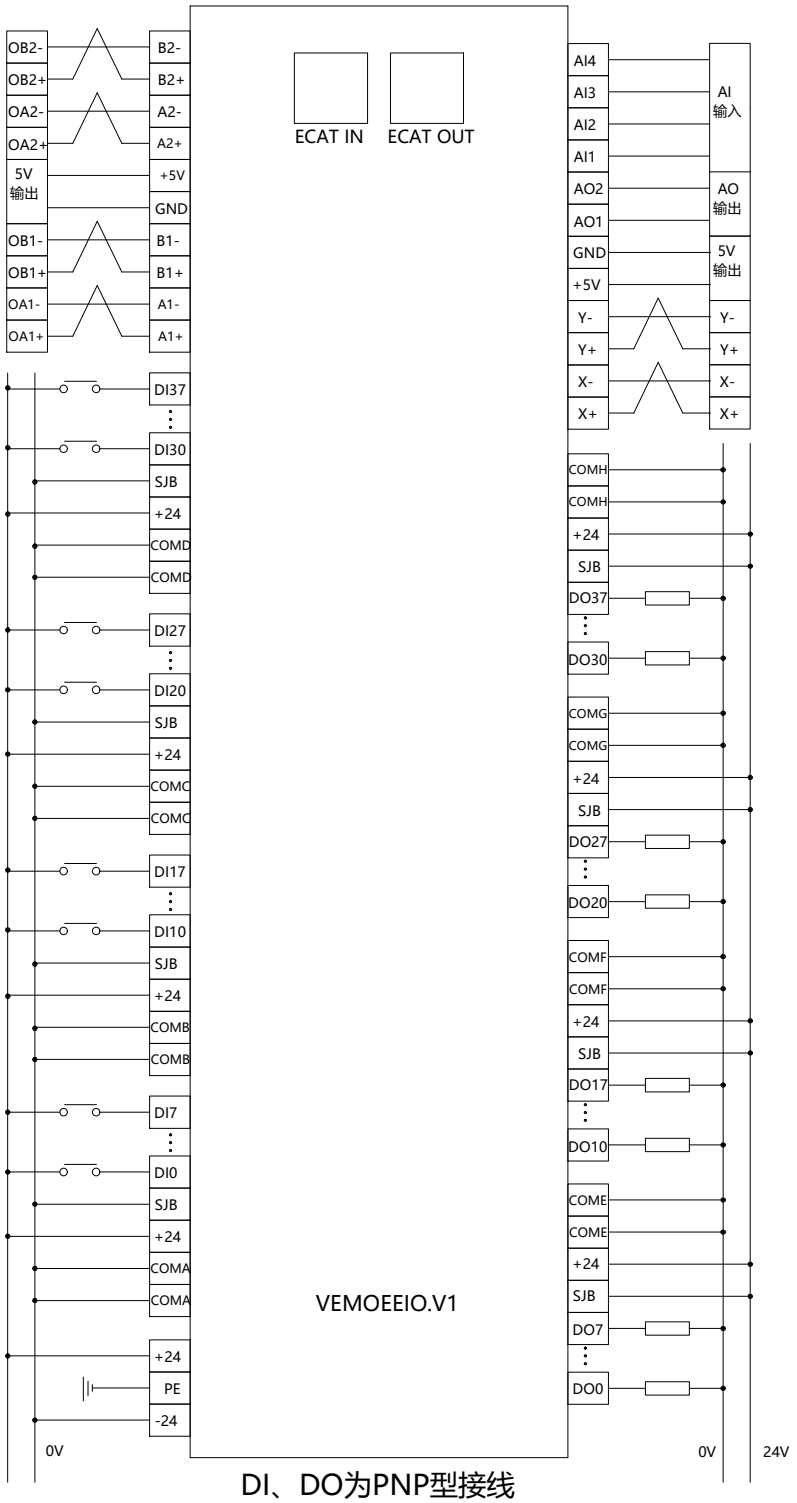
①EtherCAT(IN) : EtherCAT network input, connected to the host output or the last extension EtherCAT(OUT)
②EtherCAT(OUT) : EtherCAT network output, connected to the next extension input EtherCAT(IN) or not connected
③ The functions are as follows:
(1) 32 point digital input, 32 point digital output, input and output optional NPN or PNP;
(2) 4-channel analog input (-10V~+10V)
(3) 2-channel analog output (-10V~+10V)
(4) 1-channel pulse counter (XY pulse)
(5) 2-channel encoder count (AB pulse, support probe function, support pulse)
④External 24V power supply and DI wiring terminal. Its definition is as follows:


B2-
B2+
A2-
A2+
+5V
GND
B1-
B1+
A1-
A1+
DI37
DI36
DI35
DI34
DI33
DI32
DI31
DI30
SJD
+24D
COMD
COMD
DI27
DI26
DI25
DI24
DI23
DI22
DI21
DI20
SJC
+24C
COMC
COMC
DI17
DI16
DI15
DI14
DI13
DI12
DI11
DI10
SJB
+24B
COMB
COMB
DI7
DI6
DI5
DI4
DI3
DI2
DI1
DI0
SJA
+24A
COMA
COMA
+24V
PE
0V
ECAT IN
ECAT OUT
AI4
AI3
AI2
AI1
AO2
AO1
GND
+5V
Y-
Y+
X-
X+
COMH
COMH
+24H
SJH
DO37
DO36
DO35
DO34
DO33
DO32
DO31
DO30
COMG
COMG
+24G
SJG
DO27
DO26
DO25
DO24
DO23
DO22
DO21
DO20
COMF
COMF
+24F
SJF
DO17
DO16
DO15
DO14
DO13
DO12
DO11
DO10
COME
COME
+24E
SJE
DO7
DO6
DO5
DO4
DO3
DO2
DO1
DO0

2.4.2 Product Wiring Description



DI、DO为NPN型接线



DI、DO为PNP型接线

2.4.3 Description of the EtherCAT object

The product provides a device description file named "model.xml". Each device model has

its corresponding device description file. The file import method is performed in the master configuration,As long as the master station supports standard EtherCAT communication, the device configuration can be imported normally.

VEC-VE-EX-ECAT-SUB (hybrid) extension has one RPDO (1600) and one TPDO (1A00). Note that a maximum of 16 groups of process parameters can be configured in 1A00.
It contains the following objects:：

Object	Definition
1600 (The first RPDO)	6320h(Write output 32-bit)：32-bit DO output
	6411:01(Write analogue output 16-bit of channal1)：Analog output channel 1
	6411:02(Write analogue output 16-bit of channal2)：Analog output channel 2
	60B8h(Touch Probe Function)：Probe function register
	2003h(Pulse output1 control low32)：Pulse output 1 pulse period：If it is a period of n microseconds, write the value of n microseconds times 50
	2004h(Pulse output1 control high32)：Pulse output 1 total number（Scope：-2147483648~~~2147483647）
1A00 (The first TPDO)	2000h(Pulse Counter low32)：Pulse counter low 32 bits
	2001h(Pulse Counter high32): Pulse counter high 32 bits
	2005h(Pulse output1 status low32)： Actual insertion time
	2006h(Pulse output1 status high32)：Number of pulses sent
	6120h(Read input 32-bit)：32-bit DI input
	6004h(Position Value)：Encoder 1 position
	6104h(Position Value2)：Encoder 2 position
	6401:01(Read analogue input 16-bit of channal1)：Analog input channel 1
	6401:02(Read analogue input 16-bit of channal2)：Analog input channel 2
	6401:03(Read analogue input 16-bit of channal3)：Analog input channel 3
	6401:04(Read analogue input 16-bit of channal4)：Analog input channel 4
	60B9(Touch Probe Status)：Probe status
	60BA(Probe1 PosLatchPos)：Latch position value of rising edge of probe 1
	60BB(Probe1 NegLatchPos)：Latch position value of falling edge of probe 1
	60BC(Probe2 PosLatchPos)：Latch position value of rising edge of probe 2
	60BD(Probe2 NegLatchPos)：Latch position value of falling edge of probe 2

After importing the file device, it can be seen that the I/O mapping is shown in the figure below. For the import method, see the 《VE motion controller programming manual》 of VECTOR

		Write output 32-bit	%QD7	UDINT		Write output 32-bit
		Write analogue output 16-bit of channal 1	%QW16	INT		Write analogue output 16-bit of channal 1
		Write analogue output 16-bit of channal 2	%QW17	INT		Write analogue output 16-bit of channal 2
		Touch Probe Function	%QW18	UINT		Touch Probe Function
		Pulse output1 control low32	%QD10	UDINT		Pulse output1 control low32
		Pulse output1 control high32	%QD11	UDINT		Pulse output1 control high32
		Pulse Counter low32	%ID16	UDINT		Pulse Counter low32
		Pulse Counter hig32	%ID17	UDINT		Pulse Counter hig32
		Pulse output1 status low32	%ID18	UDINT		Pulse output1 status low32
		Pulse output1 status high32	%ID19	UDINT		Pulse output1 status high32
		Read input 32-bit	%ID20	UDINT		Read input 32-bit
		Position Value	%ID21	UDINT		Position Value
		Position Value 2	%ID22	UDINT		Position Value 2
		Read analogue input 16-bit of channal 1	%IW46	INT		Read analogue input 16-bit of channal 1
		Read analogue input 16-bit of channal 2	%IW47	INT		Read analogue input 16-bit of channal 2
		Read analogue input 16-bit of channal 3	%IW48	INT		Read analogue input 16-bit of channal 3
		Read analogue input 16-bit of channal 4	%IW49	INT		Read analogue input 16-bit of channal 4
		Touch Probe Status	%IW50	UINT		Touch Probe Status
		Probe1PosLatchPos	%ID26	UDINT		Probe1PosLatchPos
		Probe1NegLatchPos	%ID27	UDINT		Probe1NegLatchPos
		Probe2PosLatchPos	%ID28	UDINT		Probe2PosLatchPos
		Probe2NegLatchPos	%ID29	UDINT		Probe2NegLatchPos

2.4.4 Function Description

1、Pulse input function.

The pulse type of the pulse counter, as well as the type of the encoder 1 and 2, can be configured by starting the parameter,the configuration object:0X2007 (configure parameter1)

Bit0-Bit2：Pulse Type of pulse input counter	0：Pulse + direction positive logic 1：Pulse + direction negative logic 2：AB pulse 3：CW pulse positive logic 4：CW pulse negative logic
Bit3-Bit5：Type of encoder 1	1：17-bit encoder 2：24-bit encoder 3：23-bit encoder 4：Photoelectric encoder
Bit6-Bit8：Type of encoder 2	1：17-bit encoder 2：24-bit encoder 3：23-bit encoder 4：Photoelectric encoder

2. Pulse output function.

Add a configuration object to the startup parameter:0X2009 (configure parameter3)

Bit0：AB Pulse interface 1 Type	0：AB pulse interface1 is received by the encoder 1：AB pulse interface1 is the pulse output
Bit1：AB Pulse interface2 Type	0：AB pulse interface2 is received by the encoder

	1：AB pulse interface2 is the pulse output

Bit0：AB pulse interface 1 Type Selection	0：AB pulse interface1 is received by the encoder 1：AB pulse interface1 is the pulse output
Bit1：2AB pulse interface 1 Type Selection	0：AB pulse interface2 is received by the encoder 1：AB pulse interface2 is the pulse output

Then modify 2003h, 2004h, 2013h and 2014h in the process data:

2003h(Pulse output1 control low32)：Pulse output 1 Pulse period: if it is a period of N microseconds, write the value of N microseconds multiplied by 50
2004h(Pulse output1 control high32)：Pulse output 1 total number（Scope：-2147483648~~~2147483647）
2013h(Pulse output2 control low32)：Pulse output 2 Pulse period: if it is a period of N microseconds, write the value of N microseconds multiplied by 50
2014h(Pulse output2 control high32)：Pulse output 2 total number(Scope：-2147483648~~~2147483647）

The actual number of pulses emitted by pulse output 1 and pulse output 2 and the actual pulse insertion time can be observed by adding process parameters.

object	definition
1A00 (The first TPDO)	2005h(Pulse output1 status low32)：Pulse 1 Actual pulse insertion time
	2006h(Pulse output1 status high32)：Number of pulses that have been sent by pulse 1
	2015h(Pulse output2 status low32)：Pulse 2 Actual pulse insertion time
	2016h(Pulse output2 status high32)：Number of pulses that have been sent by pulse 2

3. Analog input filtering function and analog input and output function.

Configure the low-pass filtering time of analog input, which can be configured in the startup parameters. Configuration object: 0x2002

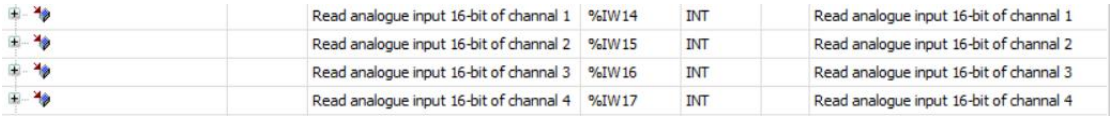
Indexes	Sub index	explanation
0X2002	0X1	Analog input AI1 Low pass filtering time，unit：20ns
	0X2	Analog input AI2 Low pass filtering time，unit：20ns
	0X3	Analog input AI3 Low pass filtering time，unit：20ns
	0X4	Analog input AI4 Low pass filtering time，unit：20ns

VEC-VE-EX-ECAT-SUB (hybrid) extension has four channels of analog input and two channels of modulus output, which includes the following objects:

Object	definition
1A00 (The first TPDO)	6401:01(Read analogue input 16-bit of channal1)：Analog input channel 1
	6401:02(Read analogue input 16-bit of channal2)：Analog input channel 2
	6401:03(Read analogue input 16-bit of channal3)：Analog input channel 3
	6401:04(Read analogue input 16-bit of channal4)：Analog input channel 4
1600 (The first RPDO)	6411:01(Write analogue output 16-bit of channal1)：Analog output channel 1
	6411:02(Write analogue output 16-bit of channal2)：Analog output channel 2

After importing the file device, it can be seen that the AI mapping is shown in the figure below. For the import method, see the 《VE motion controller programming manual》 of VECTOR

Note: the unit of output value of each channel is mV;



Read analogue input 16-bit of channal 1	%IW14	INT		Read analogue input 16-bit of channal 1
Read analogue input 16-bit of channal 2	%IW15	INT		Read analogue input 16-bit of channal 2
Read analogue input 16-bit of channal 3	%IW16	INT		Read analogue input 16-bit of channal 3
Read analogue input 16-bit of channal 4	%IW17	INT		Read analogue input 16-bit of channal 4

4.DI high-speed counter function

⑴DI pulse counting configuration:

(Add configuration object in startup parameter0x2019：DI Pulse Counter Configure)

Bit0-Bit5：Channel 1 DI selection	1：DI0 2：DI1 3：DI2 …
Bit6：Channel 1 counting mode	0：Channel 1 selects falling edge count 1：Channel 1 selects rising edge count
Bit7	retain
Bit8-Bit13：Channel 2 DI selection	1：DI0 2：DI1 3：DI2 …
Bit14：Channel 2 counting mode	0：Channel 2 selects falling edge count 1：Channel 2 selects rising edge count
Bit15	retain

(2) DI channel pulse counter:

This extension has two DI channels as pulse counters. Add and configure the following table objects in the process data group 16#1A00 as required (note that there can only be 16 groups at most when configuring the process parameters in 1A00) :

Indexes（0x2017） DI Channal 1 Pulse Counter	DI channel 1 pulse counter
Indexes：（0x2018） DI Channal 2 Pulse Counter	DI channel 2 pulse counter

5.XY pulse counter:

The expansion has one XY pulse counter. The external encoder can observe the number of pulses sent according to needs， including objects as follows:

Object	definition
1A00 (The first TPDO)	2000h(Pulse Counter low32)：Pulse counter low 32 bits
	2001h(Pulse Counter high32): Pulse counter high 32 bits

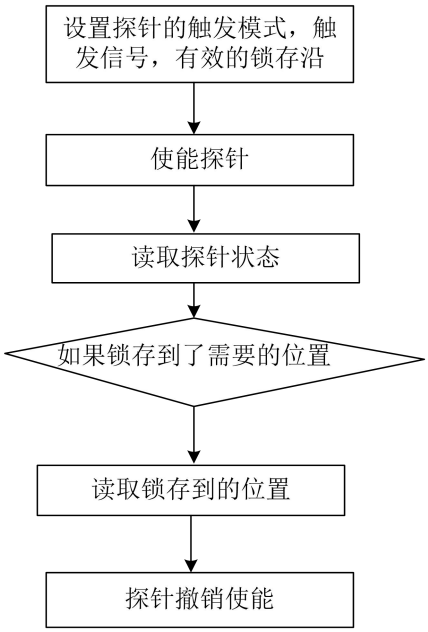
6. Probe function

(1) Introduction to probe function (only encoder 1 (Ab1) can use probe function)

Probe function is position latch function. It can latch the position information (encoder unit) when the external DI signal or the motor Z signal changes.The VEC supports two probes at the same time. The position information corresponding to the rising edge and falling edge of each probe signal can be recorded at the same time, and four positions can be locked at the same time.Probe 1 can select DI0 or motor Z signal as probe signal, and probe 2 can select DI1 or motor Z signal as probe signal.The position information latched by the rising edge of probe 1 is stored in 0x60BA (encoder unit), the position information latched by the falling edge of probe 1 is stored in 0x60BB (encoder unit), the position information latched by the rising edge of probe 2 is stored in 0x60BC (encoder unit), and the position information latched by the falling edge of probe 2 is stored in 0x60BD (encoder unit).You can also set whether each probe is locked continuously or only once.Continuous latch refers to latch as long as the probe is enabled and the signal jumps. Locking only once means that after the probe is enabled, only the jump edge of the first signal is locked. After that, no matter whether the signal has jump or not, it will not be locked.

Note: the z-trust number mentioned above is for servo drives, this extension does not have it!!

The probe must be used in strict accordance with the following steps.



⑵ The relevant objects are as follows.

Set probe function (0x60B8)

Index	60B8h		
name	Set probe function		
Object type	variant		
data type	Unsigned 16 bits		
PDO mapping	Can be mapped		
Read and write attribute	Readable and writable		
default value	0		
set range	0~65535		
detailed description	Bit	function	Bit0~Bit5：Probe 1 related Settings ◆note： Once the enable signal of probe 1 (rising edge of bit0 of 60B8h) is valid, the function Settings of probe 1 (trigger mode, trigger signal, effective latch edge) cannot be changed, and the bit0 of 60B8h must remain valid during the operation of probe 1. When DI0 acts as the trigger signal of probe 1, its rising edge and falling edge can be enabled simultaneously
	0	Enable probe 1: 0--Probe 1 is disabled 1--Probe 1 is enabled	
	1	Probe 1 triggers mode 0—Single trigger. Trigger only when the trigger signal is effective for the first time 1—Continuous trigger	
	2	Probe 1 triggers signal selection 0—DI0 input signal 1—Z signal (none)	
	3	RES	

	4	Rising edge of probe 1 is enabled 0--Rising edge does not latch 1--Rising edge latch	
	5	Probe 1 falling edge enable 0--Falling edge does not latch 1--Falling edge latch	
	6-7	RES	
	8	Enable probe2: 0--Probe 2is disabled 1--Probe 2 is enabled	Bit8~Bit15: Probe 1 related ◆note: Once the enable signal of probe 2 (rising edge of bit8 of 60B8h) is valid, the function Settings of probe 1 (trigger mode, trigger signal, effective latch edge) cannot be changed, and the bit8 of 60B8h must remain valid during the operation of probe 2. When DI0 acts as the trigger signal of probe2, its rising edge and falling edge can be enabled simultaneously
	9	Probe 2 triggers mode 0—Single trigger. Trigger only when the trigger signal is effective for the first time 1—Continuous trigger	
	10	Probe 2 triggers signal selection 0—DI1 Input signal 1—Z signal (none)	
	11	RES	
	12	Rising edge of probe 2 is enabled 0--Rising edge does not latch 1--Rising edge latch	
	13	Probe 2 falling edge enable 0--Falling edge does not latch 1--Falling edge latch	
	14-15	RES	

Read probe state (0x60B9)

Index	60B9h
name	Set probe function
Object type	variant
data type	Unsigned 16 bits

<table>
<tr><td>PDO mapping</td><td colspan="3">Can be mapped</td></tr>
<tr><td>Read and write attribute</td><td colspan="3">Readable and writable</td></tr>
<tr><td>default value</td><td colspan="3">0</td></tr>
<tr><td>set range</td><td colspan="3">0~65535</td></tr>
<tr><td>detailed description</td><td colspan="3"><table>
<tr><td>Bit</td><td>function</td><td></td></tr>
<tr><td>0</td><td>Enable probe 1:
0--Probe 1 is disabled
1--Probe 1 is enabled</td><td rowspan="7">Bit0~Bit5：Probe 1 related Settings
◆note：
Once the enable signal of probe 1 (rising edge of bit0 of 60B8h) is valid, the function Settings of probe 1 (trigger mode, trigger signal, effective latch edge) cannot be changed, and the bit0 of 60B8h must remain valid during the operation of probe 1. When DI0 acts as the trigger signal of probe 1, its rising edge and falling edge can be enabled simultaneously</td></tr>
<tr><td>1</td><td>Probe 1 triggers mode
0—Single trigger. Trigger only when the trigger signal is effective for the first time
1—Continuous trigger</td></tr>
<tr><td>2</td><td>Probe 1 triggers signal selection
0—DI0 input signal
1—Z signal (none)</td></tr>
<tr><td>3</td><td>RES</td></tr>
<tr><td>4</td><td>Rising edge of probe 1 is enabled
0--Rising edge does not latch
1--Rising edge latch</td></tr>
<tr><td>5</td><td>Probe 1 falling edge enable
0--Falling edge does not latch
1--Falling edge latch</td></tr>
<tr><td>6-7</td><td>RES</td><td></td></tr>
<tr><td>8</td><td>Enable probe2：
0--Probe 2is disabled
1--Probe 2 is enabled</td><td rowspan="5">Bit8~Bit15：Probe 1 related
◆note：
Once the enable signal of probe 2 (rising edge of bit8 of 60B8h) is valid, the function Settings of probe 1 (trigger mode, trigger signal, effective latch edge) cannot be changed, and the bit8 of 60B8h must remain valid during the operation of probe 2. When DI0 acts as the trigger signal of probe2, its rising edge and falling edge can be enabled</td></tr>
<tr><td>9</td><td>Probe 2 triggers mode
0—Single trigger. Trigger only when the trigger signal is effective for the first time
1—Continuous trigger</td></tr>
<tr><td>10</td><td>Probe 2 triggers signal selection
0—DI1 Input signal
1—Z signal (none)</td></tr>
<tr><td>11</td><td>RES</td></tr>
</table></td></tr>
</table>

	12	Rising edge of probe 2 is enabled 0--Rising edge does not latch 1--Rising edge latch	simultaneously
	13	Probe 2 falling edge enable 0--Falling edge does not latch 1--Falling edge latch	
	14-15	RES	

Probe 1 rising edge latched position 60BAh (encoder unit)

Index	60BAh
name	Probe 1 rising edge latched position
Object type	variant
data type	Signed 32-bit
PDO mapping	Can be mapped
Read and write attribute	read-only
default value	0
set range	-2147483648~2147483647
detailed description	The position latched on the rising edge of probe 1, in encoder units

Probe 1 falling edge latched position 60BBh (encoder unit)

Index	60BBh
name	Probe 1 falling edge latched position
Object type	variant
data type	Signed 32-bit
PDO mapping	Can be mapped
Read and write attribute	read-only
default value	0
set range	-2147483648~2147483647
detailed description	The position latched on the falling edge of probe 1, in encoder units

Probe 2 rising edge latched position 60BCh (encoder unit)

Index	60BCh
name	Probe 2 rising edge latched position
Object type	variant
data type	Signed 32-bit
PDO mapping	Can be mapped

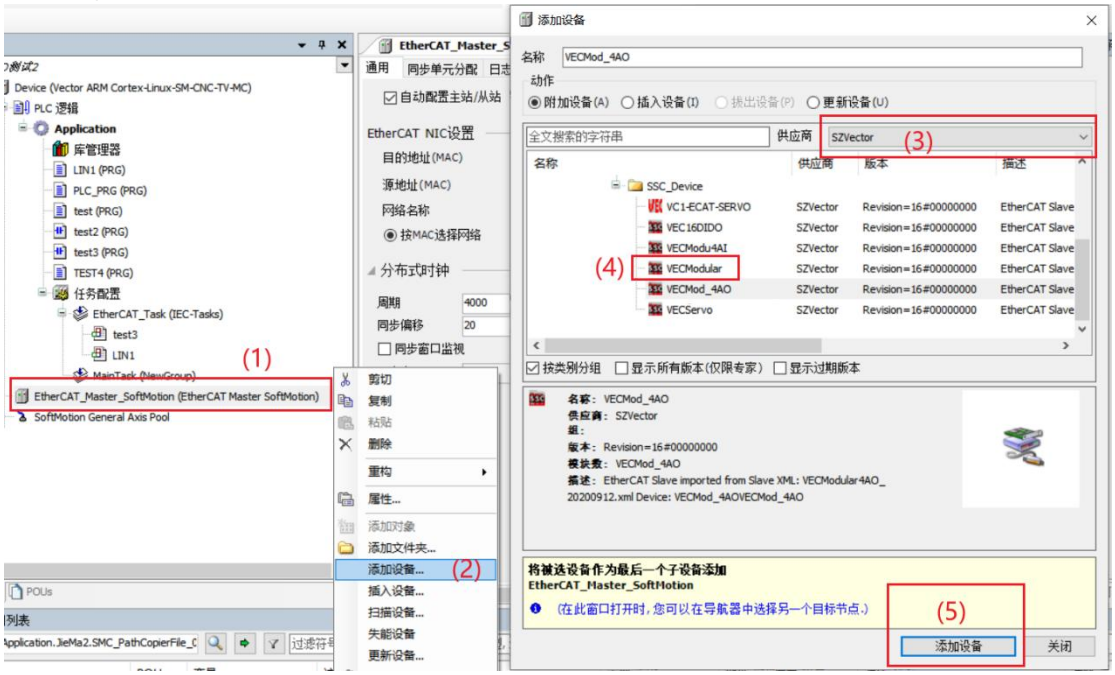
Read and write attribute	read-only
default value	0
set range	-2147483648~2147483647
detailed description	The position latched on the rising edge of probe 2, in encoder units

Probe 2 falling edge latched position 60BDh (encoder unit)

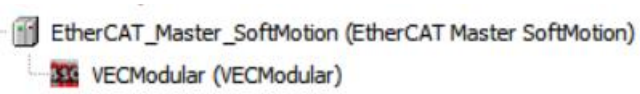
Index	60BDh
name	Probe 2 falling edge latched position
Object type	variant
data type	Signed 32-bit
PDO mapping	Can be mapped
Read and write attribute	read-only
default value	0
set range	-2147483648~2147483647
detailed description	The position latched on the falling edge of probe 2, in encoder units

2.4.5 Device Adding Description

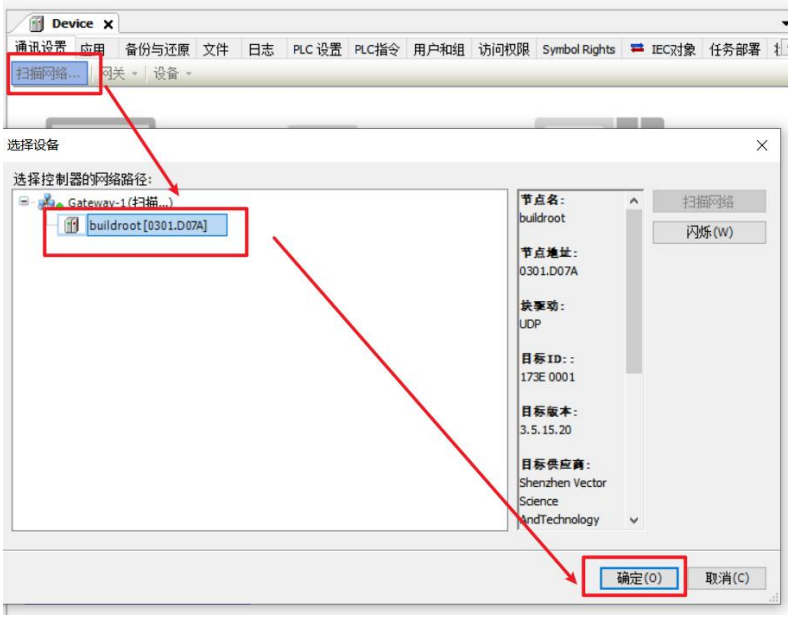
(1) Add VEC-VE-EX-32IO-A equipment on the software according to the sequence number in the figure below;



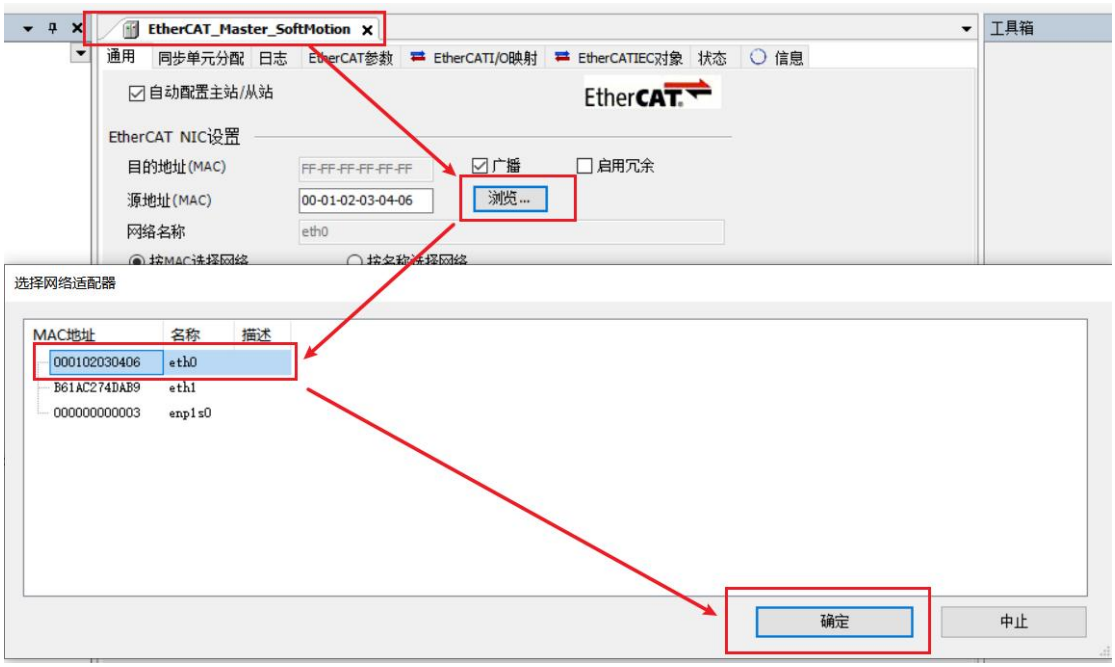
(2) As shown in the following figure, it is added successfully;



(3) Connect to the VE host and scan the network.



(4) As shown in the following figure, EtherCAT network adapter is assigned as eth0;

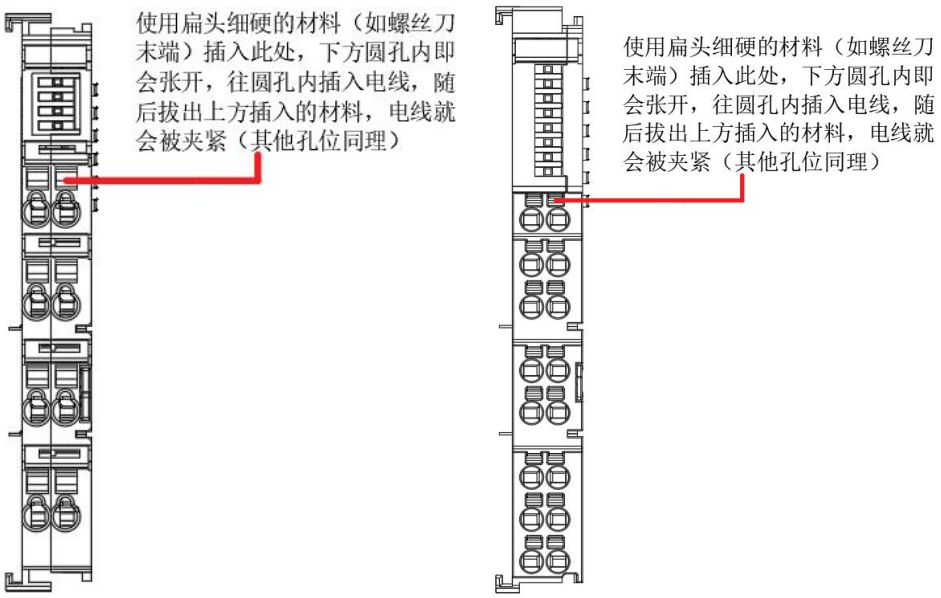


(5) It can then be used according to the above object description;

Chapter Ⅲ local IO Extension

Due to the limited IO of the host, when the system needs more IO control, the IO expansion module can be directly installed and connected to the host through the module. The local IO expansion module can be installed on the right side of the host unit, expansion unit or coupler.

The local expansion wiring method is as follows:

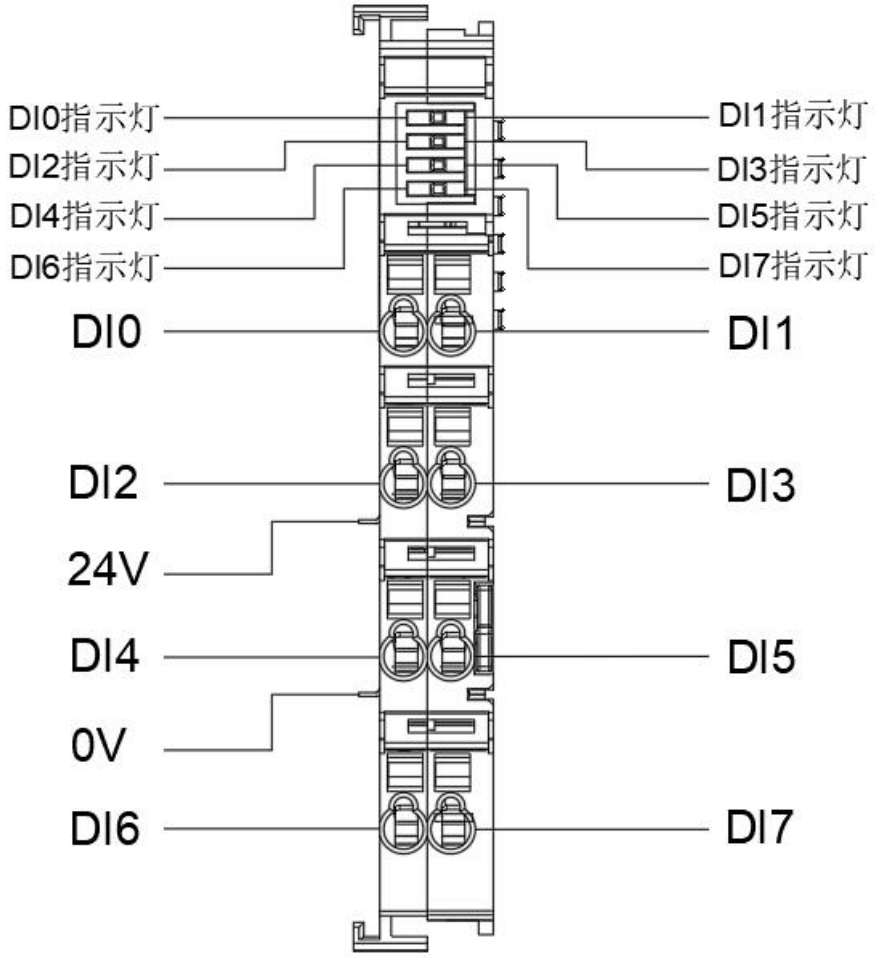


3.1 VEC-VE-EX-8DI

3.1.1 introduction to product appearance and configuration

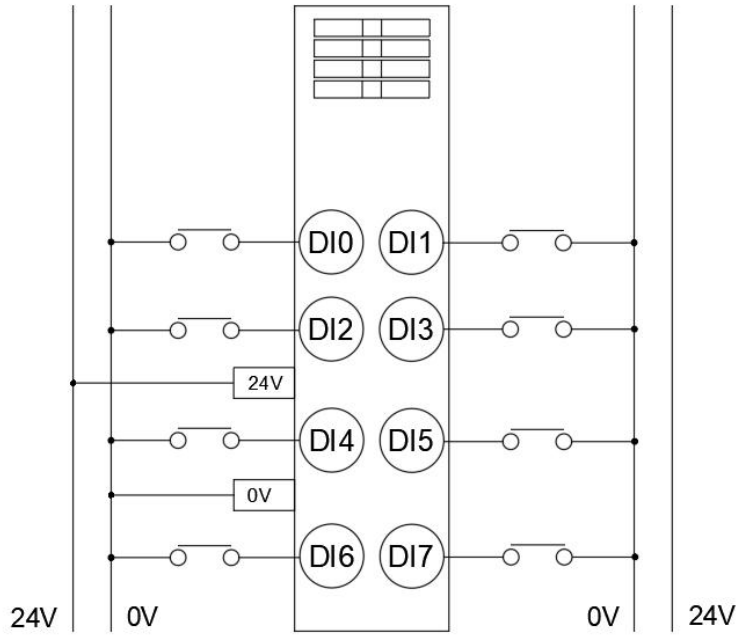
①Indicator: When the DI has an input signal, the indicator is on

② External 24V power supply and DI wiring terminal. Its definition is as follows:

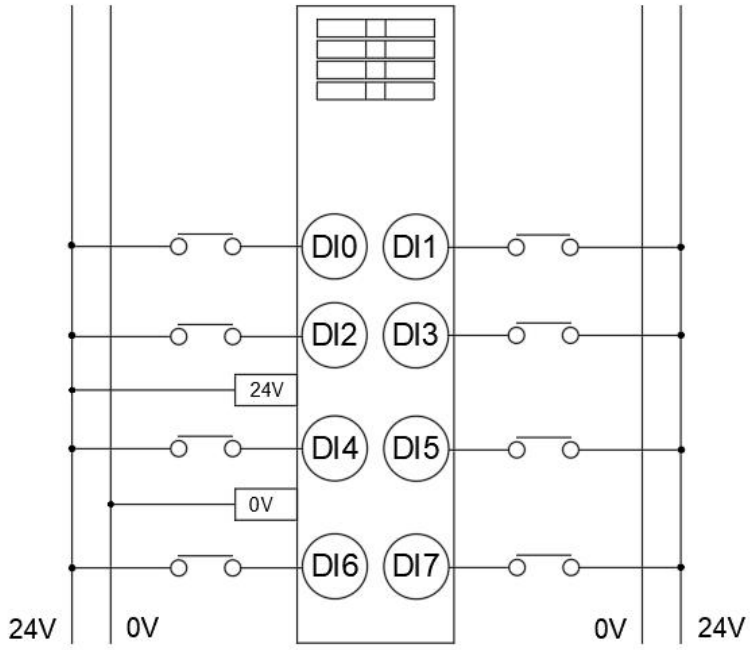


3.1.2 product wiring instructions

The IO trigger mode of this product is based on the models VEC-VE-EX-8DI-NPN and VEC-VE-EX-8DI-PNP. The specific wiring mode is as follows:



DI为NPN型接线



DI为PNP型接线

3.1.3 Object description of EtherCAT

The product provides a device description file named "model.xml". Each device model has its corresponding device description file. The file import method is performed in the master

configuration,As long as the master station supports standard EtherCAT communication, the device configuration can be imported normally.

Vec-ve-ex-8di-npn extension has a TPDO (1600), which contains the following objects:

Object	definition
1600 (Byte 0)	3001h（Input）： 8-bit DI input

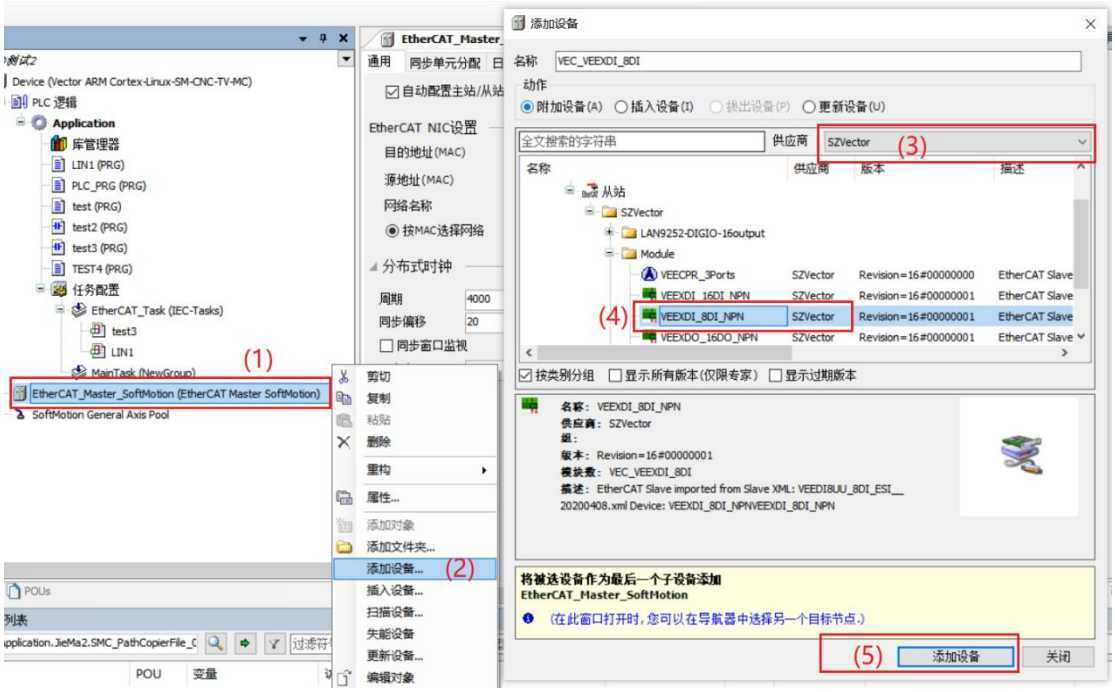
After importing the file device, it can be seen that the DI mapping is shown in the figure below. For the import method, see the 《VE motion controller programming manual》of VECTOR

变量	映射	通道	地址	类型	单元	描述
		Input	%IX2.0	BIT		Input
		Input	%IX2.1	BIT		Input
		Input	%IX2.2	BIT		Input
		Input	%IX2.3	BIT		Input
		Input	%IX2.4	BIT		Input
		Input	%IX2.5	BIT		Input
		Input	%IX2.6	BIT		Input
		Input	%IX2.7	BIT		Input

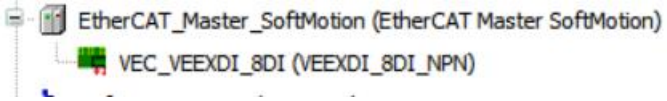
3.1.4 Device Adding Description

(1) The 8DI expansion that needs to be used is nested behind the host power supply;

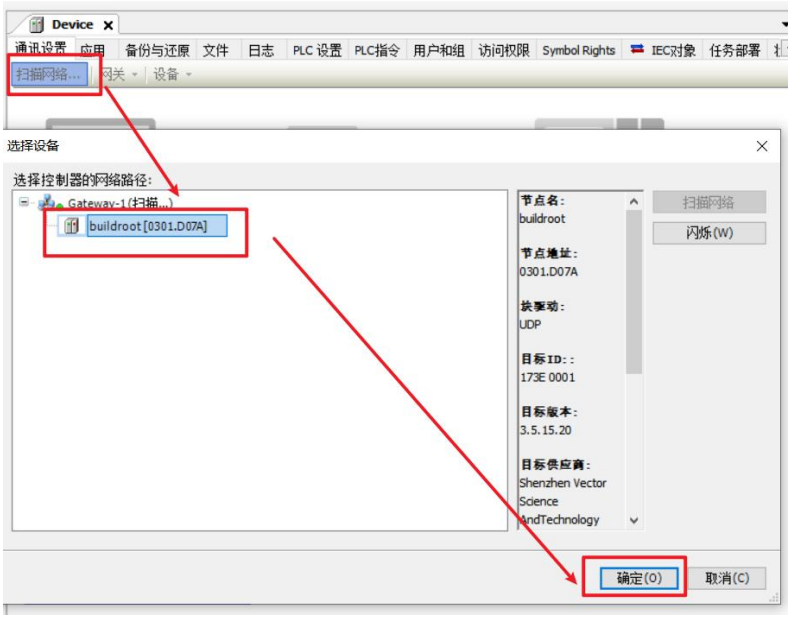
(2) Add 8DI devices to the software in the sequence as shown below;



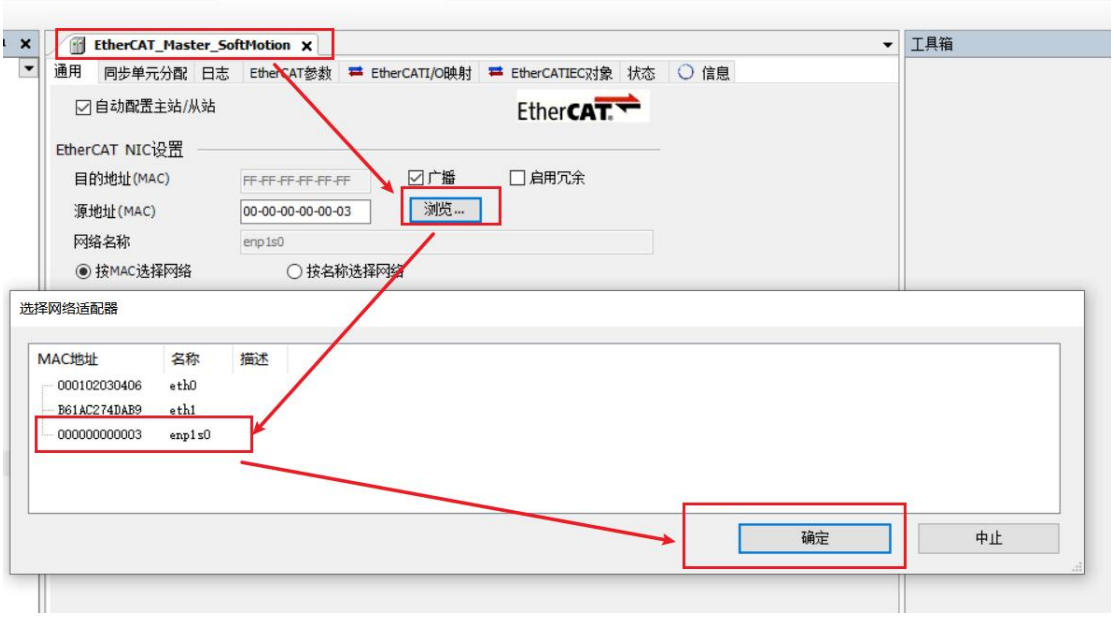
(3) As shown in the following figure, it is added successfully;



(4) Connect to the VE host and scan the network.



(5) As shown below, EtherCAT network adapter is assigned as;

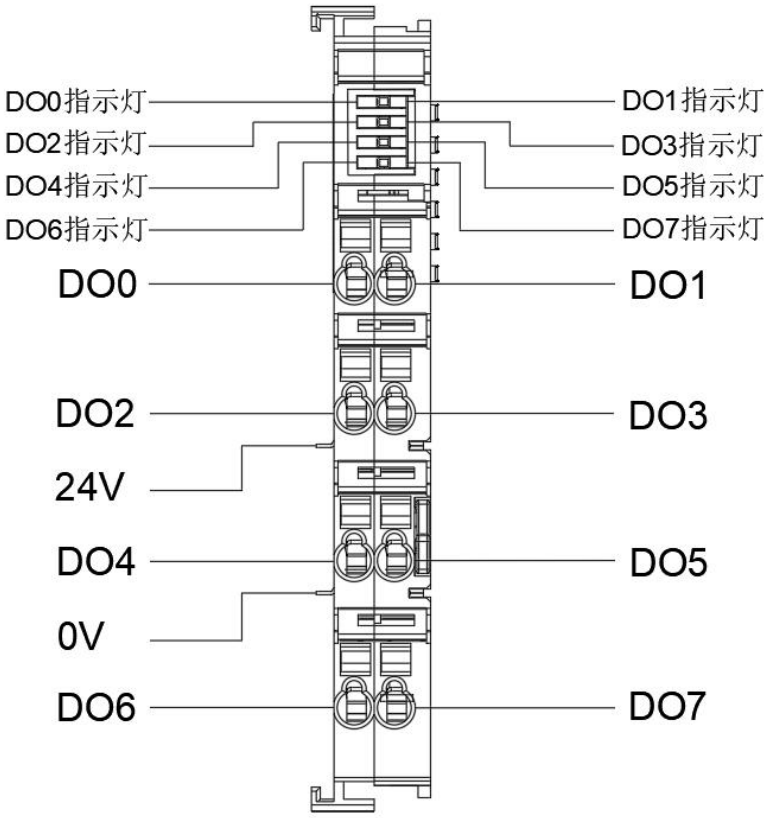


(6)You can then use it according to the object description above.

3.2 VEC-VE-EX-8DO

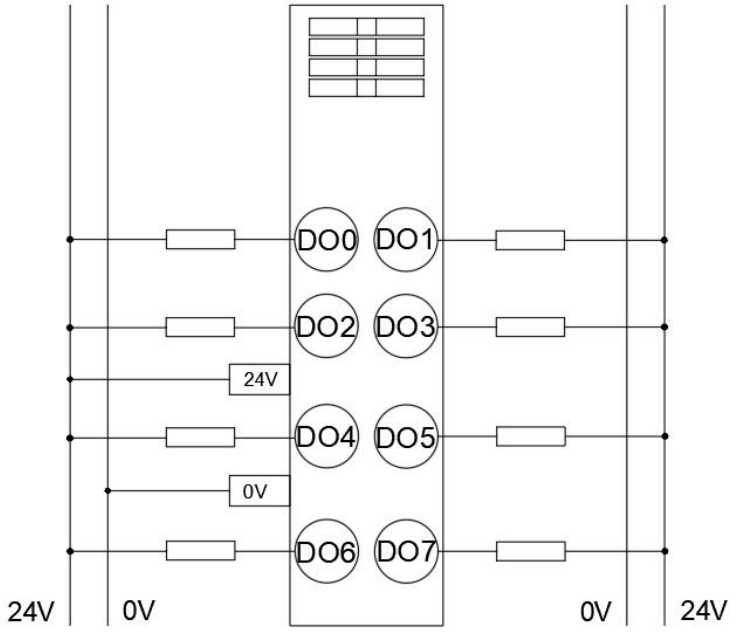
3.2.1 introduction to product appearance and configuration

① Indicator light: when the corresponding DO has an input signal, the indicator light is on
② External 24V power supply and DO terminal port. It is defined as follows:

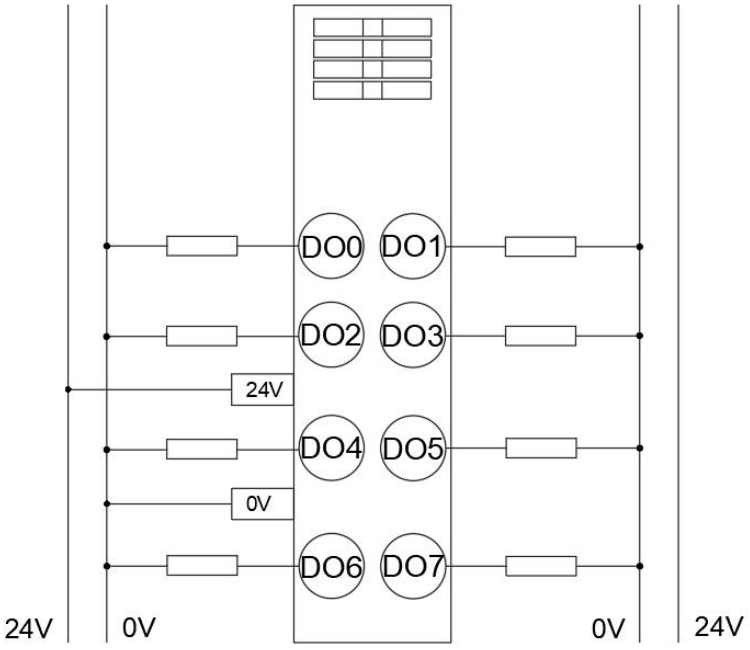


3.2.2 product wiring instructions

The IO trigger mode of this product uses NPN type by default. The specific wiring mode is as follows:



DO为NPN型接线



DO为PNP型接线

3.2.3 Description of EtherCAT Objects

The product provides a device description file named "model.xml". Each device model has its corresponding device description file. The file import method is performed in the master configuration.

VEC-VE-EX-8DO-NPN extension has an RPDO (1600), which contains the following objects:

Object	Definition
1A00 (Byte 0)	3101h（Output）： 8-bit DO output

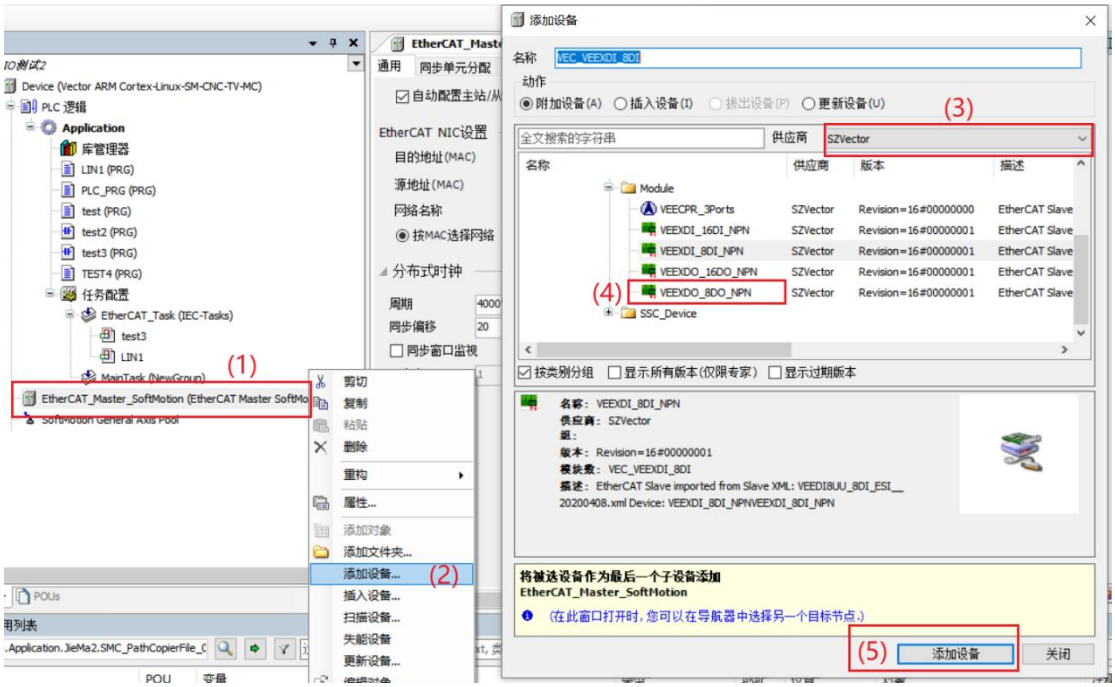
After importing the file device, it can be seen that the DI mapping is shown in the figure below. For the import method, see the 《VE motion controller programming manual》 of VECTOR

变量	映射	通道	地址	类型	单元	描述
		Output	%QX2.0	BIT		Output
		Output	%QX2.1	BIT		Output
		Output	%QX2.2	BIT		Output
		Output	%QX2.3	BIT		Output
		Output	%QX2.4	BIT		Output
		Output	%QX2.5	BIT		Output
		Output	%QX2.6	BIT		Output
		Output	%QX2.7	BIT		Output

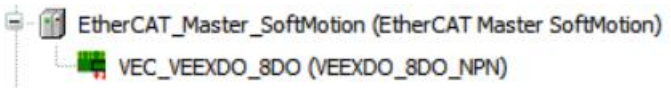
3.2.4.Device Adding Description

(1) the 8DO expansion that needs to be used is nested behind the host power supply;

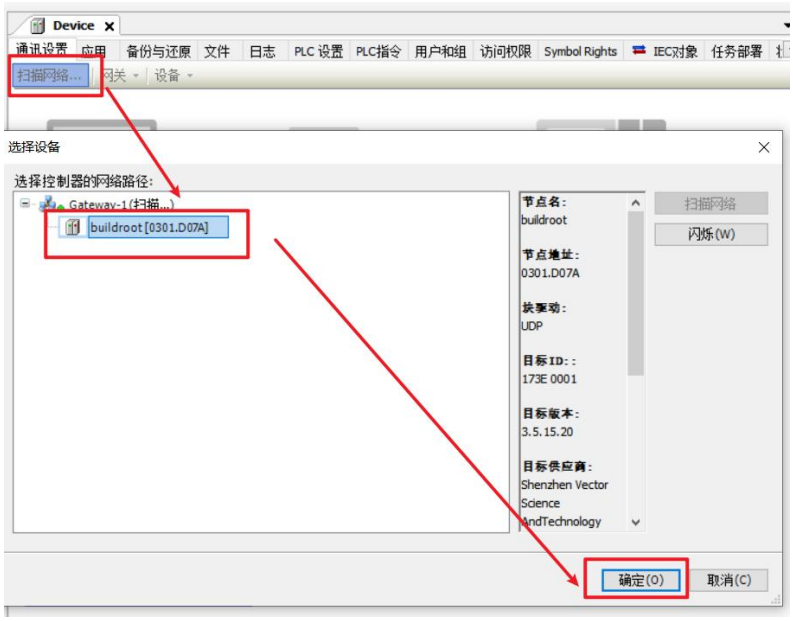
(2) Add 8DO devices to the software in the sequence as shown below;



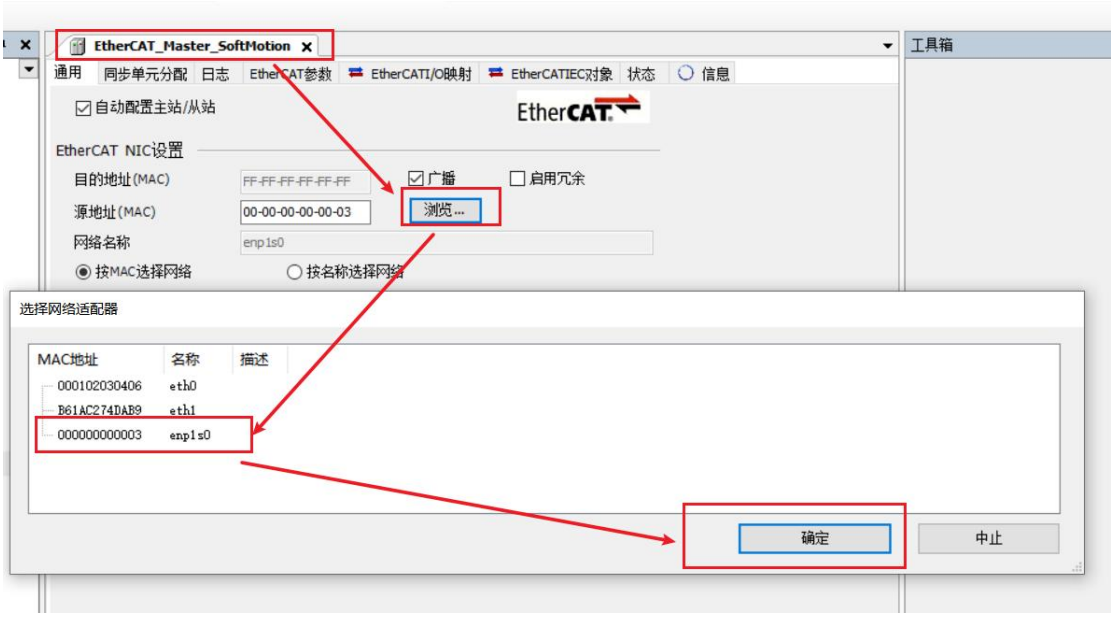
(3) As shown in the following figure, it is added successfully;



(4) Scan the network



(5) As shown below, EtherCAT network adapter is assigned as;



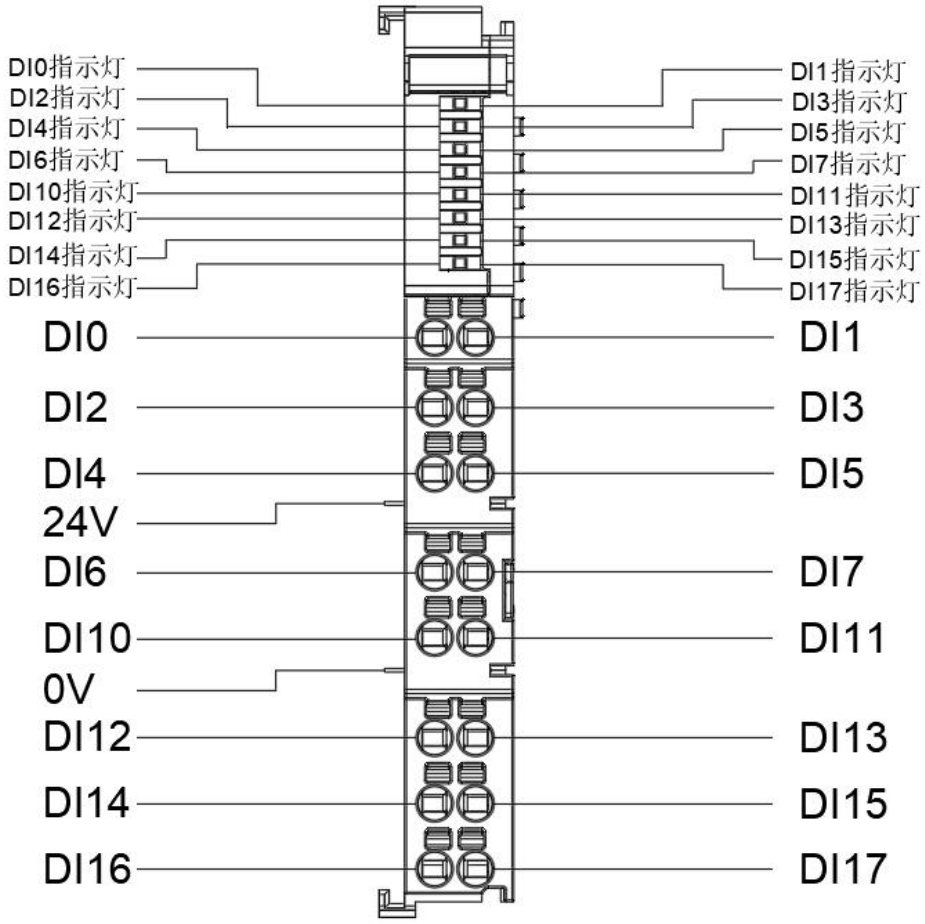
(6) It can then be used according to the above object description;

3.3 VEC-VE-EX-16DI

3.3.1 introduction to product appearance and configuration

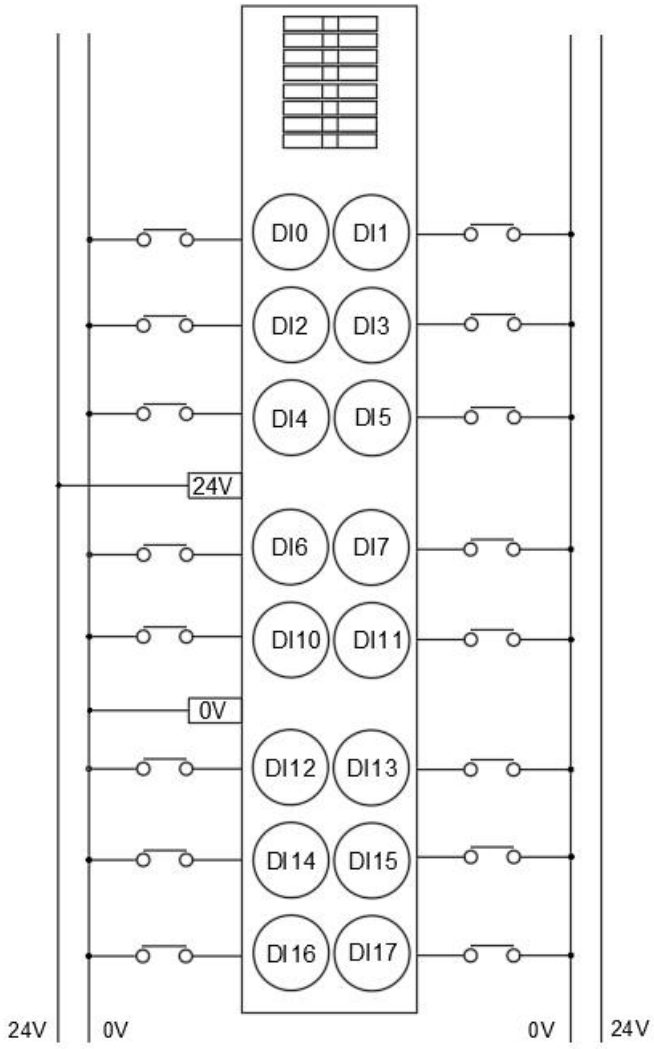
① Indicator light: when the corresponding DI has an input signal, the indicator light is on

② External 24V power supply and DI terminal port. It is defined as follows:

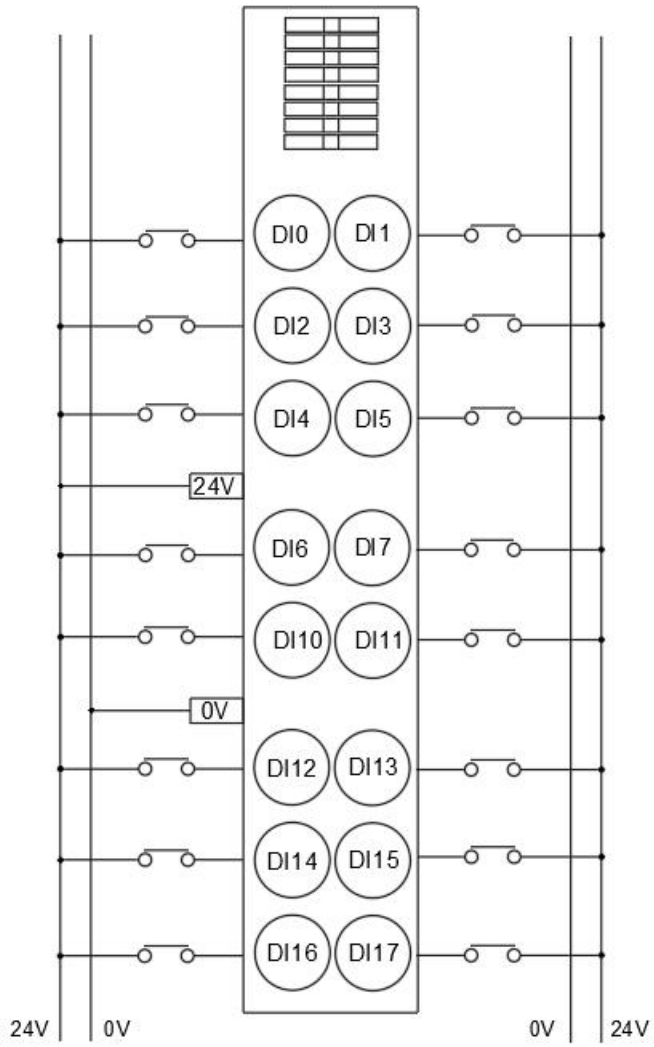


3.3.2 product wiring instructions

The IO trigger mode of this product uses NPN type by default. The specific wiring mode is as follows:



DI为NPN型接线



DI为PNP型接线

3.3.3 Description of EtherCAT Objects

The product provides a device description file named "model.xml". Each device model has its corresponding device description file. The file import method is performed in the master configuration.

VEC-VE-EX-16DI-NPN extension has two TPDO (1600 and 1601), which contain the following objects

Object	Definition
1600 (Byte 0)	3001h（Input）8-bit DI input
1601 (Byte 1)	3001h（Input）8-bit DI input

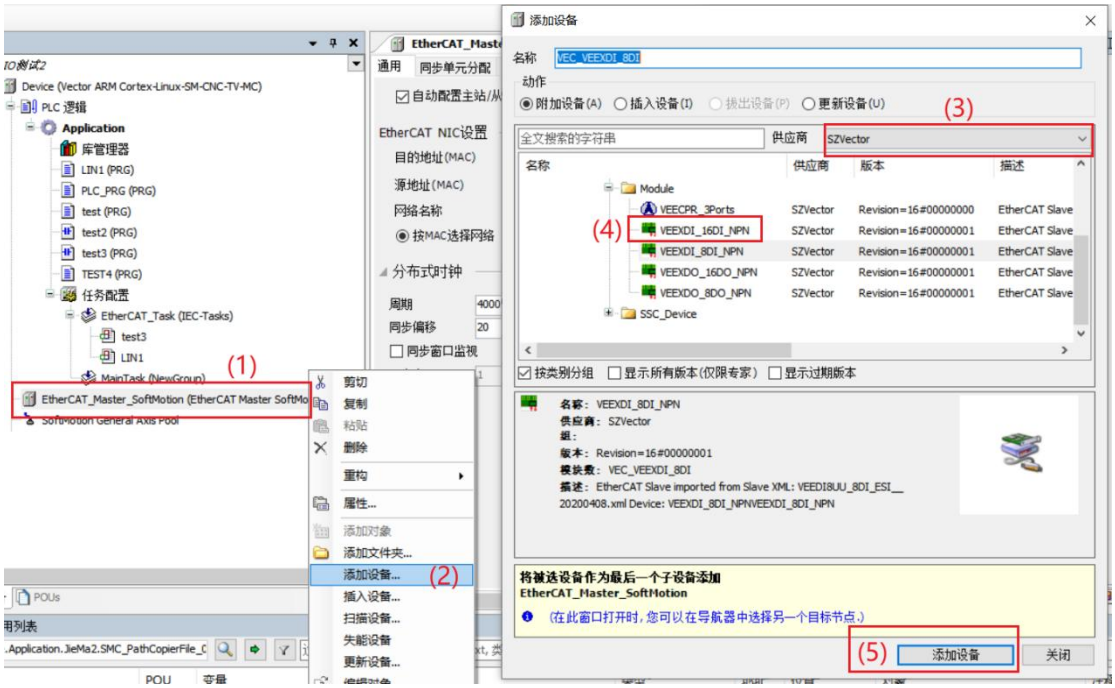
After importing the file device, it can be seen that the DI mapping is shown in the figure below. For the import method, see the 《VE motion controller programming manual》 of VECTOR

变量	映射	通道	地址	类型	单元	描述
		Input	%IX0.0	BIT		Input
		Input	%IX0.1	BIT		Input
		Input	%IX0.2	BIT		Input
		Input	%IX0.3	BIT		Input
		Input	%IX0.4	BIT		Input
		Input	%IX0.5	BIT		Input
		Input	%IX0.6	BIT		Input
		Input	%IX0.7	BIT		Input
		Input	%IX1.0	BIT		Input
		Input	%IX1.1	BIT		Input
		Input	%IX1.2	BIT		Input
		Input	%IX1.3	BIT		Input
		Input	%IX1.4	BIT		Input
		Input	%IX1.5	BIT		Input
		Input	%IX1.6	BIT		Input
		Input	%IX1.7	BIT		Input

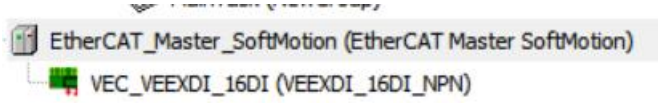
3.3.4 Device Adding Description

(1) the 16DOIexpansion that needs to be used is nested behind the host power supply;

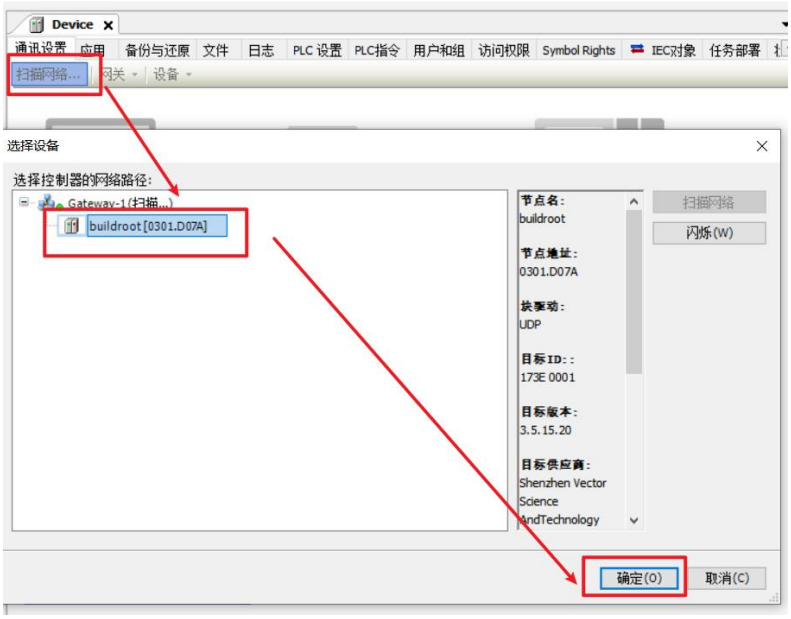
(2) Add 16DI devices to the software in the sequence as shown below;



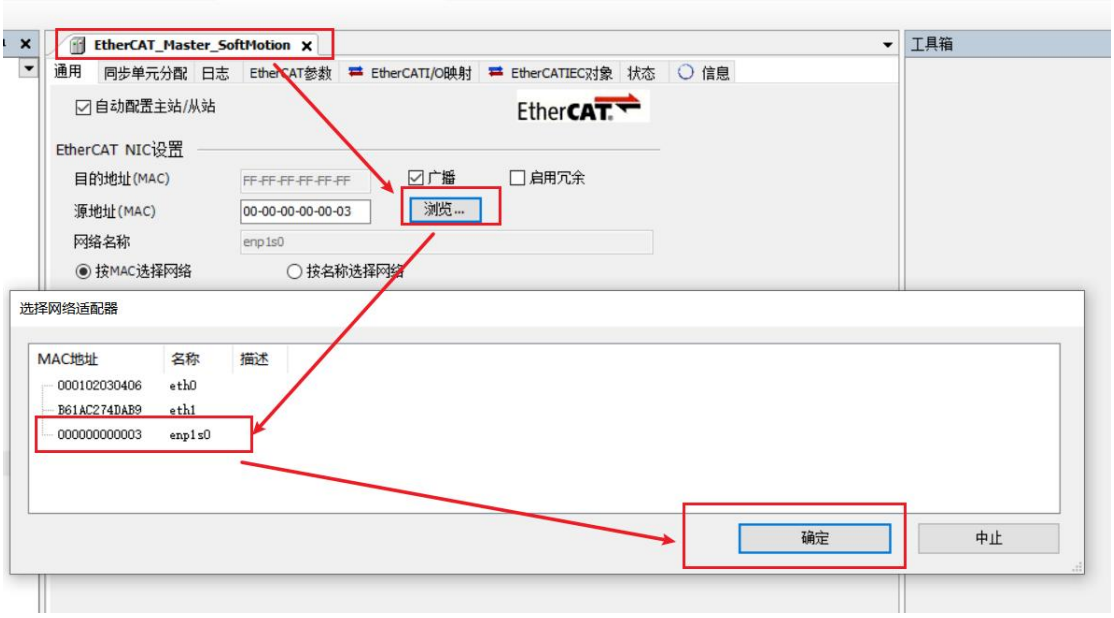
(3) As shown in the following figure, it is added successfully;



(4) Connect to the VE host and scan the network.



(5) As shown below, EtherCAT network adapter is assigned to ENPLS0;



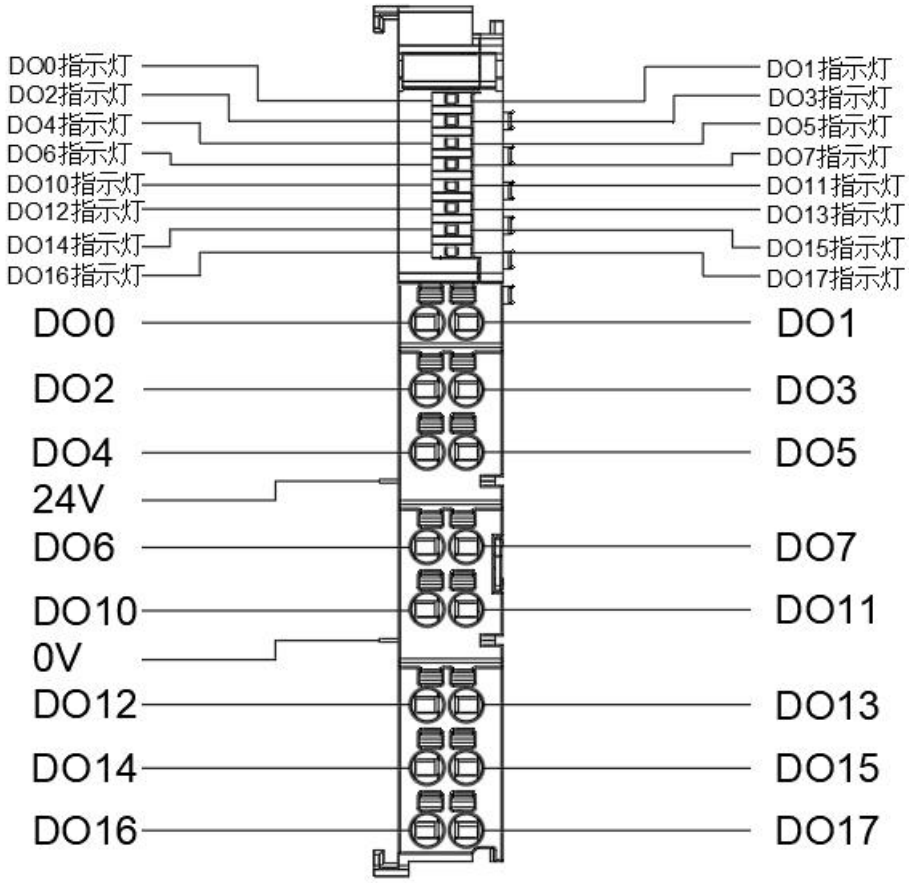
(6) It can then be used according to the above object description;

3.4 VEC-VE-EX-16DO

3.4.1 introduction to product appearance and configuration

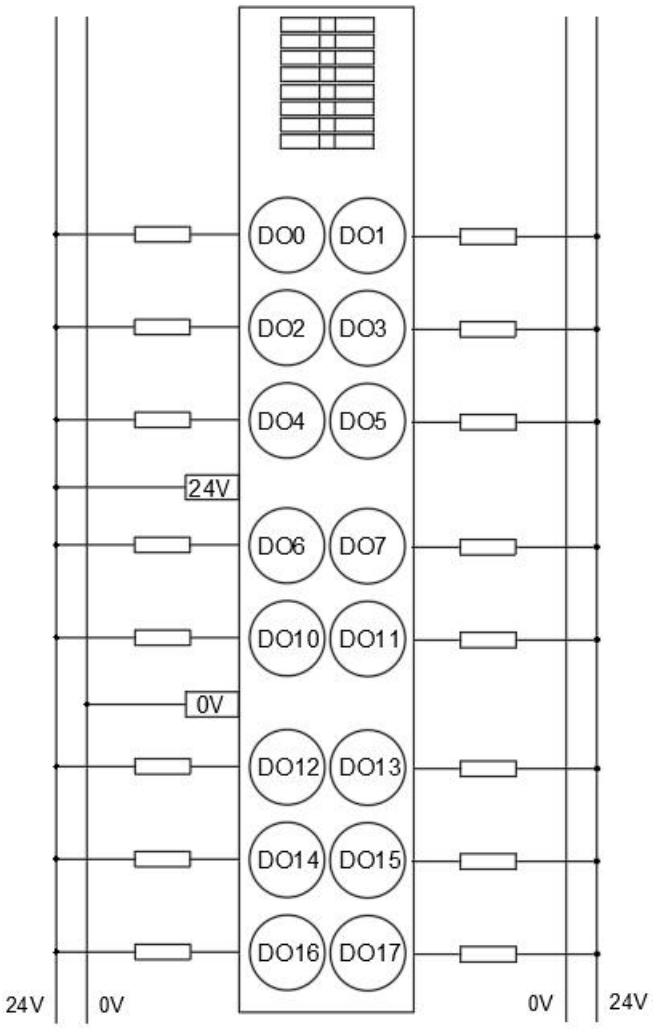
① Indicator light: when the corresponding DO has an input signal, the indicator light is on

② External 24V power supply and DO terminal port. It is defined as follows:

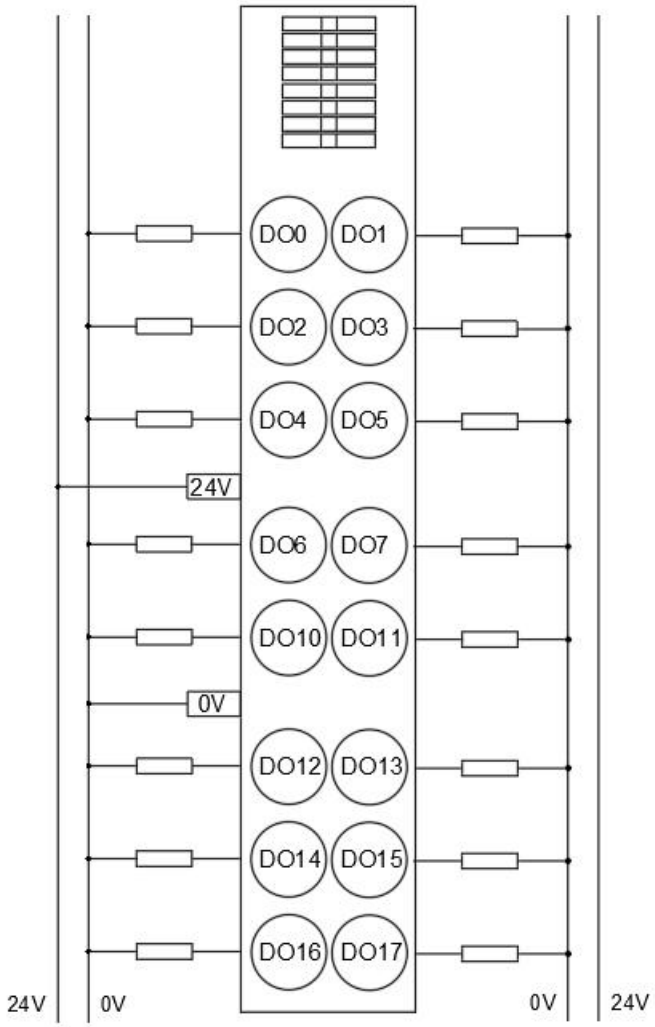


3.4.2 product wiring instructions

The IO trigger mode of this product uses NPN type by default. The specific wiring mode is as follows:



DO为NPN型接线



DO为PNP型接线

3.4.3 Description of EtherCAT Objects

The product provides a device description file named "model.xml". Each device model has its corresponding device description file. The file import method is performed in the master configuration.

VEC-VE-EX-16DI-NPN extension has two RPDO (1A00 and 1A01). Note that a maximum of 16 RPDO can be configured for process parameters in 1A00, which contain the following objects:

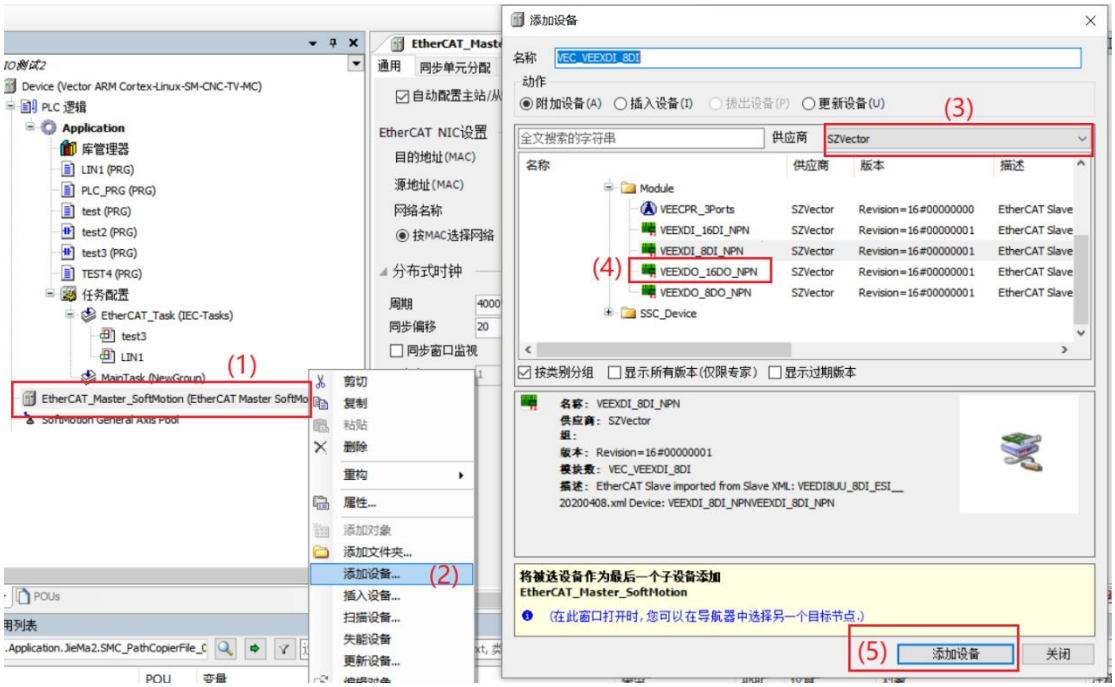
Object	
1A00 (Byte 0)	3101h（Output）8-bit DO input
1A01 (Byte 1)	3101h（Output）8-bit DO input

After importing the file device, it can be seen that the DO mapping is shown in the figure below. For the import method, see the 《VE motion controller programming manual》 of VECTOR

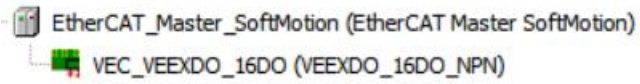
变量	映射	通道	地址	类型	单元	描述
		Output	%QX0.0	BIT		Output
		Output	%QX0.1	BIT		Output
		Output	%QX0.2	BIT		Output
		Output	%QX0.3	BIT		Output
		Output	%QX0.4	BIT		Output
		Output	%QX0.5	BIT		Output
		Output	%QX0.6	BIT		Output
		Output	%QX0.7	BIT		Output
		Output	%QX1.0	BIT		Output
		Output	%QX1.1	BIT		Output
		Output	%QX1.2	BIT		Output
		Output	%QX1.3	BIT		Output
		Output	%QX1.4	BIT		Output
		Output	%QX1.5	BIT		Output
		Output	%QX1.6	BIT		Output
		Output	%QX1.7	BIT		Output

3.4.4 Device Adding Description

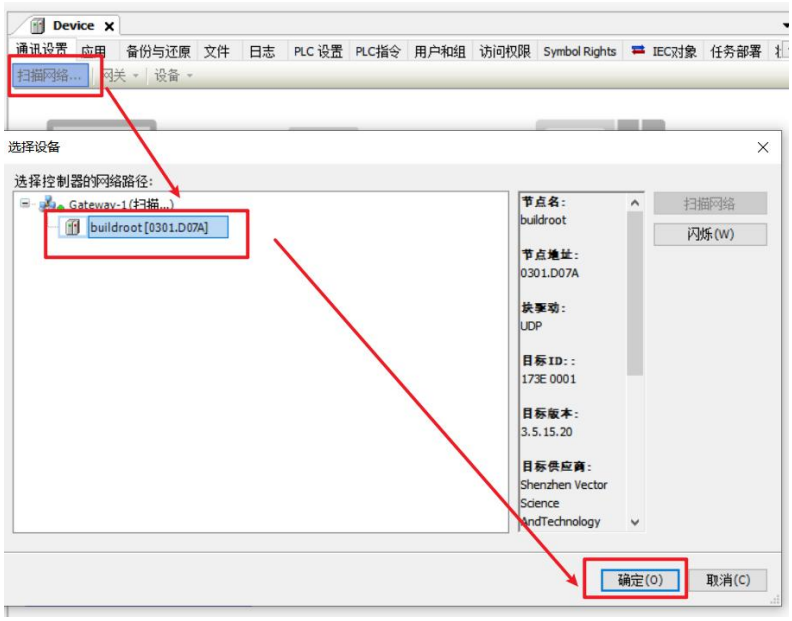
(1) the 16DO Iexpansion that needs to be used is nested behind the host power supply;
(2) Add 16DO devices to the software in the sequence as shown below;



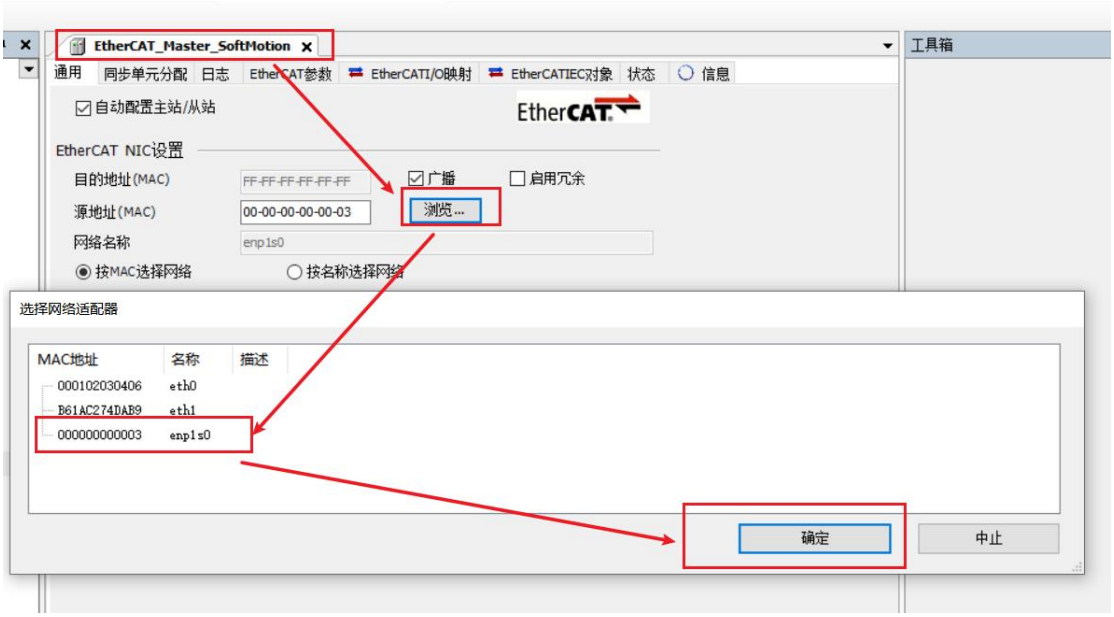
(3) As shown in the following figure, it is added successfully;



(4) Connect to the VE host and scan the network.



(5) As shown below, EtherCAT network adapter is assigned to ENPLS0;



(6) It can then be used according to the above object description;

Chapter Ⅳ AD/DA Extension

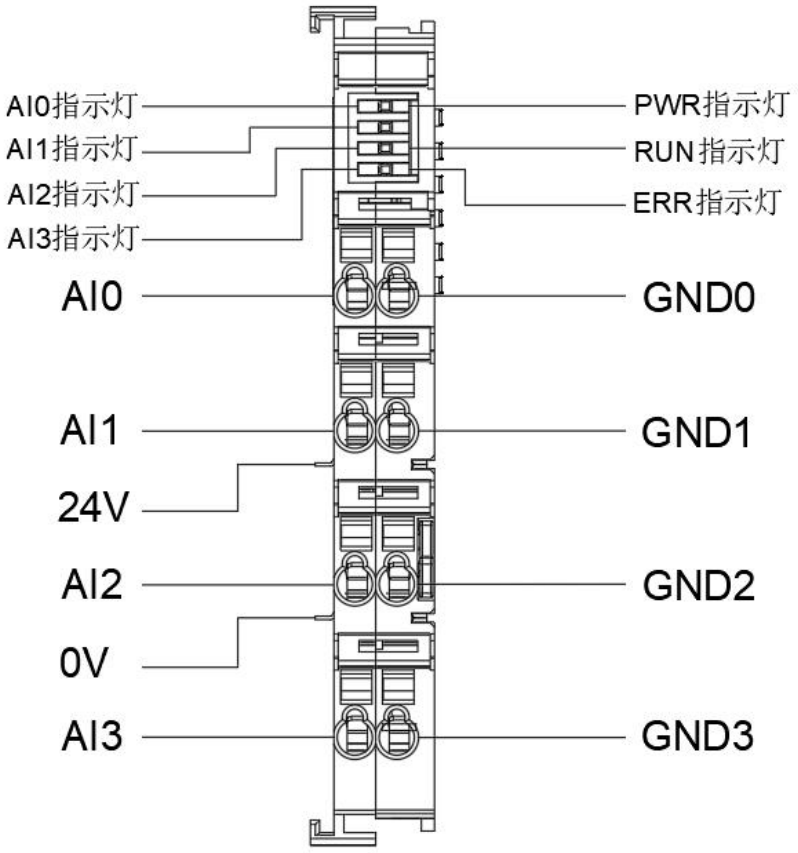
4.1 VEC-VE-EX-4AD

4.1.1 introduction to product appearance and configuration

①AI Indicator light: when the corresponding AI has an input signal, the indicator light is on

②AI input range is - 10V ~ + 10V

③ External 24V power supply and AI terminal port.It is defined as follows:



4.1.2 Description of EtherCAT Objects

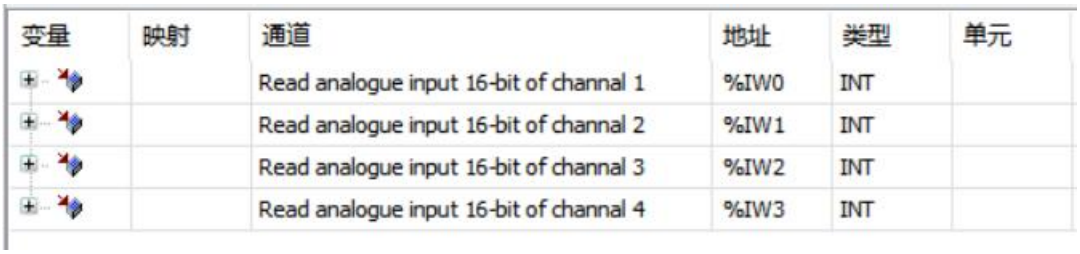
The product provides a device description file named "model.xml". Each device model has its corresponding device description file. The file import method is performed in the master configuration.

VEC-VE-EX-4AD extension has a TPDO (1B01), which contains the following objects:

Object	Definition
1B01 (TPDO260th)	6401:01（Read analogue input 16-bit of channal 1）：AI input channel1
	6401:02（Read analogue input 16-bit of channal 2）：AI input channel2
	6401:03（Read analogue input 16-bit of channal 3）：AI input channel3
	6401:04（Read analogue input 16-bit of channal 4）：AI input channel4

After importing the file device, it can be seen that the AI mapping is shown in the figure below. For the import method, see the 《VE motion controller programming manual》 of VECTOR

Note: the unit of output value of each channel is mV;



变量	映射	通道	地址	类型	单元
		Read analogue input 16-bit of channal 1	%IW0	INT	
		Read analogue input 16-bit of channal 2	%IW1	INT	
		Read analogue input 16-bit of channal 3	%IW2	INT	
		Read analogue input 16-bit of channal 4	%IW3	INT	

4.1.3 Function description

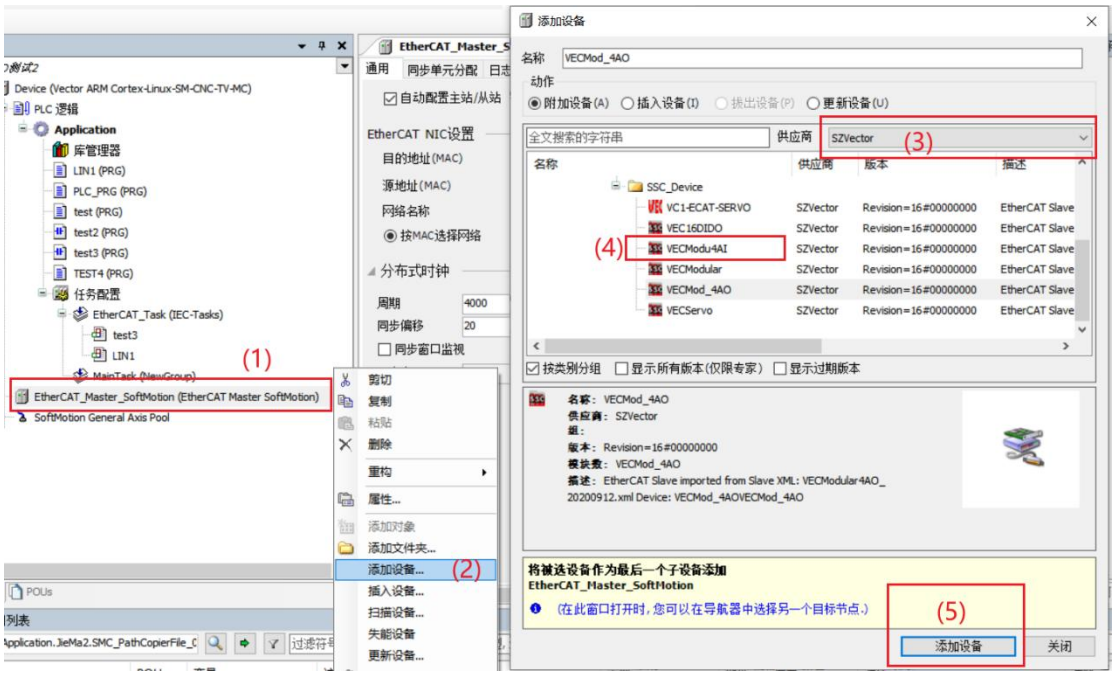
1、AI correction function.

Before using AI input, the AI correction function can be started by configuring the startup parameters. The configuration object: 0x2007 (configure Parameter1). The value of this object jumps from 0 to 1 to trigger correction;

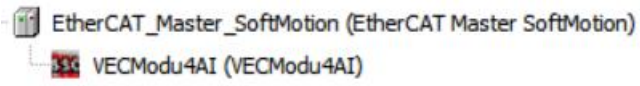
4.1.4 Device Adding Description

(1) The 4AI expansion that needs to be used is nested behind the host power supply;

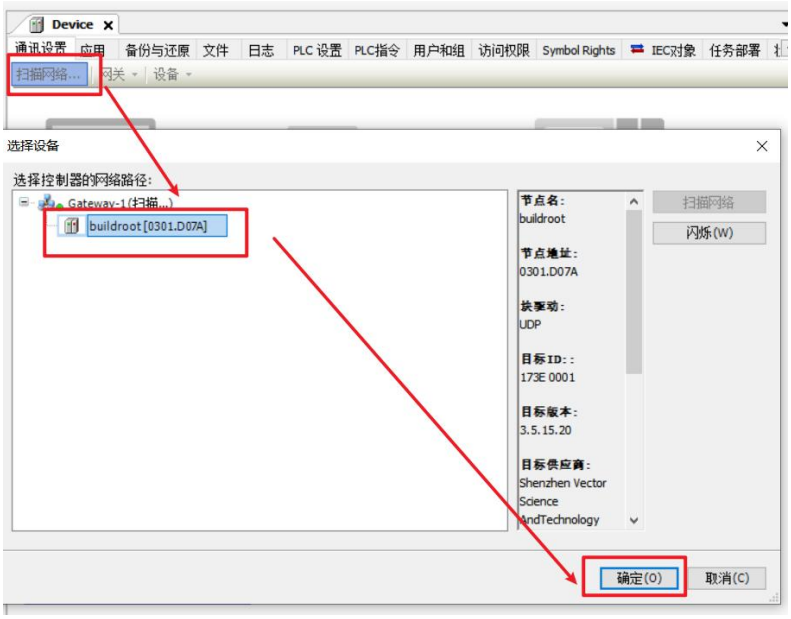
(2) Add 4AI devices to the software in the sequence as shown below;



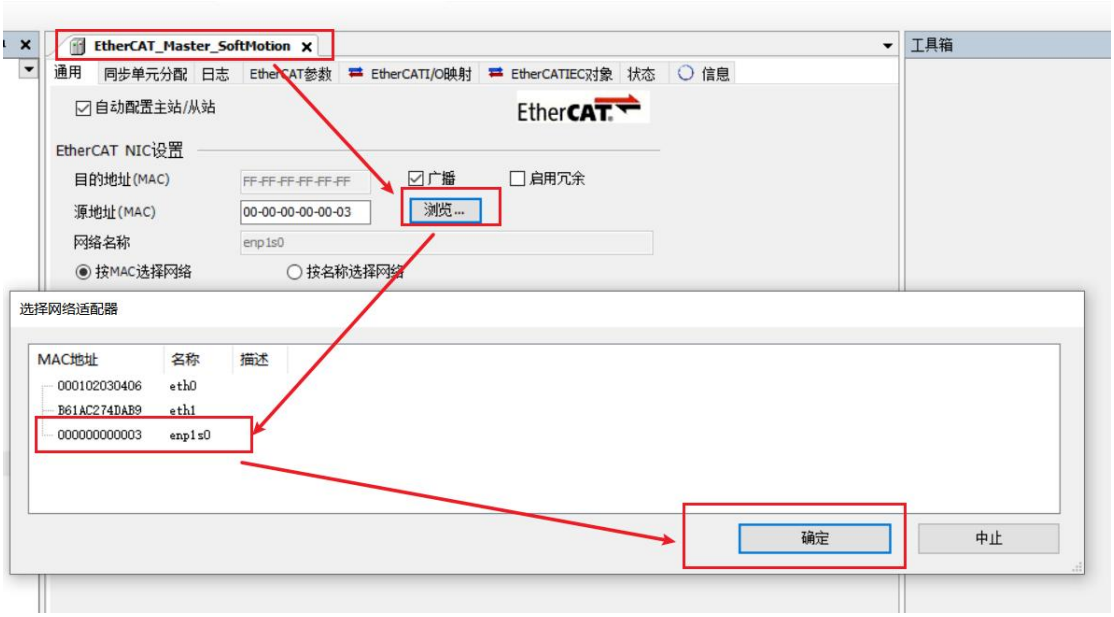
(3) As shown in the following figure, it is added successfully;



(4) Connect to the VE host and scan the network.



(5) As shown below, EtherCAT network adapter is assigned to ENPLS0;



(6) It can then be used according to the above object description;

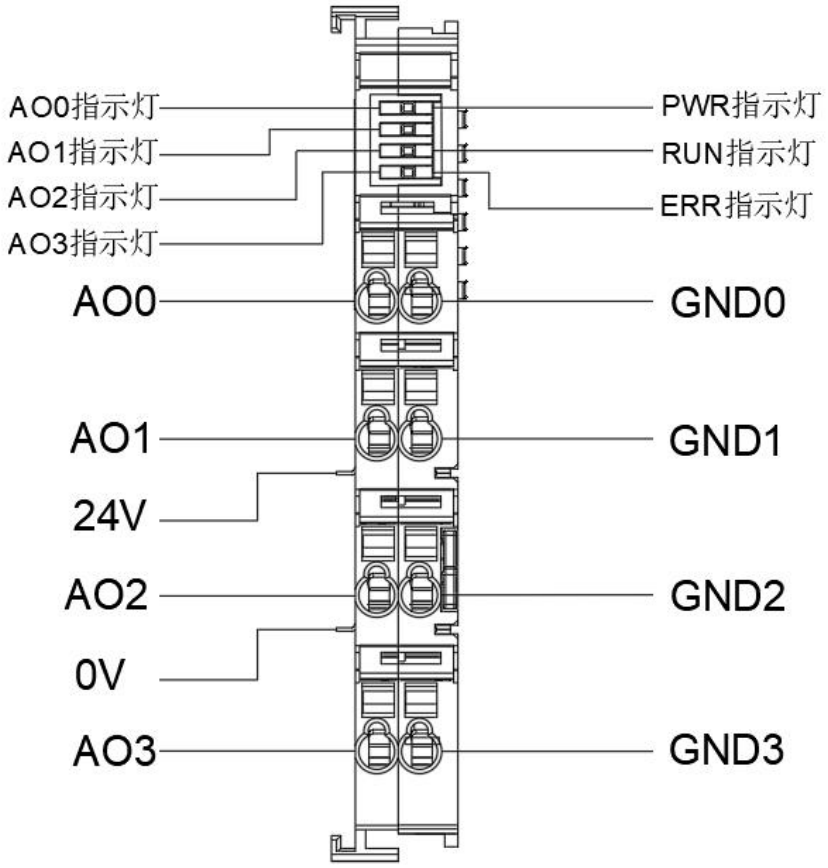
4.2 VEC-VE-EX-4DA

4.2.1 introduction to product appearance and configuration

① Indicator light: when the corresponding AO has an input signal, the indicator light is on

②AO output range is - 10V ~ + 10V

③ External 24V power supply and AO terminal port. It is defined as follows:



4.2.2 Description of EtherCAT Objects

The product provides a device description file named "model.xml". Each device model has its corresponding device description file. The file import method is performed in the master configuration.

VEC-VE-EX-4DA extension has an RPDO (1701), which contains the following objects:

Object	Definition
1B01 (TPDO260th)	6411:01（Write analogue output 16-bit of channal 1）： AO input channel 1

	6411:02（Write analogue output 16-bit of channal 2）：AO input channel 2
	6411:03（Write analogue output 16-bit of channal 3）：AO input channel 3
	6411:04（Write analogue output 16-bit of channal 4）：AO input channel 4

After importing the file device, it can be seen that the AI mapping is shown in the figure below. For the import method, see the 《VE motion controller programming manual》 of VECTOR

Note: the unit of output value of each channel is mV;

变量	映射	通道	地址	类型	单元
		Write analogue output 16-bit of channal 1	%QW0	INT	
		Write analogue output 16-bit of channal 2	%QW1	INT	
		Write analogue output 16-bit of channal 3	%QW2	INT	
		Write analogue output 16-bit of channal 4	%QW3	INT	

4.2.3 function description

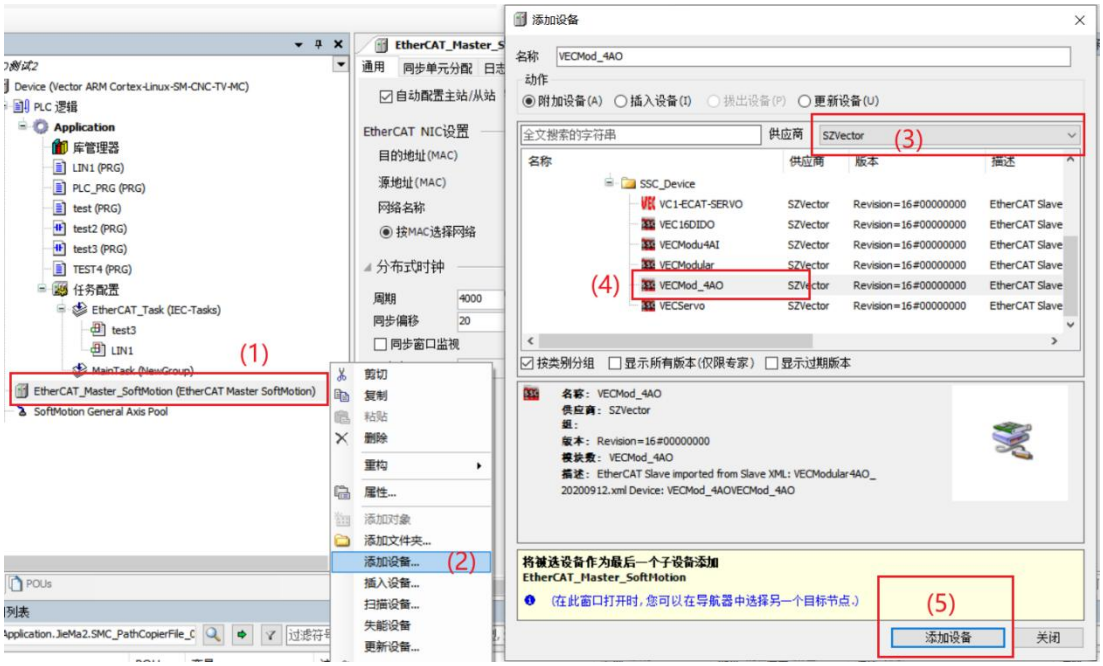
1. AO correction function.

Before using AO output, the AI correction function can be started by configuring the startup parameters and the configuration object: 0x2007 (configure Parameter1). The value of this object jumps from 0 to 1 to trigger correction;

4.2.4 Device Adding Description

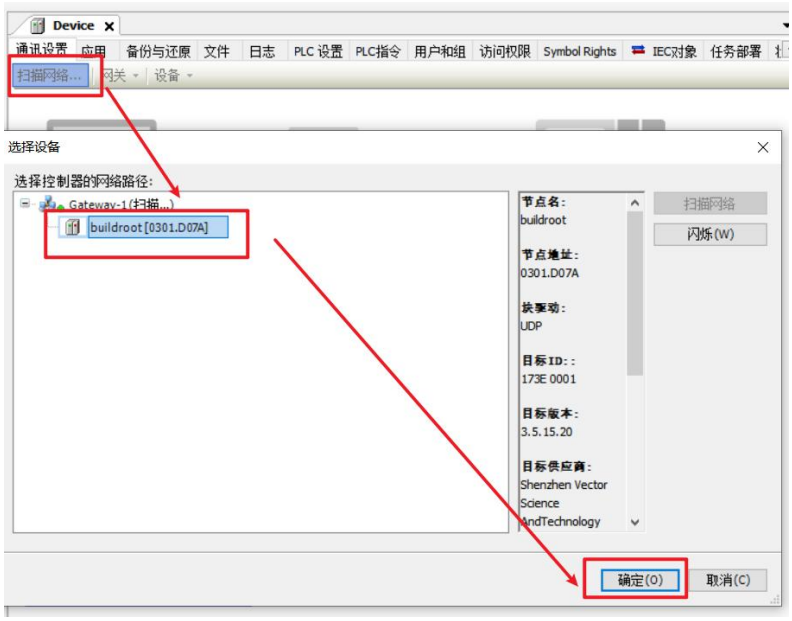
(1) The 4AO expansion that needs to be used is nested behind the host power supply;

(2) Add 4AIO devices to the software in the sequence as shown below;

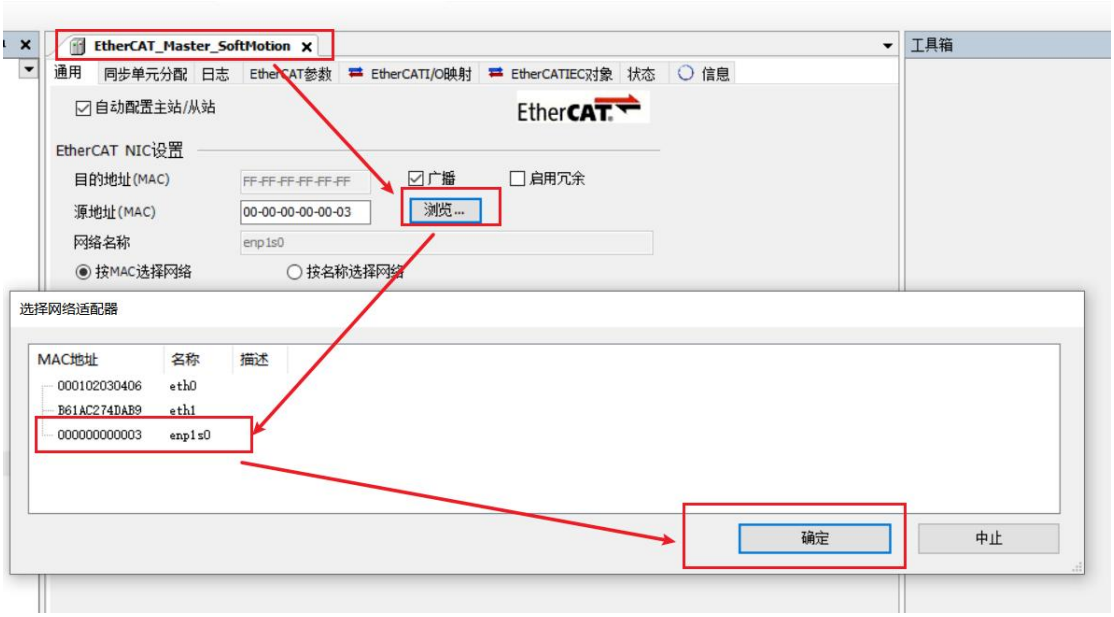


(3)As shown in the following figure, it is added successfully;

(4) Connect to the VE host and scan the network.



(5)As shown below, EtherCAT network adapter is assigned to ENPLS0;



⑹It can then be used according to the above object description;

Chapter Ⅴ Couplers

5.1 VEC-VE-CPR-P

5.1.1 introduction to product appearance and configuration

①CN1-IN: EtherCAT network input, connected to the host output or EtherCAT(OUT) of the last extension;

CN2-out: EtherCAT network output, the next extension input EtherCAT(IN) or not connected;

③ PWR: normally on when the power supply is normal;

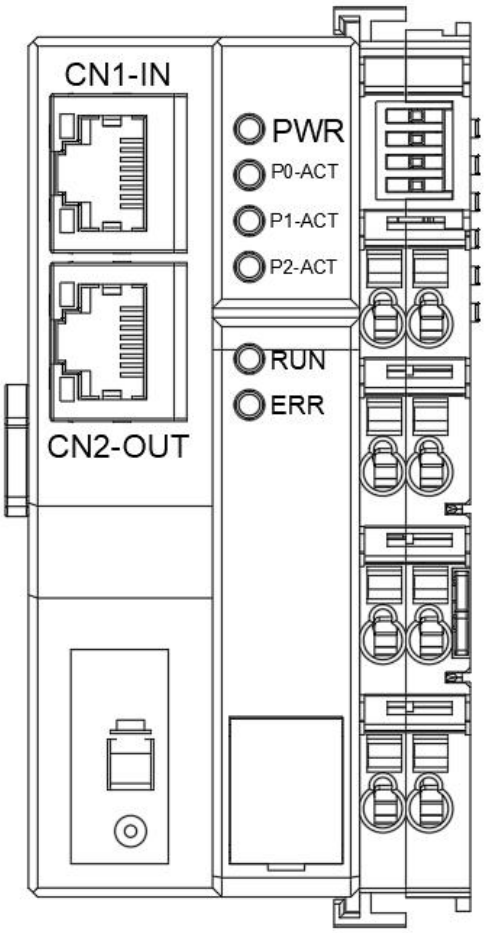
④ P0-act: flashes when establishing communication with the equipment connected to cn1-in;

⑤ P1-act: flashes when establishing communication with the equipment connected to cn2-out;

⑥ P2-act: the local expansion between the coupler and the back band of the coupler power supply flashes after establishing communication;

⑦ Run: always on during operation;

⑧ Err: always on in case of fault;



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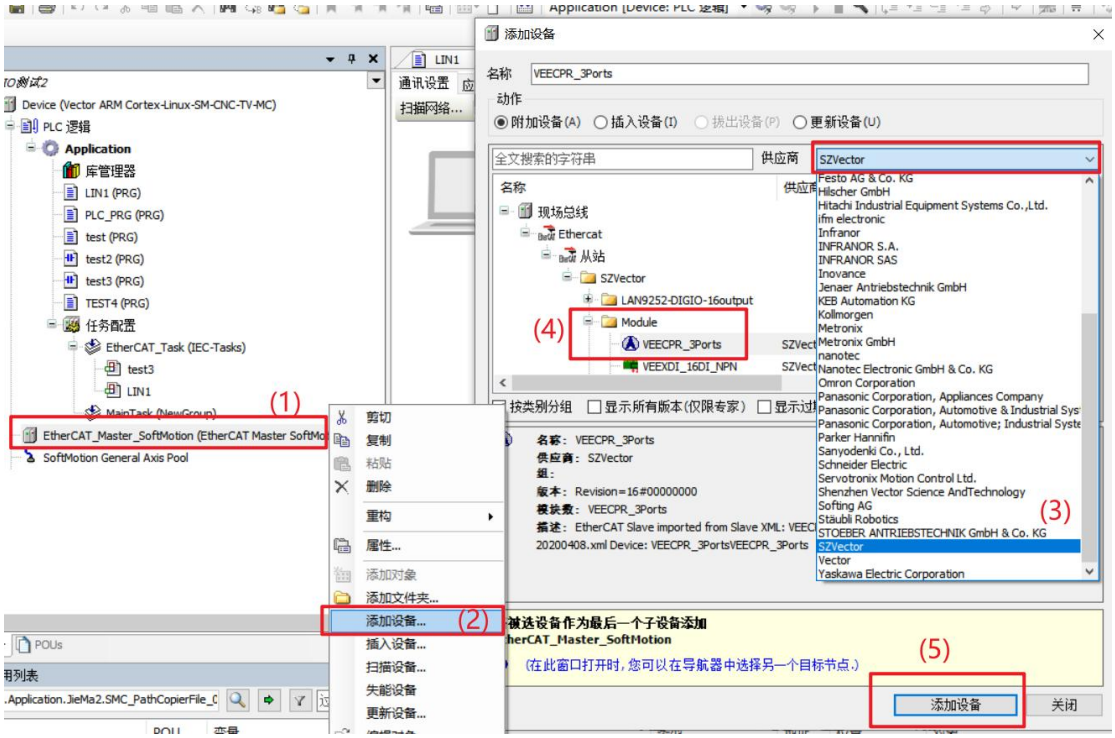
5.1.2 Device Adding Description

The product provides a device description file named "model.xml". Each device model has its corresponding device description file. The file import method is performed in the master configuration.

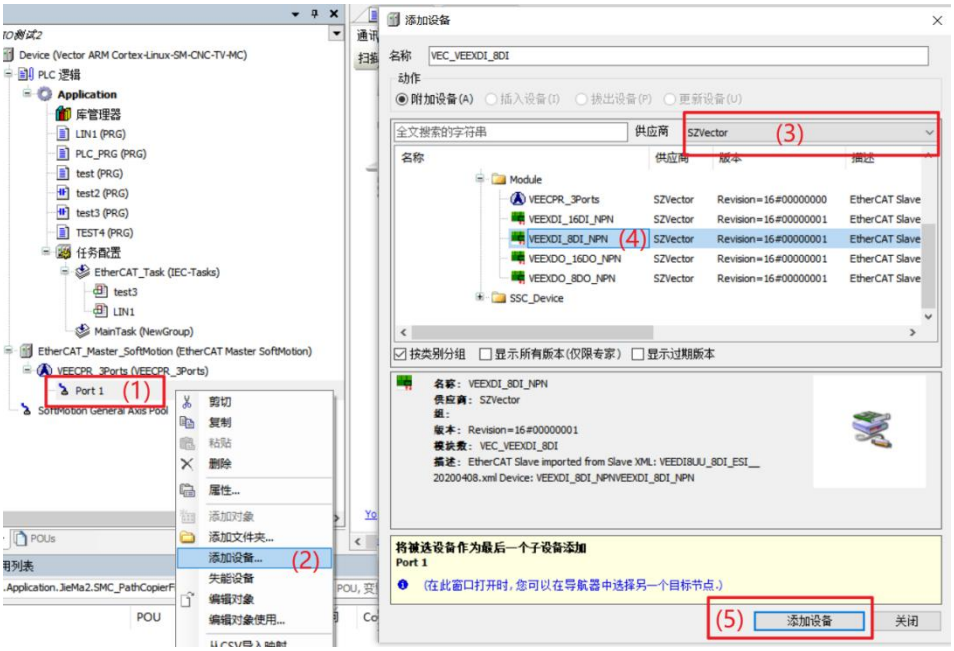
Using coupler with local IO expansion method:

(1) the IO expansion that needs to be used is nested behind the coupler power supply;

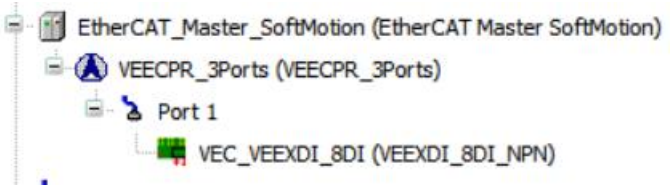
(2) Add coupler equipment to the software in the sequence as shown below;



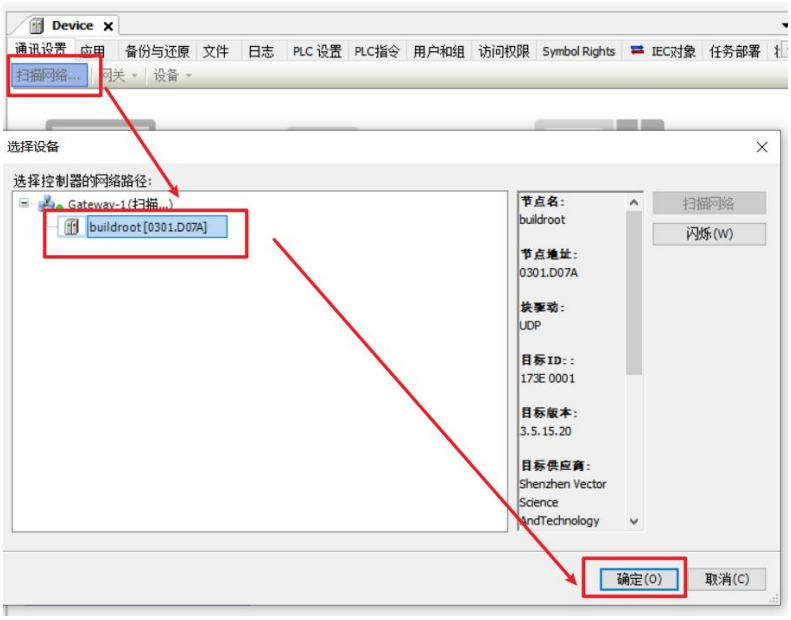
(3) Add the local IO expansion nested after the coupler according to the sequence as shown below (8DI is added for example here);



(4)As shown in the following figure, it is added successfully;



(5)Connect to the VE host and scan the network.



(6)As shown below, EtherCAT network adapter is assigned to ENPLS0;