HCFa

Q series high-speed counter HCQX-HC04-D2

HC04

ManualNo.	HPPP1380000EN
Version	1.3
Date	Apr,2022

Thank you for purchasing and using the Q series high-speed counter modules independently developed and produced by HCFA Corporation.

This manual will give the brief explanation for the following modules in the table:

Name	Module	Version	Power	Description
High-speed counter module	HCQX-HC04-D	V1.0	2.7w	The high-speed counter needs to be connected to the end of local extension modules or the coupler. It cannot be used alone and supports multiple counting functions.
High-speed counter module	HCQX-HC04-D2	V1.0	2.7w	The high-speed counter needs to be connected to the end of local extension modules or the coupler. It cannot be used alone and supports multiple counting functions.

TIPS: When the user selects modules according to the power, part of the power is reserved to avoid the loss during the signal transmission.

Applicable readers

For the users of HCFA Q series extension modules, refer to this manual to perform the wiring, installation, diagnosis and maintenance and requires the users to have the certain knowledge of electrical and automation.

This manual gives the necessary information for the use of HCFA Q series extension modules, please read this manual carefully before use and make the correct operation with full attention to safety.

1. Safety precautions

1.1Safety icons

When using this product, please follow the following safety guidelines and strictly follow the instructions

Users can see more detailed and specific safety guidelines in sections such as DIN rail mounting, wiring, communication, etc.

⚠ **DANGER**
- Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury or significant property damage

⚠ **WARNING**
- ndicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

⚠ **CAUTION**
- Indicates that incorrect handling may cause slight injury or property damage.

⚠ **NOTE**
- Indicates that incorrect handling may cause damage to the environment / equipment or data loss.

TIPS: Key points or explanations to help with better operation and understanding of product.

1.2 Safety rules

STARTUP AND MAINTENANCE PRECAUTIONS

⚠ **DANGER**
- Do not touch any terminal while the PLC's power is on. Doing so may cause electric shock or malfunctions.
- Before cleaning or retightening terminals externally cut off all phases of the power supply. Failure to do so may cause electric shock.
- Before modifying or disrupting the program in operation or Forced output, RUN, STOP etc., carefully read through this manual and the associated manuals and ensure the safety of the operation. An operation error may damage the machinery or cause accidents.
  An operation error may damage the machinery or cause accidents

Startup And Maintenance Precautions

⚠ **CAUTION**
- Do not disassemble or modify the PLC. Doing so may cause fire, equipment failures, or malfunctions.For module repair, contact our HCFA distributor.
- Turn off the power to the PLC before connecting or disconnecting any extension cable. Failure to do so may cause equipment failures or malfunctions
- Turn off the power to the PLC before attaching or detaching the following devices. Failure to do so may cause equipment failures or malfunctions
  —Display module, peripheral devices, expansion boards
  —Extension blocks and special adapters
  —Battery, terminal block and memory cassette

Disposal Precautions

⚠ **CAUTION**
- Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.

Transport And Storage Precautions

⚠ **CAUTION**
- The PLC is a precision instrument. During transportation, avoid impacts larger than those specified in Section 3.1. Failure to do so may cause failures in the PLC. After transportation, verify the operations of the PLC.

2. Product overview

2.1 Model name description

HC QX – HC 04 – D2

Company info.		Module		Powertype	
HC	HCFA controller	HC	High-speed counter	D	DC power
Series name		Number of channel		A	AC power
QX	Q-series main unit	XX	Number of channel		

❶ MODEL: HCQX-HC04-D2
❷ POWER INPUT: DC24V +20%--15% 20mA
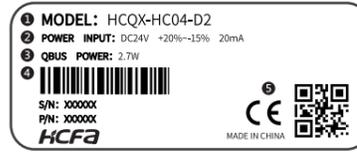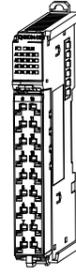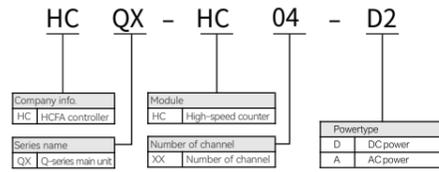❸ QBUS POWER: 2.7W
❹
S/N: XXXXXX
P/N: XXXXXX

Figure 1 Model name and nameplate description

❶ Model name
❷ Module QBUS power consumption
❸ Input parameters
❹ Output parameters
❺ Code, S/N &P/N
❻ QR code (model name, serial number)

2.2 Part name description
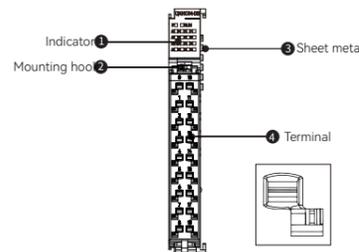
2.2.1Main view for HCQX-HC04-D2

Figure 2 Interface diagram for HCQX-HC04-D2

No.	Name	Functions
(1)	Indicators	Used to display module and terminal status
(2)	Mounting hook	Fix the connector on the module
(3)	Sheet metal	Transmit QBUS signal and control circuit current, do not support hot swap
(4)	Terminal	Insert the cable, input/output signal

■ Indicator arrangements for HCQX-HC04-D2
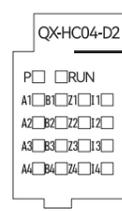
Description	NO		Description
A1	0	10	B1
Z1	1	11	I1
A2	2	12	B2
Z2	3	13	I2
A3	4	14	B3
Z3	5	15	I3
A4	6	16	B4
Z4	7	17	I4
SS	8	18	SS

Table 2 Part names and function description -2

| Symbol	Indicator color	Channel description
P	Green	The indicator show the current power supply status of the module.
RUN	Red	ESC Normal operation indicator， Lit means the module is in normal running state
A1	Red	Input channel 1 detects the encoder phase A input signal
B1	Red	Input channel 1 detects the encoder phase B input signal
Z1	Red	Input channel 1 detects the encoder phase Z input signal
I1	Red	Input channel 1 detects the input signal of functional terminal I1
A2	Red	Input channel 2 detects the encoder phase A input signal
B2	Red	Input channel 2 detects the encoder phase B input signal
Z2	Red	Input channel 2 detects the encoder phase Z input signal
I2	Red	Input channel 2 detects the input signal of functional terminal I2
A3	Red	Input channel 3 detects the encoder phase A input signal
B3	Red	Input channel 3 detects the encoder phase B input signal
Z3	Red	Input channel 3 detects the encoder phase Z input signal
I3	Red	Input channel 3 detects the input signal of functional terminal I3
A4	Red	Input channel 4 detects the encoder phase A input signal
B4	Red	Input channel 4 detects the encoder phase B input signal
Z4	Red	Input channel 4 detects the encoder phase Z input signal
I4	Red	Input channel 4 detects the input signal of functional terminal I4
SS	No indicator	S/S common terminal
SS	No indicator	S/S common terminal

2.2.2 Right view for HCQX-HC04-D2
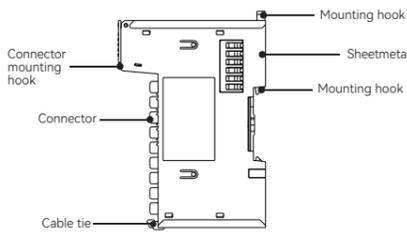
Figure 3 Interface diagram from right view for HCQX-HC04-D2

Name	Functions
Sheetmetal	Transmit QBUS signal, transmit control circuit current, do not support hot swap
Mounting hook	Fix the module on the DIN rail
Connector	Provide hot-swappable wiring device to facilitate user wiring and modulereplacement
Connector mounting hook	Fix the connector on the module
Cable tie	Pass the cable on the module and fix it with a tie to make the wiring more tidy and beautiful, and convenient for later maintenance

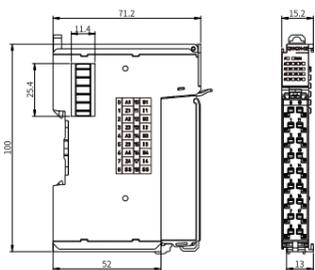### 2.3 Product Dimensions

■ Product Dimensions

Figure 4 Installation dimension for HCQX-HC04-D2（unit：mm）

3. Specifications

3.1 Electrical specifications

Items	Test Conditions	Remarks
Dielectric strength	Input to output	AC 500V 60s
Insulation resistance	Input to output	1MΩ
Leakage current (input to shell)		1mA
EMC	Electrostatic discharge	Contact ±4kV, air ±8kV
	Electrical fast burst	Control power ±4kV, 5&100kHz
		Network cable ±2kV, 5&100kHz
	Surge	DC500V

3.2 Environment specifications

Items	Specifications
Working temperature	0~55℃
Storage temperature	-25~85℃
Relative humidity	95%, No condensation
Altitude	2km or less
Atmosphere	108kPa~66kPa
Noise	±2kV, 5~100kHz
Sinusoidal vibration	9Hz<f<100Hz, 1.0 acceleration, constant amplitude
drop down	1m, 10 times during packaging and transportation

3.3 Power supply input specifications

Items	Specifications
QBUS rated power	12Vdc±5%
QBUS max. current consumption	70mA
Rated power for IO terminal	24Vdc
Input voltage range for IO terminal	20.4Vdc~28.8Vdc

3.4 Line driver specifications

Items	Specifications
Collector input	24Vdc/8.4mA
ON-voltage/ON-current	DC15V or more/5mA or more
Single-phase maximum response frequency (A/B phase)	200Khz
ON/OFF response time	Less than 2us

3.5 Input specifications

Items	Specifications
Number of channels	4
Number of inputs per channel	4
Rated input voltage	24Vdc（20.4Vdc~28.8Vdc）
Input resistance	3kΩ
Input type	NPN /PNP
Wiring method	Three-wire encoder
Pulse input method	Orthogonal phase pulse (x2/4)/pulse plus direction/up and down pulse
Counting unit	Pulse
Counter range	– 2,147,483,648~ 2,147,483,647

3.6 Counter function

Items	Specifications
Counter type	Ring counter or linear counter
Counter control	Gate control, counter reset and counter preset
Latch function	1 external input latch and 1 internal latch
Measurement method	Pulse rate measurement and pulse period measurement

3.7 Interface specifications

| Items	Specifications
Communication Interface	QBUS_IN, QBUS_OUT
Communication interface type	10/100BASE-TX (IEEE 802.3)
Input interface	16 points，2 common terminals
LED indicators	Power Indicator：P green （Indicate power supply)
	Operation indicator：RUN red （Indicate module OP status）
	Channel indicator：A1-4，B1-4，Z1-4，I1-4 red （Indicate input status）
Debugging interface	T20F256C4	JTAG
	STM32F407	SWD, UART
	LFE5U-12	JTAG

4. Installation instruction

4.1 Installation instruction

4.1.1 Control cabinet installation

When installing in the control cabinet, please pay attention to the following:
（1）Install the module in the vertical direction. Use natural air or fan cooling to the device. And install the module on the 35mm DIN rail by the mounting hooks.
（2）The cooling fan or natural air need to reduce the temperature as below to leave enough space around the equipment. To prevent the ambient temperature of the device from being too high, keep the temperature in the electric cabinet even.
（3）When installing side by side, it is recommended to leave space of more than 10mm on both sides of the horizontal direction (if the installation space is limited, you can choose not to leave space)
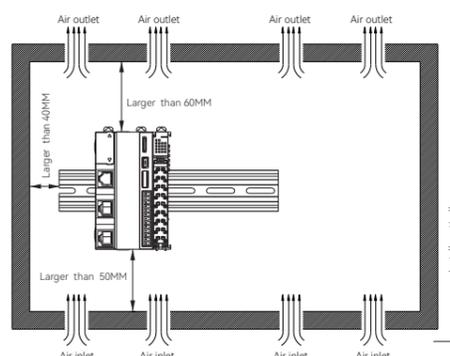

4.1.2 Module mounting and dismounting

• Module mounting

1 Align the HCQX-HC04-D (the area indicated by the dots) with the Q-series main unit (the area indicated by the dots). At this time, the installation of the HCQX-HC04-D machine is completed (Make sure the mounting hook is in a retracted state before installation, otherwise it may cause installation failure)

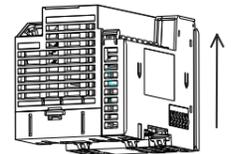❷ Press down the module

❶ Align the groove
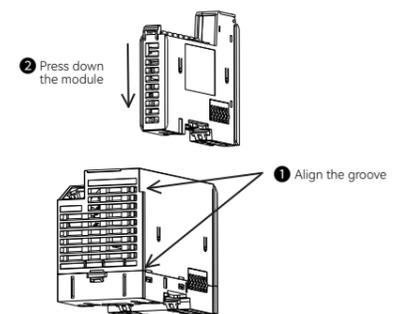
2 After the installation is completed, as shown in the figure below:
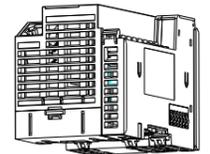

• Module dismounting

When you need to disassemble, you should press the module with both hands (shown in the direction of the arrow in the figure), and pull out the module vertically upwards.
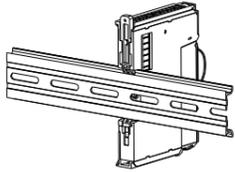
4.1.3 (Un)Installation of guide rails

• Rails installation

1 Align the bottom of HCQX-HC04-D with the 35MM international guide rail, and then press down hard, when you can hear a "click", it indicates that the bottom of the mounting hook has been connected to the international guide rail. Then the HCQX-HC04-D installation completed (Before installation, ensure that the mounting hook is in good state, otherwise it may cause installation failure)

Snap top hanging on rail ❶　　❷ Press firmly on the bottom
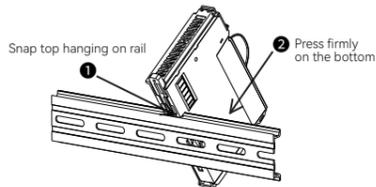
2 After the installation is completed, as shown in the figure below:
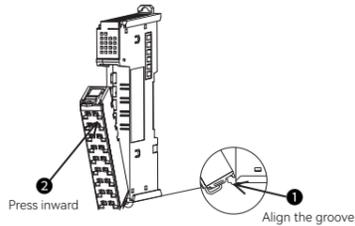
• Rails uninstallation

First remove the 35MM international guide rail dovetail groove fixing parts installed on the two sides of the machine, and then pull upwards at a distance of about 5.8 mm (when you pull upward, you can clearly hear the "click"), at this time you can directly take off the machine to complete the disassembly (you can use the accessories, such as screwdrivers, etc., when pulling)

Pull up the mounting hook ❶　　❷ Take off the module
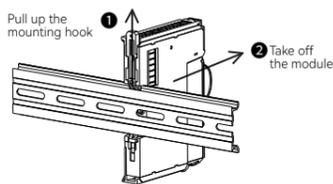
## 4.1.4 (Un)installation of connector

• Installation of connectors

Align the bottom of the connector with the bottom of the extension module. After aligning, press down on the top of the terminal in the direction shown in the figure below. When you hear a "click", the assembly of the connector is completed.

❷ Press inward　　❶ Align the groove

• Connector uninstallation

1 Use your index finger or your middle finger to firmly press the top spring of the connector down to separate the top of the connector from the extension module, and use your thumb to press the rear part of the connector. While pressing, lift the top of the connector upwards and take it away.

Press the spring on the top of the connector ❶

Lift the connector ❷
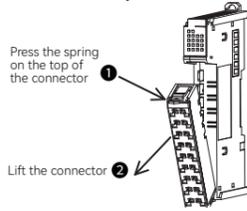
2 Lift the top of the connector to make the connector and the extension module at an angle greater than 45°, and finally remove the connector in upward direction
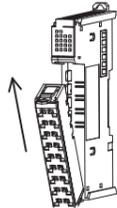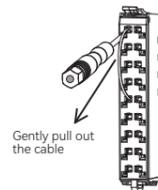
4.1.5 (Dis)connection of cables

• (Dis)connection of cables

1 First insert a small screwdriver into the hole, apply a force of 10N inward, and then insert the cable into the hole. Pull out the small screwdriver after the cable is inserted.

❶ Apply a force of 10N inward　　❷ Insert the cable into the hole
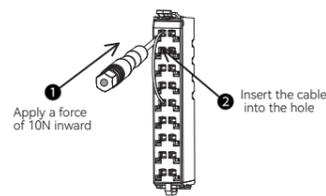
2 After the installation is complete, gently pull out the cable, the installation is complete if the cable does not fall off.

Gently pull out the cable

• Cable disconnection

Insert a small screwdriver into the hole, apply a force of 10N inward, then pull out the cable, and finally take out the screwdriver.
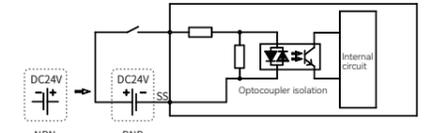
❶ Apply a force of 10N inward　　❷ Pull out the cable
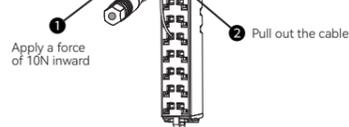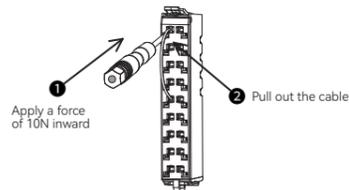
4.2 Wiring description

4.2.1 Cable selection

Item		Specifications
Installation method		Push-in
Push force (per contact)		10N
Cable type		Copper wire only (aluminum cable is not allowed)
Cable length		7~9 mm
Cross section	Single-stranded	0.08~1.50 mm2/28~16 AWG
	Multi-stranded	0.25~1.50 mm2 /24~16 AWG
	Sleeve	0.25~0.75 mm2 /24~20 AWG

4.2.2 Internal wiring description

◆ Input internal circuit

DC24V　DC24V　SS　Optocoupler isolation　Internal circuit

NPN　PNP

◆ Output internal circuit

Internal circuit　Load　DC24V　COM

NPN wiring diagram Sink output, low level is effective
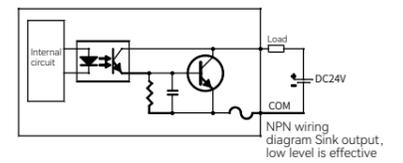
4.2.3 External wiring description

• Sink wiring diagram

Z　A　A B　B　ENCODERS　S/S S/S　24V　24V 0V

• Source wiring diagram

Z　A　A B　B　ENCODERS　Z I　S/S S/S　24V　24V 0V
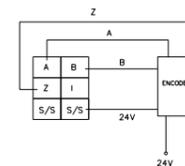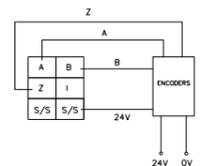
◆ Wiring precautions

When wiring the I/O module, please note the following:

• Distinguish the input/output cables and make the wiring separately.
• If the power cable is close to I/O signal cable, error may occur because of high-voltage/current. The distance between I/O signal cable and power cable should be more than 100mm.
• 24VDC I/O cable should be laid separately from AC power cable. When using piping for wiring, make sure that the piping is well-grounded.

5. Module programming examples

This example uses the CPU unit HCQ1-1300-D + coupler module HCQX-EC + high-speed counter module HCQX-HC04-D as an example to illustrate: (Q1 connection has been described briefly here. For more details, refer to Q1 Software Manual.)

1) Open CODESYS V3.5 SP14，select New project
The user can select the project type they want, enter the name and save path, and then click "OK".

Select project

Project description　Project name

Saving path
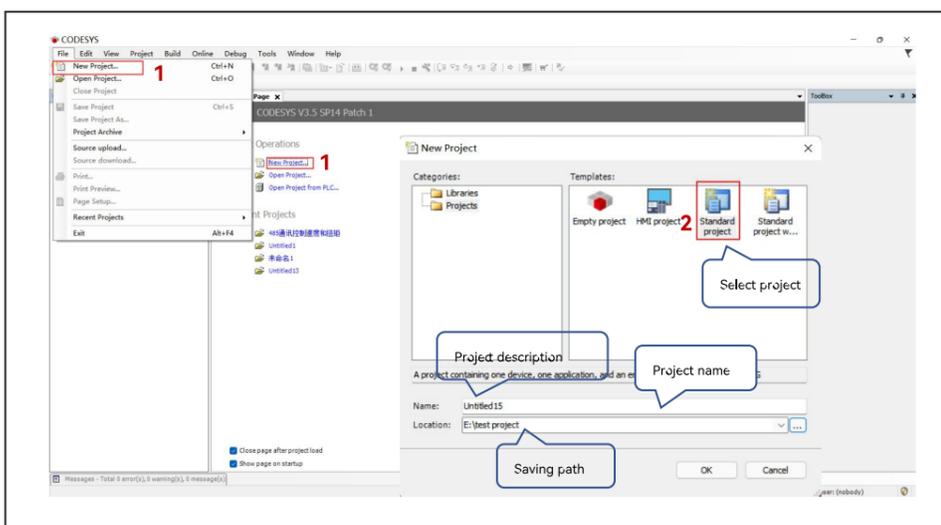
2) Follow the CODESYS guide, select the target device and main program PLC_PRG programming language. Q1 device is not installed by default, so you need to install the device description file first, otherwise the correct target device cannot be selected.

Standard Project

You are about to create a new standard project. This wizard will create the following objects within this project:

- One programmable device as specified below
- A program PLC_PRG in the language specified below
- A cyclic task which calls PLC_PRG
- A reference to the newest version of the Standard library currently installed.

Select target device

Device: HCQ1-1300-D (Zhejiang Hechuan Technology)

PLC_PRG in: Structured Text (ST)

Select programming language

3) Double click Device→Scan network，then select the Q1 device and click "OK".

Select Device

Select the network path to the controller:

Gateway-2
　ceshi [00AB.8064]
　HCQ1-1300-D [0315.A064]

Device Name: HCQ1-1300-D
Device Address: 0315.A064
Block driver: UDP
Number of channels: 4
Serial number: 0004SF04E1C3
Target ID: 16C7 0002

Scan network
Wink
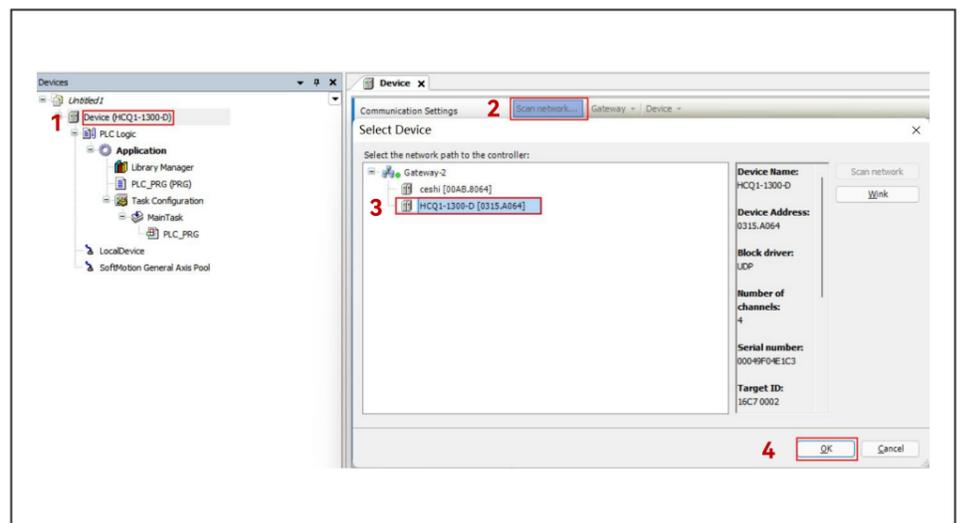
4) After communicating with Q1 device，click Device→Add device→EtherCAT Master SoftMotion

Add Device

Name: EtherCAT_Master_SoftMotion
Action:
● Append device ○ Insert device ○ Plug device ○ Update device

String for a fulltext search　Vendor: <All vendors>

Name	Vendor	Version	Des
Miscellaneous			
Fieldbuses			
CANbus			
EtherCAT			
Master			
EtherCAT Master	3S - Smart Software Solutions GmbH	3.5.14.0	Ethe
EtherCAT Master SoftMotion	3S - Smart Software Solutions GmbH	3.5.14.0	Ethe

☑ Group by category ☐ Display all versions (for experts only) ☐ Display outdated versions

Name: EtherCAT Master SoftMotion
Vendor: 3S - Smart Software Solutions GmbH
Categories: Master
Version: 3.5.14.0
Order Number:

Append selected device as last child of Device

(You can select another target node in the navigator while this window is open.)

Add Device　Close

5) Double click EtherCAT Master SoftMotion, and find the "Source Address (Mac)" under the "General" on the right and select the correct EtherCAT network card.
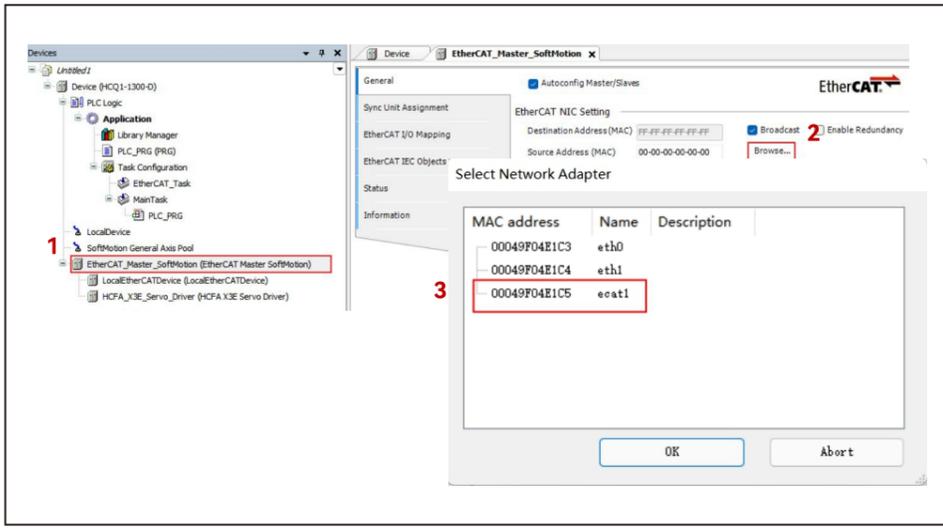
6) Right-click EtherCAT Master SoftMotion to select the scan device and for the module, which works normally and has established communication, find it in the "Scan device" and click the "Copy all devices to the project" in the lower right corner to add the module to the project.
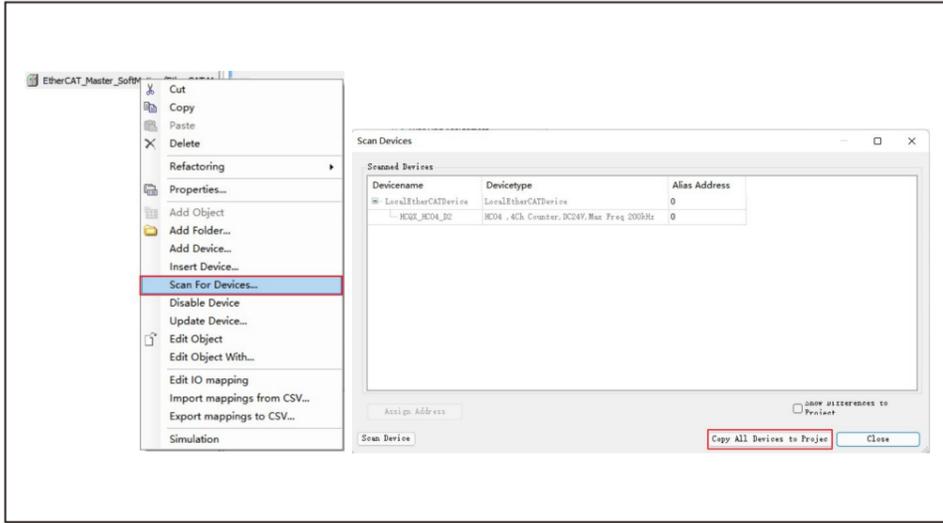
7) Log in and run the program, select the module HCQX-HC04-D, and tick "Enable Expert Mode" in "General"
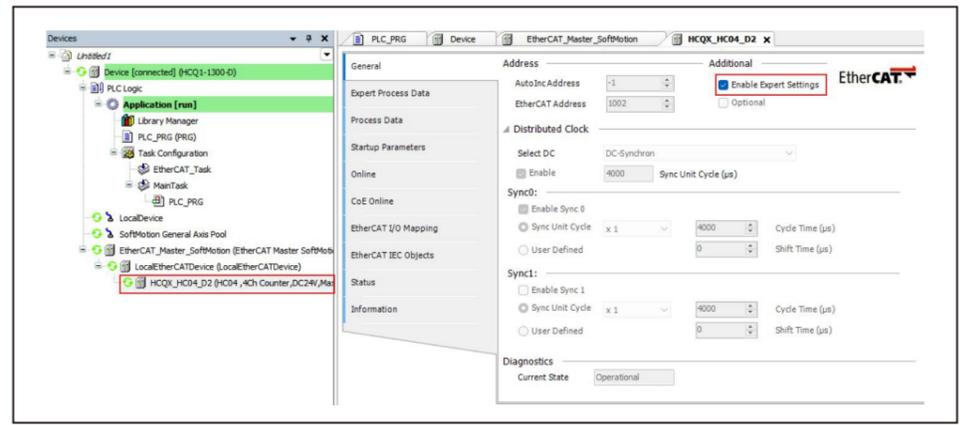
8) On the CoE online page 16#800C, set the corresponding channel Pluse Input Mode of ENC Pluse Input Mode to 2. For detailed parameter settings, please refer to the appendix.

9) On the EtherCAT I/O mapping interface, set bit0 in the ENC Operation Command to 1. For detailed parameter settings, please refer to the appendix.

10) At this time, in the EtherCAT I/O mapping interface, bit0 of the counter status ENC Timer Status changes to 1, and the current count value is stored in ENC Current Data.

Appendix: Object dictionary

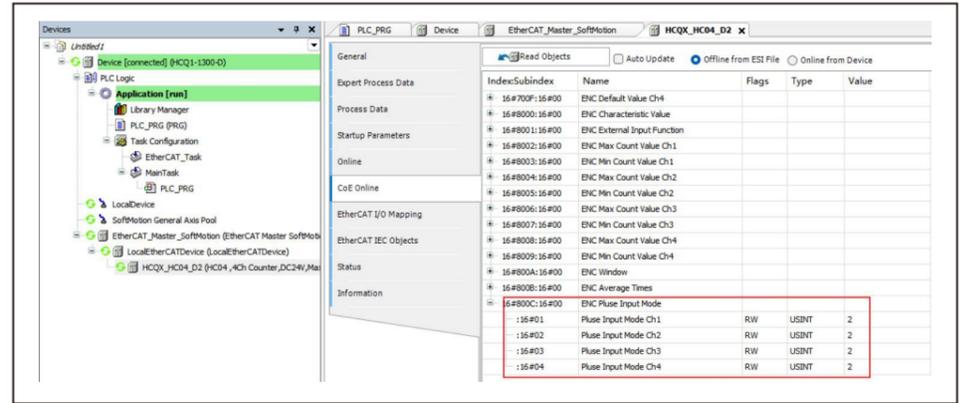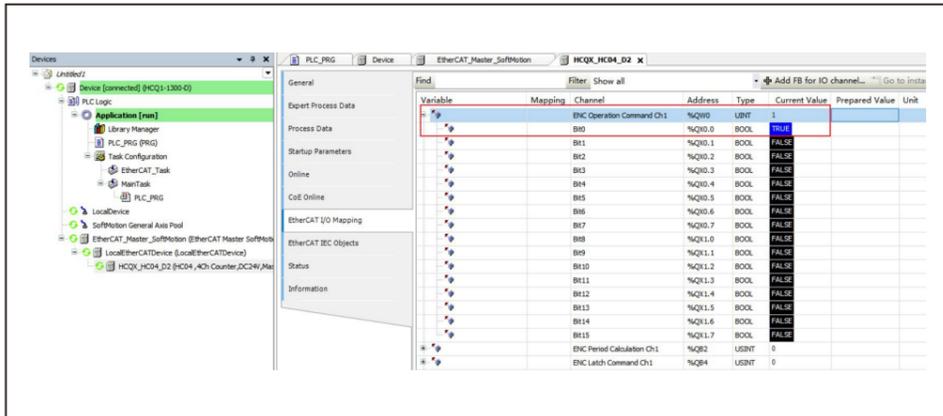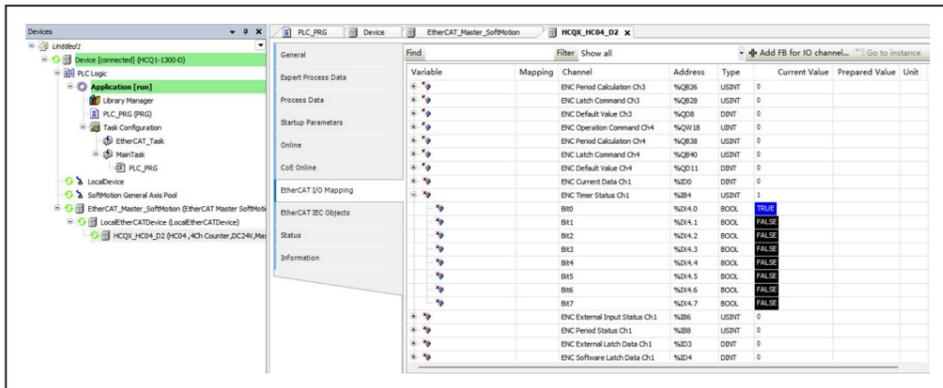| Object dictionary	Subindex	Name	Attribute	Type	Range	Default	Remark
0x1000	0	Device type	R	UDINT		402	
0x1008	0	Device name	R	STRING			HCQX_HC04-D2
0x1009	0	Hardware version	R	STRING		0.7	
0x100A	0	Software version	R	STRING		5.1	
0x1018	00	Object identify					
	01	Supplier ID	R	UDINT		9	
	02	Product Code	R	UDINT		37458	
	03	Revised No.	R	UDINT		1	
	04	Serial No.	R	UDINT		1	
Ch1							
0x 7000		Operation command	UINT			R	
	0	CENn Counter enabled	BIT	0	1 or 0	R/W	1: Counter enabled 0: Counter disabled
	1	INRSn Software (built-in) reset	BIT	0	1 or 0	R/W	0~1: Reset the current counter value
	2	INLAn Software latch	BIT	0	1 or 0	R/W	0~1: Internal latch enabled
	3	PSETn Software preset	BIT	0	1 or 0	R/W	0~1: Set the current counter value to the preset value
	4	ERENn External reset enabled	BIT	0	1 or 0	R/W	1: External terminal reset enabled 0: External terminal reset disabled
	5	ZSCRn Z-phase reset enabled	BIT	0	1 or 0	R/W	1: Z-phase reset enabled 0: Z-phase reset disabled
	6	ERCRn External reset complete flag cleared	BIT	0	1 or 0	R/W	0~1: Clear external reset complete flag
	7	ZSCRn Z-phase reset complete flag cleared	BIT	0	1 or 0	R/W	0~1: Clear Z-phase reset complete flag
	8	UPCRn Clear upper limit flag	BIT	0	1 or 0	R/W	0~1: Flag cleared
	9	DOWNCRn Clear lower limit flag	BIT	0	1 or 0	R/W	0~1: Flag cleared
0x7001		Pulse period measurement	USNIT			R	
	1	PPENn Pulse period measurement enabled	BIT	0	1 or 0	R/W	1: Pulse period measurement enabled 0: Pulse period measurement disabled
	2	PPCARn Pulse period measurement value clear	BIT	0	1 or 0	R/W	0~1: Pulse period measurement value cleared
	3	PPOFn Pulse period measurement overlimit flag clear	BIT	0	1 or 0		0~1: Pulse period measurement overlimit flag clear
0x7002		Latch function	USINT			R	
	1	LENn External latch input enabled	BIT	0	1 or 0	R/W	1: External latch input enabled 0: External latch input disabled
	2	LTRGn External latch trigger condition	BIT	0	1 or 0	R/W	0: Trigger once 1: Trigger continuously The effective time is that LENn , change from 0 to 1
	3	LSELn Latch input terminal selection	BIT	0	1 or 0	R/W	0: External input 1: Z phase of the channel The effective time is that LENn , change from 0 to 1. If the latch terminal selects phase Z, the reset function of phase Z is disabled.
0x7003		Preset value	DINT	0	214748368 ~214748367	R/W	
Ch2							
0x7004		Operation command	UINT			R	
	0	CENn Counter enabled	BIT	0	1 or 0	R/W	1: Counter enabled 0: Counter disabled
	1	INRSn Software (built-in) reset	BIT	0	1 or 0	R/W	0~1: Reset the current counter value
	2	INLAn Software latch	BIT	0	1 or 0	R/W	0~1: Internal latch enabled
	3	PSETn Software preset	BIT	0	1 or 0	R/W	0`1: Set the current counter value to the preset value
	4	ERENn External reset enabled	BIT	0	1 or 0	R/W	1: External reset enabled 0: External reset disabled
	5	ZSCRn Z-phase reset enabled	BIT	0	1 or 0	R/W	1: Z-phase reset enabled 0: Z-phase reset disabled
	6	ERCRn External reset complete flag cleared	BIT	0	1 or 0	R/W	0~1: Clear external reset complete flag

Page 13

Object dictionary	Subindex	Name	Attribute	Type	Range	Default	Remark
0x7004	7	ZSCRn Z-phase reset complete flag cleared	BIT	0	1 or 0	R/W	0~1: Clear Z-phase reset complete flag
	8	UPCRn Clear upper limit flag	BIT	0	1 or 0	R/W	0~1: Flag cleared
	9	DOWNCRn Clear lower limit flag	BIT	0	1 or 0	R/W	0~1: Flag cleared
0x7005		INLAn Pulse period measurement	USINT			R	
	1	PPENn Pulse period measurement enabled	BIT	0	1 or 0	R/W	1: Pulse period measurement enabled / 0: Pulse period measurement disabled
	2	PPCARn Pulse period measurement value clear	BIT	0	1 or 0	R/W	0~1: Pulse period measurement value cleared
	3	PPOFn Pulse period measurement overlimit flag clear	BIT	0	1 or 0	R/W	0~1: Pulse period measurement overlimit flag clear
0x7006	0	Latch function	USINT	0	1 or 0	R	
	1	LENn External latch input enabled	BIT	0	1 or 0	R/W	1: External latch input enabled / 0: External latch input disabled
	2	LTRGn External latch trigger condition	BIT	0	1 or 0	R/W	0: Trigger once / 1: Trigger continuously / The effective time is that LENn , change from 0 to 1
	3	LSELn Latch input terminal selection	BIT	0	1 or 0	R/W	0: External input / 2: Z phase of the channel / The effective time is that LENn , change from 0 to 1. If the latch terminal selects phase Z, the reset function of phase Z is disabled.
0x7007		Preset value	DINT	0	214748368 ~214748367	R/W	
Ch3							
0x7008		Operation command	UINT			R	
	0	CENn Counter enabled	BIT	0	1 or 0	R/W	1: Counter enabled / 0: Counter disabled
	1	INRSn Software (built-in) reset	BIT	0	1 or 0	R/W	0~1: Reset the current counter value
	2	INLAn Software latch	BIT	0	1 or 0	R/W	0~1: Internal latch enabled
	3	PSETn Software preset	BIT	0	1 or 0	R/W	0~1: Set the current counter value to the preset value
	4	ERENn External reset enabled	BIT	0	1 or 0	R/W	1: External terminal reset enabled / 0: External terminal reset disabled
	5	ZSCRn Z-phase Reset enabled	BIT	0	1 or 0	R/W	1: Z-phase reset enabled / 0: Z-phase reset disabled
	6	ERCRn External reset complete flag cleared	BIT	0	1 or 0	R/W	0~1: Clear external reset complete flag
	7	ZSCRn Z-phase reset complete flag cleared	BIT	0	1 or 0	R/W	0~1: Clear Z-phase reset complete flag
	8	UPCRn Clear upper limit flag	BIT	0	1 or 0	R/W	0~1: Flag cleared
	9	DOWNCRn Clear lower limit flag	BIT	0	1 or 0	R/W	0~1: Flag cleared
0x7009		Pulse period measurement	USINT			R	
	1	PPENn Pulse period measurement enabled	BIT	0	1 or 0	R/W	1: Pulse period measurement enabled / 0: Pulse period measurement disabled
	2	PPCARn Pulse period measurement value clear	BIT	0	1 or 0	R/W	0~1: Pulse period measurement value cleared
	3	PPOFn Pulse period measurement overlimit flag clear	BIT	0	1 or 0	R/W	0~1: Pulse period measurement overlimit flag clear
0x700A		Pulse period measurement	USINT			R	
	1	PPENn Pulse period measurement enabled	BIT	0	1 or 0	R/W	1: Pulse period measurement enabled / 0: Pulse period measurement disabled
	2	PPCARn Pulse period measurement value clear	BIT	0	1 or 0	R/W	0~1: Pulse period measurement value cleared
	3	PPOFn Pulse period measurement overlimit flag clear	BIT	0	1 or 0	R/W	0~1: Pulse period measurement overlimit flag clear
0x700B		Preset value	DINT	0	-214748368 ~214748367	R/W	

Page 14

Object dictionary	Subindex	Name	Attribute	Type	Range	Default	Remark
Ch4							
0x700C		Operation command	UINT			R	
	0	CENn Counter enabled	BIT	0	1 or 0	R/W	1: Counter enabled / 0: Counter disabled
	1	INRSn Software (built-in) reset	BIT	0	1 or 0	R/W	0~1: Reset the current counter value
	2	INLAn Software latch	BIT	0	1 or 0	R/W	0~1: Internal latch enabled
	3	PSETn Software preset	BIT	0	1 or 0	R/W	0~1: Set the current counter value to the preset value
	4	ERENn External reset enabled	BIT	0	1 or 0	R/W	1: External reset enabled / 0: External reset disabled
	5	ZSCRn Z-phase reset enabled	BIT	0	1 or 0	R/W	1: Z-phase reset enabled / 0: Z-phase reset disabled
	6	ERCRn External reset complete flag cleared	BIT	0	1 or 0	R/W	0~1: Clear external reset complete flag
	7	ZSCRn Z-phase reset complete flag cleared	BIT	0	1 or 0	R/W	0~1: Clear Z-phase reset complete flag
	8	UPCRn Clear upper limit flag	BIT	0	1 or 0	R/W	0~1: Flag cleared
	9	DOWNCRn Clear lower limit flag	BIT	0	1 or 0	R/W	0~1: Flag cleared
0x700D		Pulse period measurement	USINT			R	
	1	PPENn Pulse period measurement enabled	BIT	0	1 or 0	R/W	1: Pulse period measurement enabled / 0: Pulse period measurement disabled
	2	PPCARn Pulse period measurement value clear	BIT	0	1 or 0	R/W	0~1: Pulse period measurement value cleared
	3	PPOFn Pulse period measurement overlimit flag clear	BIT	0	1 or 0	R/W	0~1: Pulse period measurement overlimit flag clear
0x700E		Latch function	USINT			R	
	1	LENn External latch input enabled	BIT	0		R/W	1: External latch input enabled / 0: External latch input disabled
	2	LTRGn External latch trigger condition	BIT	0	1 or 0	R/W	0: Trigger once / 1: Trigger continuously / The effective time is that LENn , change from 0 to 1
	3	LSELn Latch input terminal selection	BIT	0	1 or 0	R/W	0: External input / 1: Z phase of the channel / The effective time is that LENn , change from 0 to 1. If the latch terminal selects phase Z, the reset function of phase Z is disabled.
0x700F		Preset value	DINT	0	-214748368 ~214748367	R/W	
0x1C00	0	Synchronization manager communication type					
	1	Communication type SM0	R	USINT		1	
	2	Communication type SM01	R	USINT		2	
	3	Communication type SM2	R	USINT		3	
	4	Communication type SM3	R	USINT		4	
0x1C12	0	Sync Manager 2PDO distribution					
	01~10	PDO mapping	R	UINT		5632~5647	
0x1C13	0	Sync Manager 3PDO distribution					
	01~21	PDO mapping	R	UINT			
0x8000	0	Characteristic Parameters					
	1	I1 logic state selection	R/W	BOOL	0 or 1	0	0: Normally-open / 1: Normally-closed
	2	I2 logic state selection	R/W	BOOL	0 or 1	0	0: Normally-open / 1: Normally-closed
	3	I3 logic state selection	R/W	BOOL	0 or 1	0	0: Normally-open / 1: Normally-closed
	4	I4 logic state selection	R/W	BOOL	0 or 1	0	0: Normally-open / 1: Normally-closed
	5	Channel 1 Counting type	R/W	BOOL	0 or 1	0	0: Ring counter / 1: linear counter
	6	Channel 2 Counting type	R/W	BOOL	0 or 1	0	0: Ring counter / 1: linear counter
	7	Channel 3 Counting type	R/W	BOOL	0 or 1	0	0: Ring counter / 1: linear counter
	8	Channel 4 Counting type	R/W	BOOL	0 or 1	0	0: Ring counter / 1: linear counter
	9	Channel 1 Encoding counting direction	R/W	BOOL	0 or 1	0	0: A phase as the positive direction / 1: B phase as the positive direction

Page 15

Object dictionary	Subindex	Name	Attribute	Type	Range	Default	Remark
0x8000	0A	Channel 2 Encoding counting direction	R/W	BOOL	0 OR 1	0	0: A phase as the positive direction / 1: B phase as the positive direction
	0B	Channel 3 Encoding counting direction	R/W	BOOL	0 OR 1	0	0: A phase as the positive direction / 1: B phase as the positive direction
	0C	Channel 4 Encoding counting direction	R/W	BOOL	0 OR 1	0	0: A phase as the positive direction / 1: B phase as the positive direction
0x8001	0	External pin function					
	1	I1 logic state selection	R/W	USINT	0 ~ 5	0	0: Disable / 1: General input / 2: Latch input / 3: Gate input / 4: Preset input / 5: Reset input
	2	I2 logic state selection	R/W	USINT	0 ~ 5	0	0: Disable / 1: General input / 2: Latch input / 3: Gate input / 4: Preset input / 5: Reset input
	3	I3 logic state selection	R/W	USINT	0 ~ 5	0	0: Disable / 1: General input / 2: Latch input / 3: Gate input / 4: Preset input / 5: Reset input
	4	I4 logic state selection	R/W	USINT	0 ~ 5	0	0: Disable / 1: General input / 2: Latch input / 3: Gate input / 4: Preset input / 5: Reset input
0x8002	0	Ch1 Max. value	R/W	DINT	1~2147483647	2147483647	
0x8003	0	Ch1 Mini. value	R/W	DINT	-2147483647~0	-2147483647	
0x8004	0	Ch2 Max. value	R/W	DINT	1~2147483647	2147483647	
0x8005	0	Mini. value Ch2 index address					
	1	Mini. value	R/W	DINT	-2147483647~0	-2147483647	
0x8006	0	Ch3 Max. value	R/W	DINT	1~2147483647	2147483647	
0x8007	0	Ch3 Mini. value	R/W	DINT	-2147483647~0	-2147483647	
0x8008	0	Ch4 Max. value	R/W	DINT	1~2147483647	2147483647	
0x8009	0	Ch4 Mini. value	R/W	DINT	-2147483647~0	-2147483647	
0x800A	0	Speed measurement window					
	1	Pulse rate measurement Time window	R/W	UINT	0~65535	0	When the setting is not 0, the pulse rate measurement function is turned on. Unit: ms
0x800B	0	Speed measurement average times					
	1	Pulse rate measurement Average times	R/W	INT	0~100	0	When the setting is not 0, the average times is turned on. Unit: Times
0x800C	0	Pulse input mode					
	1	Channel 1 Pulse input mode	R/W	USINT	1~4	2	0: Not supported / 1: ×2 orthogonal phase pulse / 2: ×4 orthogonal phase pulse / 3: Pulse + direction / 4: Up/down pulse
	2	Channel 2 Pulse input mode	R/W	USINT	1~4	2	0: Not supported / 1: ×2 orthogonal phase pulse / 2: ×4 orthogonal phase pulse / 3: Pulse + direction / 4: Up/down pulse
	3	Channel 3 Pulse input mode	R/W	USINT	1~4	2	0: Not supported / 1: ×2 orthogonal phase pulse / 2: ×4 orthogonal phase pulse / 3: Pulse + direction / 4: Up/down pulse
	4	Channel 4 Pulse input mode	R/W	USINT	1~4	2	0: Not supported / 1: ×2 orthogonal phase pulse / 2: ×4 orthogonal phase pulse / 3: Pulse + direction / 4: Up/down pulse