

PAC MAIN UNIT HCQ1-1□00-D2

Q1

ManualNo.	HPPP110000EN
Version	4.2
Date	Apr,2022

Thanks for purchasing HCFA Q series PLC main unit HCQ1

Q series controllers include the functions of traditional PLCs and support the extension of multiple remote I/O modules. Users can realize various functions of motion control through SoftMotion provided by the controller. It is a device that integrates high-speed EtherCAT communication, vision, motion control, I/O functions and supports multiple bus communication (including Modbus TCP, CANopen, OPC UA, EtherNet/IP serial port communication, etc.)

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

This Instruction describes the necessary information for using Q series CPU units. Please read this manual carefully before using it and operate it correctly based on a better understanding of safety precautions.

1. Safety precautions

1.1 Safety 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

- Indicates 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 usage.

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

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.

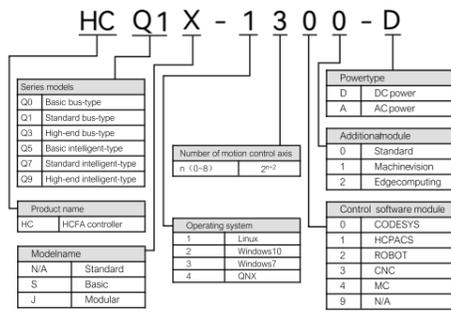
Transport And Storage Precautions

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



NOTE: Number of motion control axes. The number of axes when the task cycle is 4ms.

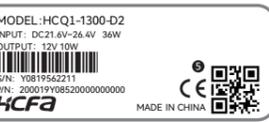
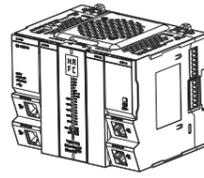


Figure 1 Model name and label description

- 1 Model name
- 2 Input voltage & current
- 3 Output voltage & power
- 4 Code, S/N & P/N
- 5 QR code(model name, serial number)

Model	Type	Description	Applicable module
HCQ1-1□00-D2	CPU units	16-ch digital I/O, (support 8-ch high-speed I/O) Support SD/MiniUSB/USB3.0 interface, 2-ch RS485; 1-ch RS232; 1-ch CAN2.0; Support Modbus TCP, Modbus RTU, EtherCAT, CANopen, OPC UA, EtherNet/IP protocol	Q series CPU unit and all extension modules

2.2 Part names

2.2.1 Front view

◆ HCQ1 CPU unit viewed from the right side

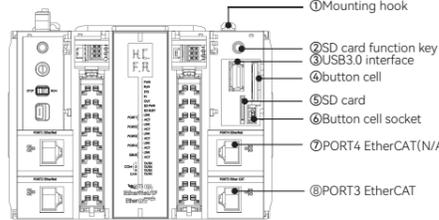


Figure 2 HCQ1 right view

Item	Name	Functions
1	Mounting hook	Install controller onto the DIN rail mounting hook
2	SD card function key	Safely uninstall SD, USB, long press to uninstall
3	USB3.0 interface	USB3.0 interface, will support U-disk data storage, 4G and WIFI modules
4	Button cell	The button battery is a standard configuration to maintain some system parameters. Don't move it. And the design life is 5 years. (Please choose HCFA standard button battery, model HCQ1-BAT)
5	SD card	User data storage
6	Button cell socket	Insert correctly when using button cell
7	PORT4	Not defined
8	PORT3	Gigabit Ethernet support EtherCAT,

◆ HCQ1 CPU unit viewed from the left side

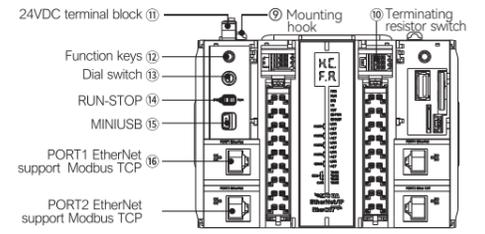


Figure 3 HCQ1 left view

Table 2 Part names and function description -2

Item	Name	Functions
9	Mounting hook	Install controller onto the DIN rail mounting hook
10	Terminating resistor switch	120Ω terminal resistance switch, ON in the direction of the arrow, and OFF otherwise. For details, see the high-speed IO interface and communication interface of the HCQ1 CPU unit
11	24VDC terminal block	24V DC power supply interface for CPU unit
12	Function keys	Switch the SYN/NOU indicator light and the display content
13	Dial switch	Dial to 0: Switch the display; Dial 1: Import the program; Dial Restore the default IP address; The functions of importing the program and restoring the default IP address need to be triggered by the function button.
14	RUN -STOP switch	Start or stop the CPU unit. Turn to the left to be off, turn to the right to be on.
15	MINI USB	USB2.0 interface, will support the connection with PLC to monitor and download user program
16	PORT1 EtherNet	Gigabit Ethernet support Modbus TCP IPV4: 192.168.1.100 Subnet mask : 255.255.255.0
17	PORT2 EtherNet	Gigabit Ethernet support Modbus TCP IPV4: 192.168.88.100 Subnet mask : 255.255.255.0

◆ HCQ1 CPU unit high-speed IO interface and communication interface
This unit is built-in high-speed I/O to realize the basic positioning function of single-axis. The frequency can reach up to 200K.

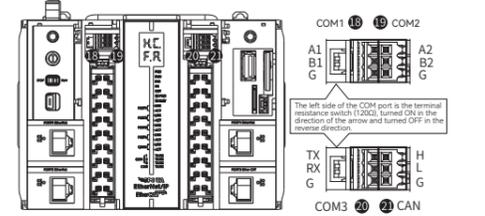


Figure 4 High-speed IO and communication interface description

◆ Table 3 Part names and function description -3

Items	Name	Function
18	COM1	Support RS485 communication
19	COM2	Support RS485 communication
20	COM3	Support RS232 communication
21	CAN	Support CAN2.0

16-ch general input terminal arrangements

Input	I0	I10
Input	I1	I11
Input	I2	I12
Input	I3	I13
Input	I4	I14
Input	I5	I15
Input	I6	I16
Input	I7	I17
COM port	SS	SS

16-ch high-speed output terminal arrangements

Output	Q0	Q10
Output	Q1	Q11
Output	Q2	Q12
Output	Q3	Q13
Output	Q4	Q14
Output	Q5	Q15
Output	Q6	Q16
Output	Q7	Q17
COM port	COM	COM

8-ch high-speed input terminal arrangements

hi.s.cnt	I0	I10	hi.s.cnt4
hi.s.cnt1	I1	I11	hi.s.cnt5
hi.s.cnt2	I2	I12	hi.s.cnt6
hi.s.cnt3	I3	I13	hi.s.cnt7
COM port	SS	SS	COM port

8-ch high-speed output terminal arrangements

hso.axi.s	Q0	Q10	hso.axi.s4
hso.axi.s1	Q1	Q11	hso.axi.s5
hso.axi.s2	Q2	Q12	hso.axi.s6
hso.axi.s3	Q3	Q13	hso.axi.s7
COM port	COM	COM	COM port

TIPS: The version V2.XX supports 4-ch high-speed output; V3.XX supports 8-ch

2.2.2 Indicator sdescription

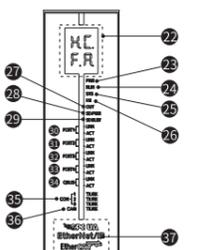


Figure 5 HCQ1 CPU unit indicator description

◆ Table 4 Part names and description-4

Items	Port	Color	Function	
(22)	LCD	White	Indicator status	Screen display
			Red for SYS	System operating status
			Red for IN	IO input status, display vertically
			Red for OUT	IO output status, display vertically
(23)	PWR	Green	Show the current power supply of the module	
(24)	RUN	Red	Operation status, lit at normal operation, not lit at stop	
(25)	SYS	Red	Operation status, lit at normal operation. Click the scan interface "flashing", the LCD will display 0000 as a response, and appears Errors will overwrite the above status	
(26)	IN	Red	IO input status, (in the left cover) the function key is in the state 2	
(27)	OUT	Red	IO output status, (in the left cover) the function key is in the state 3	
(28)	SD_PWR	Green	Not defined	
(29)	SD_BUSY	Red	Lit after successfully loading the U disk/SD card, and not lit after safe unloading	

Items	Port	Color	Function
(30)	PORT1	Green	Rj45 Ethernet interface LINK indicator, green indicates communication has been established.
		Orange	Rj45 Ethernet interface ACT indicator, Orange flashing indicates data exchange on the network port.
(31)	PORT2	Green	Rj45 Ethernet interface LINK indicator, green indicates communication has been established.
		Orange	Rj45 Ethernet interface ACT indicator, Orange flashing indicates data exchange on the network port.
(32)	PORT3	Green	Rj45 Ethernet interface LINK indicator, green indicates communication has been established.
		Orange	Rj45 Ethernet interface ACT indicator, Orange flashing indicates data exchange on the network port.
(33)	PORT4	Green	Not defined
		Orange	Not defined
(34)	QBUS	Green	QBUS communication ACT indicator, green indicates communication has been established.
		Orange	Orange flashing indicates data exchange on the network port.
(35)	COM1 (to be supported)	Green/orange	Serial communication TX/RX indicator, green indicates normal communication, and the orange light indicates disconnected or communication failure.
		Green/orange	Serial communication TX/RX indicator, green indicates normal communication, and the orange light indicates disconnected or communication failure.
		Green/orange	Serial communication TX/RX indicator, green indicates normal communication, and the orange light indicates disconnected or communication failure.
(36)	CAN (to be supported)	Green/orange	CANOpen communication TX/RX indicator, green indicates normal communication, and the orange light indicates disconnected or communication failure.
(37)	Communication protocol	N/A	Current device supports communication protocols, including OPC UA/EtherNet IP to be supported

◆ "HCFA" displayed on LCD, as shown in the figure below:



◆ Use the function key to switch the display state, the default is 1, press once to switch the state

(1) Status 1 Show operation status, and the SYS lit, if the LCD flickers, the system is on RUN state (note: If stop caused by the program, the LCD flicker normally); If the LCD outside stops, the system is in STOP status, as shown below:



(2) Status 2 Show IO inputs and the IN lit, the corresponding input points are shown as below:



(For other input points, arranged correspondingly)

(3) Status 3 Show IO outputs and the OUT lit. The arrangement of corresponding output points is the same as that of input points.

If there is an error in the system, the error code will cover all the above states and display first

2.2.3 Error codes description

(1) Error code display sequence: (The highest priority, will override, other states)



(2) Error code list

Error code	Error name	Description
0057	RTSEXCPT_GUARD_PAGE	Protect page
0058	RTSEXCPT_DOUBLE_FAULT	Double failure
0059	RTSEXCPT_INVALID_OPCODE	Invalid operation code
0100	RTSEXCPT_MISALIGNMENT	Data type alignment error
0101	RTSEXCPT_ARRAYBOUNDS	Array out of bounds
0102	RTSEXCPT_DIVIDEBYZERO	Application division by 0 operation
0103	RTSEXCPT_OVERFLOW	Overflow
0104	RTSEXCPT_NONCONTINUABLE	Noncontinuable
0105	RTSEXCPT_PROCESSORLOAD_WATCHDOG	Detected that the processor is loaded with the watchdog of all IEC tasks
0150	RTSEXCPT_FPU_ERROR	Floating point operation error
0152	RTSEXCPT_FPU_DIVIDEBYZERO	Division by 0 operation in FPU
0153	RTSEXCPT_FPU_INEXACT_RESULT	Inaccurate results of floating-point operations in FPU
0154	RTSEXCPT_FPU_INVALID_OPERATION	Invalid operation in FPU
0155	RTSEXCPT_FPU_OVERFLOW	FPU overflows
0156	RTSEXCPT_FPU_STACK_CHECK	FPU stack check
0157	RTSEXCPT_FPU_UNDERFLOW	FPU overflow
0200	RTSEXCPT_BREAKPOINT	Hardware breakpoint
0FFF	RTSEXCPT_MASK	Block all error codes so far
1000	RTSEXCPT_WATCHDOG_OMITTED_CYCLE	Watchdog period timeout with omitted cycle
2000	RTSEXCPT_VENDOR_EXCEPTION_BASE	Specific vendor error code base
0000	RTSEXCPT_APP_EMPTY	No program
0010	RTSEXCPT_WATCHDOG	IEC-task watchdog timeout
0011	RTSEXCPT_HARDWAREWATCHDOG	System hardware watchdog timeout
0012	RTSEXCPT_IO_CONFIG_ERROR	IO configuration error
0013	RTSEXCPT_PROGRAMCHECKSUM	IEC program download verification error
0014	RTSEXCPT_FIELDBUS_ERROR	Bus error
0015	RTSEXCPT_IOPDATE_ERROR	IO update error
0016	RTSEXCPT_CYCLE_TIME_EXCEED	Cycle time out
0017	RTSEXCPT_ONLCHANGE_PROGRAM_EXCEEDED	Online change program excessive
0018	RTSEXCPT_UNRESOLVED_EXTREFS	Unresolved function blocks or functions in the IEC program
0019	RTSEXCPT_DOWNLOAD_REJECTED	The current download operation is rejected
001A	RTSEXCPT_BOOTPROJECT_REJECTED_DUE_RETAIN_ERROR	The startup project is not loaded because the Retain variable cannot be loaded
001B	RTSEXCPT_LOADBOOTPROJECT_FAILED	Failed to start the project, not loaded or deleted
001C	RTSEXCPT_OUT_OF_MEMORY	Memory overflow
001D	RTSEXCPT_RETAIN_MEMORY_ERROR	Retain memory corruption cannot be mapped
001E	RTSEXCPT_BOOTPROJECT_CRASH	The startup factory cannot be loaded causing a crash
0021	RTSEXCPT_BOOTPROJECT_TARGET_MISMATCH	The current device bootproject does not match
0022	RTSEXCPT_SCHEDULEERROR	Task scheduling error
0023	RTSEXCPT_FILE_CHECKSUM_ERR	Download file verification code does not match
0024	RTSEXCPT_RETAIN_IDENTITY_MISMATCH	Retain variable does not match bootproject
0025	RTSEXCPT_IEC_TASK_CONFIG_ERROR	IEC task configuration error
0026	RTSEXCPT_APP_TARGET_MISMATCH	Application cannot run on the current device
0050	RTSEXCPT_ILLEGAL_INSTRUCTION	Illegal instruction
0051	RTSEXCPT_ACCESS_VIOLATION	Illegal address access
0052	RTSEXCPT_PRIV_INSTRUCTION	Privileged instructions, insufficient authority
0053	RTSEXCPT_IN_PAGE_ERROR	Page error
0054	RTSEXCPT_STACK_OVERFLOW	Stack overflow
0055	RTSEXCPT_INVALID_DISPOSITION	Invalid processing
0056	RTSEXCPT_INVALID_HANDLE	Invalid handle

2.2.4 Top view

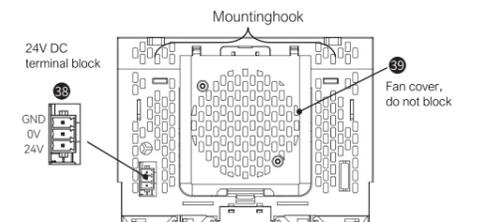


Figure 6 HCQ1 CPU unit top view

◆ Table 5 Part names and function description-5

Items	Items	Functions
(38)	Extension modules connection	24VDC power supply interface, please refer to the figure above for wiring
(39)	Fan cover	Removable, easy to attach or detach the fan (Q1 has no fan design, the fan cover is a unified mold)

TIPS: • Due to the influence of noise, the communication may be interrupted when the USB is not stable in the communication state. At this time, please pull out the USB cable, and then reinsert.
• In case the communication state is very unstable (the noise is quite serious), in order to protect the PC, please wrap the ferrite around the cable

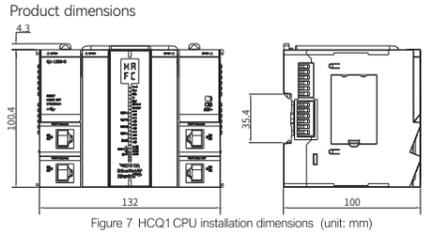
WARNING

- Do not open the back cover of the fan during power-on, otherwise it will cause electric shock, equipment damage and other serious situations; Only qualified technical personnel are allowed to operate in accordance with the regulations.

CAUTION

- Do not connect USB cable to serial port or Ethernet port (may cause port damage).

2.3 Product dimensions



3. Installation description

3.1 General specification

Items	Specifications				
Dielectric withstand voltage	1000VAC for one minute. Between power terminals and input/output terminals and between external terminals and housing				
Noise resistance	By noise simulator at noise voltage of 1500 Vp-p or more, noise width of 1 μs, rise time of 50ms. Conform to IEC standard (IEC61000-4-2/3/4/6)				
Vibration resistance	Installer	Frequency (Hz)	Acceleration (m/s ²)	Single amplitude (mm)	Sweep Count for X, Y, Z: 10 times (80 min in each direction)
	When installed on DIN rail	10~57 57~150	— 4.9	0.035	—
Insulation resistance	50MΩ or more (by 500V DC megger. Between power terminals and input/output terminals and between external terminals and housing)				
IP protection level	IP20				
Ambient temperature	Max. 50°C, free from dust and corrosive gas				
Working altitude	2000m (80kPa)				
Pollution degree	2, Normally there is only non-conductive pollution, but temporary conductivity caused by condensation should also be expected.				

3.2 Environmental specifications

Classification	Types	Working environment	Transport environment	Storage temperature
Environmental parameters (IEC60721-3)	Protection level	IE33	IE22	IE12
	Temperature	0~50°C (free from freezing)	-40~75°C	-25~75°C
	Humidity	5~95%RH (free from condensation)		
	Impact	Acceleration 150m ² , action time 11ms, 2 times in each direction of X, Y, and Z		
Altitude/Pressure		Max 2000m	Max 3000m (>70kPa)	

TIPS: IEC60721-3 is the third part of the classification of environmental conditions: the classification of environmental parameter groups and their severity.
 * Ambient temperature refers to the surrounding temperature of the module or unit, not the internal temperature of the module.

3.3 Power specifications

Items	Specifications
Voltage	DC24V
Voltage fluctuation range	-15%~20%
Input power	36W
Undervoltage	19V
Output voltage	12V
Voltage fluctuation	±5%
Output power	16W

3.4 Performance specifications

Items	Specifications	
Programming	Program capacity	16MBytes
	I-zone (%I)	128KBytes
	Q-zone (%Q)	128KBytes
	M-zone (%M)	512KBytes
	Retention area	800KBytes
Other variables	Unlimited	
Unit configuration	Number of extension modules	Digital module Analog module External power supply
	Calculated based on current consumption	
	12V/16W	
EtherCAT	Communication standard	IEC 61158 Type12
	EtherCAT master specifications	Class B (compatible with function motion control)
	Physical layer	100BASE-TX
	Modulation	Baseband
	Transmission speed	100Mbps (100Base-TX)
	Duplex mode	Duplex
	Topology	Linear, bus/star-type
	Transmission medium	Twisted-pair cable of category 5 or higher (aluminum foil + braided double-shielded direct connect cable)
	Maximum transmission distance between nodes	100m
	Maximum process data	Input: 5,736 bytes Output: 5,736 bytes (The maximum number of frames of process data is 4.)
Communication cycle	Mini. 500 μs	

Items	Specifications	
CANOpen master	Link layer	CAN2.0A
	Terminating resistor	Built-in 120Ω, Support dial switch
	Support baud rate bps	50K, 100K, 125K, 250K, 500K, 800K and 1M
	Topology	Linear, bus/star-type
	Transmission medium	Twisted-pair cable of category 5 or higher
	Maximum transmission distance between nodes	1000m (50Kbps)
	Maximum number of slaves	32
Communication cycle	Mini. 1ms	
Serial port	Physical layer	COM1, COM2, COM3
	RS485	
	Terminating resistor	COM1, COM2, COM3
	Support 120Ω, Support dial switch	
	Baud rate bps	4800~115200
	Maximum communication distance	COM1, COM2: 500m COM3: 15m
	Topology	COM1, COM2: Linear, bus/star-type COM3: Point-to-point
	Maximum number of slaves	COM1, COM2: 32 COM3: 1
	Transmission medium	Twisted-pair cable of category 5 or higher

3.5 High-speed IO basic specifications

Items	Technical specification
Signal name	High-speed input (I0-I17)
Rated input voltage	DC24V (+20%~-15%, ripple within ±10%)
Input form	Source, sink input
Rated input current	3.65mA
ON-current	>4.14mA
OFF-current	<3.88mA
Input resistance	1.5K
Max. input frequency	100KHz (Version 2.XX.XX) 200KHz (Version 3.XX.XX or above)
2-phase input worst duty ratio	(40%: 60%) ~ (60%: 40%)
Common mode	Use one common terminal for every 8 points

High-speed output specification

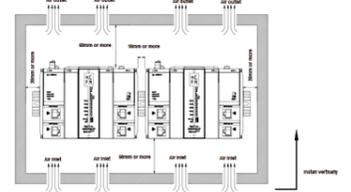
Items	Technical specification
Signal name	Output (Q0-Q17)
Output polarity	Sink output (NPN)
Control circuit voltage	DC5V~24V
Rated load current	250mA
Maximum voltage drop at powerON	0.05V
Leakage current at OFF	<0.1mA
Output frequency	100KHz (Version 2.XX.XX) 200KHz (Version 3.XX.XX or above)
Common mode	Use one common terminal for every 8 points

3.6 Installation description

3.6.1 Installation description

Carrying out the installation in the control cabinet of the equipment, please note the following points:

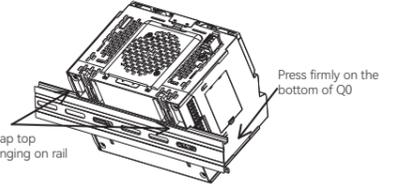
- Please ensure that the installation direction is perpendicular to the wall, use natural convection or a fan to cool the device and mount the controller firmly on the 35MM international rail by means of a two-way linkage clip.
- The top and bottom sides of the equipment or modules must be spaced at least 50 mm apart from the internal walls to allow for ventilation and replacement of the equipment or modules; the left and right sides of the equipment or modules must be spaced at least 20 mm apart from the internal walls.
- For side-by-side installation, a distance of 10mm or more is recommended between devices (if installation space is limited, no spacing is optional).



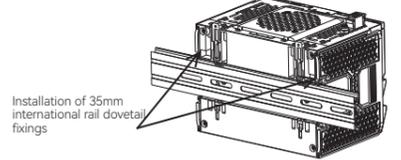
3.6.2 Mounting and dismounting of guide rails

Rails installation

- Align the bottom of Q1 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 Q1 installation is completed. (Before installation, ensure that the mounting hook is in good state, otherwise it may cause installation failure)

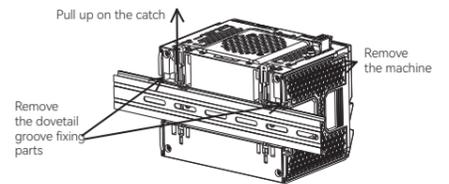


- The dovetail groove fixing parts for the 35MM international guide rail should be installed on the two sides of the machine after the installation is completed. The accessories are attached with the machine.



Rails dismounting

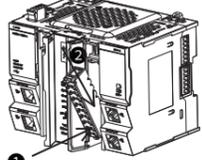
First remove the 35MM international guide rail dovetail groove fixing parts installed on the two sides of the machine, and then pull upwards at a distance of 5.8 mm (when you pull upward, you can clearly hear the "click"), at this time you can directly take off the machine to complete the disassembly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



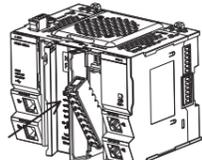
3.6.3 (Un)Installation of IO terminal block

Install the IO terminal block

- Align the bottom of the IO terminal with the Q1 machine and make sure the angle of no less than 45°, and then push the IO terminal down to make them fit together.

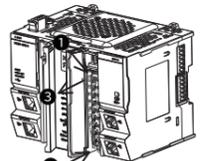


- Push the upper part of the IO terminal inward until you hear a "click", which means that the IO terminal installation is completed (the dotted line represents the terminal moving inward).

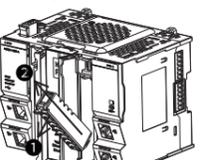


Uninstall the IO terminal block

- Press down firmly on the top spring plate of the IO terminal to separate the top of the IO terminal from the Q1 machine and hold the tail part of the IO terminal with your thumb, while pressing the spring plate, lift the top of the IO terminal upwards (the dotted line indicates that the IO terminal has been separated).



- Lift the top of the IO terminal to make the IO terminal and the Q1 machine at an angle greater than 45°, and finally remove the IO terminal upward.



3.7 Wiring description

3.7.1 Cables

Items	Technical specification	
Mounting type	Push-in	
Push-in force (single contact)	10N	
Cable type	Copper wire only (do not use aluminum cable)	
Cable length	7~9mm	
Cross section of cables	Single strand	0.08-1.50 mm ² /28-16 AWG
	Multiple strand	0.25-1.50 mm ² /24-16 AWG
	Wiring sleeve	0.25-0.75 mm ² /24-20 AWG

Q1 CPU unit is built-in 8-ch high-speed input and 8-ch high-speed output. And high-speed input support source and sink input, as follows:

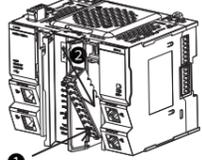
5

6

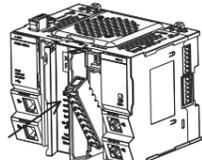
3.6.3 (Un)Installation of IO terminal block

Install the IO terminal block

- Align the bottom of the IO terminal with the Q1 machine and make sure the angle of no less than 45°, and then push the IO terminal down to make them fit together.

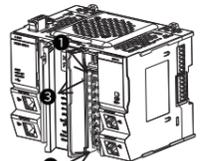


- Push the upper part of the IO terminal inward until you hear a "click", which means that the IO terminal installation is completed (the dotted line represents the terminal moving inward).

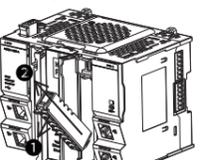


Uninstall the IO terminal block

- Press down firmly on the top spring plate of the IO terminal to separate the top of the IO terminal from the Q1 machine and hold the tail part of the IO terminal with your thumb, while pressing the spring plate, lift the top of the IO terminal upwards (the dotted line indicates that the IO terminal has been separated).



- Lift the top of the IO terminal to make the IO terminal and the Q1 machine at an angle greater than 45°, and finally remove the IO terminal upward.



3.7 Wiring description

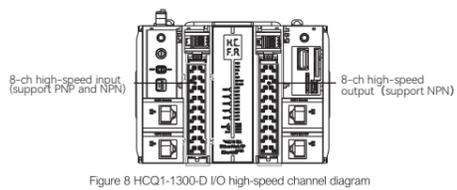
3.7.1 Cables

Items	Technical specification	
Mounting type	Push-in	
Push-in force (single contact)	10N	
Cable type	Copper wire only (do not use aluminum cable)	
Cable length	7~9mm	
Cross section of cables	Single strand	0.08-1.50 mm ² /28-16 AWG
	Multiple strand	0.25-1.50 mm ² /24-16 AWG
	Wiring sleeve	0.25-0.75 mm ² /24-20 AWG

Q1 CPU unit is built-in 8-ch high-speed input and 8-ch high-speed output. And high-speed input support source and sink input, as follows:

5

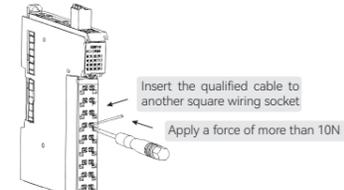
6



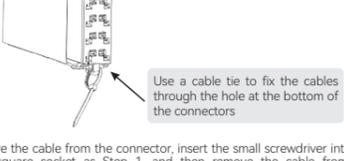
The I/O provided by the Q series CPU unit can be used either as high-speed input and output or as general input and output. When the I/O is used as general input and output, it has both 16-point input and 16-point output. The wiring method is similar to that of general digital input and output. When the I/O is used as high-speed input and output, the number of channels can be up to 8-ch input and 8-ch output. Now the high-speed I/O provided by Q1 series PLC only support single-ended input and output. The differential signal is under development in the following Q series PLC. Of course, the I/O wiring method will affect the max. number of channels that are available. For detailed wiring mode, please refer to the following instructions

Wiring for connectors

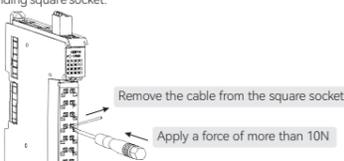
- Take out the small screwdriver in the package and insert it into the square socket of the connector, applying a force of more than 10N. And then insert the qualified cable from another square wiring socket (located inside the module) to the bottom, loosen the screwdriver, gently pull the cable up and down until the cable is clamped.



- After completing the wiring of the connector, use a cable tie to fix the cables through the hole at the bottom of the connectors and cut off the excess cable tie.

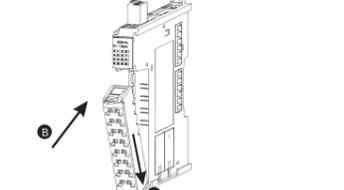


- To remove the cable from the connector, insert the small screwdriver into the outside square socket as Step 1, and then remove the cable from the corresponding square socket.

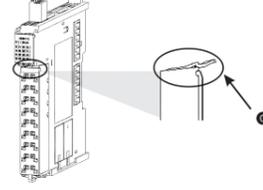


Connector uninstallation

- Align the rear end of the connector with the extension module bottom. After aligning and inserting, press the terminal down in the B direction as shown below.

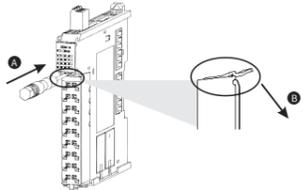


- After inserting the connector successfully, press it in the direction of C until you hear the "click", then connector installation has been completed.

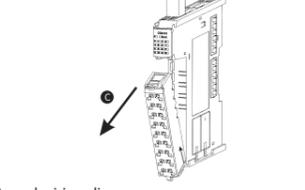


Remove the connector

- Insert the screwdriver into the upper side of the connector in the direction of A, and gently push it downward in the direction of B to unlock the buckle.

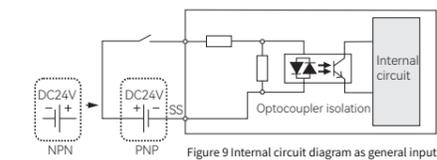


- After unlocking the connector, remove the connector from the module in the direction of C.

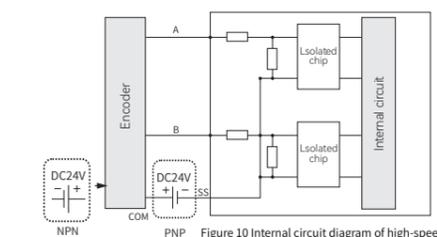


3.7.2 Internal wiring diagram

Internal circuit diagram of general inputs

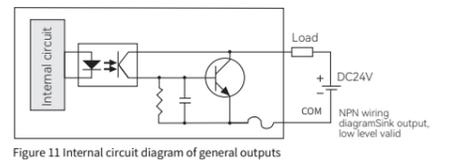


Internal circuit diagram of high-speed inputs

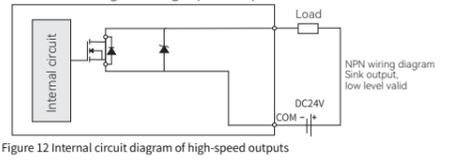


TIPS: • The total extension distance of the high-speed IO extension cable should be within 3m.
 • Ambient temperature refers to the surrounding temperature of the module or unit, not the internal temperature of the module.

Internal circuit diagram of general outputs

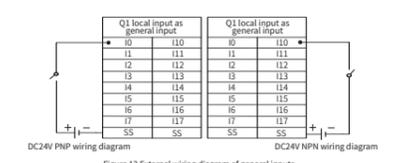


Internal circuit diagram of high-speed outputs

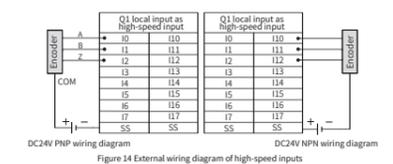


3.7.3 External wiring diagram

External wiring diagram of general inputs

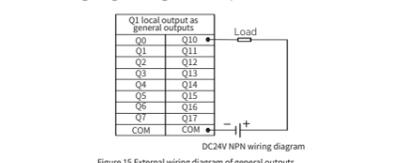


External wiring diagram of high-speed inputs

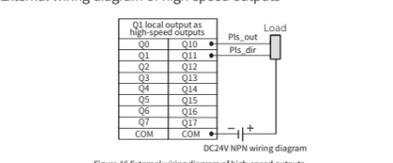


NOTE: In some modes, you need to use 2-phase or latching terminals. You can choose any free port and configure the corresponding

External wiring diagram of general outputs



External wiring diagram of high-speed outputs



7

8