

VH5/VH6 series EtherCAT communication

User manual



Wuxi XINJE Electric Co., Ltd.

Data No.: INV C 08 20220623 1.1

Basic description

- Thank you for purchasing Xinje VH5 series frequency converter. Please read this product manual carefully before carrying out relevant operation.
- The manual mainly provides users with relevant guidance and instructions for the correct use and maintenance of the frequency converter. The manual involves the functions of the frequency converter communication expansion card, usage, installation and maintenance, etc.
- The contents in the manual are only applicable to the inverter products of Xinje company.

Notice to users

This manual is suitable for the following users

- The installation personnel of frequency converter
- Engineering and technical personnel (electrical engineer, electrical operator, etc.)
- The designer

Before the above personnel operate or debug the inverter, please carefully read the chapter of safety precautions in this manual.

Statement of responsibility

- Although the contents of the manual have been carefully checked, errors are inevitable, and we can't guarantee complete consistency.
- We will often check the contents of the manual and correct them in subsequent versions. We welcome your valuable comments.
- Please understand that the contents described in the manual are subject to change without notice.

Contact us

If you have any questions about the use of this product, please contact the agent and office purchasing the product, or directly contact Xinje company.

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1. Product confirmation

Thank you for using XINJE VH5 / VH6 series frequency converter and selecting EtherCAT expansion card.

Please confirm the following when receiving the product:

- Check whether the Ethercat expansion card is damaged.
- Confirm whether the received card is correct through the label on the board, refer to Fig1.
- Confirm whether the package is complete. Refer to Table 1.
- If the card is damaged, the model is wrong, or there are omissions in the package, please contact the supplier or salesman immediately.
- Please download the XML file of this card on the website:www.xinje.com, file name: VHX-CC100.xml.



Fig. 1 Nameplate label location Table 1 Package

Model	Content	Photo	Quantity
	Communication card		1
VH5-CC100	Screw and bracket		1
VH6-CC100	Communication card		1

2. Summary

This manual provides functional specifications, installation, basic operation and settings, as well as a brief introduction to the contents of EtherCAT protocol. To ensure the correct installation and operation of this product, please carefully read this manual and the communication protocol of the frequency converter before using this communication card.

This manual is only used as the VHX-CC100 operation guide and related instructions. The details of EtherCAT protocol are not introduced here. If readers want to know more about EtherCAT protocol, please refer to relevant professional articles or books.

This EtherCAT communication card supports two kinds of reading and writing process quantities, one is through PDO, and the other is through SDO to read and write the object dictionary defined by the manufacturer.

3. Product characteristics

Supported functions

Support EtherCAT COE 402 protocol

- Supported services
 - Support PDO
 - Support SDO
 - Support the object dictionary defined by the manufacture
 - Support SDO to read and write the function code of VFD
- Supported EtherCAT Synchronization cycle

Item	Supported specifications
Synchronization cycle	250us
	lms
	2ms
	4ms

■ SDO/PDO data description

SDO(Service Data Object) is used to transmit aperiodic communication data. The master station reads and writes data in the object dictionary , and can set the objects and monitor various states of the slave station. The response to the read / write action to the SDO takes time. Objects refreshed with PDO should not be refreshed with SDO, but overwritten with the value of PDO.

PDO(Process Data Object) is used to transmit periodic communication data.

The data in PDO area can realize the real-time change of VFD data by the master station and the real-time reading of periodic data interaction.

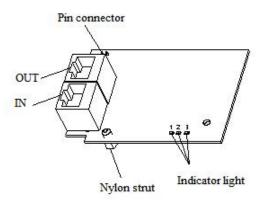
The communication address of the data is directly configured by the VFD. It mainly includes the following contents:

Master station send PDO data(RxPDO 0x1600)									
Fixed RxPDO									Variable RxPDO
Controlwo 6040h	ord	velo	arget ocity 42h	Modes of operation 6060h		Target position 607A h (reserved)		et torque 071h	Functional parameters of VFD can be changed in real time
RxPDO	1	RxP	DO2	RxPDO3		RxPDO4		PDO5	None
				VFD corr	esponding	g PDO data(Tx	PDO 0x1a	.00)	
				Fix	ed TxPD0)			Variable TxPDO
Statusword 6041 h	act val	ocity ual lue C h	Mode o operatio display 6061 h	n actual	Position actual value 6064 h	vl target demand 6043 h	Error code 603Fh	vl target actual value 6044h	Functional parameters of VFD can be changed in real time
TxPDO1	TxP	DO2	TxPDO	3 TxPDO4	TxPDO5	TxPDO6	TxPDO7	TxPDO8	TxPDO9~TxPDO12

Note: RxPDO and TxPDO can be configured with 12 at most. RxPDO cannot be added. 8 TxPDOs can be fixed and 4 TxPDOs can be added.

4. Communication card components

4.1 VH5-CC100 communication card components & indicator description



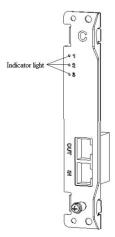
The expansion card has three LED lights, as shown in the figure .

The status indicators in the figure are error indicator, operation indicator and VFD communication status indicator from left to right. The descriptions are as follows:

Туре	Status	Description
	Normally OFF	No error
Error indicator	OFF 0.2s ON 0.2s flashing	Pre-OP fault status
Error indicator	OFF 1s ON 1s flashing	Safe-OP fault status
	Normally ON	OP fault status
	Normally OFF	Init status
On anotion in diastan	OFF 0.2s ON 0.2s flashing	Pre-OP status
Operation indicator	OFF 1s ON 1s flashing	Safe-OP status
	Normally ON	OP status

VFD communication status indicator	Normally OFF	The expansion card is disconnected from the frequency converter
	1Hz flashing	The connection between the expansion card
		and the frequency converter is normal
	Normally ON	The expansion card is establishing connection
	Normany ON	with the frequency converter

4.2 VH6-CC100communication card components & indicator description



The status indicators in the figure are VFD communication status indicator, operation indicator and the error indicator from top to bottom. The descriptions are as follows:

Туре	Status	Description
	Normally OFF	The expansion card is disconnected from the
		frequency converter
VFD communication status	1Hz flashing	The connection between the expansion card and
indicator		the frequency converter is normal
	Normally ON	The expansion card is establishing connection
		with the frequency converter
	Normally OFF	Init status
Operation indicator	OFF 0.2s ON 0.2s flashing	Pre-OP status
Operation indicator	OFF 1s ON 1s flashing	Safe-OP status
	Normally ON	OP status
	Normally OFF	No error
Error indicator	OFF 0.2s ON 0.2s flashing	Pre-OP fault status
	OFF 1s ON 1s flashing	Safe-OP fault status
	Normally ON	OP fault status

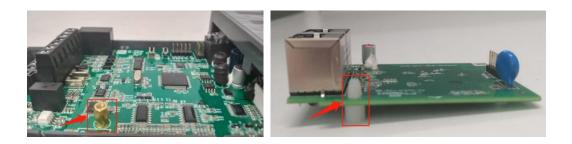
5. Installation

5.1 Install VH5-CC100 communication card

1. Disconnect all power inputs of frequency converters to ensure that the internal voltage of the frequency converter is safe.

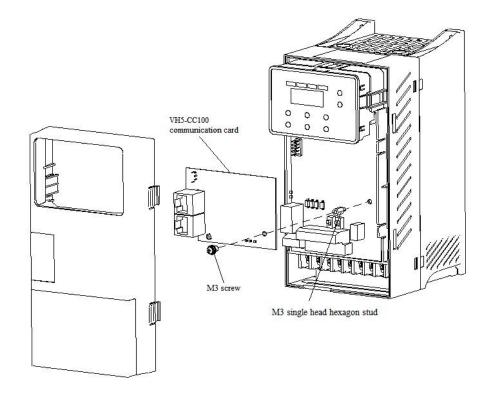
2. Disassemble the frequency converter cover plate and find the control board.

3. Install the hexagon stud at the corresponding position of the board, and tighten the M3 single head hexagon stud on the drive plate. As shown in the following figure:



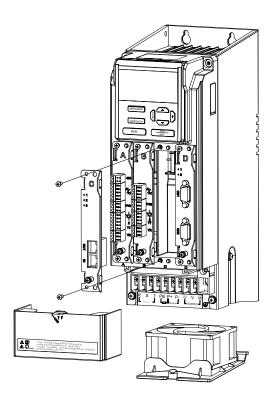
- 4. Align the communication card pin with the expansion card slot of the control board and insert it firmly.
- 5. Tighten M3 screws.
- 6. Install the frequency converter cover plate.
- 7. Connect and fix the communication line.

Note: Hot plugging is prohibited.



5.2 Install VH6-CC100 communication card

- 1. Disconnect all power inputs of VFD to ensure that the internal voltage of the frequency converter is safe.
- 2. Remove the C card cover plate of the VFD.
- 3. Align the communication card pin with the control board expansion card slot and insert it firmly.
- 4. Tighten M3 screws.
- 5. Connect and fix the communication line.
- Note: Hot plugging is prohibited.



6. CoE Object dictionary

6.1 Object dictionary area assignment

СоЕ	Object dictionary	VHX-CC100 object dictionary		
Index	Content	Index	Content	
0000h~0FFFh	Data type area	0000h~0FFFh	Data type area	
1000h~1FFFh	COE communication area	1000h~1C33h	DS301 object dictionary (CANopen protocol communication area)	
2000h~4FFFh	Factory parameter display and setting area	2000h~4FFFh	VFD Internal parameter mapping area (manufacturer defined area)	
5000h~5FFFh	Independent Protocol area	5000h~5200h	Independent motion control (manufacturer defined area)	
COOCH OFFER	Device CiA402 protocol	6000h~6502h	CiA402object(Driver profile area)	
6000h~9FFFh	area	7000h~9FFFh	Reserved	
A000~FFFFh	Reserved	A000h~FFFFh	Reserved	

The object dictionary of EtherCAT bus is all in the device description file, i.e. XML file. The XML file of VH5 and VH6 EtherCAT expansion card is: VHX-CC.xml.

6.2 COE communication area

Index	Sub-index	Name	Data type	Access
1000h	-	Device type	UINT32	RO
1001h	-	Error register	UINT8	RO
1008h	-	Manufacture device name	STRING	-
1009h	-	Manufacture hardware version	STRING	-
100Ah	-	Manufacture software version	STRING	-
	-	Identity object	-	-
	00	Number of entries	UINT8	RO
10101	01	Vendor ID	UINT32	RO
1018h	02	Product code	UINT32	RO
	03	Revision number	UINT32	RO
	04	Serial number	UINT32	RO
	-	Receive PDO mapping 1	-	-
	00	Number of entries	UINT8	RW
	01	1st receive PDO mapped	UINT32	RW
	02	2nd receive PDO mapped	UINT32	RW
1600h	03	3rd receive PDO mapped	UINT32	RW
	04	4th receive PDO mapped	UINT32	RW
	11	11th receive PDO mapped	UINT32	RW
	12	12th receive PDO mapped	UINT32	RW
	-	Receive PDO mapping 2	-	-
1(01)	00	Number of entries	UINT8	RW
1601h	01	1st receive PDO mapped	UINT32	RW
	02	2nd receive PDO mapped	UINT32	RW

Index	Sub-index	Name	Data type	Access
	03	3rd receive PDO mapped	UINT32	RW
	04	4th receive PDO mapped	UINT32	RW
	11	11th receive PDO mapped	UINT32	RW
	12	12th receive PDO mapped	UINT32	RW
	-	Receive PDO mapping 3	-	-
	00	Number of entries	UINT8	RW
	01	1st receive PDO mapped	UINT32	RW
	02	2nd receive PDO mapped	UINT32	RW
1602h	03	3rd receive PDO mapped	UINT32	RW
	04	4th receive PDO mapped	UINT32	RW
	11	11th receive PDO mapped	UINT32	RW
	12	12th receive PDO mapped	UINT32	RW
	-	Receive PDO mapping 4	-	-
	00	Number of entries	UINT8	RW
	01	1st receive PDO mapped	UINT32	RW
	02	2nd receive PDO mapped	UINT32	RW
1603h	03	3rd receive PDO mapped	UINT32	RW
100511	04	4th receive PDO mapped	UINT32	RW
			011(152	
	11	11th receive PDO mapped	UINT32	RW
	11	12th receive PDO mapped	UINT32	RW
	12	Transmit PDO mapping 1	011132	K VV
	00	Number of entries	UINT8	RW
	01	1st transmit PDO mapped	UINT32	RW
	01	2nd transmit PDO mapped	UINT32	RW
1A00h	02		UINT32	RW
IAUUI	03	3rd transmit PDO mapped4th transmit PDO mapped		RW
	04	4th transmit PDO mapped	UINT32	KW
	11	 1141 Annuari A DDO annuari 1	 UINT32	 DW
	11	11th transmit PDO mapped		RW
	12	12th transmit PDO mapped	UINT32	RW
	-	Transmit PDO mapping 2	-	-
	00	Number of entries	UINT8	RW
	01	1st transmit PDO mapped	UINT32	RW
	02	2nd transmit PDO mapped	UINT32	RW
1A01h	03	3rd transmit PDO mapped	UINT32	RW
	04	4th transmit PDO mapped	UINT32	RW
	11	11th transmit PDO mapped	UINT32	RW
	12	12th transmit PDO mapped	UINT32	RW
	-	Transmit PDO mapping 3	-	-
	00	Number of entries	UINT8	RW
	01	1st transmit PDO mapped	UINT32	RW
1A02h	02	2nd transmit PDO mapped	UINT32	RW
	03	3rd transmit PDO mapped	UINT32	RW
	04	4th transmit PDO mapped	UINT32	RW

Index	Sub-index	Name	Data type	Access
	11	11th transmit PDO mapped	UINT32	RW
	12	12th transmit PDO mapped	UINT32	RW
	-	Transmit PDO mapping 4	-	-
	00	Number of entries	UINT8	RW
	01	1st transmit PDO mapped	UINT32	RW
	02	2nd transmit PDO mapped	UINT32	RW
1A03h	03	3rd transmit PDO mapped	UINT32	RW
	04	4th transmit PDO mapped	UINT32	RW
	11	11th transmit PDO mapped	UINT32	RW
	12	12th transmit PDO mapped	UINT32	RW
	-	Sync manager communication type	-	-
	01	Communication type sync manager 0	UINT8	RO
1C00h	02	Communication type sync manager 1	UINT8	RO
	03	Communication type sync manager 2	UINT8	RO
	04	Communication type sync manager 3	UINT8	RO
	-	Sync manager channel 2	-	-
	00	Number of assigned PDOs	UINT8	RW
	01	PDO mapping object index of assigned RxPDO1	UINT16	RW
1C12h	02	PDO mapping object index of assigned RxPDO2	UINT16	RW
	03	PDO mapping object index of assigned RxPDO3	UINT16	RW
	04	PDO mapping object index of assigned RxPDO4	UINT16	RW
	_	Sync manager channel 3	-	_
	00	Number of assigned PDOs	UINT8	RW
	01	PDO mapping object index of assigned TxPDO1	UINT16	RW
1C13h	02	PDO mapping object index of assigned TxPDO2	UINT16	RW
	03	PDO mapping object index of assigned TxPDO3	UINT16	RW
	04	PDO mapping object index of assigned TxPDO4	UINT16	RW
	-	SM output parameter	-	-
	00	Number of sub-objects	UINT8	RO
	01	Synchronization Type	UINT16	RW
	02	Cycle time	UINT32	RO
	02	Shift time	UINT32	RW
	03	Sync modes supported	UINT16	RO
	04	Minimum cycle time	UINT32	RO
1C32h	06	Calc and copy Time	UINT32	RO
	08	Get cycle time	UINT16	RW
	08	Delay time	UINT32	RO
	10	Sync0 cycle time	UINT32	RW
	10	SM-Event Missed	UINT32 UINT16	RO
	11	Cycle time too small	UINT16 UINT16	RO
	32	Sync error	UINT8	RO
	32	Sync error SM input parameter	011110	ĸu
	-		- 1 N T0	- DO
	00	Number of sub-objects	UINT8	RO
1C33h	01	Sync mode	UINT16	RW
	02	Cycle time	UINT32	RO
	04	Sync modes supported	UINT16	RO
	05	Minimum cycle time	UINT32	RO

Index	Sub-index	Name	Data type	Access
	06	Calc and copy Time	UINT32	RO
	08	Get cycle time	UINT16	RW
	09	Delay time	UINT32	RO
	10	Sync0 cycle time	UINT32	RW
	11	SM-Event Missed	UINT16	RO
	12	Cycle time too small	UINT16	RO
	32	Sync error	UINT8	RO

Note: Items marked with "-" in the table indicate that there are no related attributes in the object dictionary.

6.3 VFD Internal parameter mapping area (manufacturer defined area)

The object dictionary in the user-defined area of the manufacturer corresponds to the panel parameters of VFD one by one. Only Group U parameters of the object dictionary in this area can be TPDO mapped and can be read by PDO. Other object dictionaries can only be operated based on SDO.

•	•	• •			
Index	Sub-index	Parameter	Index	Sub-index	Parameter
2000h	00	P0-00	2900h	00	P9-00
2001h	00	P0-01	2901h	00	P9-01
2002h	00	P0-02	0902h	00	P9-02
2003h	00	P0-03	2903h	00	P9-03
201Ah	00	P0-26	291Eh	00	P9-30
2100h	00	P1-00	2A00h	00	PA-00
2101h	00	P1-01	2A01h	00	PA-01
2102h	00	P1-02	2A02h	00	PA-02
2103h	00	P1-03	2A03h	00	PA-03
2123h	00	P1-35	2A1Dh	00	PA-29
2200h	00	P2-00	2B00h	00	PB-00
2201h	00	P2-01	2B01h	00	PB-01
2202h	00	P2-02	2B02h	00	PB-02
2203h	00	P2-03	2B03h	00	PB-03
2246h	00	P2-70	2B33h	00	PB-51
2300h	00	P3-00	2C00h	00	PC-00
2301h	00	P3-01	2C01h	00	PC-01
2302h	00	P3-02	2C02h	00	PC-02
2303h	00	P3-03	2C03h	00	PC-03
2317	00	P3-23	2C46	00	PC-70
2400	00	P4-00	2F00h	00	PF -00
2401	00	P4-01	2F01h	00	PF -01
2402	00	P4-02	2F02h	00	PF -02
2403h	00	P4-03	2F03h	00	PF -03

Index	Sub-index	Parameter	Index	Sub-index	Parameter
241B	00	P4-27	2F08h	00	PF -08
2500h	00	P5-00	3000h	00	A0-00
2501h	00	P5-01	3001h	00	A0-01
2502h	00	P5-02	3002h	00	A0-02
2503h	00	P5-03	3003h	00	A0-03
2532	00	P5-50	3009	00	A0-09
2600h	00	P6-00	3100h	00	A1-00
2601h	00	P6-01	3101h	00	A1-01
2602h	00	P6-02	3102h	00	A1-02
2603h	00	P6-03	3103h	00	A1-03
2617h	00	P6-23	3115h	00	A1-21
2700h	00	P7-00	3200h	00	A2-00
2701h	00	P7-01	3201h	00	A2-01
2702h	00	P7-02	3202h	00	A2-02
2703h	00	P7-03	3203h	00	A2-03
2750h	00	P7-80	3240h	00	A2-64
2800h	00	P8-00	4000h	00	U0-00
2801h	00	P8-01	4001h	00	U0-01
2802h	00	P8-02	4002h	00	U0-02
2803h	00	P8-03	4003h	00	U0-03
2818h	00	P8-24	404Bh	00	U0-75

6.4 Independent Protocol

Index	Sub-index	Object Type	Name	Data Type	Access	PDO
5000	-	VAR	Command	UINT16	RW	YES
5010	-	VAR	Target speed	UINT16	RW	YES
5100	-	VAR	Status	UINT16	RO	YES
5110	-	VAR	Output frequency	UINT16	RO	YES
	-	RECORD	Communicate state	-	-	-
	01	VAR	Number of frame lost	UINT16	RO	NO
5200	02	VAR	Number of CRC errors	UINT16	RO	NO
5200	03	VAR	Number of rejects	UINT16	RO	NO
-	04	VAR	Newest error cause	UINT16	RO	NO
	05	VAR	Newest error index	UINT16	RO	NO

	06	VAR	Cycle time	UINT16	RO	NO
--	----	-----	------------	--------	----	----

Note: the 5200hex is used to observe the communication status between the expansion card and the frequency converter and does not participate in the actual control.

Index	Sub-index	Object Type	Name	Data Type	Access	PDO
603F	-	VAR	Error code	UINT16	RO	YES
6040	-	VAR	Control word	UINT16	RW	YES
6041	-	VAR	Status word	UINT16	RO	YES
6042	-	VAR	vl target velocity(0.01%)	INT16	RW	YES
6043	-	VAR	vl target demand	INT16	RO	YES
6044	-	VAR	vl target actual value	INT16	RO	YES
	-	RECORD	vl velocity acceleration			
6046	01	VAR	Lower limit frequency	UINT32	RW	NO
	02	VAR	Upper limit frequency	UINT32	RW	NO
	-	RECORD	vl velocity acceleration			
6048	01	VAT	Maximum output frequency	UINT32	RO	NO
	02	VAR	Acceleration time	UINT16	RW	NO
	-	RECORD	vl velocity deceleration			
6049	01	VAT	Maximum output frequency	UINT32	RO	NO
	02	VAR	Deceleration time	UINT16	RW	NO
605B	-	VAR	Shutdown option code	UINT16	RW	NO
605C	-	VAR	Disable operation option code	UINT16	RW	NO
605E	-	VAR	Fault reaction option code	UINT16	RW	NO
6060	-	VAR	Modes of operation	INT8	RW	NO
6061	-	VAR	Modes of operation display	INT8	RO	NO
6064	-	VAR	Position actual value	INT32	RO	YES
606C	-	VAR	Velocity actual value(reserved)	INT32	RO	YES
6071	-	VAR	Target torque	INT16	RW	YES
6077	-	VAR	Torque actual value	INT16	RO	YES
607A	-	VAR	Target position(reserved)	INT32	RW	YES
6502	-	VAR	Supported drive modes	UINT32	RO	NO

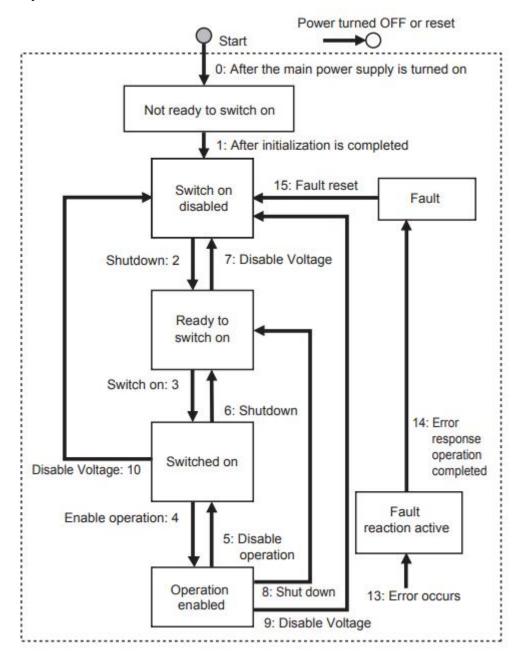
6.5 CiA402 object(Driver profile area)

7. State control

7.1 VFD status control

7.1.1 State machine

The operation state transition of VFD is shown in the figure below. Each box represents a state, and the serial number 2-10,15 represents the state control command.



Note: quick stop command is not supported. If the master station executes quick stop command, it will execute the command of conversion 9 (free shutdown).

7.1.2 Status description

Status	Description
Not ready to switch on	Power on the power supply and execute the initialization procedure
Switch on disabled	Initialization end
Ready to switch on	Waiting to enter the Switch On state, the motor is not excited
Switch on	VFD is ready, main loop power supply is normal
Operation enabled	VFD can be controlled and work normally
Fault reaction active	Occur the error and the cause of the fault needs to be determined
Fault	Fault status

7.1.3 Control command

The status is controlled by the bit of the control command (Controlword 6040 h). The combined control table is as follows.

		С					
Command	Bit7 Bit3		Bit2	Bit 1	Bit 0	Transitions	
Commanu	Fault	Enable	Quick	Enable	Switch		
	reset	Operation	Stop	Voltage	On		
Switch on	0	-	1	1	0	2,6,8	
Switch on+	0	0	1	1	1	3	
Enable operation	0	0	1	1	1	5	
Disable voltage	-	1	1	1	1	3,4 (Automatic	
						conversion)	
Quick stop	-	-	-	0	-	7,9,10	
Disable operation	-	0	1	1	1	5	
Enable operation	-	1	1	1	1	4	
Fault reset	0->1	-	-	-	-	15	

7.1.4 Status

The bit combination of statusword (6041 hex) indicates the working status of the equipment, as shown in the following table:

Status	Bit 12 FC	Bit 9 RO	Bit 6 SOD	Bit5 QS	Bit 4 VE	Bit 3 F	Bit 2 OE	Bit 1 SO	Bit 0 RTSO
Not ready to switch on	1	1	0	0	-	0	0	0	0
Switch on disable	1	1	1	-	-	0	0	0	0
Ready to switch on	1	1	0	1	-	0	0	0	1
Switched on	1	1	0	1	1	0	0	1	1
Operation enabled	1	1	0	1	1	0	1	1	1
Fault reaction active	1	1	0	1	-	1	1	1	1
Fault	1	1	0	1	-	1	0	0	0

Note:

(1)FC = Follow command; RO = Remote; SOD = Switch on disabled; QS = Quick stop; VE = Voltage enabled;

F = Fault; OE = Operation enabled; SO = Switched on; RTSO = Ready to switch on.

(2)"-" means no requirement, which may be 0 or 1. It does not participate in the judgment.

7.2 Operating mode

The operation mode supports speed mode and torque mode, which are set by parameter PF-00:

Speed mode: PF-00=0. Torque mode: PF-00=1.

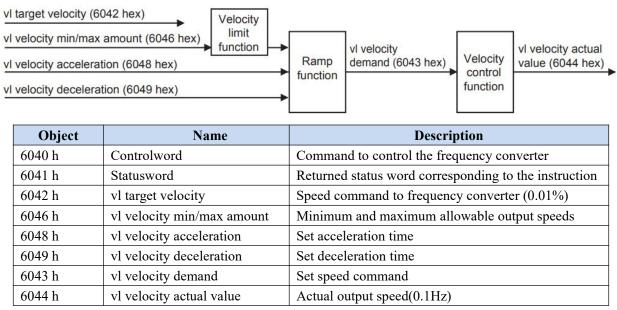
The operation mode supported by the frequency converter is displayed by "Supported drive modes (6502 hex)".

This mode supports clock synchronization mode (DC sync) and periodic synchronization mode (SM sync).

Note: Mode switching can only be realized by setting variable frequency pf-00 parameters, which cannot be modified during operation.

Setting "modes of operation (6060 hex)" cannot switch the operation mode. The default is 6060h=2.

7.2.1 Speed mode



Note: 6043h and 6044h give the same value.

7.2.2 Torque mode

Object	Name	Description		
6071 h	Target torque	Target torque		
6077 h	Torque actual value	Torque actual value		

8. Independent protocol object

The independent protocol object enables the master station to directly operate the VFD remotely, and all performance parameters directly use the parameters of the original frequency converter.

5000 hex	Command				
Range: 0000 ~ FFFF hex		Unit:-	Default value: 0000 hex		
Size: 2byte(U16)		Access: RW	PDO map: Possible		

This object directly provides action instructions to the VFD.

Bit description is as follows:

Bit	Meaning	Detail	
0	Forward	0:stop 1:Forward running	
1	Reverse	0:stop 1:Reverse running	
2-3	Reserved		
4	Parking mode	0:Deceleration shutdown 1: Free shutdown	
5-6	Reserved		
7	Fault reset	1: Fault and warning clearing	
8	Enable effective	0: Default CiA402 protocol	
		1: Independent protocol (this agreement)	
9-15	Reserved		

• The instructions are as follows:

Forward running 0x0101 (decimal corresponding to 257)

Reverse running 0x0102 (decimal corresponding to 258)

Deceleration shutdown 0x0110 (decimal corresponding to 256)

Free shutdown 0x0100 (decimal corresponding to 272)

For example, 0x0101 is converted to binary 10000001, bit0 is 1, which means forward running, and bit8 is 1, which means independent protocol.

5010 hex	Target Speed		
Range: 0000 ~ FFFF hex		Unit: 0.01Hz	Default value: 0000 hex
Size: 2byte(U16)		Access: RW	PDO map: Possible

• The object gives the output frequency of the frequency converter.

• Refer to P0-13 and P0-14 for upper frequency limit and upper frequency source.

5100 hex	Status		
Range:0000 ~ FFF	F hex	Unit : -	Default value: 0000 hex
Size: 2byte(U16)		Access: RO	PDO map: Possible

- The current state of the frequency converter.
- Bit description is as follows:

Bit	Meaning	Detail
0	Operation / shutdown	0: Shutdown 1: Operation
1	Forward/Reverse	0: Forward 1: Reverse
2	Fault flag	0: Normal 1: Fault
3	Frequency arrival	1: Reach the set frequency
4-6	Reserved	Normally 0
7	Abnormal communication	0: normal 1: abnormal

8-15	Fault code	Refer to the VH5/VH6 frequency inverter manual
		or appendix

5110 hex	Output Frequency		
Range: 0000 ~ FFFF hex		Unit : 0.1Hz	Default value: 0000 hex
Size: 2byte(INT16)		Access: RO	PDO map: Possible

5200 hex	Communicate State			
Sub-index 0:Number of entries				
Range: -		Unit : -	Default value: 0006hex	
Size: 1byte(U8)		Access: RO	PDO map: Not possible	
Sub-index 1: Num	ber of frame lost			
Range:-		Unit : times	Default value: 0000hex	
Size: 2byte(U16)		Access: RO	PDO map: Not possible	
Sub-index 2:Numb	per of CRC error CF	RC		
Range:-		Unit :times	Default value: 0000hex	
Size: 2byte(U16)		Access: RO	PDO map: Not possible	
Sub-index 3: Num	Sub-index 3: Number of rejections			
Range:-		Unit :times	Default value: 0000hex	
Size:2byte(U16)		Access: RO	PDO map: Not possible	
Sub-index 4:Newe	st error cause			
Range: 0-3		Unit :-	Default value: 0000hex	
Size:2byte(U16)		Access: RO	PDO map: Not possible	
Sub-index 5:Newe	st error index			
Range: -		Unit :-	Default value: 0000hex	
Size:2byte(U16)		Access: RO	PDO map: Not possible	
Sub-index 6:Cycle	time			
Range:-		Unit : ms	Default value: 0000hex	
Size:2byte(U16)		Access: RO	PDO map: Not possible	

• Sub-index 1~3 diaplay the status of the communication data frame between the expansion card and the frequency converter.

- Sub-index 4 displays the latest error reason, 1/2/3 respectively represents sub objects 1 to 3, and 0 represents no error at present.
- Sub-index 5 displays the latest access object when an error occurs, which is used for fault location.
- Sub object 6 displays the cycle of the communication frame, which is generally 10ms (version below 3720) /15ms (version 3720). If the value is too large, it indicates that there is a problem in the communication with the frequency converter.
- This object is used to monitor and analyze the communication status between the expansion card and the frequency converter, which can be ignored in normal use.

Notes:

① The independent protocol does not support torque mode, only speed mode. If the customer wants to use torque mode, please use CiA402 protocol.

② The firmware version of VFD can be queried through P8-16.

9. CiA402 protocol object

603Fhex	Error code		
Range: 0000 ~ FF	FF hex	Unit : -	Default value: 0000 hex
Size:2byte(U16)		Access: RO	PDO map: Possible

• This object displays the latest error or alarm code of the equipment.

Object	name	Data type	Description
603F hex	Error code	U16	0000: No error
			8**:EtherCAT expansion card related errors, please
			refer to 11. EtherCAT communication alarm code
			9**: error reported by frequency converter, ** is
			the error number of frequency converter
			For example,
			901 indicates acceleration overcurrent, Err01
			910 indicates motor overload,Err10
			Refer to chapter 7-1 of VH5/VH6 frequency
			inverter manual

6040hex	Control word		
Range: 0000 ~ FFFF hex		Unit : -	Default value: 0000 hex
Size:2byte(U16)		Access: RW	PDO map: Possible

• This object controls the working state of the equipment.

• Bit description is as follows:

Bit	Name	Details
0	Switch on	The state is controlled by these bits.
1	Enable voltage	Quick stop is not supported.
2	Quick stop(reserved)	
3	Enable operation	
4-6	Reserved	Normally 0
7	Fault reset	Faults and warnings are cleared when this bit turns ON
8-15	Error code	Unused, normally 0

6041hex	Statusword		
Range :0000 ~ F	FFF hex	Unit: -	Default value: 0000 hex
Size:2byte(U16)		Access: RO	PDO map: Possible

- This object displays the working status of the current equipment.
- Bit description is as follows:

Bit	Name	Details
0	Ready to switch on	these bits gives the state.
1	Switched on	Quick stop is not supported.
2	Operation enabled	
3	Fault	
4	Voltage enabled	
5	Quick stop	
6	Switch on disable	Normally 0
7	Warning	0:No warning occurred for the unit or inventor
		1:Warning occurred for the unit or inventor
8	Reserved	Not used

9	Remote	0:Control from Controlword is diabled	
		1:Indicates that being performed by Controlword	
10-15	Reserved	Not used	

6042hex	vl target velocity		
Range : -32768-32767		Unit: 0.01%	Default value: 0
Size: 2byte(INT16)		Access:RW	PDO map:Possible

This object corresponds to the percentage of the maximum output frequency P0-13, namely:

vl target velocity =
$$\frac{\text{Data} \times \text{Maximum output frequency P0-13}}{100000}$$

10000

Data corresponds to the value given in 6042h. The given range of data is 0~10000. Values beyond the given range cannot be written.

6043hex	vl velocity demand		
Range :-32768-32767		Unit: 0.01Hz	Default value: 0000 hex
Size:2byte(INT16)		Access: RO	PDO map: Possible

6044hex	vl velocity actual value		
Range :-32768-32767		Unit: 0.1Hz	Default value: 0000 hex
Size:2byte(INT16))	Access: RO	PDO map: Possible

• This object indicates the speed command fed back by the frequency converter.

6046hex	vl velocity min max amount			
Sub-index 0:Number of entries				
Range :-		Unit: -	Default value: 02hex	
Size:1byte(U8)		Access: RO	PDO map: Not possible	
Sub-index 1: vl velocity min amount (Lower limit frequency)				
Range :0 – FFFFFFF hex		Unit: 0.01Hz	Default value: 00000000hex	
Size:4byte(U32)		Access: RW	PDO map: Not possible	
Sub-index 2: vl ve	Sub-index 2: vl velocity max amount (Upper limit frequency)			
Range :0 – FFFFFFF hex		Unit: 0.01Hz	Default value: 00001388hex	
Size:4byte(U32)		Access: RW	PDO map: Not possible	

• This object sets the maximum and minimum speed.

- Sub index 01 supports the minimum speed of reading and writing, which will be associated with frequency converter parameter P0-17
- Sub index 02 supports the maximum speed of reading and writing, which will be associated with frequency converter parameter P0-15(the maximum allowable setting value is determined by the maximum output frequency of P0-13)

6048hex	vl velocity acceleration			
Sub-index 0: Number of entries				
Range :-		Unit:-	Default value: 02hex	
Size:1 byte(U8)		Access: RO	PDO map: Not possible	
Sub-index 1: the maximum output frequency P0-13				
Range :0 – FFFFFFF hex		Unit:0.01Hz	Default value: 00001388hex	
Size:4 byte(U32)		Access: RO	PDO map: Not possible	
Sub-index 2: Delta	Sub-index 2: Delta time			
Range :0 – FFFF h	iex	Unit:0. 1s	Default value: 00000200hex	
Size:2 byte(U16)		Access: RW	PDO map: Not possible	

- This object sets the acceleration time.
- Read / write delta time will be associated with VFD parameter P0-18.

6049hex	vl velocity deceleration			
Sub-index 0:Number of entries				
Range :-		Unit:-	Default value: 02hex	
Size:1 byte(U8)		Access: RO	PDO map: Not possible	
Sub-index 1: the maximum output frequency P0-13				
Range :0 – FFFFFFF hex		Unit: 0.01Hz	Default value: 00001388hex	
Size:4 byte(U32)		Access: RO	PDO map: Not possible	
Sub-index 2: Delta	Sub-index 2: Delta time			
Range :0 – FFFF h	nex	Unit: 0.1s	Default value: 00000200hex	
Size:2 byte(U16)		Access: RW	PDO map: Not possible	

- This object sets the deceleration time.
- Read / write delta time will be associated with VFD parameter P0-18.

605Bhex	Shutdown option code		
Range :1		Unit:-	Default value: 1
Size:2byte(INT16))	Access: RW	PDO map: Not possible

• This object describes the action during shutdown (operation enable → ready to switch on). When this object is set to 1, it indicates deceleration shutdown, otherwise it will free shutdown.

605Chex	Disable operation option code		
Range :1		Unit:-	Default value: 1
Size:2byte(INT16))	Access: RW	PDO map: Not possible

• This object describes the action of canceling operation (operation enable → switch on). When this object is set to 1, it indicates deceleration shutdown, otherwise it will free shutdown.

605Ehex	Fault reaction option code		
Range :1		Unit:-	Default value: 1
Size:2byte(INT16))	Access: RW	PDO map: Not possible

• This object describes the action when an error occurs (operation enable → fault reaction active). When this object is set to 1, it means deceleration and shutdown, otherwise free shutdown (this function is reserved for standby).

6060hex	Mode of operation		
Range :2		Unit::-	Default value: 02 hex
Size:1 byte(INT8)		Access: RW	PDO map: Not possible

6061hex	Mode of operation display		
Range : 0 - 10		Unit:-	Default value: 02 hex
Size:1 byte(INT8)		Access: RO	PDO map: Not possible

• This object displays the current operation mode, which is equal to 6060 hex (mode of operation) during operation.

6064hex	Position actual value		
Range :-21474836	48 - 2147483647	Unit:-	Default value: 00000002 hex
Size:4 byte(U32)		Access: RO	PDO map: Not possible

• This object displays the encoder position fed back by the frequency converter.

6071hex	Target torque			
Range :-32768 -32	2767	Unit: 0.01%	Default value: 0	
Size:2 byte(INT16		Access: RW	PDO map: Possible	

6077hex	Torque actual value				
Range :-32768 -32	2767	Unit:0.01%	Default value: 0		
Size:2 byte(INT16	Size:2 byte(INT16)		PDO map: Possible		
• TT1 · 1 · · 1 ·	1 .1 .	1011 11	1 0		

• This object displays the torque command fed back by the frequency converter.

6502hex	Supported drive	Supported drive modes		
Range : 0 - 10		Unit:-	Default value: 00000002 hex	
Size:4 byte(U32)		Access: RO	PDO map: Not possible	

• This object displays the operation mode supported by expansion card.

• Bit description is as follows:

Bit	Supported mode	Definition
0	pp (Profile Position mode)	0:Not supported
1	vl (velocity mode)	1:Support
2	pv (Profile Velocity mode)	0:Not supported
3	tq (Profile Torque mode)	0:Not supported
4	Reserved	0
5	hm (Homing mode)	0:Not supported
6	ip (Interpolated Position mode)	0:Not supported
7	csp (Cyclic Sync Position mode)	0:Not supported
8	csv (Cyclic Sync Velocity mode)	0:Not supported
9	cst (Cyclic Sync Torque mode)	1:support
10 - 31	Reserved	0

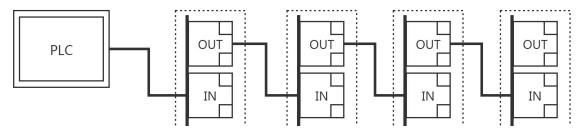
10. EtherCAT use case

10.1 XINJE XDH series PLC and VH5/VH6

10.1.1 System topology

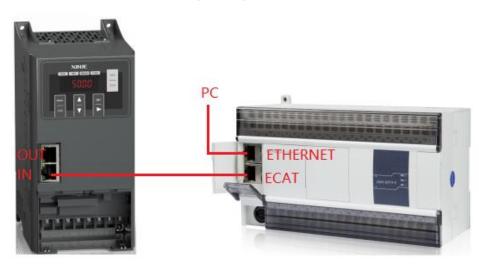
VH5/VH6 has two communication network ports. The network port at the upper end is the outgoing port (out port) and the network port at the lower end is the incoming port (in port). The principle of "bottom in and top out" shall be followed when connecting multiple frequency converters.

VH5 and VH6 EtherCAT expansion cards are connected to PLC master station and frequency converter slave station according to the series topology shown in the figure below.



10.1.2 Physical wiring

Take Xinje XDH series PLC and VH5 as an example, the physical wiring is shown in the figure:



10.1.3 System configuration

10.1.3.1 Parameter setting

The frequency converter slave station needs to be configured as EtherCAT communication mode, and the parameters to be modified are as follows:

Parameter	Name	Access	Set	Range	Explanation
			value		
P0-02	Operation command channel selection	Runtime read only	2	0-2	Communication
P0-03	Main frequency A input channel	Runtime read	6	0-9	Communication setting

	selection	only			
P9-00	Communication protocol	Runtime read only	1	0-2	EtherCAT
P9-12	Slave station No.	RW	-	0-65535	After modification, it is valid when power on again.

Note: When using the CiA402 protocol for control, other parameters of the frequency converter can be factory parameters. If the master station supports automatic reading of the slave station number (e.g. Xinje bus type PLC), P9-12 does not need to be set.

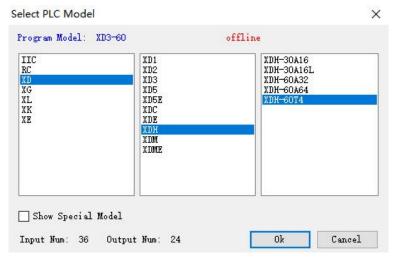
10.1.3.2 Add XML file

Before opening the PLC software, you need to add the XML file. (when installing the XDPPro software, the XML file of frequency conversion has been included.) If you need to update the XML file, please go to the official website \rightarrow service and support \rightarrow download center to download it by yourself.

Right click XDPPro software, open the location of the file, find the directory [plugins] ethercat[vendorxml], and add the XML file here.

his PC ▶ Local Disk (D:) ▶ XINJE ▶ XDPPro ▶ 3.7.14a_20220	1428 ⊧ plugins ⊧ eth	ercat ⊧ vendorxml	
Name	Date modified	Туре	Size
Profile402.xml	10/8/2020 10:45 A	XML File	22 KB
VHX-CC100.xml	6/3/2021 10:03 AM	XML File	417 KB
XINJE-DP3C-Rev2.0-v1.2.20.20210615-30	9/10/2021 1:26 PM	XML File	260 KB
XINJE-DS5C-ECT.xml	7/29/2021 9:32 AM	XML File	787 KB
XINJE-LC3-AP-Rev1.3.0.xml	6/3/2021 10:03 AM	XML File	230 KB

10.1.3.3 New project(take XDH-60T4 as an example)



10.1.3.4 Master connection configuration

1.Computer configuration

After the network cable is plugged in, open "control panel" \rightarrow "network and Internet" \rightarrow "network connection". Find the Ethernet that has been successfully connected. Right click the Ethernet and click properties. The Ethernet properties interface pops up. Then follow the steps below:

- (1) Double click "Internet Protocol Version 4 (TCP/IPV4)".
- (2) Select "use the following IP address".
- (3) Set IP address: 192.168.6.xxx, "xxx" can be set arbitrarily (except 6).

Note: The last digit of the computer address and the IP address of the PLC device cannot be set repeatedly.

Ethernet P	roperties	Internet Protocol Versi	on 4 (TCP/IPv4) Properties
Networking Sharing		General	
Connect using:		You can get IP settings assigned a	utomatically if your network supports
Realtek PCIe GBE Family Co	ontroller #2	this capability. Otherwise, you nee for the appropriate IP settings.	d to ask your network administrator
	Configure	Obtain an IP address automa	tically
This connection uses the following	items:	• Use the following IP address:	
QoS Packet Scheduler	er Multiplexor Protocol	IP address:	192.168.6.10
Microsoft LLDP Protocol I	Driver	Subnet mask:	255 . 255 . 255 . 0
 Link-Layer Topology Disc. Link-Layer Topology Disc. 		Default gateway:	
Internet Protocol Version Internet Protocol Version		Obtain DNS server address a	utomatically
<	>	Use the following DNS server	
Install Unins	stall Properties	Preferred DNS server:	
Description		Alternate DNS server:	
Transmission Control Protocol/Ir wide area network protocol that across diverse interconnected n	provides communication	Validate settings upon exit	Advanced
	OK Cancel		OK Cancel

2.PLC configuration

After checking the wiring and Ethernet configuration, open XDPPRO programming tool----click communication configuration-----------double click Ethernet-Xnet.

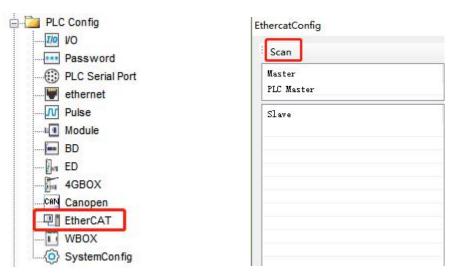
Configure according to the following figure:

Communication configura	ove-Up Move-Dow		The street water		-
Name	Connection status	Status	Belonging Global	Description	Connect Inf
USB_Xnet_1 Ethernet_Xnet_Default	Not connected	in use	Global	Search type: Automatic search, Search mode: Search type: ethernet, Search mode: Device t	10
Ethernet_Anet_Default Ethernet_Modbus_Default	Not connected Not connected		Global	Modbus-TCP connection, device IP address: 19	

ommunication Name	: Ethernet_Xnet_1		
Connection mode s	selection		
Interface Type:	Ethernet	~	
CommProtocol:	Xnet	~	
Connect Type:	designated addre	s ~	
Communication par	ameter configurati	on	
IP Address:	192.168.6.6		
		Service	stopped
ServerConfig			
ServerConfig		🗹 Auto-o	onnect on exi

Click OK after configuration and select " in use" for corresponding status.

After the communication connection is successful, find the "PLC configuration" column, click "EtherCAT" to open the configuration interface, click "Scan", and then the page will display the scanned slave station and master station.



10.1.4 Control under CIA 402 protocol and Independent protocol

10.1.4.1 Configuration

- (1) Click Scan
- (2) Select the function module: User Define/Servo Module
- (3) Click write, then click activate
- (4) Confirm that the State Machine is switched to the OP state.
- (5) Enter the Expert process data and click input and output respectively.

PDO allocation selection 1600 (CiA402 protocol).

PDO allocation selection 1601 (Independent protocol).

The PDO list can be selected. If you need to set a new address, you can add or modify it in the PDO content.

EthercatConfig	General Expert process data Launch parameter	x IO Mapping COE-Online ESC Reg
Master PLC Master Slave StationID:0 VH5-CC100	Offset time(us): 0 <table-cell-columns></table-cell-columns>	FundMappingMum: 0 😍 2 FundModeule: Servo Module v
		3 (4)

Note: If you need to use the function module: Servo Module, please ensure that the PLC firmware is 3.7.2 and above, and update the PLC programming software to version 3.7.14b or above. Use A_ PWR instruction to control the start and stop of frequency conversion.

10.1.4.2 CiA402 protocol control

1) Enter the Expert process data and click "Input" and "Output" respectively in the SynManager. Select 1600, 1a00 from PDO list. If you need a new address, you can add or modify it in the PDO content. After checking, click configuration write and activate.

EthercatConfig

Scan	General	Expert pr	rocess data	Launch param	eters IO M	lapping	COE-O1	nline ESC B	leg			
laster	SyncMa	nager			PDO list							
PLC Master	SM	Size	Туре		Index	Size	Ne	ame		Sign	SM	
lave	0		Mailbo		#x1600	4.0		and a product of the second	s data mapping		2	
-StationID:0 VH5-CC100	1		Mailbo		#x1601	4.0			s data mapping			
	2	4.0	Output		#x1602	4.0			s data mapping			
	3	6.0	Input		#x1603	4.0			s data mapping	_	- 1	
	770			2	#x1a00 #x1a01	6.0 4.0			ss data mapping s data mapping	_	3	
	PDO As:	sı gn			#x1a01 #x1a02	4.0 6.0			s data mapping s data mapping			
	🗹 #x1	600			#x1a02 #x1a03	4.0			s data mapping s data mapping			
	= #x1	601			#A1400	1.0	1.	the process	s data mapping			
	#x1							Jan Same				
	= #x1	603			PDO: A	dd Eo	dit Del	ete Move	up Move down			
				-	Index:Su	bIdx	Size	Offset	Name	Туре		
					#x6040:0	0	2.0	0.0	Control Word	UINT		
					#x6042:0	0	2.0	2.0	vl target velocit	y INT		
				-								
								Read	Write A	tivate	OK	Cance

2) View the register address of the control word through IO mapping

Note: the specific IO address value shall be used according to the actual display setting of PLC

Scan	General Expert	process data Launch parameter	rs IO Mapping CO	E-Online ESC R	eg
Master	Address				
PLC Master	Index:SubIdx	Name	Address	Туре	Bit lengt
Slave		Control Word	НД10000	UINT	16
-StationID:0 VH5-CC100	⊕-#x6042:00	vl target velocity	HD10002	INT	16
	⊕- # x6060:00	ModeOfOperation	100004	SINT	8
	⊞-#x607A:00	Target position	HD10006	DINT	32
	⊕-#x6071:00	Target torque	HD10008	INT	16
	⊕-#x6041:00	Status Word	HD10010	UINT	16
	⊕-#x606C:00	Velocity actual value	HD10012	DINT	32
	⊕- # x6061:00	ModeOfOperationDisplay	HD10014	SINT	8
	⊕-#x6077:00	Torque actual value	HD10016	INT	16
	te-#x6064∶00	Position actual value	HD10018	DINT	32
	⊕- # x6043:00	vl target demand	HD10020	DINT	32
	te-#x603F:00	ErrorCode	HD10022	UINT	16
		vl target actual value	HD10024	INT	16

3)VFD operation (function module selection: User define & speed mode: PF-00=0 as an example)

FuncModeule: User Define ~

Set **[**6060h: Mode of operations **]** to 2 (speed mode).

Set [6040h: Control word] to start / stop the frequency converter.

For example, when 15 is written, the VFD starts. Write the value other than 15, and the VFD stops. Write 128 to clear the VFD alarm.

Set [6042h:vl target velocity], which corresponds to the percentage of the maximum output frequency P0-13

vl target velocity = $\frac{\text{Data} \times \text{Maximum output frequency P0-13}}{10000}$

Data corresponds to the value given in 6042h. The given range of data is $0\sim10000$. Values beyond the given range cannot be written.

For example: P0-13=50.00Hz, if 1000 is written in 6042h, the frequency converter operates at 5.00Hz forward, write -1000, and the frequency converter operates at 5.00Hz reverse.

Set [6071h: target torque] to set the upper limit value of torque in the speed mode, which is 150.0% by default.

Read **[**6041h: status word **]** to obtain the status feedback of the frequency converter.

Read [6064h: position actual value] to obtain encoder position feedback. (only valid when PG card is used).

Read **[**603Fh: ErrorCode **]** to obtain the alarm code. For details, refer to Chapter 11.Alarms related to EtherCAT communication.

Note:

①Check the version number of the expansion card through the frequency converter U4-09. If U4-09=100, 6042h will give the frequency (unit: 0.01Hz).

For example, if 1000 is written in 6042h, the frequency converter operates in forward direction at 10.00 Hz, if -1000 is written, the frequency converter operates in reverse direction at 10.00 Hz.

⁽²⁾Parameters in torque mode

Parameter	Name	Access	Set value	Range	Explanation
PF-00	Torque control	Runtime read only	1	0: Speed control 1: Torque control	Torque control
PF-01	Upper limit source of driver torque	Runtime read only	5	0-7	communicati on setting
PF-03	Torque control forward maximum frequency source	Can be modified during operation	5	0-7	communicati on setting
PF-05	Torque control inverse maximum frequency source	Can be modified during operation	5	0-7	communicati on setting

Set **[**6071h: target torque **]** to set the torque setting.

When the torque is given as positive, the VFD operates in the forward direction.

When the torque is given as negative, the VFD operates in the reverse direction.

For example, if 1000 is set, the frequency converter operates at 10.00% of the rated torque

Set **[**6042h:vl target velocity **]** to modify the upper speed limit (0.01%) under torque mode, corresponding to the percentage of maximum output frequency P0-13.

10.1.4.3 Independent protocol control

(1) Enter the expert process data and click input and output respectively in the synchronization manager. PDO allocation selection 1601,1a01. If you need to set a new address, you can add or modify it in the PDO content. After checking, click write and activate.

SM	Size	Туре	Index	Siz	e Na	une		Sign	SM
0	Sire	Mailbo	#x1600	11.0	15	t RxPDO Maj	ping		
1		Mailbo	#x1601	4.0			ss data mapping		2
2	4.0	Output	#x1602	4.0	Rx	3rd proces	ss data mapping		
3	6.0	Input	#x1603	4.0	Rx	4th proces	ss data mapping		
			#x1a00	21.0	1 s	t TxPDO Maj	oping		
PDO As	sign		#x1a01	6.0	Tx	2nd proces	ss data mapping		3
	1600		#x1a02	6.0	Tx	3rd proces	ss data mapping		
→ #x			#x1a03	6.0	Тх	4th proces	ss data mapping		
and the second	1602								
	1603		PDO: A	dd I	E <mark>dit</mark> Del	ete Move	up Move down		
			Index:Su	bIdx	Size	Offset	Name	Туре	
			#x5000:0	D	2.0	0.0	Command	UINT	
			#x5010:0	D	2.0	2.0	TargetSpeed	UINT	

(2) View the register address of the control word through IO mapping Note: the specific IO address value shall be used according to the actual display setting of PLC.

rt process data	Launch parame	eters IO Mapping CO	E-Online ESC R	leg
: Name		Address	Туре	Bit length
Command		10026	UINT	16
TargetSpeed		10028	UINT	16
Status		НД10030	UINT	16
OutputFreque	ncy	10032	DINT	32
	: Name Command TargetSpeed Status	: Name Command TargetSpeed	Name Address Command HD10026 TargetSpeed HD10028 Status HD10030	Name Address Type Command HD10026 UINT TargetSpeed HD10028 UINT Status HD10030 UINT

(3) VFD Operation

Set **[**6060h:Mode of operations **]** to 2 (speed mode)

Set [5000h:Command] to control the frequency converter.

For example, if 257 is written, the frequency converter will run forward. Write 256, and the frequency converter deceleration shutdown. Other commands can be converted by customers. (see Chapter 8 for detailed usage rules) Set [5010h:Target Speed], which corresponds to the percentage of the maximum output frequency P0-13

vl target velocity = $\frac{\text{Data} \times \text{Maximum output frequency P0-13}}{\text{Maximum output frequency P0-13}}$

10000

Data corresponds to the value given in 5010h. The given range of data is $0\sim10000$. Values beyond the given range cannot be written.

For example: P0-13=50.00Hz, if 1000 is written in 5010h, the frequency converter operates at 5.00Hz forward, write -1000, and the frequency converter operates at 5.00Hz reverse.

Read [5100h: status word] to obtain the status feedback of the frequency converter.

Note: Check the version number of the expansion card through the frequency converter U4-09. If U4-09=100, 5010h will give the frequency (unit: 0.01Hz).

For example, if 1000 is written in 5010h, the frequency converter operates in forward direction at 10.00 Hz, if -1000 is written, the frequency converter operates in reverse direction at 10.00 Hz.

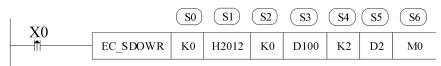
10.1.5 Instruction read / write

Note: Select the corresponding register address according to different protocols.

Taking the CiA402 protocol as an example:

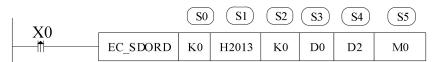
(1) Write SDO write instructions to associate addresses with registers, or modify parameters with corresponding register addresses.

Example ①: Modify the acceleration time P0-18 through SDO write instruction. According to chapter 6.3, write the object index of reading acceleration time P0-18: H2012.



Operand	Function	Range	Туре
S 0	EtherCAT slave station no.: Station ID	0~63	16-bit constant or single word register
S1	Object index	0x1000~0xffff	16-bit constant or single word register
S2	Object subIndex	0~255	16-bit constant or single word register
S 3	Write value register		single word register
S4	write value byte length		16-bit constant or single word register
S 5	Status register		single word register
S 6	Completion flag bit		Bit

Example ②: Read the deceleration time P0-19 through SDO reading instruction. According to chapter 6.3, write the object index of deceleration time P0-19: H2013.



Operand	Function	Range	Туре
S 0	EtherCAT slave station no.: Station ID	0~63	16-bit constant or single word register
S1	Object index	0x1000~0xffff	16-bit constant or single word register
S2	Object subIndex	0~255	16-bit constant or single word register
S3	Value register		Single word register
S4	Status register		Single word register
S5	Completion flag bit		Bit

Note: ①The first slave station ID is 0, not 1.

②For instructions, please refer to *XDHXLH motion control manual*.

10.2 Omron series PLC and VH5/VH6(CiA402 protocol)

10.2.1 System configuration

•			
Name	Model	Quantity	Explanation
Upper computer	Sysmac Studio	1	Omron upper computer software
Controller	OMRON NJ501-1500 series	1	-
Communication card	VHX-CC100(V2.0)	1	-
Network cable	JC-CB-3	some	For connection between computer and PLC and between PLC and VFD

10.2.2 Parameter setting

The frequency converter slave station needs to be configured as EtherCAT communication mode, and the parameters to be modified are as follows:

Parameter	Name	Access	Set	Range	Explanation
			value		
P0-02	Operation command channel selection	Runtime read only	2	0-2	Communication
P0-03	Main frequency A input channel selection	Runtime read only	6	0-9	Communication setting
P9-00	Communication protocol	Runtime read only	1	0-2	EtherCAT
P9-12	Slave station No.	RW	-	0-65535	After modification, it is valid when power on again.

10.2.3 Setup steps

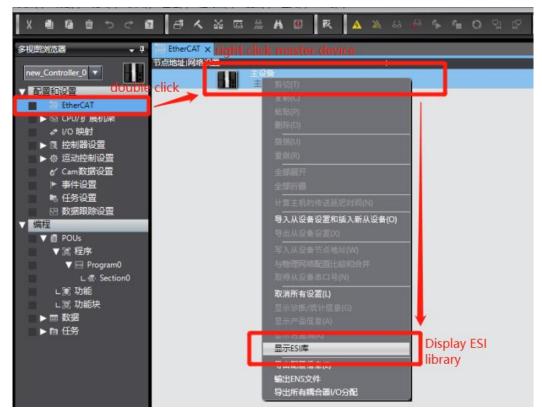
1) New project

Open the Omron upper computer software SYSMAC studio. If "new project" is selected for the first time, select the model: NJ501-1500, version 1.02 in the project attribute interface, and click "create" to generate the programming interface.

Sysmac Studio						-	×
高线 New project ● 新建工程(N) ● 打开工程(O) ● 公 导动(D ● 公 导动(D ● 公 导动(D ● 女 连接到设备(C) 许可(L)		 12程属性 12名称 作者 注释 类型 	新建工程 p'c 标准工程				
□ 许可(L) 试用版 除东天型 10	Dev Vers	1. 均择设计 类型 Cire 设备 Oth 版本	8 12448 1.02	Tisso Creat	▼ ▼ ●		

2) Add XML file

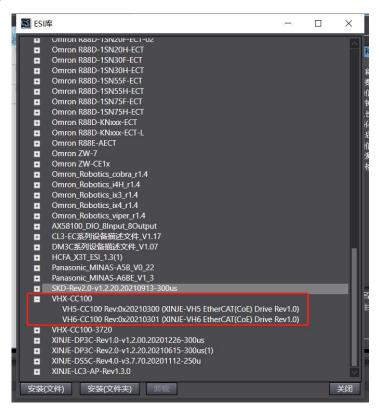
For initial use, customers need to add XML files to the library. Double click "EtherCAT", pop up the EtherCAT configuration screen. Right click master device and select "Display ESI Library".



Then in the pop-up ESI library, we need to add the XML file of VHX-CC100. Select "this folder" to display the path of the storage folder, where the "VHX-CC100" XML type file is placed.

所有ESI文件			名称 值	组 	
 Omron 3G3AX-MX2-ECT 		称	主设备	Term	ninal Coupler
Omron 3G3AX-RX-ECT Omron CJ1W-ECTxx	🎦 打开				×
Omron E3NW-ECT					
Omron E3X-ECT	$\leftrightarrow \rightarrow \land \uparrow$	> 此电脑 > 桌面 > 适配文件 > VH6适配	欧姆龙 ~ ひ	搜索"VH6适配欧姆龙"	Q
 Omron EJ1N-HFUC-ECT 					1
 Omron FHV7x-xxxxx 	组织 • 新建文件	夹			
 Omron FH-xxxx-xx 	XLM	^ 名称 ^	修改日期	类型	大小
Omron FQ-MS12x-x-ECT		140	NALA LI HO	大主	1.1.
Omron FZM1-XXX-ECT	1 时间戳	VHX-CC100.xml	2021/6/1 10:15	XML 文档	41
 Omron GRT1-ECT_Ver2_0 Omron GX-Analog IO 	OneDrive - Per				
 Omron GX-Analog IO Omron GX-Digital IO 	 OneDrive - Per 	SC			
Omron GX-Digital IO-T	▶ 此电脑				
Omron GX-Encoder					
	🧊 3D 对象				
 Omron GX-IO-Link 			\backslash		
Omron GX-IO-Link Omron GX-JC	📕 视频		\backslash		
Omron GX-IO-Link Omron GX-JC Omron GX-JC06-H			\backslash		
Omron GX-IO-Link Omron GX-JC Omron GX-JC06-H Omron NX_Coupler	■ 视频		\backslash		
Omron GX-IO-Link Omron GX-JC Omron GX-JCG6-H Omron GX-JC06-H Omron NX_Coupler Omron R880-1SAN02H-ECT Omron R88D-1SAN04H-ECT	■ 视频 ■ 原片 文档		\backslash		
Omron GX-IO-Link Omron GX-IC Omron GX-ICC Omron RX-C0cH Omron NX_Coupler Omron R88D-1SAN02H-ECT Omron R88D-1SAN08H-ECT Omron R88D-1SAN08H-ECT	 ■ 视频 ■ 原件 文档 ↓ 下载 				
Omron GX-IO-Link Omron GX-IC Omron GX-IC Omron GX-ICG-H Omron RX2-Coupler Omron RX8D-1SAN02H-ECT Omron R88D-1SAN08H-ECT Omron R88D-1SAN08H-ECT Omron R88D-1SAN07H-ECT Omron R88D-1SAN07H-ECT	 ■ 视频 ■ 原片 文档 ↓ 下载 ♪ 音乐 				
Omron GX-IO-Link Omron GX-IO-Link Omron GX-IC6-H Omron R8D-ISAN02H-ECT Omron R8D-ISAN08H-ECT Omron R8BD-ISAN08H-ECT Omron R8BD-ISAN10F-ECT Omron R8BD-ISAN10F-ECT Omron R8BD-ISAN10F-ECT Omron R8BD-ISAN10F-ECT	 ■ 视频 ■ 原件 文档 ◆ 下载 ♪ 音乐 				
Omron GX-IO-Link Omron GX-IC Omron GX-IC6-H Omron R88D-1SAN02H-ECT Omron R88D-1SAN04H-ECT Omron R88D-1SAN04H-ECT Omron R88D-1SAN04H-ECT Omron R88D-1SAN10H-ECT	 ■ 视频 ■ 照片 ● 下载 ● 下载 ● 音乐 ■ 桌面 	v «			
Omron GX-IO-Link Omron GX-IO-Link Omron GX-IOE-H Omron GX-IOE-H Omron R82D-ISAN02H-ECT Omron R82D-ISAN02H-ECT Omron R82D-ISAN10F-ECT Omron R82D-ISAN15F-ECT Omron R82D-ISAN15F-ECT Omron R82D-ISAN15F-ECT Omron R82D-ISAN15F-ECT Omron R82D-ISAN15F-ECT Omron R82D-ISAN15F-ECT	 ■ 视频 ■ 照片 ● 下载 ● 下载 ● 音乐 ■ 桌面 	~ <			
Omron GX-IO-Link Omron GX-IO-Link Omron GX-IC6 Omron R8D-ISAN02H-ECT Omron R8BD-ISAN04H-ECT Omron R8BD-ISAN10F-ECT Omron R8BD-ISAN10F-ECT Omron R8BD-ISAN19F-ECT Omron R8BD-ISAN19F-ECT Omron R8BD-ISAN19F-ECT Omron R8BD-ISAN19F-ECT Omron R8BD-ISAN19F-ECT Omron R8BD-ISAN19F-ECT Omron R8BD-ISAN29F-ECT Omron R8BD-ISAN29F-ECT	 ■ 初時 ■ 四片 ● 下载 ● 下载 ● 音乐 ■ 桌面 	マ く 文件名(N): VHX-CC100.xml		XML files(*.xml)	
Omron GX-IO-Link Omron GX-IO-Link Omron GX-JC06-H Omron GX-2006-H Omron R88D-ISAN02H-ECT Omron R88D-ISAN08H-ECT Omron R88D-ISAN10H-ECT Omron R88D-ISAN10H-ECT Omron R88D-ISAN10H-ECT Omron R88D-ISAN10F-ECT Omron R88D-ISAN15F-ECT Omron R88D-ISAN20H-ECT Omron R88D-ISAN	 ■ 初時 ■ 四片 ● 下载 ● 下载 ● 音乐 ■ 桌面 				~
Omron GX-IO-Link Omron GX-IO-Link Omron GX-20C+H Omron GX-20C6+H Omron R820-1SAN02H-ECT Omron R820-1SAN04H-ECT Omron R820-1SAN04H-ECT Omron R820-1SAN10F-ECT Omron R820-1SAN10F-ECT Omron R820-1SAN15F-ECT Omron R820-1SAN15F-ECT Omron R820-1SAN15F-ECT Omron R820-1SAN30F-ECT Omron R820-1SAN30F-ECT Omron R820-1SAN30F-ECT Omron R820-1SAN30F-ECT	 ■ 视频 ■ 四片 ○ 文档 ◆ 下载 ◆ 百乐 ■ 桌面 			XML files(*.xml) 打开(Q)	
Omron GX-IO-Link Omron GX-IO-Link Omron GX-JC6-H Omron GX-JC06-H Omron R88D-ISAN02H-ECT Omron R88D-ISAN03H-ECT Omron R88D-ISAN10H-ECT Omron R88D-ISAN10H-ECT Omron R88D-ISAN10H-ECT Omron R88D-ISAN10H-ECT Omron R88D-ISAN10H-ECT Omron R88D-ISAN20H-ECT Omron R88D-ISAN30H-ECT Omron R88D-ISAN3	 ■ 视频 ■ 四片 ○ 文档 ◆ 下载 ◆ 百乐 ■ 桌面 			打开(<u>0</u>)	~ 取消
Omron GX-IO-Link Omron GX-IO-Link Omron GX-IC6-H Omron NX, Coupler Omron NX, Coupler Omron R88D-ISAN02H-ECT Omron R88D-ISAN04H-ECT Omron R88D-ISAN10F-ECT Omron R88D-ISAN10F-ECT Omron R88D-ISAN15F-ECT Omron R88D-ISAN15F-ECT Omron R88D-ISAN20H-ECT Omron R88D-ISAN20H-ECT Omron R88D-ISAN20H-ECT Omron R88D-ISAN20H-ECT Omron R88D-ISAN20H-ECT Omron R88D-ISAN20H-ECT	 ■ 视频 ■ 同片 文档 ● 下载 ● 音乐 ■ 桌面 				~

The installation is completed as shown below:



3)Scan and add devices

When using the device, ensure that P9-12 is set. The station number can be increased from 1 in actual connection sequence. After modification, it needs to be powered on again.

If the controller is online, right-click the master device to compare and merge the configurations with those of the physical network.



жи_iSysma	c Studio上的网	络设置	节点地址 物理网	络配置		Sysmac Studio	比较结果	物理网络配置	较低
		安备		主设备		主设备	匹配	主设备	-
1	-XJ	E003 VH6-CC100 Rev:0x2021	1	201 VH6-CC100	Rev:0x2021030	1 : VH6-CC100	匹配	1 : VH6-CC100	
2	XJ	E004 VH6-CC100 Rev:0x2022	2		Rev:0x2022010	2 : VH6-CC100	UC AC	2 : VH6-CC100	
3	-xj	E002 VH5-CC100 Rev:0x2022	3	VH5-CC100	Rev:0x2022010	3 : VH5-CC100	匹配	3 : VH5-CC100	

The actual connection is shown in the following figure:

节点地址(网络设置			
	项目名称	值	
1 E003	设备名称	主设备	
VH6-CC100 Rev:0x20210301	机型	主设备	
2 E004	产品名称	主设备	
VH6-CC100 Rev:0x20220107	从设备数量		
	PDO通信周期	1000	微秒
VH5-CC100 Rev:0x20220106	参考时钟		
	电缆总长度	1000	*
	故障弱化操作设置	故障弱化操作	
	从设备启动等待时间	30	秒
	PDO通信超时检测次数		次
	版本检测方法	设置值 < = 实际设备	
	串口号检测方法	不检查	
	_ 设备名称 设置主设备名称。		

4)Add Group U parameters to the PDO.

After adding a node, select the node with the cursor to display the current node PDO configuration. Select "Edit PDO mapping settings". The pop-up interface displays the current output PDO mapping on the left and PDO entries on the right. You can add or delete PDO as required.

To add a PDO, select "Add PDO entry", and the PDO object that can be added will be displayed in the pop-up window. Select it, click OK, and then click apply to add it successfully.

編集PDO映射设置 Edit PDO mapping	- 🗆 X	
PDO映射 PDO mapping 过程数据大小输入 168(位) / 2048(位) 输出 88(位) / 2048(位) 选择 1输入/输出 名称 / 标志 ● 未选择 输出 1st RxPDO Mapping 可编辑 ● 输出 Rx 3rd process data mapping 可编辑 ● 输出 Rx 2nd process data mapping 可编辑 ● 输出 Rx 2nd process data mapping 可编辑	包含在1st TxPDO Mapping中的PDO条目 ⁹ DO entiries 索引 大小 数据类型 PDO条目名称 0x6041:00 16(位 UINT Statusword 0x606C:00 32(位 DINT Velocity actual value 0x6043:00 32(位 DINT vitarget demand 0x6077:00 16(位 INT Torque actual value 0x6064:00 16(位 INT Position actual value 0x6064:00 16(位 SINT Witarget actual value 0x6061:00 8(位 SINT Modes of operation disp 0x603F:00 16(位 UINT ErrorCode	项目名称 值 设备名称 <u>E004</u> 机型 VH6-CC100 产品名称 XINJE-VH6 EtherCAT(Co 版本 0x20220107 节点地址 2
 → 未洗择 → 未洗择 ◆ 輸入 1st TxPDO Mapping → 可编辑 ◆ 輸入 Tx 3rd process data mapping → 未洗择 ◆ 輸入 Tx 2nd process data mapping → 新入 Tx 4th process data mapping → 新和 Tx 4th process data mapping → 新和 Tx 4th process data mapping → 新和 Tx 4th process data mapping 	Add PDO entrys 下修 对齐 端即DOAL 添加PDO条目 删除PDO条目 确定 取消 应用	
Ox000000 concernent Edit PDO mapping Ox000000 0.000 0.000 0.000 Ox4000:00 U0-00 0.000 0.000 Ox4000:00 U0-00 0.000 0.000 Ox4000:00 U0-02 0.000 0.000 Ox4000:00 U0-03 0.000 0.000 Ox4000:00 U0-04 0.000 0.000 Ox4000:00 U0-012 0.000 0.000 Ox4000:00 U0-13 U0-13 0.000 Ox4000:00 U0-15 U0-15 U0-15 U0-00 Øx80222 UINT 注择:		Protectoperfax 操作的问题量 統用 PDO映射设置 数据被过程数据(PDO)通信周期性的输入/输出。 ・ T ×

After adding, see the following figure:

PDO映	討				包含在1st Txl	PDO Ma	pping中的	的PDO条目		
		过程数据大小:输入 输出		/ 2048[位] 2048[位]	索引 0x6041:00	大小	数据类型 UINT	PDO条目名称 Statusword	注释	
选择国	俞入/输出	名称	标志	1 1	0x4000:00	16[位]	UINT	U0-00		
		未选择			0x606C:00	32[位]	DINT	Velocity actual		
	输出	1st RxPDO Mapping	可编辑		0x6043:00	32[位]	DINT	vl target dema		
	输出	Rx 3rd process data mapping	可编辑		0x6077:00	16[位]	INT	Torque actual	1	
0		未洗择	[>		0x6064:00	32[位]	DINT	Position actual		
X	输出	Rx 2nd process data mapping	可编辑		0x6044:00	16[位]	INT	vl target actua		
- Contraction	输出	Rx 4th process data mapping	可编辑		0x6061:00	8[位]	SINT	Modes of oper		
		未洗择			0x603F:00	16[位]	UINT	ErrorCode		
		木辺洋 1st TxPDO Mapping								
	输入	Tx 3rd process data mapping	可编辑							
100000		1 11 3	PJ 9H444							
		未选择								
	输入	Tx 2nd process data mapping	可编辑							
	输入	Tx 4th process data mapping	可编辑							

5)Gateway communication settings

First, check the IP address of the PLC: in the multi view browser, select Controller settings-Bulit-in Ethernet/IP

port settings \rightarrow TCP/IP settings.

In the configuration interface, you can view the fixed IP address set by the current project. For a new program, the default IP address is 192.168.250.1.



Select Controller - Communicate setting

插入(I) 工程 P		ommunicate	setting "
с ш <mark>1</mark>	变更设备(V)		AN 60 1
👻 📮 🦾 Secti	or 在线(O)	Ctrl+W	as000 (0) 🛛 🐼 数
立 空量	离线(F)	Ctrl+Shift+W	
命名:	望 同步(Y)	Ctrl+M	
内部	传送中(A)	•	Ⅰ 初始值
外部	1C 模式(M)	•	

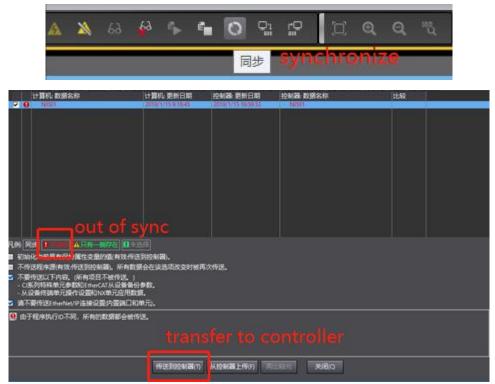
Select "Ethernet - Direct connection" in the "communication setting" interface, and then click "OK" to close the interface.

Note: Ethernet connection requires that the IP address of the connected device (PC) is automatically obtained or within the PLC IP address network segment, so confirm whether the IP address setting of the PC meets the requirements before connection.

1 通信设置	and an and the second	_	
▼ 连接类型			
请选择一个在线时每次与控制器连接时使用的方法	Ę,		
C Ethernet 直接连接 Ethernet			
 ● Ethernet-Hub连接 ● 每次在线连接时,请从以下选项中选择。 ■ USB-直接连接 ■ Ethernet-直接连接 		A	
II USB-远程连接 III Ethernet-Hub连接	···		THE STATE
Ethernet-Hub) <u>Hi</u> g			
▼ 远程IP地址			
指定远程P地址。	通信测试 Ethernet通信测试		
▼选项			
☑ 在线时确认序列ID。 ☑ 离线时检查强制刷新。			
▼ 响应监测时间			
设置与控制器连接的响应监测时间。 2 (秒)			

6)Synchronous Download

Select synchronize in the toolbar, and a pop-up window will pop up to compare the local project with the project in the controller. The local project is different from the project in the controller and "out of sync" is displayed. If you click transfer to controller, the local project will be downloaded and the original project of the controller will be overwritten.





After synchronization is completed, click recomparison to view the synchronization of the entries of the local project and the controller project. When the subsequent modified projects are synchronized again, the entries different from the controller project will be marked in detail.

1 同步						×
计算机: 数据名称	计算机:更新日期	控制器:更新日期	控制器 数据名称	比较		_
VJ501	2019/1/15 9:18:45	2019/1/15 16:59:53	NUSOI			_
凡例:同步 日本市地 承只有一侧存在 🛽	未选择					
■ 初始化当前具有保持属性变量的值(有效:						
 不传送程序源(有效:传送到控制器)。所有 不要传送以下内容。(所有项目不被传送) 		1次传送。				
- CI系列特殊单元参数和EtherCAT从设备	备份参数。					
- 从设备终端单元操作设置和NX单元应用 ☑ 请不要传送EtherNet/IP连接设置内置端Ⅱ						
同步处理完成。						
HID ALSE AGAN						
	传送到控制器①	从控制器上传由	比较(<u>R</u>) 关闭(<u>C</u>)			
	·····					
10000000000000000000000000000000000000					- 0	×
计算机: 数据名称	计算机: 更新日期	控制器:更新日期	控制器:数据名称	比较	- 0	×
	2019/1/15 9:18:45 2019/1/14 17:53:09	2019/1/15 9:18:45 2019/1/14 17:53:09	▼NJ501 EtherCAT主机设置	比较	-	×
	2019/1/15 9:18:45 2019/1/14 17:53:09 2019/1/14 17:53:09	2019/1/15 9:18:45 2019/1/14 17:53:09 2019/1/14 17:53:09	● VIJ501 EtherCAT主机设置 EtherCAT从设备设置	比较		×
	2019/1/15 9:18:45 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09	2019/1/15 9:18:45 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09	▼NJ501 EtherCAT主机设置 EtherCAT从设备设置 ▼CPU/扩展机架 ▼CPU机架	比较		×
	2019/1/15 9:18:45 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09	2019/1/15 9:18:45 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09	▼NJ501 EtherCAT主机设置 EtherCAT从设备设置 ▼CPU/扩展机架 ▼CPU机架	比较		×
计算机 数据名称 ■ TheCAT主机设置 ■ theCAT土机设备设置 ■ TheCAT从设备设置 ■ ▼CPUが 限机架 ■ CPUが 限机架 ■ 年元 ■ 「控制器设置 ■ 推行设置	2019/1/15 9:18:45 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09	2019/1/15 9:18:45 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09	 YND501 EtherCAT主机设置 EtherCAT法设备设置 VCPU扩展机梁 VCPU扩展 単元 単元 YC約 YC約 WC約 WC10 WC10<td>比较</td><td></td><td>×</td>	比较		×
计算机 数据名称 ■ TheCAT主机设置 ■ theCAT土机设备设置 ■ TheCAT从设备设置 ■ ▼CPUが 限机架 ■ CPUが 限机架 ■ 年元 ■ 「控制器设置 ■ 推行设置	2019/1/15 9:18:45 2019/1/14 17:53:69 2019/1/14 17:53:69 2019/1/14 17:53:69 2019/1/14 17:53:69 2019/1/14 17:53:69 2019/1/14 17:53:69 2019/1/14 17:53:69 2019/1/14 17:53:69	2019/1/15 9:18:45 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09	YN501 EtherCAT主机设置 EtherCAT从设备设置 VCPU分展机架 单元 单元 单元 操作设置 内置therNet/P满口设置	比较		×
计算机 数据名称 ■ TheCAT主机设置 ■ theCAT土机设备设置 ■ TheCAT从设备设置 ■ ▼CPUが 限机架 ■ CPUが 限机架 ■ 年元 ■ 「控制器设置 ■ 推行设置	2019/1/15 91845 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09 2019/1/14 17:53:09	2019/7/15 9:18:45 2019/1/14 17:53:09 2019/7/14 17:53:09 2019/7/14 17:53:09 2019/7/14 17:53:09 2019/7/14 17:53:09 2019/7/14 17:53:09 2019/7/14 17:53:09 2019/7/14 17:53:09	▼NJ501 EtherCAT主机设置 EtherCAT从设备设置 ▼CPU/扩展机梁 单元 ▼CPU/扩展机梁 单元 操作设置 内置therNet/P第口设置 场设置	比较		×
计算机 数据名称 ■ TheCAT主机设置 ■ theCAT土机设备设置 ■ TheCAT从设备设置 ■ ▼CPUが 限机架 ■ CPUが 限机架 ■ 年元 ■ 「控制器设置 ■ 推行设置	2019/1/14 59:18:45 2019/1/14 17:53:09 2019/1/14 17:53:09	2019/1/15 91845 2019/1/14 17:53.09 2019/1/14 17:53.09 2019/1/14 17:53.09 2019/1/14 17:53.09 2019/1/14 17:53.09 2019/1/14 17:53.09 2019/1/14 17:53.09 2019/1/14 17:53.09 2019/1/14 17:53.09 2019/1/14 17:53.09	 ▼N9501 EtherCAT主机设置 EtherCAT上设备设置 ▼CPU扩展机梁 ▼CPU扩展机梁 单元 单元 单元 * 运动活動设置 法传设置 内窗性herhet/P第口设置 本设置 抽设置 抽印设置 面设置 4回设置 Can表現的量 	比较		×
计算机 数据名称 ■ TheCAT主机设置 ■ theCAT土机设备设置 ■ TheCAT头设备设置 ■ ▼CPUが 限机架 ■ CPUが 限机架 ■ 年元 ■ 「控制器设置 ■ 推行设置	2019/1/15 91845 2019/1/14 17:53:09 2019/1/14 17:53:09	2019/1/15 91845 2019/1/14 1753:09 2019/1/14 1753:09 2019/1/14 1753:09 2019/1/14 1753:09 2019/1/14 1753:09 2019/1/14 1753:09 2019/1/14 1753:09 2019/1/14 1753:09 2019/1/14 1753:09	 ▼MSDI EtherCAT生机设置 EtherCAT从设备设置 ▼CPU/F 规划梁 ▼CPU/F 规划梁 単元 单元 ▼控制器设置 内管EtherNet/P/所口设置 ▼运动法制设置 抽设置 抽误量 	比较		×
计算机 数据名称 ■ TheCAT主机设置 ■ theCAT土机设备设置 ■ TheCAT头设备设置 ■ ▼CPUが 限机架 ■ CPUが 限机架 ■ 年元 ■ 「控制器设置 ■ 推行设置	2019/1/15 91845 2019/1/14 17:53:09 2019/1/14 14:464-2 2019/1/14 14:464-2	2019/1/15 91845 2019/1/14 17:53.09 2019/1/14 17:53.09	 ▼NJ501 EtherCAT主机设置 EtherCAT上设备设置 ▼CPU扩展机梁 ▼CPU扩展机梁 单元 *É动器设置 操作设置 内置therNet/P端口设置 *运动运制设置 抽组设置 抽组设置 抽组设置 石板器设备 事件设置 任务设置 ▼PO15 	比较		×
 计算机 数据名称 ■ EtherCAT主机设置 ■ EtherCAT上机设备设置 ■ EtherCAT上机设备设置 ■ CPU的 规制架 ■ CPU的 规制架 ■ CPU机架 ■ 第元 ■ 经均需说设置 ■ 经均需说设置 ■ 通信设置 ■ 通信设置 ■ 新设置 ■ 年待设置 ■ 年待设置 ■ 平均% ■ Y程% ■ Ethername <	2019/1/14 59:18:45 2019/1/14 17:53:09 2019/1/14 14:46:42 2019/1/14 14:46:42 2019/1/14 14:46:42	2019/1/15 91845 2019/1/14 17:53.09 2019/1/14 17:53.09	▼H9501 EtherCAT主机设置 EtherCAT先设备设置 ▼CPU/扩展机梁 ▼CPU/扩展机梁 単元 単元 単元 支約制品设置 操作设置 内置therNet/Pi病口设置 地設置 抽设置 抽设置 抽设置 面積空 動設置 抽設置 1	比较		×
计算机数据名称 ● HerCaT上机设置 ● EtherCaT上机设置 ● EtherCaT上机设备设置 ● EtherCaTL认识备设置 ● CPU机架 ● CPU机架 ● CPU机架 ● CPU机架 ● CPU机架 ● CPU机梁 ● CPUL ● CPUL ● CPUL ● CPUL ● CPUL ● CPUL	2019/1/14 591845 2019/1/14 17:53:09 2019/1/14 14:46:42 2019/1/14 17:53:09 2019/1/14 14:46:42 2019/1/14 17:53:09	2019/1/15 91845 2019/1/14 17:53.09 2019/1/14 17:53.09	 ▼ND501 EtherCAT主机设置 EtherCAT法设备设置 ▼CPU扩展机梁 ΨCPU扩展机梁 ΨCPUT 	比较 一		×
计算机 数据名称 ▼N501 EtherCAT主机设置 EtherCAT主机设置 EtherCAT主机设置 ● EtherCAT主机设置 ● Unit ● 単元 ● 単元 ● 単元 ● ジョン	2019/1/15 91845 2019/1/14 17:53:09 2019/1/14 14:46:42 2019/1/14 14:46:42	2019/1/15 91845 2019/1/14 1753.09 2019/1/14 1753.09	 ▼ND501 EtherCAT主机设置 EtherCAT法设备设置 ▼CPU扩展机梁 ΨCPU扩展机梁 ΨCPUT 	比较		×
计算机 数据名称 ● Charles And	2019/1/14 591845 2019/1/14 17:53:09 2019/1/14 17:	2019/1/15 91845 2019/1/14 1753.09 2019/1/14 1753.09	 ▼ND501 EtherCAT主机设置 EtherCAT法设备设置 ▼CPU扩展机梁 ΨCPU扩展机梁 ΨCPUT 	比较		×
计算机 数据名称 ● Charles And	2019/1/14 591845 2019/1/14 17:53:09 2019/1/14 17:	2019/1/15 91845 2019/1/14 1753.09 2019/1/14 1753.09	 ▼ND501 EtherCAT主机设置 EtherCAT法设备设置 ▼CPU扩展机梁 ΨCPU扩展机梁 ΨCPUT 			×
计算机 数据名称 ▼N501 EtherCAT主机设置 EtherCAT主机设置 EtherCAT主机设置 ● EtherCAT主机设置 ● Unit ● 単元 ● 単元 ● 単元 ● ジョン	2019/1/14 17:53:09 2019/1/14 14:46:42 2019/1/14 1	2019/1/15 91845 2019/1/14 1753.09 2019/1/14 1753.09	 ▼ND501 EtherCAT主机设置 EtherCAT法设备设置 ▼CPU扩展机梁 ΨCPU扩展机梁 ΨCPUT 			X
计算机 数据名称 ● HerCAT主机设置 ■ EtherCAT上机设备设置 ● CPUIF展机架 ● CPUIF展机架 ● CPUIF展机架 ● CPUIFR ● PA ● PA ● SittlenVell ● S	2019/1/14 17:53:09 2019/1/14 14:46:42 2019/1/14 1	2019/1/15 91845 2019/1/14 1753.09 2019/1/14 1753.09	 ▼ND501 EtherCAT主机设置 EtherCAT法设备设置 ▼CPU扩展机梁 ΨCPU扩展机梁 ΨCPUT 			×
计算机 数据名称 ● HerCAT主机设置 ■ EtherCAT上机设备设置 ● CPUIF展机架 ● CPUIF展机架 ● CPUIF展机架 ● CPUIFR ● PA ● PA ● SittlenVell ● S	2019/1/14 17:53:09 2019/1/14 14:46:42 2019/1/14 1	2019/1/15 91845 2019/1/14 1753.09 2019/1/14 1753.09	 ▼ND501 EtherCAT主机设置 EtherCAT法设备设置 ▼CPU扩展机梁 ΨCPU扩展机梁 ΨCPUT 			×
计算机 数据名称 ● HerCAT主机设置 ■ EtherCAT上机设备设置 ● CPUIF展机架 ● CPUIF展机架 ● CPUIF展机架 ● CPUIFR ● PA ● PA ● SittlenVell ● S	2019/1/14 17:53:09 2019/1/14 14:46:42 2019/1/14 1	2019/1/15 91845 2019/1/14 1753.09 2019/1/14 1753.09	 ▼ND501 EtherCAT主机设置 EtherCAT法设备设置 ▼CPU扩展机梁 ΨCPU扩展机梁 ΨCPUT 			×
计算机 数据名称 ● HerCAT主机设置 ■ EtherCAT上机设备设置 ● CPUIF展机架 ● CPUIF展机架 ● CPUIF展机架 ● CPUIFR ● PA ● PA ● SittlenVell ● S	2019/1/14 17:53:09 2019/1/14 14:46:42 2019/1/14 1	2019/1/15 91845 2019/1/14 1753:09 2019/1/14 1753:09	 ▼ND501 EtherCAT主机设置 EtherCAT法设备设置 ▼CPU扩展机梁 ΨCPU扩展机梁 ΨCPUT 			×
	2019/1/14 17:53:09 2019/1/14 14:46:42 2019/1/14 1	2019/1/15 91845 2019/1/14 17:53:09 2019/1/14 14:46:42 2019/1/14 14:46:42 2019/1/14 14:46:42 2019/1/14 14:46:42 2019/1/14 14:46:42	 ▼ND501 EtherCAT主机设置 EtherCAT法设备设置 ▼CPU扩展机梁 ΨCPU扩展机梁 ΨCPUT 			x

7)PDO data read/write(enable and speed setting)

PDO object data can monitor real-time changing values through "IO mapping".



位置	満口	说明	R/W	数据类型	值	安量	变量注释
	▼ EtherCAT网络配置						
ī点1	▼ VH6-CC100				· ·		
	Rx 1st process data mapping_Controlword_6040_00		W	UINT	0		
	Rx 1st process data mapping_vl target velocity_6042_00		w	INT	0		
	Tx 1st process data mapping_Statusword_6041_00		R	UINT	4688		
	Tx 1st process data mapping_vl target demand_6043_00		R	INT	0		
	Tx 1st process data mapping_vl target actual value_6044_00		R	INT	0		
点2	VH6-CC100						
ī点3	▼ VH5-CC100						
	1st RxPDO Mapping_Controlword_6040_00		W	UINT	0		
	1st RxPDO Mapping_vl target velocity_6042_00		w	INT	0		
	1st RxPDO Mapping_Modes of operation_6060_00		w	SINT	0		
	1st RxPDO Mapping_Target position_607A_00		w	DINT	0		
	1st RxPDO Mapping_Target torque_6071_00		W	INT	0		
	1st TxPDO Mapping_Statusword_6041_00		R	UINT	4688		
	1st TxPDO Mapping_Velocity actual value_606C_00		R	DINT	0		
	1st TxPDO Mapping_Modes of operation display_6061_00		R	SINT	2		
	1st TxPDO Mapping_Torque actual value_6077_00		R	INT	0		
	1st TxPDO Mapping_Position actual value_6064_00		R	DINT	0		
	1st TxPDO Mapping_vl target demand_6043_00		R	DINT	0		
	1st TxPDO Mapping_ErrorCode_603F_00		R	UINT	0		
	1st TxPDO Mapping_vl target actual value_6044_00		R	INT	0		
	▼ <u>■</u> CPU/扩展机架						
PU机架C	CPU机架0			1			

Set **(**6040h: Control word **)** : write $6 \rightarrow 7 \rightarrow 15$ enable. $15 \rightarrow 7$ turn off enable. Write 128 to clear the frequency conversion alarm.

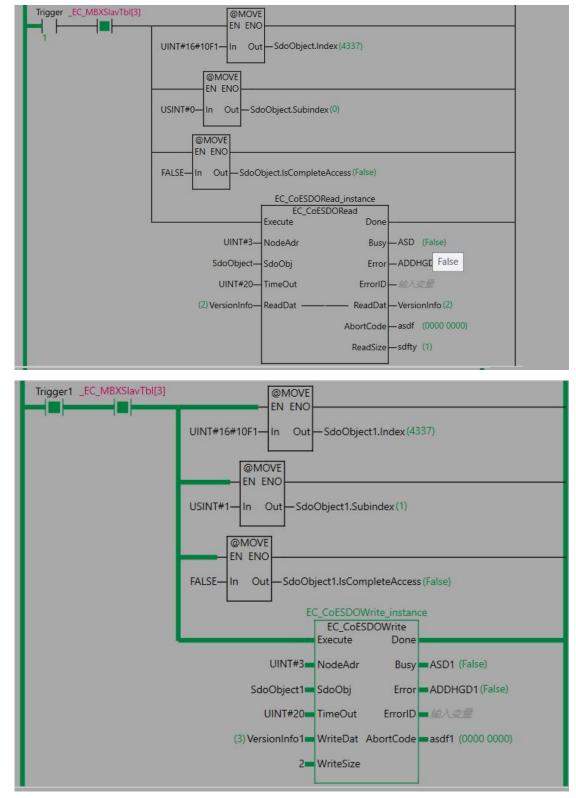
Set **(**6042h:vl target velocity **)**, for example, write 1000, P0-13=50Hz. The frequency converter operates with 5Hz forward rotation, writes -1000, and the frequency converter operates with 5Hz reverse rotation.

8)SDO data read/write

Variable definition and assignment:

名空	间 - 使用						
	名称	数据类型	初始值	分配到	保持	常量	注释
	Trigger	BOOL	False				1
2202	SdoObject	_sSDO_ACCESS	(Index := 0, Subind				
5555	EC_CoESDORead_instance	EC_CoESDORead					
2000	VersionInfo	UINT	0				
2222	DoSdoRead	BOOL	False				
5000 (ErrorEnd	UINT	0				
9999 (ADDHGD	BOOL	False				
3755	NormalEnd	UINT	0				
2022	ASD	BOOL	False				
1005	asdf	DWORD					
2022	sdfty	UINT					
3995	EC_CoESDOWrite_instance	EC_CoESDOWrite					
5650	Trigger1	BOOL					5 -
2000 (ASD1	BOOL					
2000	ADDHGD1	BOOL					
1946	asdf1	DWORD					
222	VersionInfo1	UINT					
2002	SdoObject1	_sSDO_ACCESS	(Index := 0, Subind				

Programming:



The contacts are connected, and the input object dictionaries are read and written respectively. Abortcode is displayed as 0 after reading and writing is successful.

10.3 Beckhoff series PLC (TWINCAT) and VH5/VH6

10.3.1 System configuration

Name	Model	Quantity	Explanation
Upper computer	TwinCAT	1	Beckhoff upper computer software
Controller	CX5120	1	-
Communication card	VHX-CC100	1	-
Network cable	JC-CB-3	some	For connection between devices

10.3.2 Parameter setting

The frequency converter slave station needs to be configured as EtherCAT communication mode, and the parameters to be modified are as follows:

Parameter	Name	Access	Set	Range	Explanation
			value		
P0-02	Operation command channel selection	Runtime read only	2	0-2	Communication
P0-03	Main frequency A input channel selection	Runtime read only	6	0-9	Communication setting
P9-00	Communication protocol	Runtime read only	1	0-2	EtherCAT
P9-12	Slave station No.	RW	-	0-65535	After modification, it is valid when power on again.

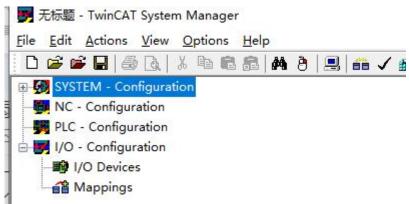
10.3.3 Setup steps

1) Add XML file

Before opening the software operation, we need to copy the XML file to the TwinCAT installation directory, and the default path is c:\twincat\3.1\config\io\ethercat.

2) New project

Open the upper computer software TwinCAT. File—New—Project:



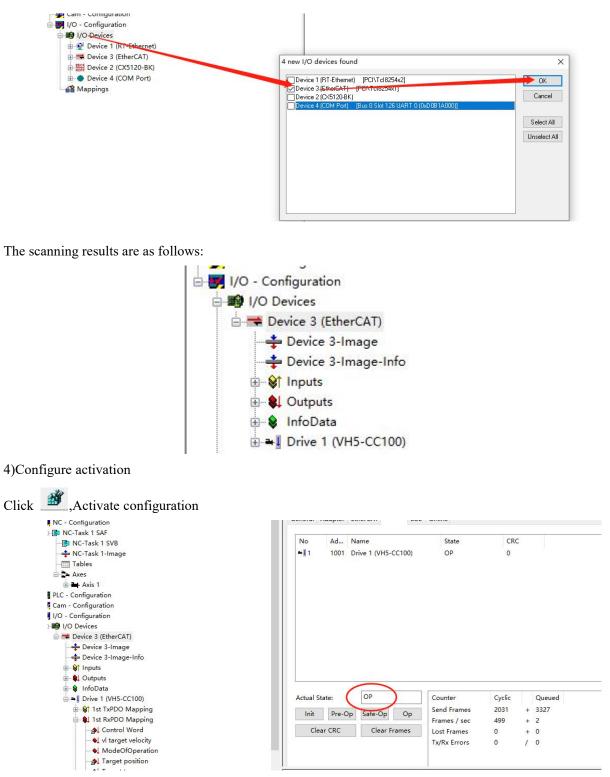
3)Master station connection configuration:

Copyrights BC- Copyrigh	(h a lat a l		Versies /1	a) 1/ / //	D 10 11 17			
Resterings Rector Registration IV- Configuration IV- Configuratio IV- Configuration IV- Configuration			version (Loc	al) Version (Target)	Boot Settings (Ta	arget)		
Configuration Pic - C								
No Configuration PLC - Con				TwinCAT System M	lanager		-	
19:C - Configuration 10: - Configura						enc	oose Target	
IVO-Configuration VO-Christians VD-Device: Status linked to: 2, IVD-Device: Concert linked to: 2, IVD-Device: Status linked to: 2,				v2.11 (build 2200)				
VO Devices Weight ECK							1	
Image imposed Gree imited to: 28 Copyright BECKI Inter/Jown backit Registration: Name: Company: Reg. Key: Imited to: 28 Copyright BECKIT Registration: Name: Company: Reg. Key: Imited to: 28 Copyright BECKIT Reg. Key: Image intervention: Name: Company: Reg. Key: Imited to: 28 Copyright BECKIT Reg. Key: Imited to: 28 Copyright BECKIT Reg. Key: Imited to: 28 Conception: Conception: December 1: December				v2.11 (Build 23)	Choose Target Sys	tem	<u> </u>	×
Company: Registration: Nome: Company: Registration: Nome: Company: Registration: Nome: Company: Registration: Registratio	a 🖆 Mappings							
-Local- [127.255.255.11.1] Add Route Dialog Company: Registration: Name: Company: Reg. Kry: Correction to "DX:508.644" failed Correction Timeod (s) 5 DX:508.644" failed Ferter Host Name (1 183.254.222. 193.31) Pieter Host Name (1 183.254.222. 193.31) Ferter Host Name / IP: Perter Host Name / IP: Refersh Statut Host Name Concession 1 (183.254.222. 193.3254.222. 193.251.11) DX:508.644" failed TwinCAT Rection to 'DX:508.664" failed Transport <td></td> <td></td> <td></td> <td>and the second second</td> <td>E - S Local</td> <td>(127.255.255.1.1.1)</td> <td></td> <td>ОК</td>				and the second	E - S Local	(127.255.255.1.1.1)		ОК
-Local- [127.255.255.11.1] Add Route Dialog Company: Registration: Name: Company: Reg. Kry: Correction to "DX:508.644" failed Correction Timeod (s) 5 DX:508.644" failed Ferter Host Name (1 183.254.222. 193.31) Pieter Host Name (1 183.254.222. 193.31) Ferter Host Name / IP: Perter Host Name / IP: Refersh Statut Host Name Concession 1 (183.254.222. 193.3254.222. 193.251.11) DX:508.644" failed TwinCAT Rection to 'DX:508.664" failed Transport <td></td> <td></td> <td></td> <td>and the second second</td> <td></td> <td>A64 (169,254,220,15</td> <td></td> <td>Cancel</td>				and the second		A64 (169,254,220,15		Cancel
Image: Registration: Name: Company: Reg-Key: Seech Friedbart Image: Reg-Key: Image: Reg-Key: Image: Reg-Key: Image: Reg-				http://www.beckn				
Image: Registration: Name: Company: Reg-Key: Seech Friedbart Image: Reg-Key: Image: Reg-Key: Image: Reg-Key: Image: Reg-								a srob (Ethernet)
Image: Company: Registration: Name: Company: Reg. Key: Connection to 10/508A64 lated Connection to 10/508A64 lated Connection to 10/508A64 lated Image: Company: Refersh Status Period: D-470022 (5.34.200 55.11) Image: Connection to 10/508A64 lated Image: Connection to 10/508A64 lated Image: Connection to 10/508A64 lated Image: Connection to 10/508A64 lated Image: Connection to 10/508A64 lated Image: Connection to 10/508A64 lated Image: Connection to 10/508A64 lated Image: Connection to 10/508A64 lated Image: Connection to 10/508A64 lated Image: Connection to 10/508A64 lated Image: Connection to 10/508A64 lated Image: Connection to 10/508A64 lated Image: Connection to 10/508A64 lated Image: Connection to 10/508A64 lated Image: Connection to 10/508A64 lated Image: Connection to 11 at 1022 windows 8 Image: Connection to 10/508A64 lated Image: Connection to 11 at 1022 windows 8 Image: Connection to 10/508A64 lated Image: Connection to 11 at 1022 windows 8 Image: Connection to 10/508A64 lated Image: Connection to 11 at 1223 windows 8 Image: Connection to 10/508A64 lated Image: Connection to 11 at 1223 windows 8 Image: Con								
Name: Company: Reg-Key: Set as Defail -Lood- [127,256,255,11,1] -Lood- [127,255,255,11,1] -Lood- [127,255,255,11,1] -Lood- [127,255,255,11,1] -Lood- [127,255,255,11,1]								Search (Fieldbus)
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melocite [127,255,255,1,11] Model				Name:				
				Company:				
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Important								Set as Default
Important Add Route Dialog Important Important Importa					Connection to 'CX-50)BA64' failed!		
Important Add Route Dialog Important Important Importa								
Important Add Route Dialog Important Important Importa					с. т. т. н			
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rection to 'DX:508A64' failed! Image: CX:508A64' failed!		CX-508Apr DESKTOR-3Q1V0FN	10.100.47.35	5 169.254.73.90.1.1	3.1.4022 Wind	dows (1 dows 8		
rection to 'DX:508A64' failed! Image: CX:508A64' failed!		CX-508Apr DESKTOR-3Q1V0FN	10.100.47.35	5 169.254.73.90.1.1	3.1.4022 Wind	dows (1 dows 8	on Information	
Interview Example Password: Poute Name (Target: CX508A64 Route Name (Remote): DESKTOP4 Poute Name (I arget: CX508A64 Route Name (Remote): DESKTOP4 AmsNetId: 169.254.220.193.1.1 Target Route Remote Remote Re Address Info: 169.254.220.193 O Hoat Name Static OK Address Info: 169.254.220.193 Temporary Temporary Temporary		CX-508Apr DESKTOR-3Q1V0FN	10.100.47.35	5 169.254.73.90.1.1	3.1.4022 Wind	dows (1 dows 8		er name and password that is
Interview Example Password: Poute Name (Target: CX508A64 Route Name (Remote): DESKTOP4 Poute Name (I arget: CX508A64 Route Name (Remote): DESKTOP4 AmsNetId: 169.254.220.193.1.1 Target Route Remote Remote Re Address Info: 169.254.220.193 O Hoat Name Static OK Address Info: 169.254.220.193 Temporary Temporary Temporary		CX-508Apr DESKTOR-3Q1V0FN	10.100.47.35	5 169.254.73.90.1.1	3.1.4022 Wind	dows (1 dows 8	Enter a us	er name and password that is stem.
ection Timeout (s): 5 AmsNelld: 169/254/220.193.1.1 Transport Type: TCP/IP Address Info: 169/254/220.193 O Host Name (i): 5		CX-508Apr DESKTOR-3Q1V0FN	10.100.47.35	5 169.254.73.90.1.1	3.1.4022 Wind	dows (1 dows 8	Enter a us remote sys	stem.
ection Timeout (s): 5 AmsNetId: 169.254.220.193.1.1 Transport Type: TCP/IP Address Info: 169.254.220.193 O Host Name) IP Address Connection Timeout (s): 5		CX-508544 DESKTOR-3Q1VOFN DESKTORVSO908	10.100.47.35	5 169.254.73.90.1.1	3.1.4022 Wind	dows (1 dows 8	Enter a us remote sys	stem. e: <u>Administrator</u>
ection Timeout (s) 5 Transport Type: TCP/IP Address Info: 158 254 220 193 Host Name (e) IP Address Connection Timeout (s) 5 (c) Temporary (c) Temporary	nection to "CX-508A64" failed	CX-50850* DESKTOP-301V0FN DESKTOP/S090R	10.100.47.35	5 169.254.73.90.1.1	3.1.4022 Wind	dows (1 dows 8	Enter a us remote sys	stem. e: <u>Administrator</u>
Transport Type: TCP/IP ○ Project ○ None Address Info: 159.254.220.193 ○ Static ○ Static ○ Static ○ Host Name ○ IP Address Connection Timeout (s): 5	nection to "CX-50BA64" failed	CX-50850* DESKTOP-301V0FN DESKTOP/S090R	10.100.47.35	5 169.254.73.90.1.1 . 127.255.255.1.1.1	3.1.4022 Wind 2.11.2306 Wind	dows (1 dows 8	Enter a us remote sys	stem. e: <u>Administrator</u>
Address Infor 159.254.220.193 O Temporary Temporary Temporary Temporary		CX-508:64* DESKTOR-301V0FN DESKTOR/S09/0R Koute Name (Target)	10.100.47.35 169.254.22	5 169.254.73.90.1.1 . 127.255.255.11.1	3.1.4022 Wind 2.11.2306 Wind te Name (Remote):	dows (1 dows 8	Enter a us remote sys	stem. e: <u>Administrator</u>
O Host Name ● IP Addless Connection Timeout (s): 5 ●		CX-508:64* DESKTOP-301Y0FN DESKTOP/S0910R Route Name (Target AmsNetId:	10.100.47.35 169.254.22. [CX:50BA64 [169.254.220.193.1.1	5 169.254.73.90.1.1 127.255.255.1.1.1 Rout	3.1.4022 Wind 2.11.2306 Wind te Name (Remote): get Route Project	dows (1 dows 8 Log DESKTOP4 Remote Rc	Enter a us remote syn User name Password	s: Administrator
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		CX-508H0+ DESKTOP-301V0FN DESKTOP-JS0910R Route Name (Target: AmsNetId: Transport Type: Address Info:	10.100.47.35 169.254.22. С×508А64 169.254.220.193.1.1 ТСР/Р 169.254.220.193	5 169,254,7390,1.1 . 127,255,255,1.1.1 . Rout	3.1.4022 Wind 2.11.2306 Wind te Name (Remote): get Route Project Static	dows (1 dows 8 DESKTOP4 Remote Rc O None © Static	Enter a us remote syn User name Password	s: Administrator
		CX-508H0+ DESKTOP-301V0FN DESKTOP-JS0910R Route Name (Target: AmsNetId: Transport Type: Address Info:	10.100.47.35 169.254.22. С×508А64 169.254.220.1931.1 ТСР/Р 169.254.220.193	5 169.254.73.90.1.1 127.255.255.1.1.1 ■ Rout	3.1.4022 Wind 2.11.2306 Wind te Name (Remote): get Route Project Static	dows (1 dows 8 DESKTOP4 Remote Rc O None © Static	Enter a us remote syn User name Password	s: Administrator
		CX-50860* DESKTOP-301YDFN DESKTOP-301YDFN DESKTOP-30010R Route Name (Targe 1: AmsNetId: Transport Type: Address Info: O Host Name () IP A	10.100.47.35 169.254.22. С×508А64 169.254.220.1931.1 ТСР/Р 169.254.220.193	5 169.254.73.90.1.1 127.255.255.1.1.1 ■ Rout	31.4022 Wind 2.11.2306 Wind te Name (Remote): get Route Project Static Temporary	dows (1 dows 8 Log DESKTOP4 Mone © Static Terror by	Enter a us remote syn User name Password	s: Administrator
	nection to 10×508A64* failed nection Timeout (s): 5	CX-50860* DESKTOP-301YDFN DESKTOP-301YDFN DESKTOP-30010R Route Name (Targe 1: AmsNetId: Transport Type: Address Info: O Host Name () IP A	10.100.47.35 169.254.22. С×508А64 169.254.220.1931.1 ТСР/Р 169.254.220.193	5 169.254.73.90.1.1 127.255.255.1.1.1 ■ Rout	31.4022 Wind 2.11.2306 Wind te Name (Remote): get Route Project Static Temporary	dows (1 dows 8 Log DESKTOP4 Mone © Static Terror by	Enter a us remote syn User name Password	s: Administrator
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		CX-50860* DESKTOP-301YDFN DESKTOP-301YDFN DESKTOP-30010R Route Name (Targe 1: AmsNetId: Transport Type: Address Info: O Host Name () IP A	10.100.47.35 169.254.22. С×508А64 169.254.220.1931.1 ТСР/Р 169.254.220.193	5 169.254.73.90.1.1 127.255.255.1.1.1 ■ Rout	31.4022 Wind 2.11.2306 Wind te Name (Remote): get Route Project Static Temporary	dows (1 dows 8 Log DESKTOP4 Mone © Static Terror by	Enter a us remote syn User name Password	s: Administrator

Connection complete.

TwinCAT System Manager v2.11 (Build 2288)	Choo	ose Target					
Dose Target System - ∰Local (127.255.255.1.1.1) ⊕ ∰ CX-47C0A2 (5.34.200.96.1.1) ⊕ ∰ CX-508A64 (169.254.220.193.1.1)	OK Cancel Search (Ethernet),,-	Add Route Dialog		1	Refresh Status	Bo	adcast Sear
	Set as Defau	Host Name CH50BA54 DESKTOP-3Q1V0FN DESKTOP-3Q187DA DESKTOP-3087DA DESKTOP-1S0910R	10.100.47.35 10.100.47.1	AMS NetId 169.254.220.19 169.254.73.90.1.1 10.100.47.116.1.1 127.255.255.1.1.1	3.1.4022 3.1.4022	OS Version Win CE (7.0) Windows (1 Windows (1 Windows 8	Comment

At this time, if the controller is not in config mode, you need to click this icon to switch the controller to config mode first, and then right-click Device and click Scan to scan the slave station of EtherCAT.



Click online, and the current state is the running state, indicating that the activation is correct.

常规	设备状态		Current et	ate: running
过程数据(PDO设置)	初始化	引导状态	当前状态:	运行
自动参数(SDO设置)	预运行	安全运行	请求状态:	运行
百约参到(300反应)	运行	清除错误	H-1/1////	
在线 Online				
在线CoE	FoE			
200-0-	下载	上传		
EtherCAT I/O映射	E ² PROM接口 -			
状态	写E2PROM	读 E ² PROM	写入E2P	ROM XML

5)Add Group U parameters to the PDO.

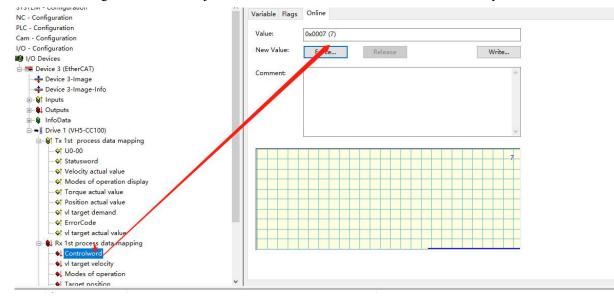
As shown in the following figure: click Drive 1 (VH5-CC100), select Process Data, click 0x1A00 in PDO list, and right-click in PDO content to insert U0-00 parameter.

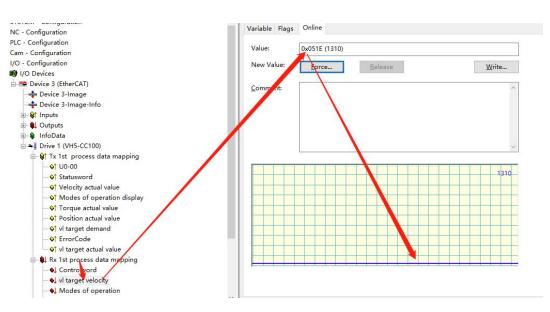
SYSTEM - Configuration NC - Configuration	General EtherCAT DC Proces	s Data Startup CoE	- Online Online		
PLC - Configuration		A second			
Cam - Configuration	Sync Manager:	PDO List:			
I/O - Configuration	SM Size Type Flags	Intex Size	Name Flags	SM	SU
I/O Devices	128 Mbx	0x1 00 23.0	Tx 1st process data mappi	3	0
E Device 3 (EtherCAT)	1 128 MbxIn	0x1A01 6.0	Tx 2nd process data mapp		0
🜩 Device 3-Image	2 11 Outp	0x1A02 6.0	Tx 3rd process data mappi		0
+ Device 3-Image-Info	3 23 Inputs	0x1A08 6.0	Tx 4th process data mappi		0
⊕- 😵 Inputs		0x160 11.0	Rx 1st process data mappi	2	0
⊞ \$L Outputs		0x160 4.0	Rx 2nd process data mapp	-	0
🗈 😫 InfoData		0x160. 4.0	Rx 3rd process data mappin		0
i → Drive 1 (VH5-CC100)		0.1001 4.0			0
B State Tx 1st process data mapping	PDO Assignment (0x1C12):	PDO Content (0x1	1A00):		
ia ≰L Rx 1st process data mapping a⊖ ≨ WcState	Øx1600	Index Size	Offs Name	Туре	Default (h
B- InfoData	0x1601	0x4000 2.0	0.0 U0-00	UINT	Denduit (in
A Mappings	0x1602	0x6041 2.0	2.0 Statusword	UINT	
NC-Task 1 SAF - Device 3 (EtherCAT)	0x1603	0x606C 4.0		DINT	
NC-Task 1 SAF - Device 3 (EtherCAT) - Info					
The inclusion of the perice of (Enerciary - Inio		0x6061 1.0	8.0 Modes of operation display	SINT	
	Download	Predefined PDO	Assignment: (none)		
	PDO Assignment	Load PDO info fr	rom device		
	PDO Configuration	Sync Unit Assign	ment		
	Name Online	- 2F-	Size >Add In/Out User Linke	d to	

In config mode, add PDO data. As shown in the above figure, it was added successfully.

6) PDO data read/write(enable and speed setting)

As shown in the figure below, the object words 6040h and 6042h are written successfully.





Set **(**6040h: Control word **)** : write $6 \rightarrow 7 \rightarrow 15$ enable. $15 \rightarrow 7$ turn off enable. Write 128 to clear the frequency conversion alarm.

Set **(**6042h:vl target velocity **)**, for example, write 1000, P0-13=50Hz. The frequency converter operates with 5Hz forward rotation, writes -1000, and the frequency converter operates with 5Hz reverse rotation.

7)SDO data read/write

As shown in the following figure, the COE object dictionary 10F1 is read and written. The value of 10F1-01 is written from 1 to 3, and the value of 10F1-02 is written from 4 to 3. The writing and reading is successful.

YSTEM - Configuration			6	0-1
IC - Configuration	General EtherC	CAT DC Process Data Start	UD OE -	Online
LC - Configuration	22/ 200			1
am - Configuration	Update	List Update	Single U	Update 🗌 Show Offline Data
/O - Configuration	Advanc	ed		
I/O Devices			1	
Device 3 (EtherCAT)	Add to St.	artup Online Data	Mo	oule OD (AoE 0
🛶 Device 3-Image			,	
-+ Device 3-Image-Info	Index	Name	Flags	Value
⊕- \$↑ Inputs	1000	Device type	M RO	0x00010192 (65938)
⊕- 😫 Outputs	1001	Error register	RO	0x00 (0)
🗄 😵 InfoData	1008	Device name	RO	VH5-CC100
Drive 1 (VH5-CC100)	1009	Hardware version	RO	v1.0
🗄 😫 Tx 1st process data mapping	- 100A	Software version	RO	v5.12
🖶 🌒 Rx 1st process data mapping	+ 1018:0	Identity		> 4 <
庄 象 WcState	= 10F1:0	Error Settings		>2<
i≟- InfoData	10F1:01	Local Error Reaction	RW	0x0000003 (3)
Mappings Mappings Mortask 1 SAF - Device 3 (EtherCAT)	10F1:02	Sync Error Counter Limit	RW	0x0003 (3)
		Rx 1st process data mapping	RW	> 6.<
"He inc-rask i sar - Device s (EtherCAT) - Inio	± 1601:0	Rx 2nd process data mapping	RW	> 2 <
	∃ 1602:0	Rx 3rd process data mapping	RW	> 2 <
		Rx 4th process data mapping	RW	> 2 <
	± 1A00:0	Tx 1st process data mapping	RW	> 8 <
	⊕ 1A01:0	Tx 2nd process data mapping	RW	> 2 <

10.4 Inovance AM600 (CODESYS) and VH5/VH6

10.4.1 System configuration

Name	Model	Quantity	Explanation
Upper computer	InoProShop	1	Inovanceupper computer software
Controller	AM600	1	-
Communication card	VHX-CC100	1	-
Cable	JC-CB-3	some	For connection between computer and PLC and between PLC and VFD

10.4.2 Parameter setting

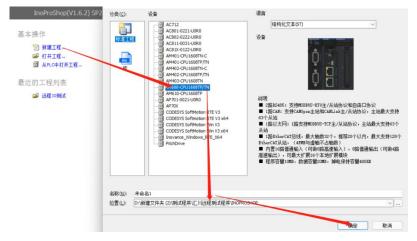
The frequency converter slave station needs to be configured as EtherCAT communication mode, and the parameters to be modified are as follows:

Parameter	Name	Access	Set value	Range	Explanation
P0-02	Operation command channel selection	Runtime read only	2	0-2	Communication
P0-03	Main frequency A input channel selection	Runtime read only	6	0-9	Communication setting
P9-00	Communication protocol	Runtime read only	1	0-2	EtherCAT
P9-12	Slave station No.	RW	-	0-65535	After modification, it is valid when power on again.

10.4.3 Setup steps

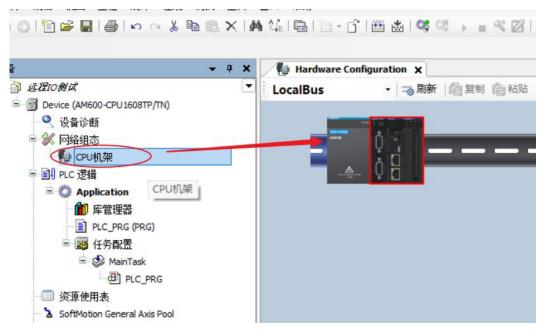
1)New project

Open the software InoProShop. Select "new project", select the model: AM600-CPU1608TP/TN in the project attribute interface, define the name and select the save path, and click "OK" to generate the programming interface.



2)Hardware configuration

Double click the "CPU rack" item on the left to enter the hardware configuration screen of PLC mainframe:



① Double click to enter the local expansion module configuration interface.

2 Expansion module component library.

③ Select the position on the right side of the CPU unit on the installation slot, and in the expansion module component library, double-click to select the required IO modules and place them in order.

According to the module model and installation sequence used by the actual application system, double-click the selected module from the expansion module library on the right, and drag it to the "installation rack".

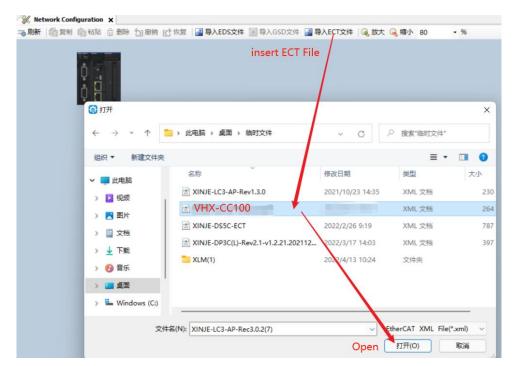
To delete a module, select the module and press Del to delete it. Take AM600 as an example, up to 16 expansion modules can be connected to the mainframe, including 8 analog modules.

3)Add XML file

(1) Install in the network configuration interface.

Click "import ECT file", and the following dialog box will pop up:

Select the XML file of the corresponding device and click "open".



② Install through menu tools.

Choose Tool-Device library



Select "Install" in the pop-up dialog box.

位置(L):	System Repository	▼ 编辑位置(E)
	(C:\InovanceControl\InoProShop(V1.3.50.0)\CODESYS\Repository\Dev	ices)
安装的设行	■描述(∨):	install
在所有设	备中输入全文搜索的字符串 Vendor: <全部供应商>	▼ 安装(1)
名称	供应商版本描述	Blac(U)
* 🗊 🕯	時用设备	
Э 🗃 Р	LC	
	oftMotion股动	
€-∰ ₹	风场总线	

Select the "EtherCAT XML device description configuration file" item in the pop-up "install device description"

dialog box, select the slave device description file saved in the local path, and open the corresponding XML file.

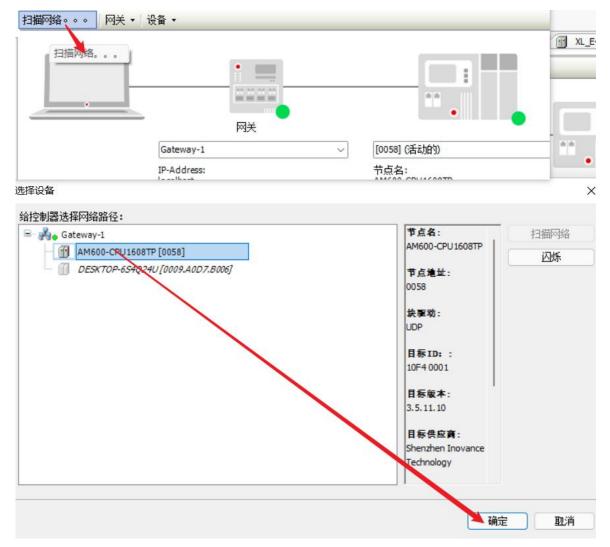
4)Add master device

It is recommended to use the scanning function and follow the **[**hot reset**]**-**[**log out**]**-**[**scanning device**]** process. Preparation conditions:

(1) The PC and PLC are correctly connected through the gateway, search the PLC in the same network segment, and click OK after finding it.

Note: Ethernet connection requires that the IP address of the connecting device (PC) and the IP address of the PLC are in the same network segment, so confirm whether the IP address setting of the PC meets the requirements before making the connection action.

The following figure:



2 PLC and slave networking are normal.

③ The configuration information of the background configuration port is consistent with the actual PLC connection port, as shown in the following figure.

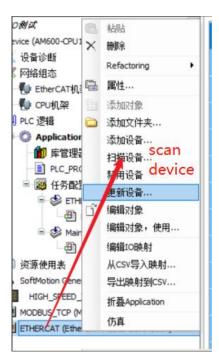


5)Set master station parameters

	🖡 🗶 👘 Xinje_Cortex_Linux_SM_CNC 🔮 EtherCAT_Task 🖉 EtherCAT_Master	×
Chelled Contexclinux_SM_ONC (Dinje-Contexclinux-SM- Single_Contex_Linux_SM_ONC (Dinje-Contexclinux-SM- Single_Contexclinux-SM- Single_Contexclinux- Single_Contexclinux-	Ceneral General General General Sync Unit Assignment EtherCAT NIC Setting EtherCAT VIO Mapping Destrict VIO Mapping EtherCAT IEC Objects Network Name eth1	EtherCATT Broadcast Enable Redundancy Browse 3
■ ∑ BERCAT Master) 1 1 1 1 1 1 1 1 1 1	Select Network Adapter MAC address Name Description 400640031E2A atd0 400640031E2C atd1 00000000000 sis0 4	5 OK Abort
Xinje_Cortex_Linux_SM_CN General	C EtherCAT_Master X	EtherCAT
Sync Unit Assignment	EtherCAT NIC Setting Destination Address (MAC) FF-FF-FF-FF-FF	Broadcast Enable Redundancy
EtherCAT I/O Mapping	Source Address (MAC) 0C-82-87-85-78-21	Browse
EtherCAT IEC Objects	Network Name eth1	
Status		

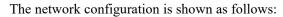
6)Scan slave station

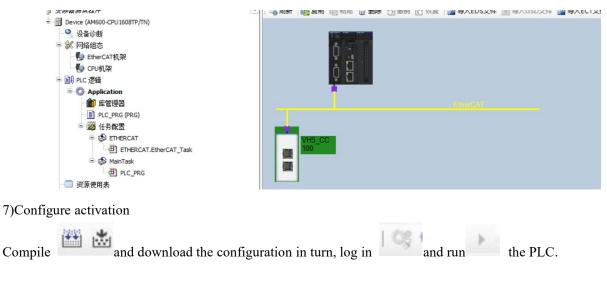
After the configuration information of the background configuration port is consistent with the actual PLC connection port, scan the EtherCAT slave device.



The scanning results are shown in the figure below. Click Copy scanned device to add all the scanned slave stations to the project.

Device [i车接的] (AM600-CPU 1608TP/TN)	Common da								-
🔍 设备诊断	扫描设备								
😪 网络组态	扫描到的设备				配置的设备				
 ● EtherCAT机架 ● CPU机架 ● IPLC 逻辑 	设备名 — VH5_CC100	设备类型 XINJE-VH5	EtherCAT(CoE) Drive Rev2.0	别名地址 3	向上插入	设备名 — VH5_CC100	设备类型 XINJE-VH5	EtherCAT(CoE)	Drive Rev2.0
 Application 節 库管理器 PLC_PRG (PRG) 					向下版入				
■ ● 任务配置 ● ● ETHERCAT ● ETHERCAT_EtherCAT_Task					の				
MainTask					全部拷贝				
□ 资源使用表 SoftMotion General Axis Pool ■ HIGH_SPEED_IO (高速IO模块)					× 7 1988				
ETHERCAT (EtherCAT Master SoftMotion)									
	分配地址	-			c	copy scar	ned de	evice	🕑 显示差异





▼ ₽	×	/ 🔐 De	vice	Hardwar	re Configu	uration	/ % N	etwork C	onfigurat	tion X	VH5_0	CC 100
变频器制试程序		一刷新	詹复制	胸粘贴 (品删除	り撤销	[] 恢复	🛃 导入	EDS文件	: ●导	\GSD 文件	曇入ECT
⊙ 🕤 Device 〔连接的] (AM600-CPU1608T	P/TN											
- 🍳 设备诊断				75 1								
😑 💥 网络组态	- 11			A T								
	- 11			Ų 👩								
Levu机架	- 11			n 🗒								
□ 圓 PLC 逻辑	- 11			Ŷ []								
😑 🔘 Application [运行]												
🎁 库管理器												
PLC_PRG (PRG)												
🖃 👹 任务配置	- 11											
ETHERCAT	- 11		VH5 C									
ETHERCAT.EtherCA	AT_T	0	100									
🖃 🍪 MainTask												
PLC_PRG												
资源使用表		-	1									
😔 🏅 SoftMotion General Axis Pool	- 11											
- 🚱 📕 HIGH_SPEED_IO (高速IO模块	e)											
GI ETHERCAT (EtherCAT Master So	ftMc											
VH5_CC100 (XINJE-VH5	n)											

Click online, and the current state is the running state, indicating that the activation is correct.

常规	设备状态 ——		Current et	ator running
过程数据(PDO设置)	初始化	引导状态	Lurrent sta 当前状态:	ate: running 运行
启动参数(SD0设置)	预运行	安全运行	请求状态:	运行
后的多数(300反应)	运行	清除错误	H-1/1//00-	
在线 Online				
在线CoE	FoE 下载	上传		
EtherCAT I/O映射	E ² PROM接口 —	TIA		
状态	写E ² PROM	读 E ² PROM	写入E2P	ROM XML
信息				

8)Add Group U parameters to the PDO.

data	输//输出	○ 2部折叠 全部显 2 名称	索引	子索引	长度	英型	标志	SM
自动参数(SDO设置)	◎ 🗹 输出	1st RxPDO Mapping	16#1600	16#00	11.0		可编辑	2
THE	1.7	Control Word	16#6040	16#00	2.0	UINT		
	1-3	vl target velocity	16#6042	16#00	2.0	INT		
王线CoE	-14	ModeOfOperation	16#6060	16#00	1.0	SINT		
	- 50	Targetposition	16#607A	16#00	4.0	DINT		
therCAT I/O映射		Target torque	16#6071	16#00	2.0	INT		
城市	* 🗌 输出	Rx 2nd process data mapping	16#1601	16#00	4.0		可编辑	
A36	🔹 🗔 輸出	Rx 3rd process data mapping	16#1602	16#00	4.0		可编辑	
息	* 🗌 输出	Rx 4th process data mapping	16#1603	16#00	4.0		可编辑	
		1st TxPDO Mapping	16#1A00	16#00	23.0		可编辑	3
	input	00-00	16#4000	16#00	2.0	UINT		
	- *9	Status Word	16#6041	16#00	2.0	UINT		
	- *9	Velocity actual value	16#606C	16#00	4.0	DINT		
		ModeOfOperationDisplay	16#6061	16#00	1.0	SINT		
	- *9	Torque actual value	16#6077	16#00	2.0	INT		
	-*9	Position actual value	16#6064	16#00	4.0	DINT		
	-*>	vl target demand	16#6043	16#00	4.0	DINT		
	- *9	ErrorCode	16#603F	16#00	2.0	UINT		
	- 10	vl target actual value	16#6044	16#00	2.0	INT		
	Image: ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●	Tx 2nd process data mapping	16#1A01	16#00	6.0		可编辑	
	* 🗌 输入	Tx 3rd process data mapping	16#1A02	16#00	6.0		可编辑	
	* 🗌 输入	Tx 4th process data mapping	16#1A03	16#00	6.0		可编辑	
	□ 輸入		16#0000	16#00	0.0		可编辑	

Add PDO data without login. As shown in the above figure, it is added successfully.

规	查找		抖动 显示所有			•				
t程数据(PDO设置)	变量	映射	通道	地址	类型	默认值	当前值	准备值	单位	描述
	8-50		Control Word	%QW2	UINT	<	128	6		Control Word
动参数(SDO设置)	⊕- * ≱		vl target velocity	%QW3	INT		0			vl target velocity
线	· · · ·		ModeOfOperation	%QB8	SINT		0			ModeOfOperation
59%	·····		Target position	%QD3	DINT		0			Target position
E线CoE	8.50		Target torque	%QW8	INT		0			Target torque
			U0-00	%IW2	UINT		0			U0-00
therCAT I/O映射	8- * 9		Status Word	%IW3	UINT		4688			Status Word
变量	映射	通道	地址	类型	默认值		当前值	准备值	单位	
	映射	Control Word	%QW2	UINT	默认值	6		准备值	单位	Control Word
₩- * ∲ ₩- * ∳	映射	Control Word vl target velocity	%QW2 %QW3	UINT	默认值	6 5000		准备值	单位	Control Word vl target velocity
8-59 8-59 8-59	映射	Control Word	%QW2 %QW3	UINT	默认值	6 5000 0		准备值	单位	Control Word vl target velocity
00 - ⁵ φ 10 - ⁵ φ 10 - ⁵ φ 10 - ⁵ φ	映射	Control Word vl target velocity	%QW2 %QW3	UINT	默认值	6 5000		准备值	单位	Control Word vl target velocity
8-59 8-59 8-59	映射	Control Word vl target velocity ModeOfOperatio	%QW3 %QW3 n %QB8	UINT INT SINT DINT	默认值	6 5000 0		准备值	单位	Control Word vl target velocity ModeOfOperation
00 - ⁵ φ 10 - ⁵ φ 10 - ⁵ φ 10 - ⁵ φ	映劇	Control Word vl target velocity ModeOfOperatio Target position	%QW3 %QW3 n %QB8 %QD3	UINT INT SINT DINT	默认信	6 5000 0 0		准备值	单位	Control Word vl target velocity ModeOfOperation Target position

9)PDO data read/write(enable and speed setting)

As shown in the figure above, the object words 6040h and 6042h are written successfully.

Set **(**6040h: Control word **)** : write $6 \rightarrow 7 \rightarrow 15$ enable. $15 \rightarrow 7$ turn off enable. Write 128 to clear the frequency conversion alarm.

Set **(**6042h:vl target velocity **)**, for example, write 1000, P0-13=50Hz. The frequency converter operates with 5Hz forward rotation, writes -1000, and the frequency converter operates with 5Hz reverse rotation.

10)SDO data read/write

As shown in the following figure, the COE object dictionary 10F1 is read and written. The value of 10F1-01 is written from 1 to 3, and the value of 10F1-02 is written from 4 to 3. The writing and reading is successful.

	16#1009:16#00	Hardware version	RO	STRING(3)	'v1.0'
在线CoE CoE online	16#100A:16#00	Software version	RO	STRING(4)	'v5.12'
	I6#1018:16#00	Identity			
EtherCAT I/O映射	= 16#10F1:16#00	Error Settings			
状态	:16#01	Local Error Reaction	RW	UDINT	1
1//0	:16#02	Sync Error Counter Limit	RW	UINT	4
信息	= 16#1600:16#00	Rx 1st process data mapping	RW	USINT	5

10.5 Inovance H5U and VH5/VH6

10.5.1 System configuration

Name	Model	Quantity	Explanation
Upper	AutoShop	1	Inovance upper computer software
computer		1	
Controller	H5U	1	-
Communication	VHX-CC100	1	
card		1	-
Cable	JC-CB-3	~~~~~	For connection between computer and
Cable		some	PLC and between PLC and VFD

10.5.2 Parameter setting

The frequency converter slave station needs to be configured as EtherCAT communication mode, and the parameters to be modified are as follows:

Parameter	Name	Access	Set value	Range	Explanation
P0-02	Operation command channel selection	Runtime read only	2	0-2	Communication
P0-03	Main frequency A input channel selection	Runtime read only	6	0-9	Communication setting
P9-00	Communication protocol	Runtime read only	1	0-2	EtherCAT
P9-12	Slave station No.	RW	-	0-65535	After modification, it is valid when power on again.

10.5.3 Setup steps

1)New project

Double click to open autoshop v4.4.6.0 software and create a new project:

1) Executive document - new project;

② Select a new project, select H5U series, enter the project name and save path, click OK, then the project column will appear attribute explorer.

★建工程(N) New project Ctrl+N 新建工程(N) New project Ctrl+N う 打开工程(Q) Ctrl+O 保存工程(S)	 新建工程 工程设定 工程名: 	○临时工程
工程另存为(A) 工程属性(PLC类型)(T)	工住石· 保存路径: 编辑器:	C:\Users\HONOR\Documents\
打包工程档案 解压工程档案	工程描述:	梯形图 ~
关闭工程(C)	设备选型	
保存文件(E) Ctrl+S 关闭文件(E) D220 - Index K1 - SubIndex K4 - DstLength D230 - Data 网络3 网络注释	(2)支持自定 (3)最大支持 冲),支持定 (4)支持4轴2 (5)1路以太序	H5U系列 H5U > 总线高性能小型FLC > > 次变量和FB/FC 324抽运动控制(含EtherCAT和本地脉位、插补和电子凸轮 > > 2010Hz脉:沖輸出,4路2001Hz高速输入 > > > 对支持ModBus TCF和Socket、1路CAN支持 > > > jopen、1路485支持ModBus和自由协议 > > >

2)Add XML file

具箱	₽ ×	늘 « 桌面 > 临时文件 > XLM(1) >	XLM ~ C	○ 搜索"XLM"	
~	· 搜索 新建文件	挟		≣ •	
EtherCAT Devices Add XM	L file	名称	修改日期	类型	大小
Inovan 导入设备XML	150	E VHX-CC100	2022/4/18 10:39	XML 文档	4
⊞ Other Devices - 指令集	助	VHX-CC100-3720	2022/1/11 13:47	XML 文档	4
□ 程序逻辑指令	に行って				
■ 流程控制指令	下載				
自·触点运算指令	訴				
 ■ 数据运算指令 ■ 数据处理指令 	K TED	1			
■ 频确处理指令 ● 矩阵指令	Vindows (C				
□ 字符串指令	indoirs (c	· · · · · · · · · · · · · · · · · · ·			
● 时钟指令		文件名(N): VHX-CC100-3720	~ x	ml Files (*.xml)	Ý
Ⅲ MC轴控(EtherCAT&脉冲输出)				打开(0)	取浦

3) Master station connection configuration

通讯设置			
PLC通讯设置 通讯类型:	¥ 以太网 7	~	确定
设备IP:	192 . 168 .	1 . 88	
设备名称:			PING
			修改IP/设备
搜索PLC			搜索
序号 IP地址	设备类型	设备名称	MAC地址

LC通讯i ji	∞血 通讯类型:	登以太网 7 ~	确定
	设备IP:	192 . 168 . 1 . 88	测试
ì	设备名称:		PING
		AutoShop X	修改IP/设备名
索PLC			搜索
序号	IP地址	连接状态: 已连通! 当前PLC交替显示"0"	MAC地址
		确定	

4)Add slave station

If the controller is not in the monitoring state 1, the frequency converter does not support automatic scanning of the slave station at present, and it needs to be added manually.

0

11 編程 □ ■ 程序块	1 过栏数据		B- Inovance Devices
	启动参数	分布式即钟	Other Devices Ning Electronics, Inc. NINUE-DSSC1 EtherCAT(CoE) Drive Rev3.0 v3.7.42 NINUE-DSSC1 EtherCAT(CoE) Drive Rev4.0 v3.7.70
由-門 INT_001 ■ 功能块(FB) ■ 函数(FC)	1/0功能映射	同步模式选择	 XINJE-DSSC EtherCAT(CoE) Drive Rev2.0 v3.7.30 XINJE-DSSC EtherCAT(CoE) Drive Rev4.0 v3.7.70 LC3-4P EtherCAT Adapter 3.0.2
□ 函数(FC) □ 函数(FC) □ 函数 = □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	信息	■ 使能に同步事件 4000 μs Syna0:	XIV.E-WH5 EtherCAT(CoE) Drive Rev1.0 XIV.E-WH5 EtherCAT(CoE) Drive Rev1.0 XIV.E-WH5 EtherCAT(CoE) Drive Rev2.0
—≦◎ 模块配置 ————————————————————————————————————	状态		→ XIUL=HIS CAT(CAE) Drive Rev2.0 □ 指令集 由 程序逻辑指令
- 11音 运动控制轴 - ④ 轴组设置		(● 図出却三時間 [2] (■) (■) (■) ○ 用ド定义 0 (編録时间(us))	 流程控制指令 触点运算指令
EtherCAT		Syncl: □ STRCL使能	·
		 ● 同步单元周期 x1 4000 周期討同(µs) 	 ⇒ 芬祥用指令 ■ 时神指令 ● Numberg/CenterCAT8級/中編出)
→ 空量监控表 MAIN		○用户定义 [0. 偏移时间(μ≤)	⊕ MC铀控(CanOpen)

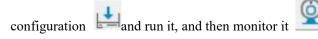
If you need to automatically add an axis, please check the following operation to automatically create an axis and associate the slave when creating a new slave station.



5)Activate configuration

1 Click compile

to confirm whether the configuration and program are wrong, then download the



② Click status to confirm that all slave state machines are in OP status.



6) Add Group U parameters to the PDO.

过程数据	前入/输出		名字	索引 子索引	长度	E Ether	CAT Devices	
process data	≝ ☑ 输出	Rx 1st process	■ 新増/编辑					
启动参数	🗉 🗎 躺出	Rx 2nd process	索引:子索引	名称		标志	类型	默认任
和中国的教育	≝ □ #出	Rx 3rd process	16#5100:16#00	Status		RO	UINT	
L/0功能映射	🛎 🗔 輸出	Rx 4th process	16#5110:16#00	OutputFrequency		RO	INT	
170393月16日天为3	⇒ ☑ 输入	Tx 1st process	16#603F:16#00	ErrorCode		RO	VINT	
信息	新 入	Statusword	16#6041:16#00	Statusword		RO	UINT	
间题	输入	vl target deman	16#6043:16#00	vl target demand		RO	INT	
状态	input 🕷 🔨	vl target actua	16#6044:16#00	vl target actual value		RO	INT	
17.53	■ 🗌 输入	Tx 2nd process	16#6061:16#00	Modes of operation display		RO	SINT	
	🙂 🗔 输入	Tx 3rd process						
	🛎 🗌 輸入	Tx 4th process						
			名称: 10-0		数据类数	ย: บาท		•
				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	RX MPCS	E. CIN		
			索引: 16# 4000		位长期	₹: 16		
AIN TO VH5-CC100	EtherCat		子索引: 16# 0					

7) PDO data read/write(enable and speed setting)

Click IO function mapping to perform relevant operations on the required values. Clear alarm:



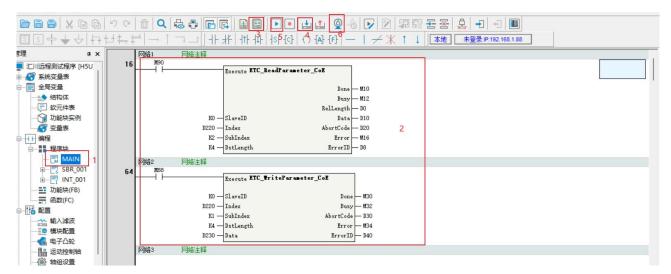
Set velocity:

	1 × 常规设置	☑十六进制显示当前值				工具箱
<b>중</b> 变量表	AMICE	变量		通道	类型	
编程 	过程数据	S _IQ1_0		Control Word	UINT	EtherCAT Devices
E ■ MAIN	1211161.00	191_1		vl target velocity	INT	Inovance Devi     Other Devices
⊕- SBR_001	A-144	S_191_2		Statusword	UINT	🖻 - Xinje Elect
- INT_001	启动参数	S _1Q1_3		vl target demand	INT	XINJE XINJE
10 功能块(FB)		# _IQ1_4		vl target actual value	INT	XINJE
	1/9功能映射					XINJE
配置				写入元件		× INI
☆ 輸入減波 ✓ 模块配置	信息			-370014		INJ
				位软元件		INJ C3-
1 运动控制轴	状态			<u> </u>		
() 轴组设置						/OFF取反   指 非指 非指 単指
C EtherCAT				强制ON	强制 OFF 强制 ON	/OFF取反 II指 II指
VH5-CC100						指
COM				学校元件		単指
器 CAN(CANLink)						
✓ 以太网				较元[1]: _JQ1_]		F
变量监控表 MAIN				<b>数据类型</b> : 16位整	(数 - 显示格式: +	送制 ~ Eth Car
交叉引用表					e	R201
元件使用表				值: 2000		▶设置 CAT
Trace						关闭
	1 d MAIN 1 VH5-CC100	EtherCat				TN1

8) SDO data reading and writing

① Operate in sequence according to the steps written in the figure, and then read and write according to the required parameters.

- 2 Note: the trigger condition of the command is normally on / off.
- ③ Read / write program.



# 10.6 KEYENCE PLC KV 7300 and VH5/VH6

 oj stem tonigaration			
Name	Model	Quantity	Explanation
Upper computer	KV STUDIO Ver.9G	1	Omron upper computer software
Controller	KV_7300 series	1	-
Communication card	VHX-CC100(V2.0)	1	-
Network cable	JC-CB-3	some	For connection between PLC and slave
USB cable	USB cable	-	For connection between computer and PLC

### **10.6.1 System configuration**

### 10.6.2 Parameter setting

The frequency converter slave station needs to be configured as EtherCAT communication mode, and the parameters to be modified are as follows:

Parameter	Name	Access	Set value	Range	Explanation
P0-02	Operation				
	command	ommand Runtime 2 0-2 Com	Communication		
	channel	read only	lly 2 0-2 Comm		Communication
	selection				
P0-03	Main frequency	Runtime			
	A input channel		6	0-9	Communication setting
	selection	read only			
P9-00	Communication	Runtime	1	0-2	EtherCAT
	protocol	read only	1 0-2		LUICICAI
DO 12	Slave station	DW		0-65535	After modification, it is
F9-12	P9-12 No. RW		-	0-03333	valid when power on again.

### 10.6.3 Setup steps

1)New project

(1) The computer and PLC are connected and communicated through USB port.

②Open the software and create a new project.

File(E) View(V) Monitor/Simulator(N) Tool(T) Window(W) Help(H)	
🗄 🗋 💑 📲 🐘 🖶 🕼 🕢 👔 🔛 USB 🔹 🔹 🗎 🖼	? ☜ ₽ ๗ ॼ ቘ ■ ଈ   ! 圷 羿 邙 铧 끙 恕 ? ?
i plsx plsy jogx jogy orax oray terx way i 🖉 🗄 🔀 🔀 📾 📾 📲 🎜 💀 🖳 🔘	● ● ■ II HI ▲ H N ▼ H > ۞ 🖑 🖳 🗑
	New project X
	Project name(N) PLC model(K)
	KV-7500 ~
	Position(P)
	C:\Users\admin\Desktop\JIWNSHI
	Comment(C)
	¥
	AW display comments( <u>W</u> )
	KVS PROJECT
	Register special device cmnts(M) OK Cancel

③Pop up the confirm unit configuration setting interface, and click "yes".

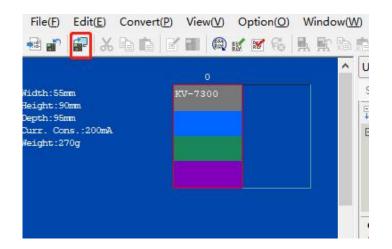
Confirm unit setting informatic	on	×
Setup unit setting info now?		
* [Yes]Start Unit Editor. * [No]Close this dialog. * [Read unit setting]Read uni Yes(Y)	t setting inform No( <u>N</u> )	ation from PLC. Read unit setting(U)

(4)Click the icon in the upper left corner: obtain the unit configuration information connected to the PLC, double-click the model "KV-7300" to open the unit editor.

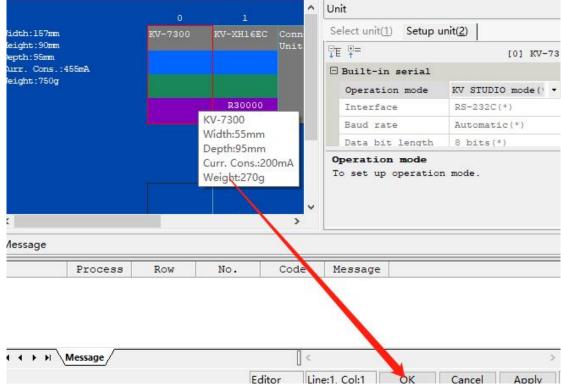
Project	φ×	Main	×			
Unit configuration     (0) KV-7300     Unit configuration switching     Device comment     Exbel		00001		1	2	3
GPU system setting     GPU system setting     Forgram: 成成     Every-scan execution     DE Weinstailze module		00002				
■ Standby module ■ Fixed-period module ■ Inter-unit sync module ■ Function Block ■ ■ Macro		00003				
Subroutine macro Self-hold macro Device default File register setting 0:Memory card LiCFU memory		00004				
n 🚔 User document		00005				
		00006				

2)Get configuration information (master station connection)

1 Click "get unit configuration information connected to PLC".



### 2 Click OK.



#### 3)ESI file registration

Click "axis composition setting" and "ESI file registration".



Select the XML file .

3000						
lease select the ESI file to be registered.			×	XINJE-DS5C EtherCAT(CoE) Drive		
$\leftrightarrow$ $\rightarrow$ $\checkmark$ $\uparrow$ $\blacksquare$ « PKBACK# 001 (F:) $\rightarrow$ XLN	۸(1) v ٿ	搜索"XLM(1)"	م	LC3-AP EtherCAT Adapter 3.0.2 [De		
组织 ▼ 新建文件夹		83	- 🔳 🖓	[Register ESI file]		
🔰 3D 对象 🔷 名称	^ /	參改日期	类型			
III 视频	2	022/4/18 10:40	文件夹			
■ 图片 VHX-CC100(6)	2	2022/4/19 8:27	XML 文档			
↓ 下载 ♪ 音乐						
三 桌面						
🏪 本地磁盘 (C:)						
新加卷 (D:)				-		
<b>新加卷 (E:)</b>				1		
PKBACK# 001						
- PKRACK# 001 /F Y <			,	•		
文件名(N):	``````````````````````````````````````	ESI file(*.xml)	~			
		打开(0)	取消			

After adding successfully, it is shown in the following figure:

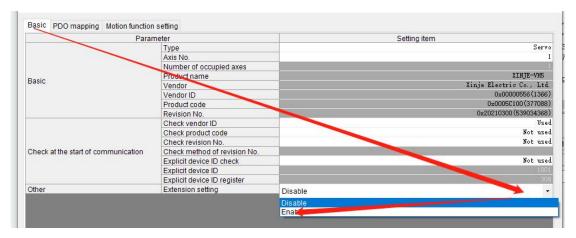
🖃 🔀 Xinje E	electric Co., Ltd.
-XJ Fre	equency Converter
->>	XINJE-VH5 EtherCAT(CoE) Drive Rev1.0 [Detailed setting required]
	XINJE-VH6 EtherCAT(CoE) Drive Rev1.0 [Detailed setting required]
	XINJE-VH5 EtherCAT(CoE) Drive Rev2.0 [Detailed setting required]
XJ	XINJE-VH6 EtherCAT(CoE) Drive Rev2.0 [Detailed setting required]
1 - VI Co	nia Driuna

### 4)Add slave configuration

As shown in the figure below, double-click VH5 1.0 to add the first slave station, and a configuration interface will pop up after adding.

KHIBEC Set up max. number of Control period(L) Servo	of axes 16 axes 16 axes 18 axes 18 axes 18 axes	All All vendors      All Vendors      All All vendor
lave detailed setting Basic PDO mapping Motion function	nsetting	ng req
Para	meter	Setting item
Basic	Type Axis No. Number of occupied axes Product name Vendor Vendor ID Product code Revision No.	Serve - 1 1 1 XINJE-VH5 V1.0 Xinje Electric Co., Ltd. 0x00000556(1366) 0x200100(377088) 0x2021030(539034368)
Check at the start of communication	Check vendor ID Check product code Check revision No. Check method of revision No. Explicit device ID check Explicit device ID	Used Not used Not used Not used Used
	Explicit device ID register	

Select the extension settings, as shown in the following figure:



### DC setting-choose DC mode

Basic PD	O mapping Motion function setting	Communication command at initialization DC setting Advanced settings
	Parameter	Setting item
	Operation mode	DC-Synchr on
Basic	Sync cycle	1000 us
Basic	User setting mode	Used
	Sync	Used
	Sync mode	Sync cycle
Sync0	Sync cycle	x 1 (1000 us)
Synco	User definition	1000 us
	Shift time	0 us
	Sync mode	Not used
	Sync cycle	x 1 (0 uz)
Sync1	Sync 0 cycle	x 1 (0 uz)
	User definition	. 0 us
	Shift time	. 0 us

Select the operation mode supported by the slave station of the EtherCAT connection object.

Para	meter	Settin	g item
	Туре	1/0	
	Axis No	Servo	
	Number of occupied axes	Stepper	
Basic	Product name	Inverter	
Jasic	Vendor	1/0	
	Vendor ID		a£1) add0000x0
	Product code	Χ.	0x0005C100 (37708
	Revision No.	X	0x20210300 (53903436
	Check vendor ID		υs
	Check product code	N	Not us
	Check revision No.		Not us
Check at the start of communication	Check method of revision No.		
	Explicit device ID check		Not us
	Explicit device ID		10
	Explicit device ID register		
Other	Extension setting		Enab

### 5)Add PDO mapping

Add the required PDO parameters, including input and output, as shown in the figure below.

Direction Pl	DO mapping name (index)		PDO entry name	Index		Data
(Add)						
		-				
(Add)	Hd PDO					;
	PDU					,
	1600 Rx 1st proc	ess data map	ping		~	
	Name(N)	Bx 1st pr	ocess data mapping			
			cocce and mapping			
	Index (map)([)	1600		HE	EX 🗸	
	Na	me	Index (entry)	Data size (bit)		
	Control Word vl target velocity		0x6040:00 0x6042:00		16 16	
	(Add)					+
						×
						+
					- E E	1
					- 1 - C	•
PDO n	otion function setting Comm napping name (index)	Control \	PDO entry name	Index 0x6040:00		Da
	ata mapping (0x1600)	vi target		0x6042:00		
(A d)				0x0042:00		
				0x6042:00		
(Aud)	Add PDO			0x0042:00		
(ALd)		a data manni		0x0042:00		
(Aud)	Add PDO	s data mappi	ing	0x6042:00	~	
(A <b>. d</b> )			ing cess data mapping	0x6042:00	~	
(A <b></b> d)	1A00 Tx 1st propes Name( <u>N</u> )	-				
(A.d)	1A00 Tx 1st proces Name( <u>N</u> ) Index (map)( <u>1</u> )	Tx 1st pro	cess data mapping	 	× IEX ×	
(A.d)	1A00 Tx 1st propes Name( <u>N</u> ) Index (map)(]) Nam	Tx 1st pro	cess data mapping		IEX ~	
(A <b>.</b> d)	1A00 Tx 1st propes Name(N) Index (map)(I) Statusword	Tx 1st pro	Index (entry)	 	HEX ~	
(A <b>.</b> d)	1A00 Tx 1st propes Name( <u>N</u> ) Index (map)(]) Nam	Tx 1st prov	cess data mapping	 	IEX ~	
(ALG)	1A00 Tx 1st proces Name( <u>N</u> ) Index (map)() Nam Statusword vi target demand	Tx 1st prov	Index (entry) 0x6041:00 0x6043:00	 	HEX ~ 16 16	
(ALG)	1A00 Tx 1st propes Name( <u>N</u> ) Index (map)( <u>J</u> ) <u>Nam</u> <u>Statusword</u> vi target demand vi target demand vi target demand	Tx 1st prov	Index (entry) 0x6041:00 0x6043:00		HEX ~ 16 16	
(AL3)	1A00 Tx 1st propes Name( <u>N</u> ) Index (map)( <u>J</u> ) <u>Nam</u> <u>Statusword</u> vi target demand vi target demand vi target demand	Tx 1st prov	Index (entry) 0x6041:00 0x6043:00		HEX ~ 16 16	-
(A.C.)	1A00 Tx 1st propes Name( <u>N</u> ) Index (map)( <u>J</u> ) <u>Nam</u> <u>Statusword</u> vi target demand vi target demand vi target demand	Tx 1st prov	Index (entry) 0x6041:00 0x6043:00		HEX ~ 16 16	
(A.C.6)	1A00 Tx 1st propes Name( <u>N</u> ) Index (map)( <u>J</u> ) <u>Nam</u> <u>Statusword</u> vi target demand vi target demand vi target demand	Tx 1st prov	Index (entry) 0x6041:00 0x6043:00		HEX ~ 16 16	
(ALG)	1A00 Tx 1st propes Name( <u>N</u> ) Index (map)( <u>J</u> ) <u>Nam</u> <u>Statusword</u> vi target demand vi target demand vi target demand	Tx 1st prov	Index (entry) 0x6041:00 0x6043:00		HEX ~ 16 16	
(A.C.)	1A00 Tx 1st propes Name( <u>N</u> ) Index (map)( <u>J</u> ) <u>Nam</u> <u>Statusword</u> vi target demand vi target demand vi target demand	Tx 1st prov	Index (entry) 0x6041:00 0x6043:00		HEX ~ 16 16	
(A-4)	1A00 Tx 1st propes Name( <u>N</u> ) Index (map)( <u>J</u> ) <u>Nam</u> <u>Statusword</u> vi target demand vi target demand vi target demand	Tx 1st prov	Index (entry) 0x6041:00 0x6043:00		HEX ~ 16 16	
(AL d)	1A00 Tx 1st propes Name( <u>N</u> ) Index (map)( <u>J</u> ) <u>Nam</u> <u>Statusword</u> vi target demand vi target demand vi target demand	Tx 1st prov	Index (entry) 0x6041:00 0x6043:00		HEX ~ 16 16	

6)Activate configuration

After adding the object dictionary, download the program . After downloading the program, power on the PLC again. When the lower computer PLC turns green, it indicates that the activation is successful.

### 7)Add Group U parameters to the PDO.

Direction	PDO mapping name (index)		PDO entry name	Index	Data size (bit)	UG	1
		Control V		0x6040:00	16	42064.00	1
	Rx 1st process data mapping (0x1600)	vI target v	relocity	0x6042:00	16	42065.00	1
	(Add)	Statuswo		0x6041:00	10	10000 00	-
	and the second	and the second of		0x6041:00	16	42000.00 42001.00	
<b>R</b> +	Tx 1st_process data mapping (0x1A00)	ing (0x1A00) vi target demand vi target a U0-00		040043.00	10	42001.00	1
	(Add)		No selectable dev	ice definition		~	
			Name(N)	Tx 1st process d	ata mapping		
			Index (map)(I)	1A00		HEX ~	
BDO and		×	Nam	ie Ind	lex (entry)	Data size (bit)	
PDO ent	iry	~	Statusword vI target demand		0x6041:00 0x6043:00	16	
selectat	ple device definitio		vi target actual va	lue	0x6044:00	16	+
	name(N) U0-00		U0-00		0x4000:00	16	×
JO entry I	Tame(14)	_	(D0)	and the second			
dex( <u>l</u> )	4000 🔻 HEX						+
ub-index(							+
ata type( <u>C</u>	2) UINT OK Cancel	~					

8)PDO data read/write(enable and speed setting)

The following figure shows the register configuration of the object dictionary. Switch the controller to online

mode after configuration, as shown in the following figure:

Editor
Editor
Monitor
Online edit
Simulator
Simulator edit

The following figure shows the mapping address of the object dictionary:

e detailed setting

sic F	PDO mapping Communication comman	nd at initialization DC setting Ad	Ivanced settings		
rection	PDO mapping name (index)	PDO entry name	Index	Data size (bit)	JG
	Du dat assass data manaina (0x1600)	Control Word	0x6040:00	16	42064.00
	Rx 1st process data mapping (0x1600)	vI target velocity	0x6042:00	16	42065.00
	(Add)				
		Statusword	0x6041:00	16	42000.00
	Tx 1st process data mapping (0x1A00)	vl target demand	0x6043:00	16	42001.00
<b>(</b>		vl target actual value	0x6044:00	16	42002.00
	(Add)				

Open the monitor , select the expansion unit buffer memory, find the mapping address, and directly operate the object dictionary.

EX OREY TCHX TCHY   🦧 📰 🗺 🗺 🕼		t 💀 💀 🔍 🜰		H V H > O 9	r 🖄 🚥	Monitor	- 1	Comments	Comment 1	
						: Monitor	- 1 ·	comments	comment i	
E 📰 🔲 📖 🎆 📰   🕺 🕩 🕋	001									
u 🖻 🖬 🖬 🖬 🐘 📾 🖬 🖬	<b>a</b>	😼 😘 🐘 🛤 🖻								
Ф <b>х</b>	[1] Co	ntact output 🗙	[1] Point parameter	× [1] Axis control setti:	ng 🗙	[1] Unit common setting	×	Main 🗙		
guration ^	Conta	ct output setting(O)	1 V Display unit s	etting(D) %						
-7300		= Batch monitor					×			
-XH16EC R30000 DM10000				-			~	1		
configuration setting	N	O Device(D)	Unit buffer memory(G)	<ul> <li>Unit Internal device</li> </ul>	( <u>U</u> )					
common setting		Unit	Offset Curren	t value Display form	at	Comments	^			
control setting		[1] KV-XH16EC	42060			I/O Input 60		1		
t parameter		[1] KV-XH16EC	42061	0 DEC 16BIT		I/O Input 61				
control setting		[1] KV-XH16EC	42062	0 DEC 16BIT		I/O Input 62				
nc parameter	N	11KV-XH16EC	42063	0 DEC 16BIT		I/O Input 63				
ntact output setting	N	11KV-XH16EC	42064	0 DEC 16BIT		I/O Output 0				
m setting	N	1] KV-XH16EC	42065	0 DEC 16BIT		I/O Output 1				
Resolution setting	No	1] KV-XH16EC	42066	0 DEC 16BIT		I/O Output 2				
Program	No	1] KV-XH16EC	42067	0 DEC 16BIT		I/O Output 3				
	No	1] KV-XH16EC	42068	0 DEC 16BIT		I/O Output 4				
on setting	No	1] KV-XH16EC	42069	0 DEC 16BIT		I/O Output 5				
-C32XTD R44000/R44200	No	11KV-XH16EC		0 DEC 16BIT		I/O Output 6 I/O Output 7				
nfiguration switching		[1] KV-XH16EC [1] KV-XH16EC	42071 42072	0 DEC 16BIT 0 DEC 16BIT		I/O Output 7				
ment	INC	[1] KV-XH16EC	42072	0 DEC 16BIT		I/O Output 9				
	INU	[1] KV-XH16EC	42073	0 DEC 16BIT		I/O Output 10				
setting	INC	[1] KV-XH16EC	42075	0 DEC 16BIT		I/O Output 11				
2 20 28	INC	[1]KV-XH16EC	42075	0 DEC 16BIT		I/O Output 12				
can execution	NO	[1] KV-XH16EC	42077	0 DEC 16BIT		I/O Output 13	~			
	140 -			0 DEC 10BII		1/0 output 15		10-		
ize module	No.2			0.000000%	Bit 14					
module	No.2			0.000000%	1000000000					
eriod module	No.2			0.000000%	Bit 15					
nit sync module	No.2			0.0000000%						
	No.2			0.0000000%						
lock	No.2			0.0000000%						
×	No.2			0.0000000%						
>	No.3			0.000000%						
roject	No.3			0.0000000%						

9) SDO data read/write

Read:

			3	4	5	6	7	8	9	10
0001	MR000	R37112						#42144	\$10F1	#1
0000							KV-XH16E	C Axl Servo param read		
	R30512						UWRIT -			
0002							#1	#42145	\$0001	#1
0000							KV-XH16E	C Ax1 Servo param read		
							UREAD -	_		
0003							#1	#42148	EM10	#1
0000							KV-XH16E	C Ax1 Servo Param Read	#00004	
							UREAD - #1	#42149	EM11	#1
0004							100		1000000000	34536
0000							KV-XH16E	C Ax1 Servo Param Read	#00000	
e:										
e: MR004	R371	13				Γ	UWRIT	#42152	\$1051	#1
	R371:	13				[	UWRIT	#42152	\$10F1	#1
	R371	13						#42152 Ax1 Servo param wrt	\$10F1	#1
MR004		13				K	#1	Ax1 Servo	\$10F1	#1
		13 ↑				K	<b>#1</b> V-XH16EC	Ax1 Servo	\$10F1 \$0001	#1 #1
MR004		₽ Î				[	#1 V-XH16EC UWRIT —	Axl Servo param wrt		
MR004		1 <u>3</u>				[	#1 V-XH16EC UWRIT	Axl Servo param wrt #42153 Axl Servo		
MR004		13 ↑				[	#1 V-XH16EC UWRIT	Axl Servo param wrt #42153 Axl Servo		
MR004		1 <u>3</u>					#1 V-XH16EC UWRIT — #1 V-XH16EC UWRIT —	Axl Servo param wrt #42153 Axl Servo param wrt	\$0001	#1
MR004		13 ↑				[	#1 V-XH16EC UWRIT	Axl Servo param wrt #42153 Axl Servo param wrt #42154 Axl Servo	\$0001	#1
MR004		1 <u>3</u>				[	#1 V-XH16EC UWRIT — #1 V-XH16EC UWRIT — #1	Axl Servo param wrt #42153 Axl Servo param wrt #42154 Axl Servo	\$0001	#1

# **11. EtherCAT communication alarm code**

When the EtherCAT communication is abnormal, the frequency converter panel displays an alarm with error Err44, and the object word 603Fh displays the error code "8xx", which can be queried through U0-73 on the frequency converter panel. After the fault is rectified, use the bit7 of Controlword to reset the fault. The following table lists the detailed fault causes. (When the frequency converter itself alarms, that is, errors other than Err44, need to clear the alarm twice through the panel, once clear the alarm itself and once clear the communication alarm Err44. Through the bit7 of controlword, the reset and clearing fault only needs to be cleared once.)

Alarm	Description	Reasons	Solutions
code			
817	Incorrect ESM	Accept state transition requirements that cannot be	Confirm whether the
	status request	transitioned from the current state:	master station's state
	exception	Init→SafeOP	transition request is
	protection	Init $\rightarrow$ OP	correct
		$PreOP \rightarrow OP$	

Alarm	Description	Reasons	Solutions
code		ESM status often an amon is reported. When the	
		ESM status after an error is reported: When the	
		ESM status is Init, PreOP, or SafeOP, the ESM	
		status remains. Change to SafeOP when the ESM status is OP	
		ESC register AL Status Code:0011h	
818	No ESM	Receive state transition requirements other than:	Confirm whether the
	required	1:Request Init State	master station's state
	exception	2:Request Pre-Operational State	transition request is
	protection	3:Request Bootstrap State	correct
	defined	4:Request Safe-operational State	
		8:Request Operational State	
		ESM status after error reporting: stops at the	
		current status when the current status isInit, PreOP,	
		SafeOP, and changes to SafeOP when OP	
		ESC register AL status code:0012h	
819	Boot status	Accept the following state transition requirements:	Confirm whether the
017	request exception	3:Request Bootstrap State	master station's state
	protection	ESM status after error reporting: init	transition request is
	protoction	ESC register AL status code:0013h	correct
822	Mailbox setting	The SM0/1 setting value of the mailbox is	Set syncmanage
022	exception	incorrect:	correctly according to
	protection	The receiving and sending areas of the mailbox	ESI file description
	protection	overlap with SM2/3, and the addresses of the	
		receiving and sending areas are odd.	
		The starting address of the mailbox is outside the	
		_	
		syncmanager1:1200h~12ffh	
		Incorrect setting of SyncManager 0/1 length (ESC	
		registers: 0802h, 0803h/080ah, 080bh):	
		SyncManager0: out of the range of 32~256byte	
		SyncManager1: outside the range of 40~256byte	
		Incorrect setting of control register (ESC register:	
		0804h/080ch) of SyncManager 0/1:	
		Set other than 100110b to 0804h:bit5-0	
		Set other than 100110b to 080ch:bit5-0	
		ESM status after error reporting: init	
		ESC register al status code:0016h	
826	Synchronization	Invalid synchronization signal	Check whether the
	error	ESC register AL status code:001ah	network cable is
			disconnected of
			strongly disturbed
827	PDO watchdog	During PDO communication (SafeOP or OP	Confirm whether the
	abnormal	status), bit10 of time 0220 (AL event request) is set	sending time of PDO
	protection	through ESC register addresses 0400 (watchdog	from the upper device is
		divider) and 0420 (watchdog time process data)	fixed (interrupted).
		without on.	Confirm that the PDO
		ESM status after error reporting: Safe OP	watchdog detection

Alarm code	Description	Reasons	Solutions
		ESC register al status code:001bh	delay value is too large. Confirm whether there is any problem with the wiring of EtherCAT communication cable and whether there is excessive noise on the cable.
829 /830	Syncmanager 2/3 setting exception protection	SM2/3 is set to an incorrect value The physical address of SM2/3 is set incorrectly (ESC register: 0810h/0818h): the receiving and transmitting area overlaps, overlaps with SM2/3, the starting address is an odd number, and the starting address completion address is outside the range SM2/3 length setting (ESC register: 0812h/081a) is different from RxPDO and TxPDO The control register (ESC register: 0814h/081ch) of SM2/3 is set incorrectly ESM status after error reporting: PreOP ESC register al status code:001dh/001eh	Set syncmanager2/3 correctly according to ESI file description
831	PDO watchdog setting abnormal protection	PDO watchdog setting error The PDO watchdog trigger is valid (SyncManager: bit6 of register 0804h is 1), and the set value of PDO watchdog detection timeout value (registers 0400h, 0402h) does not meet the "communication cycle *2" condition ESM status after error reporting: PreOP ESC register AL status code:001fh	Correctly set the watchdog detection timeout value
836	TxPDO distribution abnormal protection	The data size of TxPDO mapping exceeds 24 bytes ESM status after error reporting: PreOp ESC register Al status code:0024h	Confirm that the data size of TxPDO mapping is set within 24 bytes
837	RxPDO distribution abnormal protection	The data size of RxPDO mapping exceeds 24 bytes ESM status after error reporting: PreOp ESC register Al status code:0025h	Confirm that the data size of RxPDO mapping is set within 24 bytes
844	Synchronous signal abnormal protection	After the synchronization processing is completed, the interrupt processing occurs above the set threshold according to SYNC0 or IRQ ESM status after error reporting: SafeOP ESC register al status code:002Ch	Confirm the setting of DC and whether the propagation delay compensation and deviation compensation are correct.
845	PLL does not complete abnormal	1s after synchronous processing, the phase combination (PLL locking) of master station and slave station still cannot be completed	Confirm the setting of DC

Alarm code	Description	Reasons	Solutions
	protection		
848	DC setting abnormal protection	The setting of DC is wrong. Bit2-0 of ESC register 0981h (activation) is set to a value other than the following: bit2-0=000b, bit2-0=011b ESM status after error reporting: PreOp ESC register al status code:0030h	Confirm the setting of DC
850	PLL abnormal protection	ESM status refers to the situation that the communication and servo phases (PLL locking) do not match under SafeOp or OP status ESM status after error reporting: SafeOp ESC register al status code:0032h	Confirm the setting of DC and whether the propagation delay compensation and deviation compensation are correct.
853	Synchronization cycle setting abnormal protection	Set unsupported synchronization cycle: The set value of synchronization cycle is beyond 500us, 1ms, 2ms and 4ms ESM status after error reporting:PreOP ESC register AL status code: 0035h	Set the synchronization period correctly
870	Data frame loss alarm	Data frame loss	<ol> <li>Check whether the baud rate set in P9-02 matches the communication card.</li> <li>The default baud rate of the general machine is 06.</li> <li>When setting ECAT communication parameters, power on again after modification, otherwise data frame loss may occur.</li> <li>After the firmware of the communication card or frequency converter is updated, it needs to be powered off and restarted.</li> <li>Check whether the communication card and the inverter backplane are properly inserted, or whether there is interference at the interface.</li> </ol>
880	Internal	Expansion card and frequency converter failed to	Check whether there are

Alarm code	Description	Reasons	Solutions
coue	communication failure	establish communication successfully.	foreign matters in the expansion card slot and whether the pins in the slot are intact.
881	Inverter not responding		Check whether the parameters of the inverter are correct.
890	Slave state machine error status	When the frequency converter is running, the master station requests non OP status without first closing the slave station. Or the error code is displayed after the key is reset, indicating that the key has no permission to reset the error (it may be enabled by the master station)	Check whether it enters non OP state during operation. If the reset key cannot clear it, it is necessary to check that the master station is forcibly enabling the operation command.





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