

Manual No. HPP134000EN, Version 2.1, Date Jan, 2022

Thank you for purchasing and using the Q series remote extension modules independently developed and produced by HCFA Technology.

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

Table with columns: Name, Module, Version, Power, Description. Lists various digital input/output modules like HCQX-ID16-D2, HCQX-ID32-D2, etc.

When the user selects modules according to the power, part of the power is reserved to avoid the loss during the

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 automation.

1. Safety Precautions

- 1.1 Safety symbols: DANGER, WARNING, CAUTION, NOTE. 1.2 Safety precautions: Do not touch any terminal while the PLC's power is on. Do not do so may cause electric shock or malfunctions.

STARTUP AND MAINTENANCE PRECAUTIONS

- Do not disassemble or modify the PLC. Doing so may cause fire, equipment failures, or malfunctions. Turn off the power to the PLC before connecting or disconnecting any extension cable.

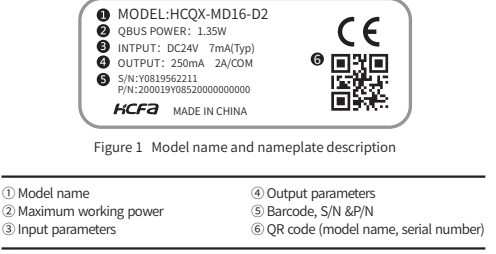
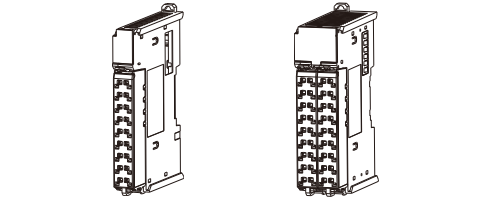
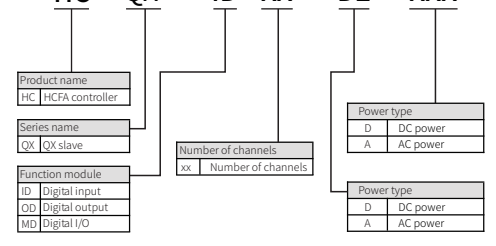
DISPOSAL PRECAUTIONS

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

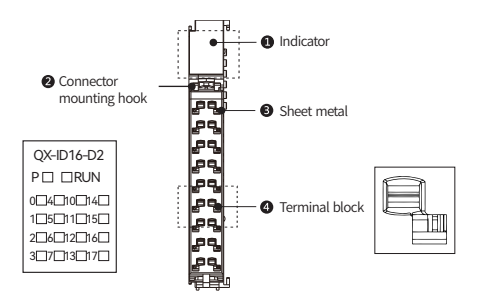
TRANSPORT AND STORAGE PRECAUTIONS: The PLC is a precision instrument. During transportation, avoid impacts larger than those specified in Section 3.1.

2. Product Overview

2.1 Model name description



2.2 Part name description

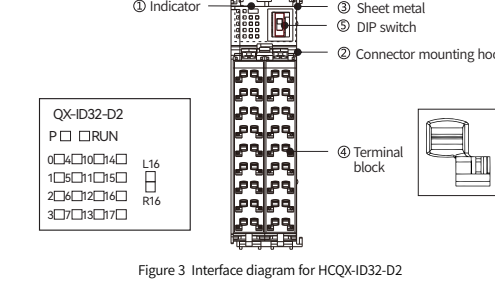


Indicator color and channel description table for HCQX-ID16-D2. Shows channels 0-15 with indicator colors (Green, Red, No indicator).

Table 1 Light board description for HCQX-ID16-D2

Light board description table for HCQX-ID16-D2. Lists channels 0-15, indicator colors, and channel descriptions.

2.2.1 Digital input module HCQX-ID16-D2

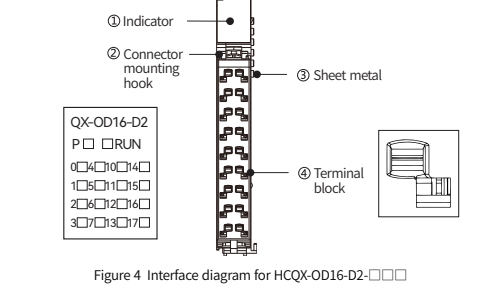


Indicator arrangements for HCQX-ID16-D2 (PNP). Shows channel descriptions and indicator colors.

Indicator arrangements for HCQX-ID16-D2 (NPN)

Indicator arrangements for HCQX-ID16-D2 (NPN). Shows channel descriptions and indicator colors.

2.2.2 Digital output module HCQX-OD16-D2

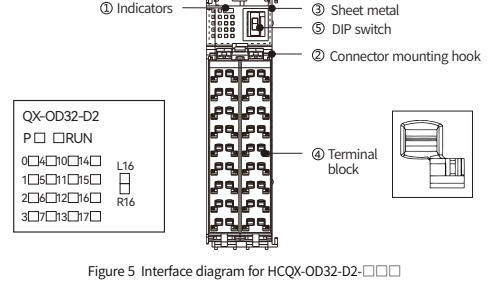


Indicator arrangements for HCQX-OD16-D2. Shows channel descriptions and indicator colors.

Table 3 Light board description for HCQX-OD16-D2

Light board description table for HCQX-OD16-D2. Lists channels 0-15, indicator colors, and channel descriptions.

2.2.3 Digital output module HCQX-OD32-D2

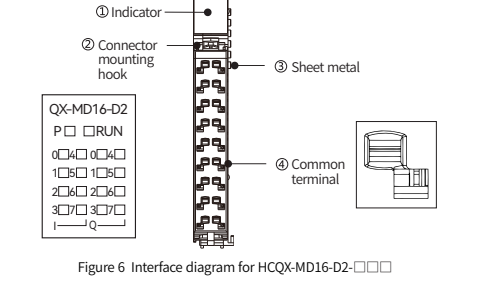


Indicator arrangements for HCQX-OD32-D2. Shows channel descriptions and indicator colors.

Table 4 Light board description for HCQX-OD32-D2

Light board description table for HCQX-OD32-D2. Lists channels 0-31, indicator colors, and channel descriptions.

2.2.4 Digital I/O module HCQX-MD16-D2

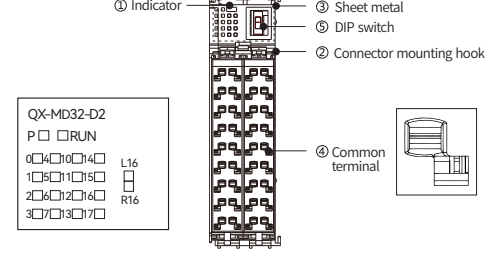


Indicator arrangements for HCQX-MD16-D2. Shows channel descriptions and indicator colors.

Table 5 Light board description for HCQX-MD16-D2

Light board description table for HCQX-MD16-D2. Lists channels 0-15, indicator colors, and channel descriptions.

2.2.6 Digital I/O module HCQX-MD32-D2



Indicator arrangements for HCQX-MD32-D2. Shows channel descriptions and indicator colors.

Table 6 Light board description for HCQX-MD32-D2

Light board description table for HCQX-MD32-D2. Lists channels 0-31, indicator colors, and channel descriptions.

STARTUP AND MAINTENANCE PRECAUTIONS

- Turn off the power to the PLC before connecting or disconnecting any extension cable. Failure to do so may cause equipment failures or malfunctions.

2.2.7 Left view for digital module

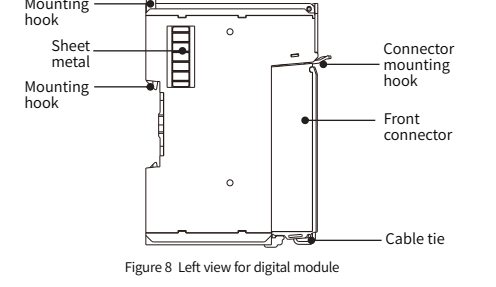


Table with columns: Name, Description. Lists components like Sheet metal, Mounting hook, Front connector, Connector mounting hook, Cable tie.

2.3 Product Dimensions

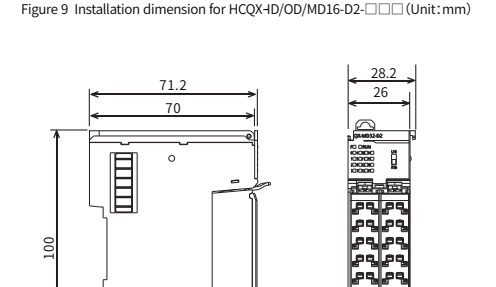
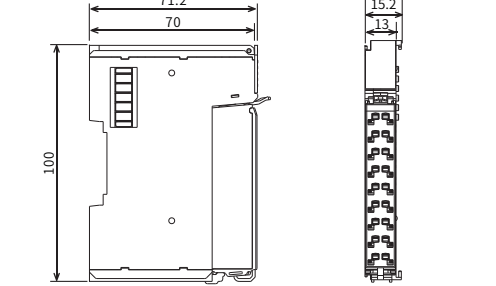


Figure 10 Installation dimension for HCQX-ID/OD/MD32-D2 (Unit: mm)

3. Installation Description

3.1 Installation Description

Table with columns: Items, Specifications. Lists electrical and EMC specifications.

3.2 Environment specifications

Table with columns: Items, Specifications. Lists environmental conditions like working temperature, storage temperature, relative humidity.

3.3 QBUS power input specifications

Table with columns: Items, Specifications. Lists power input specs like rated power, input voltage, max current.

3.4 Specifications for digital input module (HCQX-ID16/32-D2)

Table with columns: Items, Specifications. Lists digital input module specs like input points, input form, input voltage.

3.5 Specifications for digital output module (HCQX-OD16/32-D2)

Table with columns: Items, Specifications. Lists digital output module specs like output points, external power supply, output form.

3.6 Specifications for digital I/O module (HCQX-MD16/32-D2)

Table with columns: Items, Specifications. Lists digital I/O module specs like input points, output points, input form.

3.6 Specifications for digital I/O module (HCQX-MD16/32-D2)

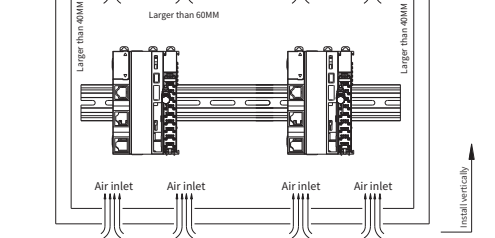
Table with columns: Items, Specifications. Lists digital I/O module specs like input points, output points, input form, output form.

3.7 Installation description

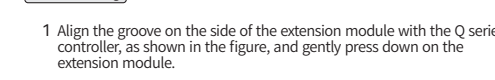
3.7.1 Installation in control cabinet

- Please ensure that the installation direction is perpendicular to the wall, use natural convection or a fan to cool the device and mount the controller firmly on the 35MM international rail by means of a two-way linkage clip.

3.7.2 Module mounting and dismounting



3.7.3 (Un)Installation of guide rails



3.7.4 (Un)Installation of connectors



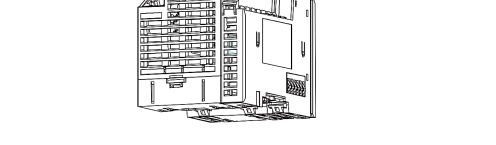
3.8 Wiring description

3.8.1 Cable selection

Table with columns: Item, Specifications. Lists cable types and lengths.

3.8.2 Wiring description for digital input module (HCQX-ID16/32-D2)

Internal circuit

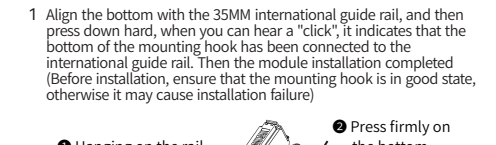


Terminal connection diagram



3.8.3 Wiring description for digital output module (HCQX-OD16/32-D2)

Internal circuit



Terminal connection diagram

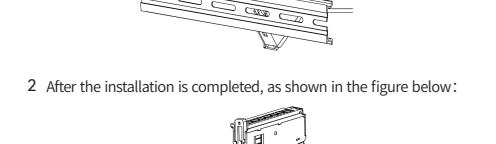


Figure 14 Terminal connection for HCQX-OD16/32-D2

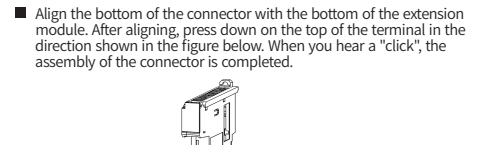
3.8 Wiring description

3.8.1 Cable selection

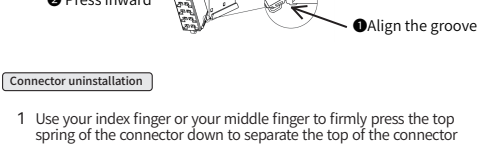
Table with columns: Item, Specifications. Lists cable types and lengths.

3.8.2 Wiring description for digital input module (HCQX-ID16/32-D2)

Internal circuit

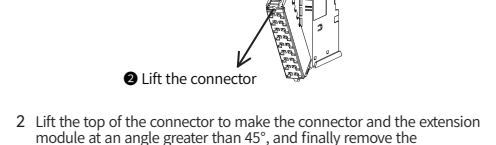


Terminal connection diagram



3.8.3 Wiring description for digital output module (HCQX-OD16/32-D2)

Internal circuit



Terminal connection diagram

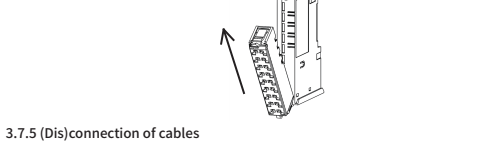


Figure 14 Terminal connection for HCQX-OD16/32-D2

3.8.4 Wiring description for digital output module (HCQX-OD16/32-D2-PNP)

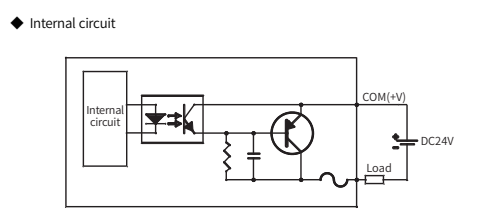


Figure 15 Internal circuit for HCQX-OD16/32-D2-PNP

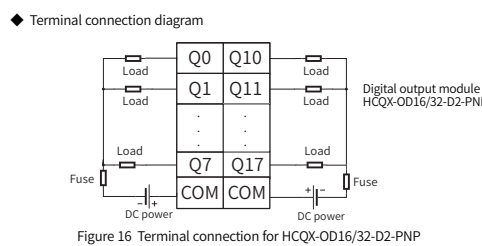


Figure 16 Terminal connection for HCQX-OD16/32-D2-PNP

3.8.5 Wiring description for digital I/O module (HCQX-MD16/32-D2)

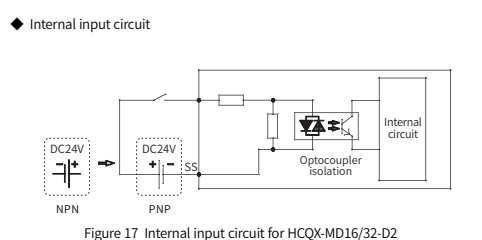


Figure 17 Internal input circuit for HCQX-MD16/32-D2

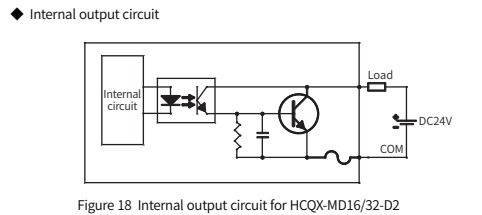


Figure 18 Internal output circuit for HCQX-MD16/32-D2

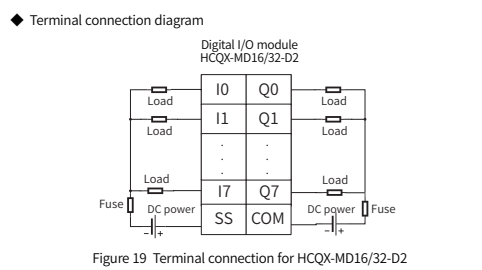
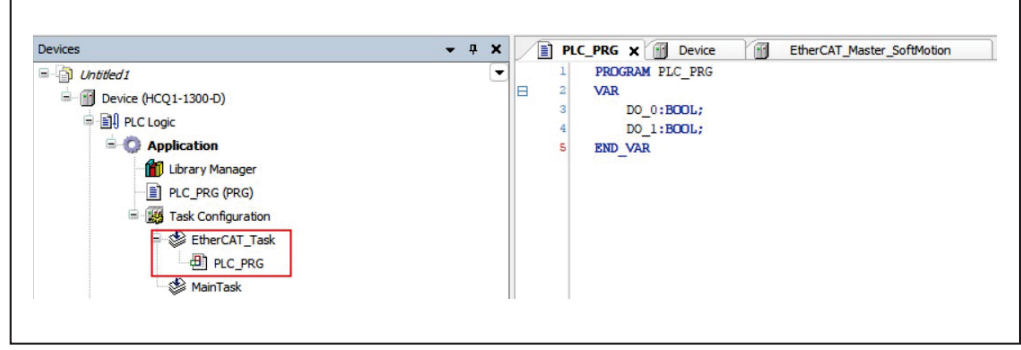
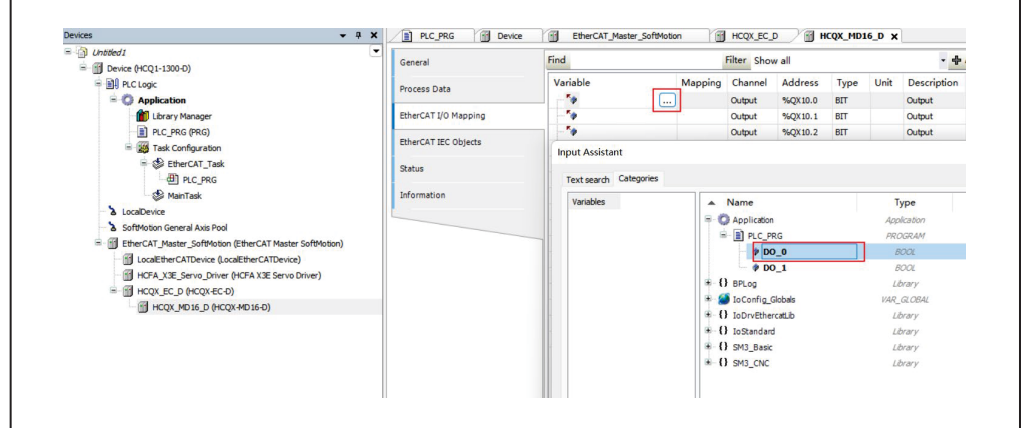


Figure 19 Terminal connection for HCQX-MD16/32-D2

7) Use ST programming language in PLC_PRG to define two variables of type BOOL and map them to the corresponding output variables. After completion, place the program under the EtherCAT task.



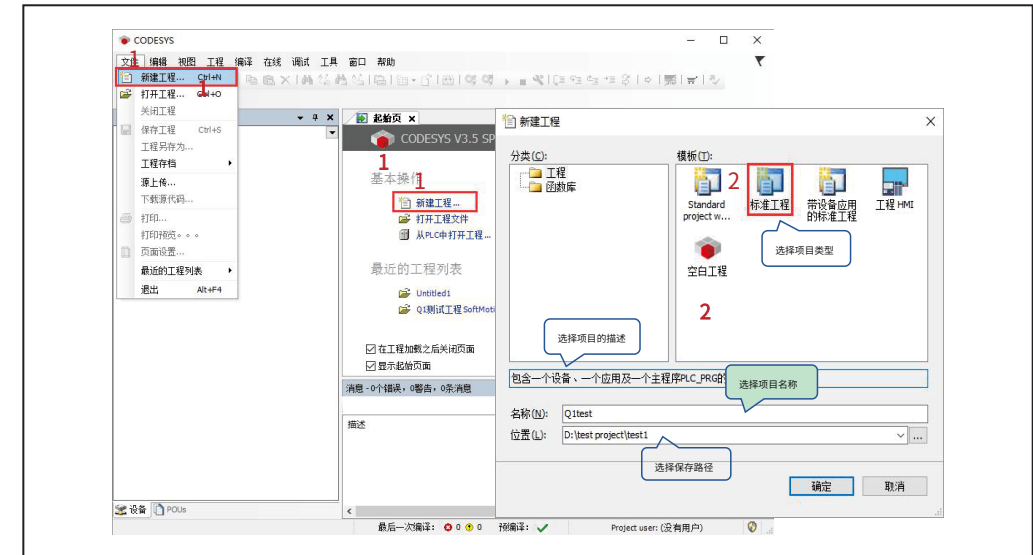
8) Map the two channels of HCQX-MD16-D2 to the variables DO_0 and DO_1 respectively in the program, as follows



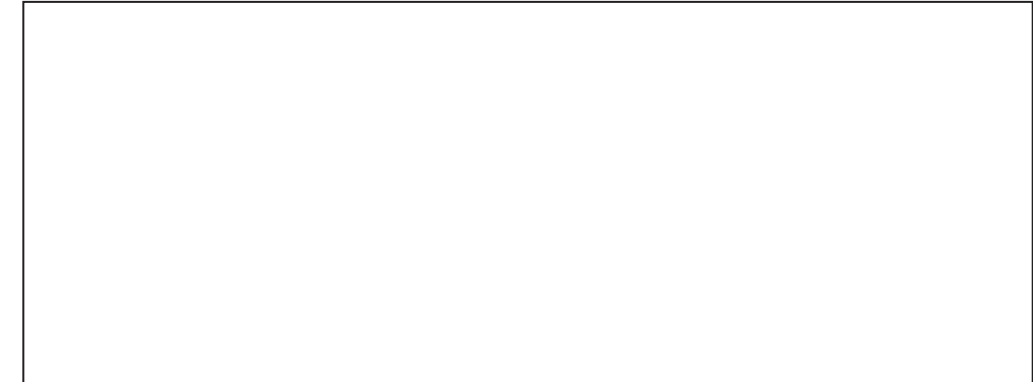
4. Module programming examples

This example uses the CPU unit HCQ1-1300-D2 + coupler module HCQX-EC01-D + digital I/O module HCQX-MD16-D2 as an example to illustrate. (Q1 connection has been described briefly here. For more details, refer to Q1 Software Manual.)

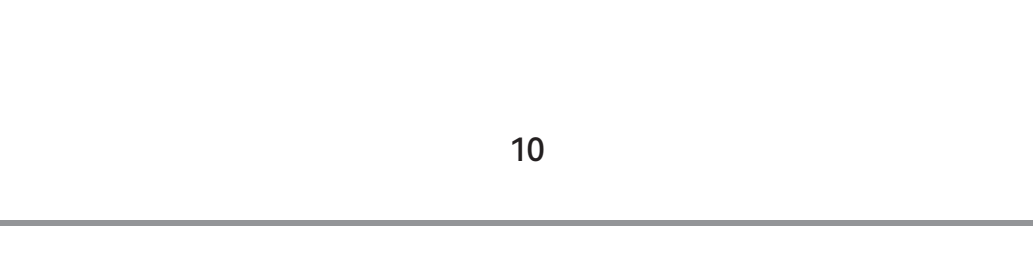
1) Open CODESYS V3.5 SP14, select New project. The user can select the project type they want, enter the name and save path, and then click "OK"



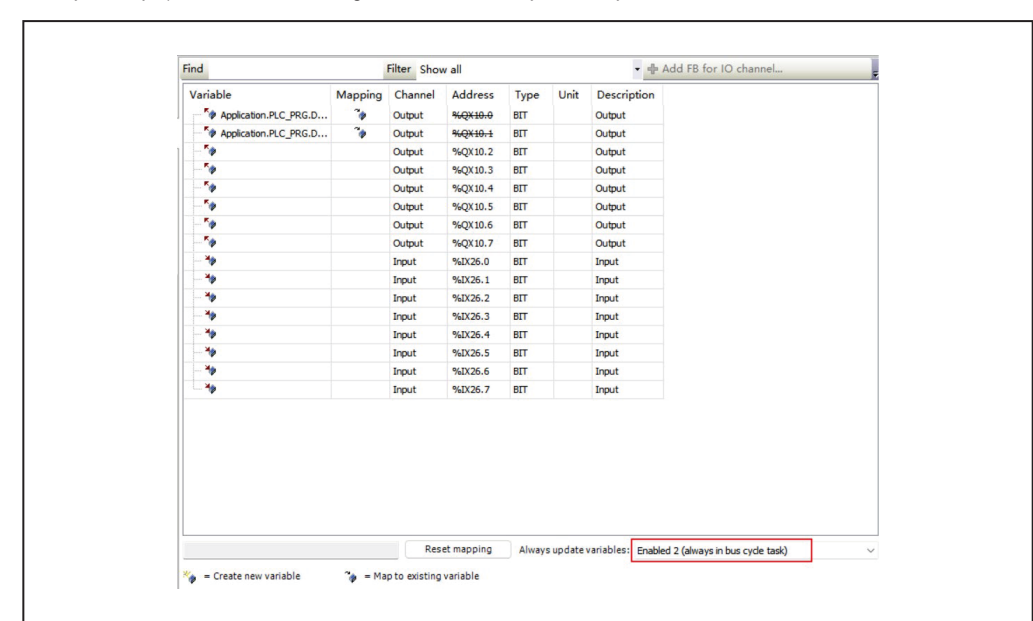
2) Follow the CODESYS guide, select the target device and main program PLC_PRG programming language. Q1 device is not installed by default, so you need to install the device description file first, otherwise the correct target device cannot be selected.



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



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



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 project" in the lower right corner to add the module to the project.

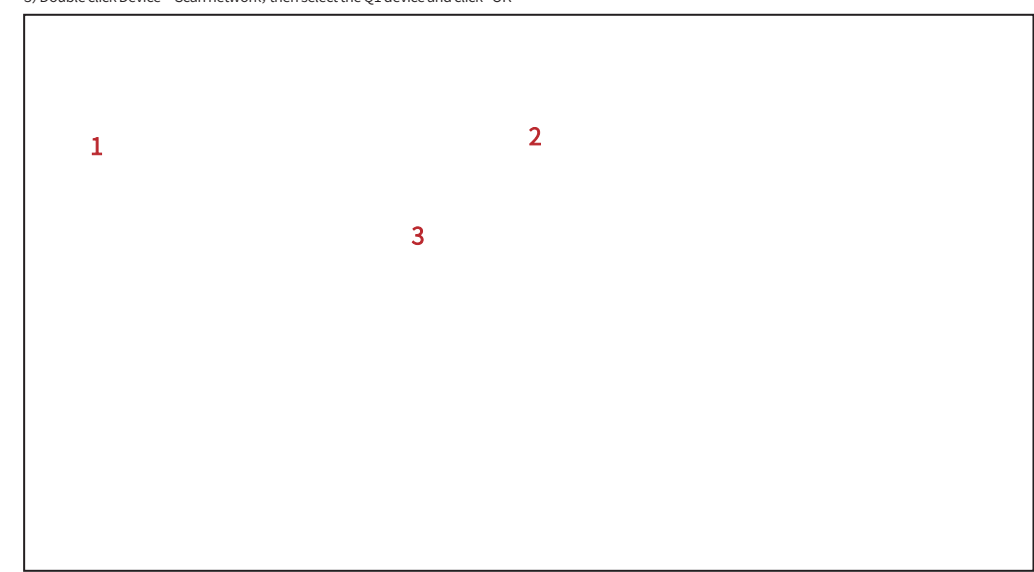


7) Modify the [Always update variables] in the lower right corner to [Enabled 2 (always in bus cycle task)]

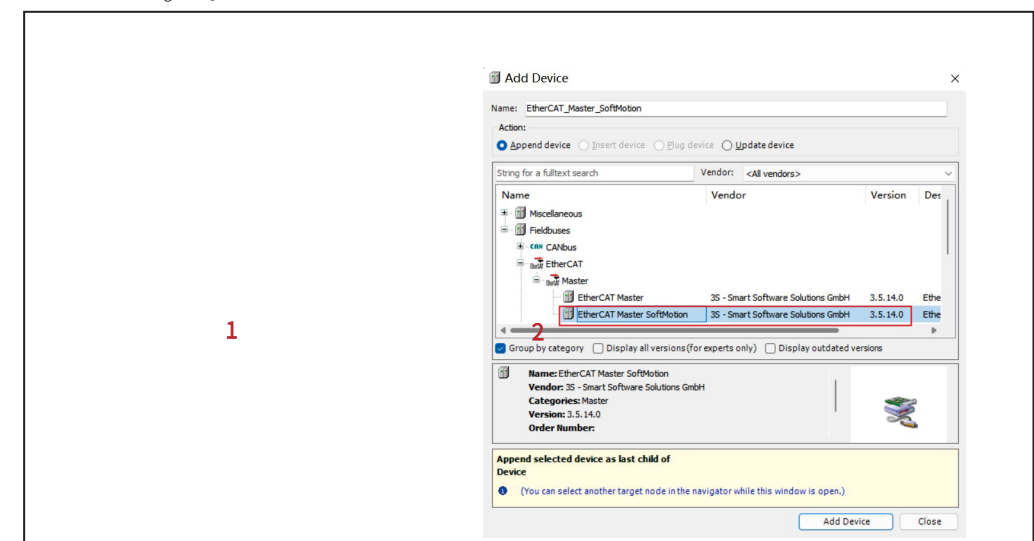


8) After compiling without errors, log in and run the program. When outputting a signal to the corresponding output channel, it can be detected that the channel has a response signal output.

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"



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.



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



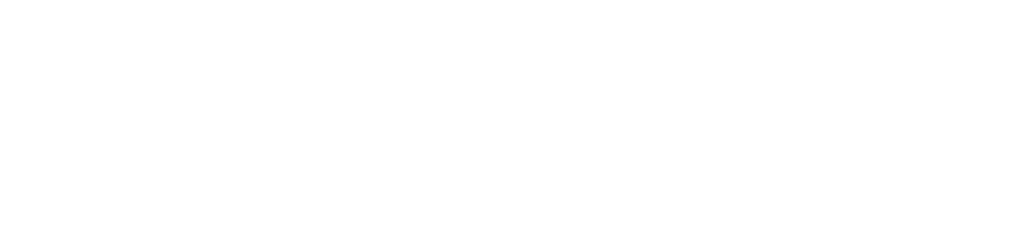
4) After communicating with Q1 device, click Device→Add device→EtherCAT Master SoftMotion



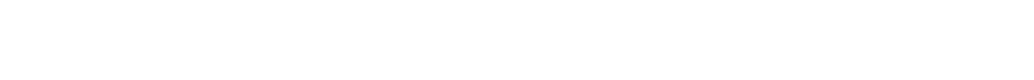
5) Double click EtherCAT Master SoftMotion, and find the "Source Address (Mac)" under the "General" on the right and select the correct EtherCAT network card.



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 project" in the lower right corner to add the module to the project.

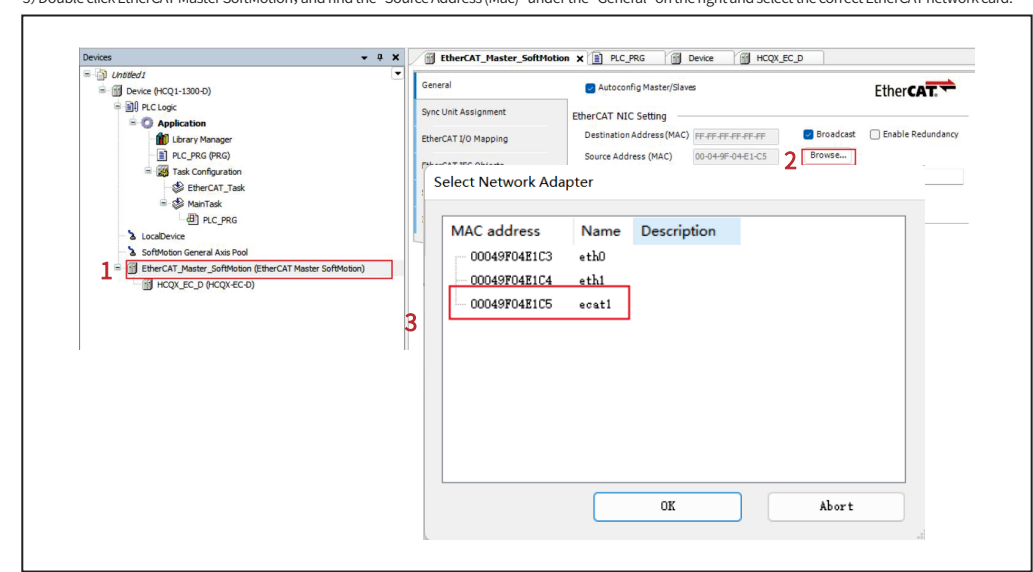


7) Modify the [Always update variables] in the lower right corner to [Enabled 2 (always in bus cycle task)]

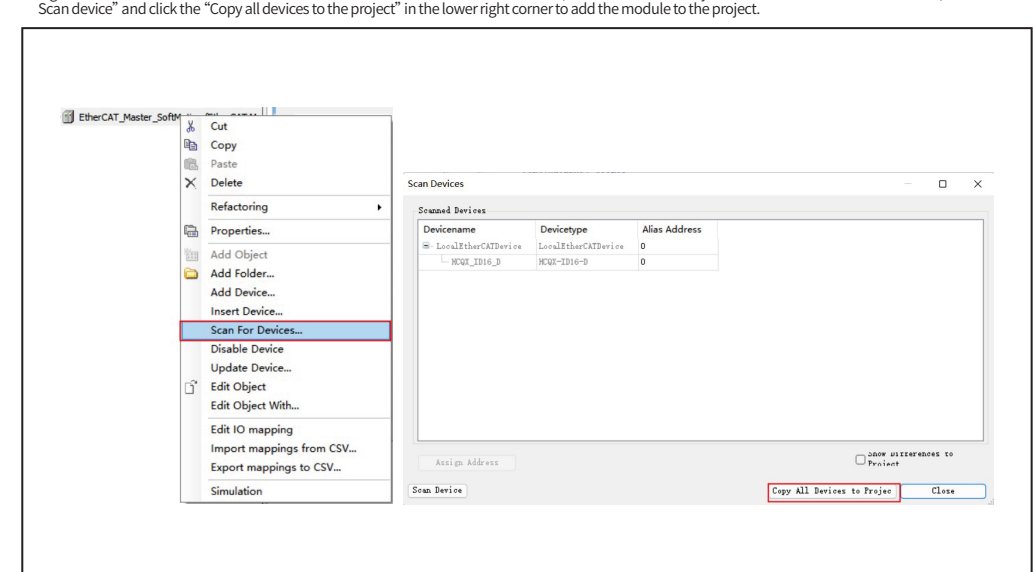


8) After compiling without errors, log in and run the program. When outputting a signal to the corresponding output channel, it can be detected that the channel has a response signal output.

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 project" in the lower right corner to add the module to the project.



7) Modify the [Always update variables] in the lower right corner to [Enabled 2 (always in bus cycle task)]



8) After compiling without errors, log in and run the program. When outputting a signal to the corresponding output channel, it can be detected that the channel has a response signal output.