



Control



Drive



Sensor



Transmission



Digitalization

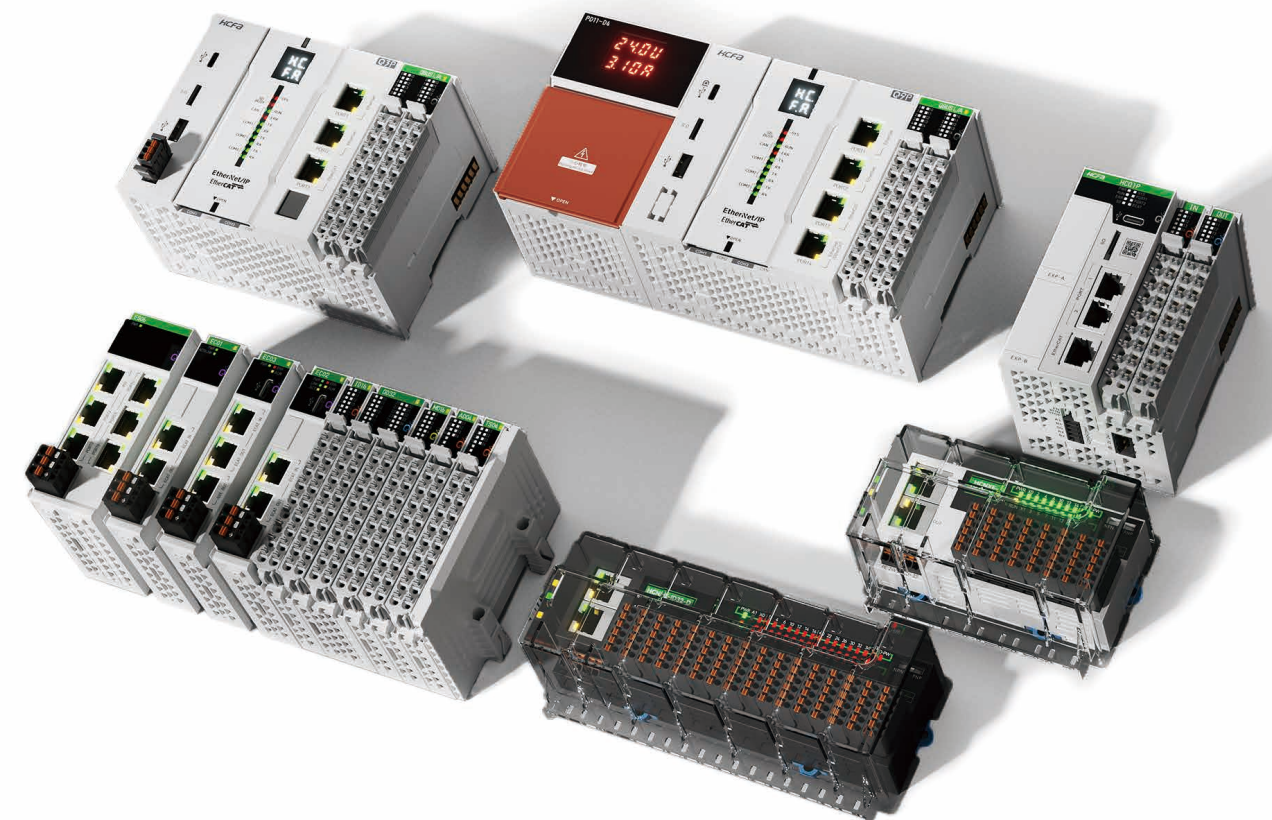


BETTER WORK, BETTER LIFE



POWERING THE HIGH-END AUTOMATION FIELD

Q-Series Control Products Selection Manual



Innovation Integrity Service

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HCFA



ATC

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Manual Number: April 2025, Issue No. 1

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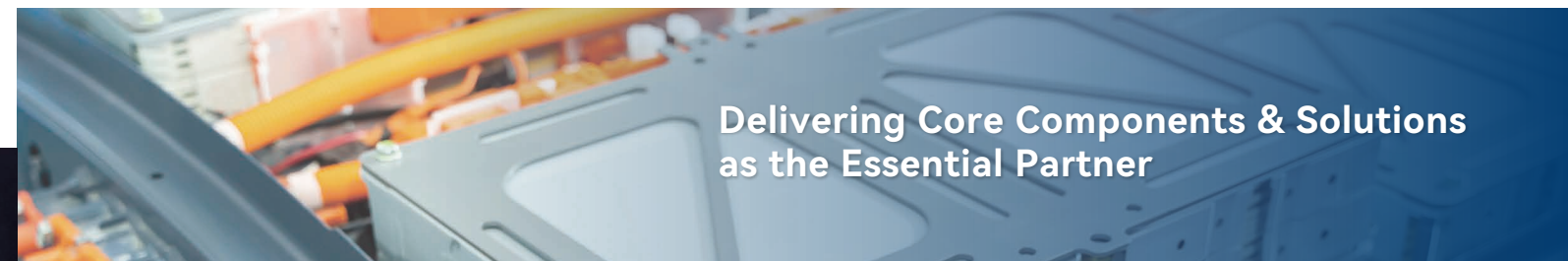
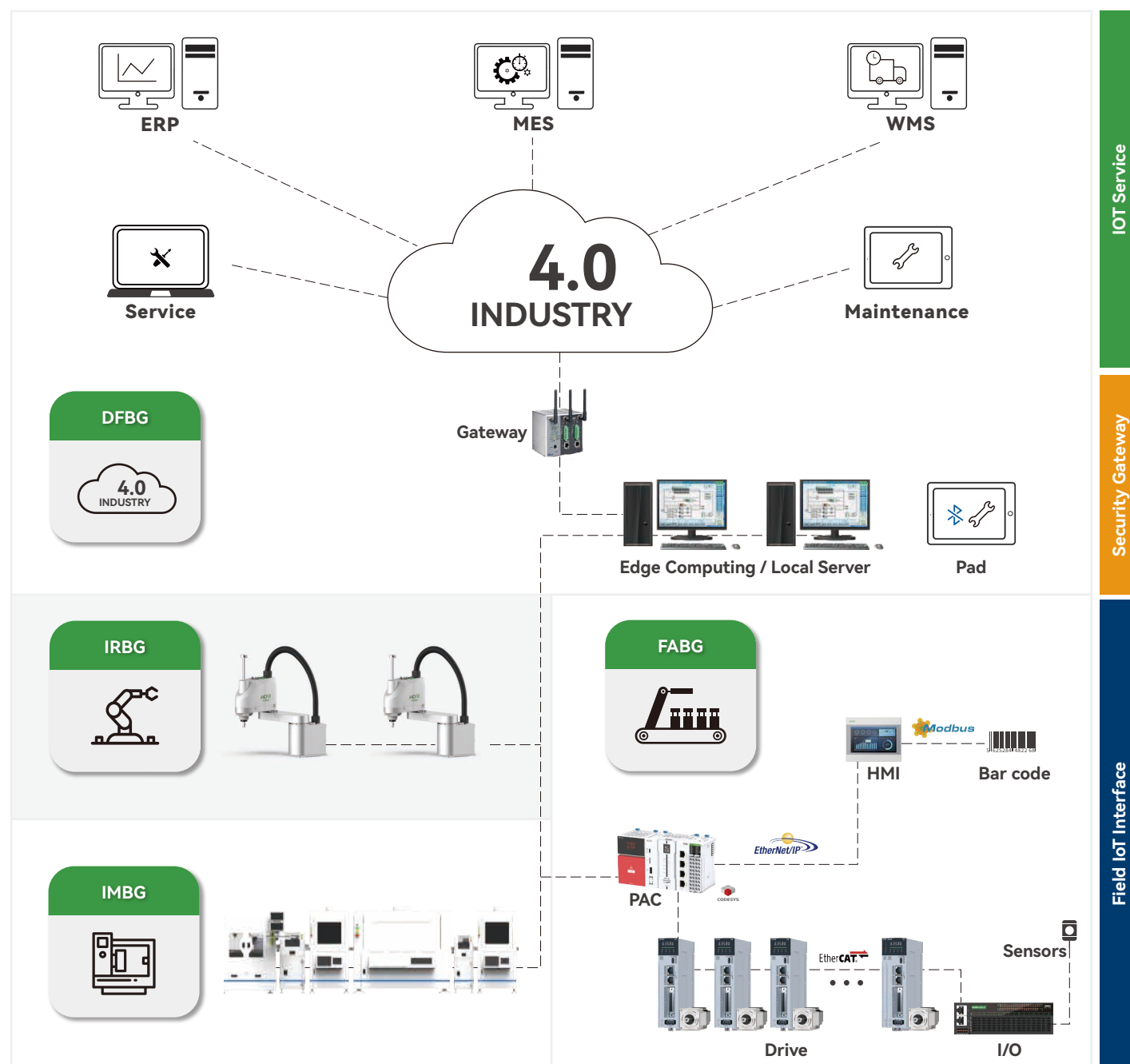
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Empowering Industry, Shaping Smart Manufacturing

We not only provide essential components for industrial automation, but also engage in industrial robots, industrial machinery, and digital factories. We can offer businesses comprehensive solutions integrating **automation, intelligent equipment, and digitalization.**



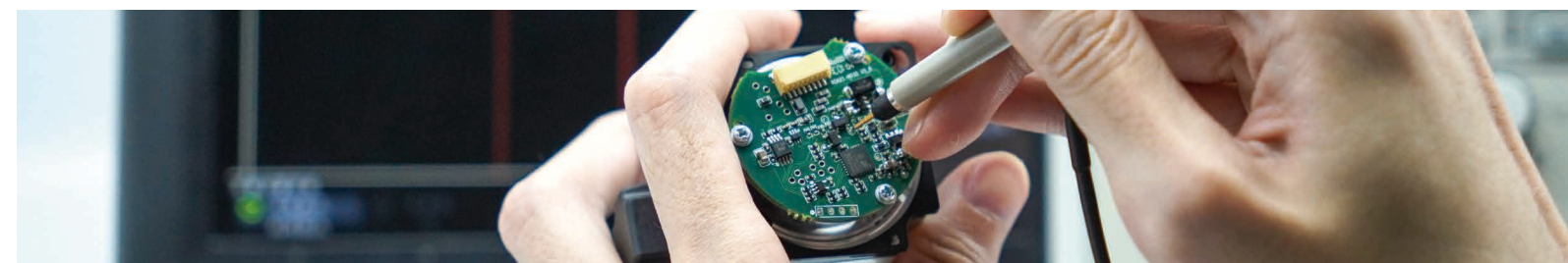
Delivering Core Components & Solutions
as the Essential Partner

Zhejiang Hechuan Technology Co., Ltd. (HCFA Technology), founded in 2011, is a company dedicated to developing, manufacturing, sales, and application-integration of industrial automation products. It is committed to supplying core components and system-integration solutions for smart factories.

Its product range encompasses controllers, servo systems, vision systems, encoders, variable-frequency drives (VFDs), human-machine interfaces (HMIs), electric rollers, and precision transmission components, covering the entire spectrum of the industrial automation field.

In November 2023, HCFA Technology and Bosch Rexroth inked a strategic cooperation agreement. Bosch Rexroth made a strategic investment in HCFA Technology and planned to collaborate on establishing a subsidiary. Grounded in shared innovative concepts and forward-thinking, the two parties will pool their respective strengths, create resource complementarity, and engage in in-depth cooperation, aiming to become ecological partners throughout the industrial automation value chain and drive the further advancement of China's industrial automation industry.

Stock Code: 688320



R&D Center

6

Number of Establishments

R&D Investment

10%+

Proportion of Revenue

R&D Personnel

300+

Elite Talent Pool

- Six R&D centers across Longyou, Hangzhou, Shenzhen, Dalian, Suzhou, and Germany
- Independently designed ASIC & SOC chips for domestic fabrication and localization substitution
- Industry-leading AMR magnetic technology and high-precision encoders

BRAND-NEW APPEARANCE DESIGN

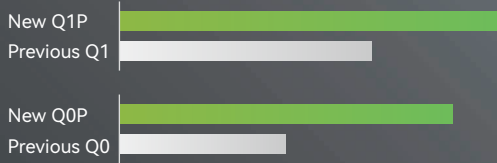
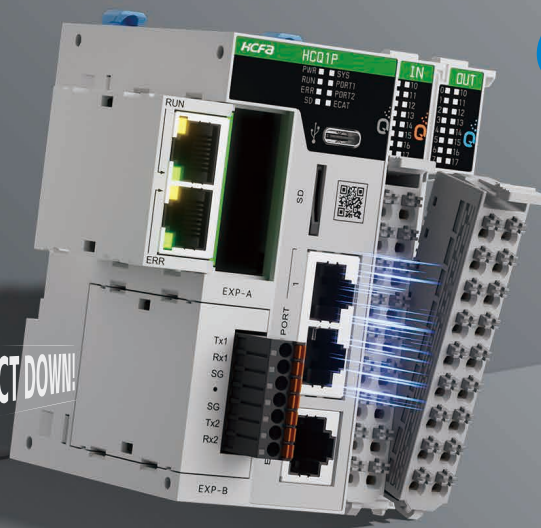
Powered by HCFA Design, Crafted in Canon White

Expandable Dual-Slot Design
RTC, CAN, RS485, RS232 & Beyond

Easy Installation
Detachable PUSH IN latching terminals for efficient equipment

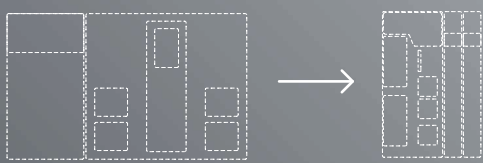
Dual Switch-Style Ethernet Ports
Two-port EtherNet (Unified IP management & Built-in switching functionality)

POWER UP, COMPACT DOWN!

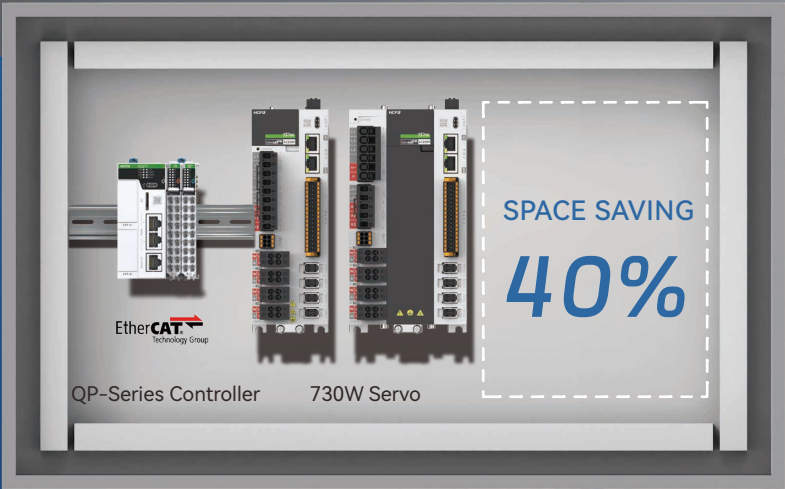


Performance increase: **1.5x!**

Performance increase: **2x!**



SIMPLIFIED WIRING
RAPID ASSEMBLY
COST EFFICIENCY



Multi-Protocol / High Integration

Supported Interfaces: 2x RS485, 2x Ethernet, 1x EtherCAT, dual BD slots, 1x Type-C and right-side expansion modules (compatible with HCQX-D4 modules)

Supported Protocols: Tag communication, OPC UA Server, TCP, UDP, HTTP and MQTT

Performance / Capacity Upgrade

Dual-core high-performance processor featuring a 1.5x generational performance boost

128MB program + 128MB data storage, featuring 1M persistent data memory.

Flexible & Diverse Motion Control

8-axis 200 kHz pulse outputs | 8-channel 200 kHz pulse inputs | 8/16 bus axes

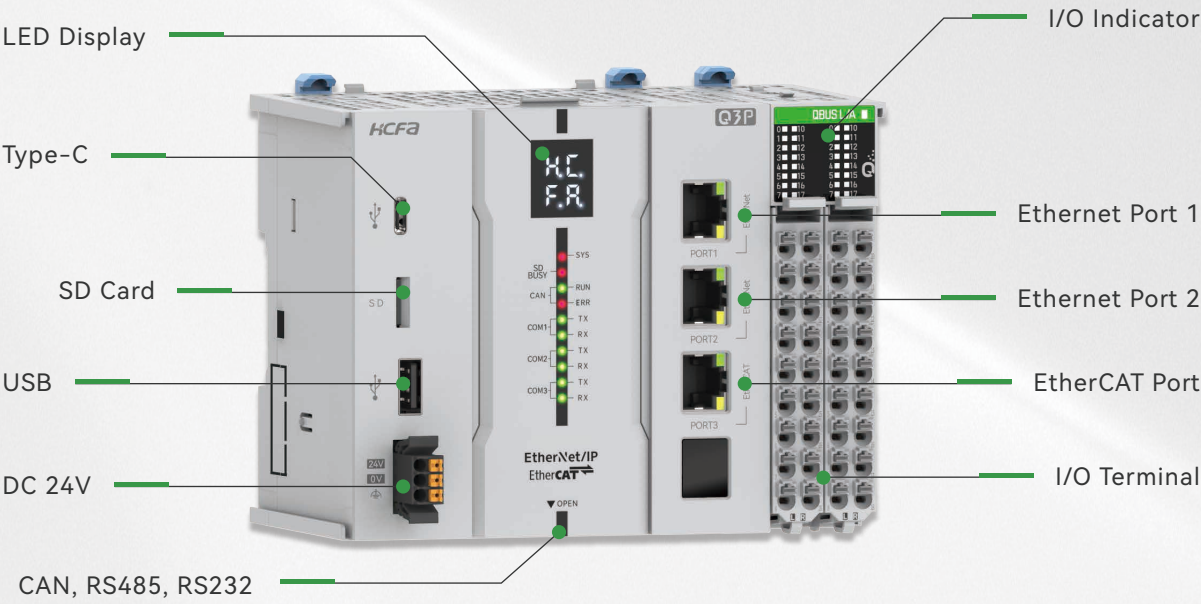
Supported Complex Motion Control: Single-axis position/-speed/torque control, electronic cam, axis grouping, and CNC

Easy Programming / Easy Debugging

Newly Developed IDE – HCP Works 3: Graphical, list-based, modular programming

Built-in servo parameter debugging interface with online downloading and offline simulation support

FASTER RESPONSE!
BETTER CONTROL!



HCQ3P-1400-D4



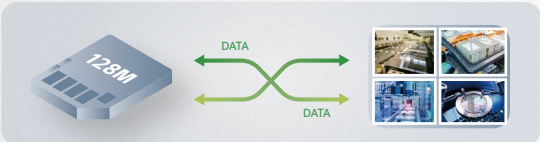
EtherNet/IP



OPCUA



Powerful Storage

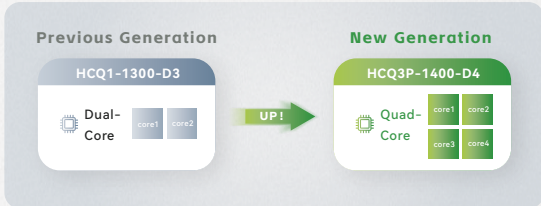


128M Program Storage: Sufficient for users to write and store more complex control programs, suitable for medium and large-scale automation project applications.



1M Persistent Data Memory: Permanent storage of critical data in the event of power loss, preventing data loss.

Double Performance



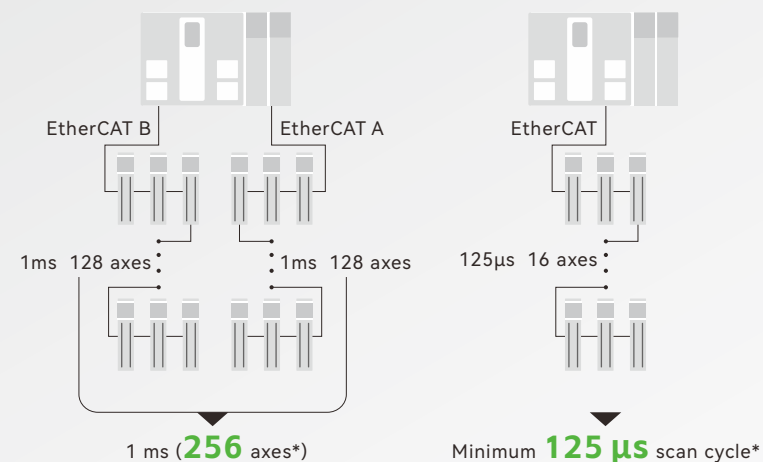
QP-Series

NEW GENERATION QP-SERIES INTELLIGENT MECHANICAL CONTROLLERS

The Next-Generation Q Plus Series Smart Mechanical Controllers leverage HCFA's deeply customized HCP Works 3 Programming Platform, fully compliant with PLCopen specifications and IEC 61131-3 standards. Engineered with high performance, low scan cycles, enhanced multi-axis coordination, and industrial-grade network flexibility, these controllers deliver precision-driven solutions for photovoltaic (PV) systems, lithium battery (LiB) manufacturing, 3C electronics, semiconductor fabrication, and digital printing. Targeting high-end industrial automation applications, the Q Plus Series boosts the industrial automation industry upgrades.

Control products seamlessly adapt from simple applications to complex industrial scenarios. **Q0P & Q1P:** Utilize high-performance processors with speeds up to 1.2GHz and 1.5GHz, respectively, featuring compact modular designs for flexible deployment across diverse applications. **Q3P:** Integrates an ARM quad-core high-performance processor. **Q5P, Q7P & Q9P:** Leverage Intel quad-core processors to handle high-response, complex applications. **Q5P, Q7P & Q9P:** Feature dedicated IP addressing, ensuring secure isolation between information and control layers for stable factory operations. **All models:** Integrate EtherCAT, EtherNet/IP, OPC UA, CANopen, and Modbus protocols, enabling seamless connectivity with MES, ERP systems, and workshop devices.

DUAL MASTER EtherCAT



Note: Supported by specific hardware configurations.

HIGH-PERFORMANCE CONTROL/

The QP-Series Smart Mechanical Controllers target high-end industrial automation applications, leveraging high-performance processors, sub-100μs scan cycles, and enhanced axis control capabilities to excel in **photovoltaic (PV) systems**, **lithium battery (LiB) manufacturing**, **semiconductor fabrication**, and **digital printing industries**.

Intel HIGH-PERFORMANCE QUAD-CORE PROCESSOR



OPC UA

EtherNet/IP

EtherCAT
Technology Group

CANopen

QP-Series Product Family Chart

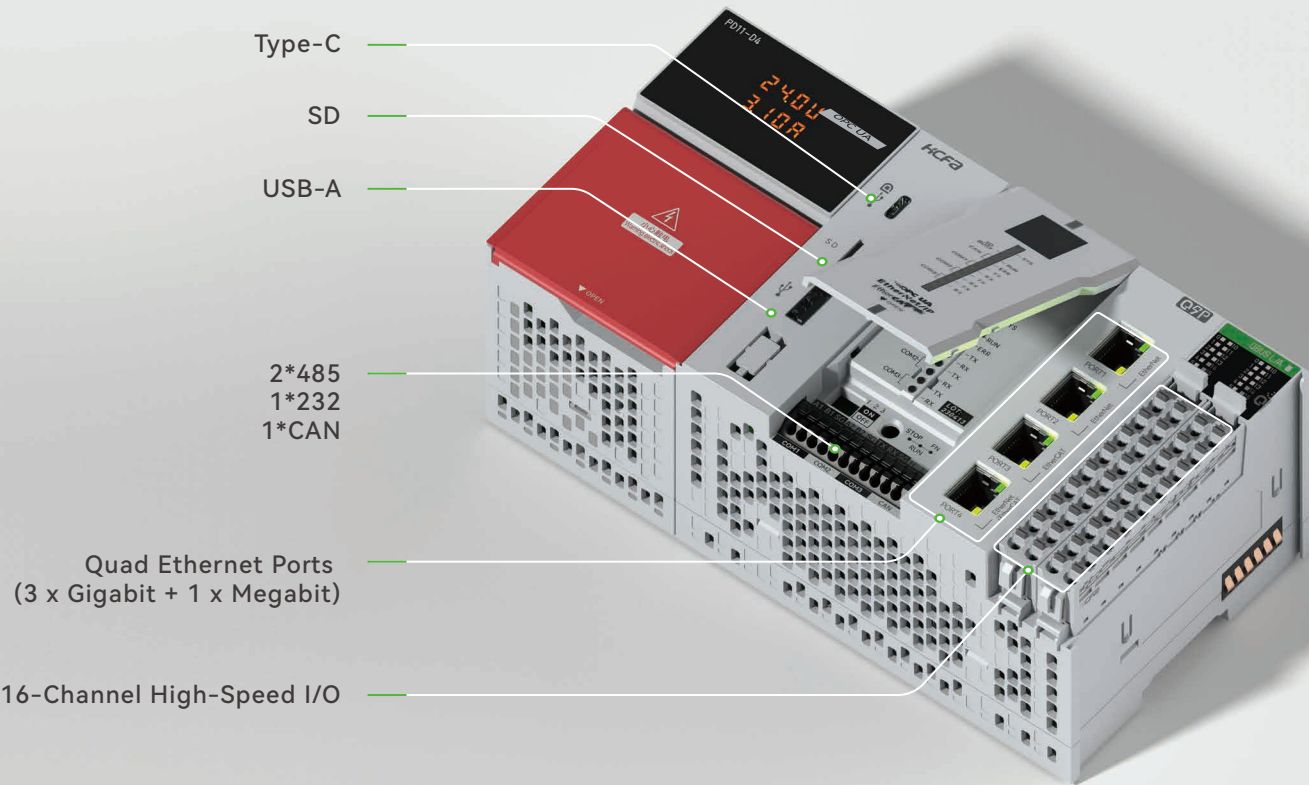


INTEGRATED HARDWARE INTERFACES/

The **QP-Series** Controllers offer a variety of communication interface options, including Ethernet, serial ports, and CAN bus. Rich communication interfaces enable them to exchange data and communicate quickly and reliably with other devices and systems.

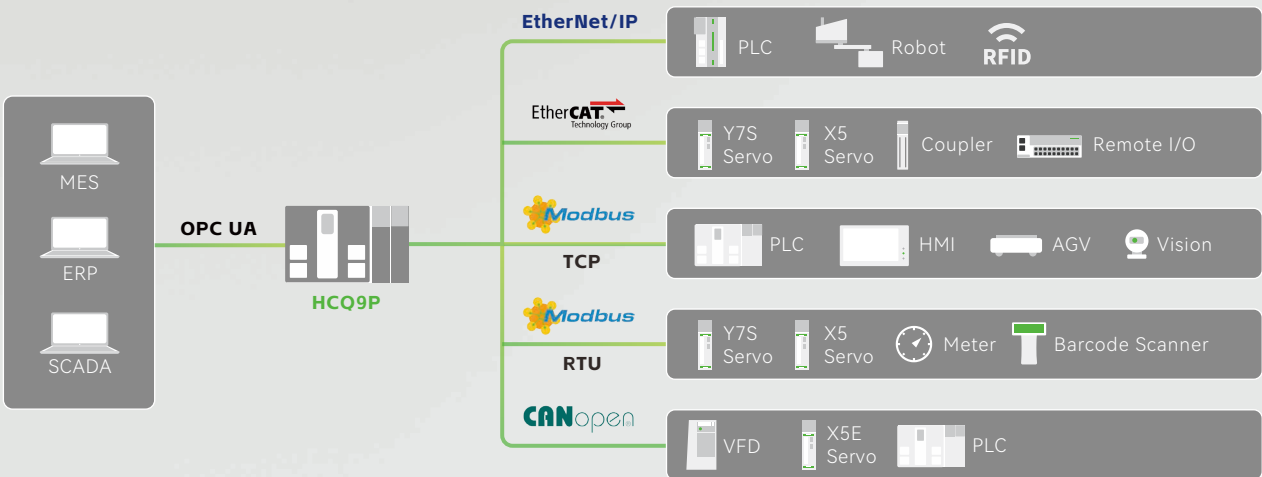
3 Gigabit Ethernet Ports: No gateway module required, enabling independent IP addresses.

192.168.188.XXX	192.168.88.XXX	192.168.8.XXX
EMS/ERP/SCADA	PLC/Robot/Rfid	PLC/HMI/AGV/Vision



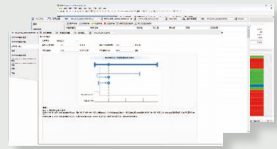
MULTIPLE MAINSTREAM BUS PROTOCOLS/

The **QP-Series** Smart Mechanical Controllers support multiple industrial communication protocols, including **Modbus**, **CANopen**, **EtherCAT**, **OPC UA**, and **EtherNet/IP**. Users can effortlessly achieve seamless interconnection with other devices, sensors, and actuators.



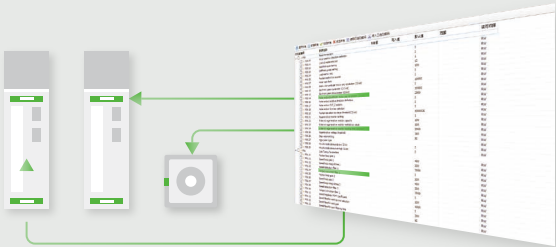
NEW SECONDARY DEVELOPMENT IDE--HCP WORKS3

The **HCP Works3** Programming Platform supports IEC 61131-3 standard programming languages and complies with PLCopen 2.0 specifications. It includes a built-in servo parameter tuning interface, one-click slave device configuration, and a resource usage table to improve user convenience. The platform features clear topology visualization, a graphical device configuration interface, and a local configuration interface.



Built-In Servo Parameter Tuning Interface/

The built-in servo parameter quick-transfer interface supports batch import/export operations for HCFA's full-range servo parameters directly on the host computer, eliminating the need for additional servo debugging software and significantly reducing user workload.



Graphical Configuration Interface/

The HCP Works3 Programming Platform provides a graphical configuration interface for the Q-Series products. During hardware configuration, users simply need to right-click and select the required modules from the right-side module library to add them.

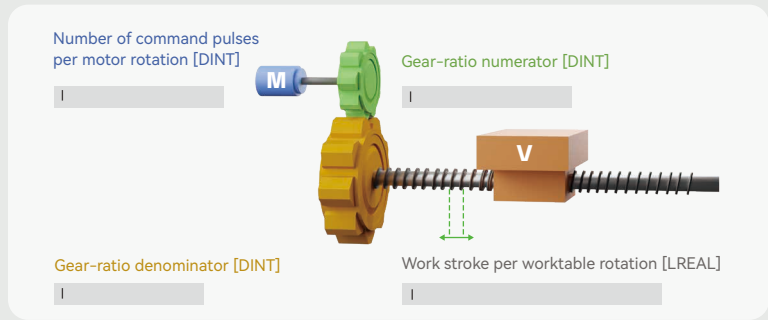


Visual Parameter Configuration/

The system provides a visualized external physical topology (differentiated by linear and rotational axes) for configuring electronic gear ratios. Unit conversions are contextualized to real-world applications, making it easier for users to understand.

Unit Conversion Formula:

$$\text{Pulse} = \frac{\text{Number of command pulses per motor rotation [DINT]}}{\text{Work stroke per worktable rotation [LREAL]}} \times \frac{\text{Gear-ratio numerator [DINT]}}{\text{Gear-ratio denominator [DINT]}} \times \text{Movement distance [User-defined unit]}$$

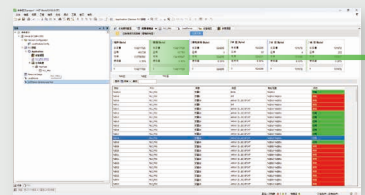


Visualization Processing



Intuitive Resource Allocation/

In the Resource Usage Table, users can view the current utilization status of programs, data, persistent data memory, I-area, Q-area, and M-area. This includes metrics such as total capacity, available space, and usage rate. The table also displays real-time data address usage and conflict status, preventing data overwrite issues caused by duplicate address assignments. This helps users optimize resource allocation with visual clarity.



Data (Byte)

Total Capacity: 134217728	Usage Rate: 0.10%
Available: 134109947	Used: 107781

Naming Rule for QP-Series Controllers

HC

HC: HCFA

Q5

Q0: Basic network motion controller

Q1: General-Purpose bus motion controller

Q3: Standard bus motion controller

Q5: Basic high-speed mechanical controller

Q7: Standard intelligent mechanical controller

Q9: Premium flagship mechanical controller

P

None: Standard type

P : Enhanced type

1

1: Linux

0

0: CODESYS

0

0: Standard software

U

U: UPS power supply

D: DC power supply

4

11

11: 100W power supply
(compatible with Q-U4-series controller))

4

*

1

2

3

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8

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10

HC

Q

5

P

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4

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Naming Rule for Power Supply Modules

HC

HC: HCFA

QX

QX: Q-Series general
-purpose expansion

PD

PD: System power
supply expansion

11

11: 100W power supply
(compatible with Q-U4-series controller))

D

D: DC power supply

A: AC power supply

4

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1

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HC

Q

X

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QP Product Series Comparison

Model	HCQ0P-1200-D4	HCQ1P-1300-D4	HCQ3P-1400-D4	HCQ5P-1500-U4	HCQ7P-1600-U4	HCQ9P-1700-U4
Processor	ARM			Celeron	Intel i5	Intel i7
Hard Disk/RAM	8G/512M			64G/2G	64G/8G	64G/8G
Program capacity	128 MBytes					
Persistent data memory	1 MBytes			6 MBytes		
EtherCAT axis capacity (1ms)	8 axes	16 axes	32 axes	32 axes+32 axes	64 axes+64 axes	128 axes+128 axes
Pulse axis	8 axes					
Onboard I/O	16-channel input & 16-channel output					
Right-Side expansion (output power)	16W					
Power supply module	No UPS required, 24V DC input			UPS module required: HCQX-PD11-D4 (DC 24V), HCQX-PD11-A4 (AC 220V)* ¹		
Ethernet port	100Mbps*3		1000Mbps*2 + 100Mbps*1	1000Mbps*3 + 100Mbps*1		
Monitoring protocol download	Supported					
EtherNet/IP	Scanner & Adapter modes supported					
Modbus TCP/IP	Server/Client modes supported					
OPC UA	Server mode supported					
EtherCAT	1 Port			2 Ports		
CANopen	1 Port (Optional card)		1 Port			
Serial port	2 RS485 ports		2 RS485 ports + 1 RS232 port			
USB	1 Type-C port		1 USB 2.0 port + 1 Type-C port			
SD card	1 Port					
Programming software	HCP Works3					
Programming language	LD, ST, SFC, CFC, FBD					

^{*1} This model will be released in subsequent launches.

QP-Series Controller Specifications

Model			HCQ0P-1200-D4	HCQ1P-1300-D4	HCQ3P-1400-D4	HCQ5P-1500-U4	HCQ7P-1600-U4	HCQ9P-1700-U4
Appearance								
			-			Note: HCQ5P, HCQ7P, and HCQ9P controllers must be used with the PD11 power supply module (see page 10 for details).		
Processor			ARM			Celeron	Intel i5	Intel i7
Hard disk/RAM (Bytes)			8G/512M			64G/2G	64G/8G	64G/8G
Progra-mming	Program capacity		128 MBytes					
	I-area/O-area/M-area		128 KBytes / 128 KBytes / 512 KBytes					
	Persistent data memory		1 MBytes			6 MBytes		
	User data storage capacity		128 MBytes (Folder name: FlashFiles)					
Unit confi-guration	Onboard expansion module number	Digital/Analog /Other	Calculate based on consumption current					
		Power supply output	DC12V/16W					
	Compatible power supply module		-			HCQX-PD11-D4, HCQX-PD11-A4*		
Axis capacity	EtherCAT (1ms)		8 axes	16 axes	32 axes	32 axes+32 axes	64 axes+64 axes	128 axes+128 axes
	Pulse axis		8 axes, 200kHz (open collector output)					
EtherCAT	Communication standard		IEC 61158 Type12					
	EtherCAT master specifications		Class B (compatible with function pack motion control)					
	Physical layer		100Base-TX					
	Modulation		Baseband					
	Data transmission speed		100Mbps (100Base-TX)					
	Duplex mode		Full duplex					
	Topology		Linear topology and star topology					
	Transmission medium		Cat5e shielded twisted pair					
	Max. transmission distance between nodes		100m					
	Max. number of slave stations		65535					
	Max. process data		Input: 5,736 Bytes; Output: 5,736 Bytes (Max. process data frame: 4)					
	Max. communication cycle		1ms		500μs	500μs	250μs	125μs
CANopen master	Link layer		CAN2.0A					
	Termination resistor		External 120Ω required		Built-in 120Ω with DIP switch toggle			
	Supported baud rate (bps)		20k, 50k, 100k, 125k, 250k, 500k, 800k, and 1M					
	Topology		Linear topology					
	Transmission medium		Cat5e shielded twisted pair					
	Max. communication distance		2500m (20kbps)					
	Max. number of slave stations		31					
	Communication cycle		Min. 1ms		Min. 500μs	Min. 125μs		
Serial port	Physical layer	COM1,COM2	RS485					
		COM3	-	RS232				
	Termination resistor	COM1,COM2	-	120Ω with DIP switch toggle				
	Baud rate		1200bps~115200bps					
	Max. communication distance	COM1,COM2	500m					
		COM3	-	5m				

* This model will be released in subsequent launches.

Model		HCQ0P-1200-D4	HCQ1P-1300-D4	HCQ3P-1400-D4	HCQ5P-1500-U4	HCQ7P-1600-U4	HCQ9P-1700-U4
Serial port	Topology	COM1,COM2	Linear topology				
		COM3	-	Point-to-Point topology			
	Max. number of slave stations	COM1,COM2	31				
		COM3	-	1			
Internal clock	Ambient temperature: 55°C		-	Monthly error of -1.5 min to +1.5 min			
	Ambient temperature: 25°C		-	Monthly error of -3.5 min to +0.5 min			
	Ambient temperature: 0°C		-	Monthly error of -3 min to +1 min			
Ethernet Specifications							
Item			PORT1	PORT2	PORT3	PORT4*	
Function			Communication, program upload/download, and firmware update		EtherCAT master	Communication, program upload/download, firmware update, and EtherCAT master	
Data transmission speed			100Mbps		100Mbps	1000/100/10Mbps	
Communication mode			Full/Half duplex				
Interface			RJ45 connector				
Max. segment length (between hub and node)			100m				
Supported protocol	Protocol monitoring download		✓	✓	-	✓	
	Modbus TCP/IP server and client		✓	✓	-	✓	
	OPC UA server		✓	✓	-	✓	
	EtherNet/IP scanner and adapter		✓	✓	-	✓	
	EtherCAT master		-	-	✓	✓	
Initial IP address (PORT1 & PORT2 of Q0P & Q1P share a default IP: 192.168.88.100)			192.168.188.100	192.168.88.100	-	192.168.8.100	
Cable			Cat5e shielded twisted pair				
Serial Port Specifications							
Item			COM1, COM2		COM3		
Interface			RS485 interface		RS232 interface		
Data transmission speed			Max. 115200bps				
Communication mode			Half duplex		Full duplex		
Max. transmission distance			500m (at 9600bps)		5m		
Supported protocol			Modbus RTU master/slave		Serial port custom protocol		
Insulation			Digital isolator insulation				
Termination resistor			Built-in 120Ω (switchable, Q0P/Q1P excluded)		-		
Supported number of slave stations			31		1		
CAN Specifications							
Item			Specification				
Interface			CAN interface				
Number of interfaces			1				
Data transmission speed			Max. 1Mbps				
Communication mode			Half duplex				
Max. transmission distance			2500m (at 20kbit/s)				
Supported protocol			CANOpen				
Insulation			Digital isolator insulation				
Termination resistor			Built-in 120Ω (switchable, Q0P/Q1P excluded)				
Supported number of slave stations			31				
USB Specifications							
Item			Type-C		USB-A		
Transmission specification			USB2.0 Type-C		USB2.0		
Max. output current at 5V			1A				
Max. communication speed			480Mbps (theoretical)				
Insulation			Non-Isolated		-		

* HCQ0P-1200-D4, HCQ1P-1300-D4, and HCQ3P-1400-D4 are not supported.

General Specifications

Item			Q0P/Q1P	Q3P	Q3P/Q5P/Q7P/Q9P
Weight			278g	710g	
Size (mm)			70.3 (W) *122.0 (H) *81.9 (D)	132.2 (W) *105.5 (H) *81.9 (D)	
Operating environment	Operating temperature		-10~55℃		
	Storage temperature		-40~75℃		
	Relative humidity		10 - 95% (non-condensing)		
	Altitude		2,000m Max.		
	Random drop		1m, 2 times of packaging and transportation		
	Vibration	Frequency	5 Hz ~150Hz		
		Displacement	3.5mm, constant amplitude		
		Acceleration	1.0g, constant amplitude		
		Direction	3 axes		
	Shock		Random amplitude 15g, 11ms half-sine wave, 3 mutually perpendicular axes		
Pollution degree		Pollution degree II			
IP rating		IP20			
Electromagnetic compatibility requirement	Electrostatic discharge		Contact ±4kV; Air ±8kV		
	Electrical Fast Transient/Burst (EFT/B)		±2kV		
	Surge		DC1kV		
Insulation resistance			>1MΩ		
Dielectric withstand voltage			2000V, 1min		
Cooling method			Natural cooling		Active heat dissipation, fan cooling
Installation location			Inside control cabinet		
Main material			Standard PPE, UL94 standard, flame retardant class V0		
Certification			CE		CE, UL

Power Supply Specifications

Item	HCQ0P-1200-D4	HCQ1P-1300-U4	HCQ3P-1400-D4	HCQ5P-1500-U4	HCQ7P-1600-U4	HCQ9P-1700-U4
Power supply voltage	DC24V					
Voltage fluctuation range	-15%~+20%					
Rated power consumption	21W		22W	35W	46W	50W
Power supply efficiency	80%					
Allowable instantaneous power failure time	Operation will continue if the time is below 5ms					
Output voltage	DC12V					
Output power	16W					

High-Speed IO Input Specifications

Item	Specification
Signal name	16-Channel high-speed input (I0-I17, Octal)
Rated input voltage	DC24V (-15% to +20%, ripple ≤±10%)
Input type	NPN or PNP input
Rated input current	6.81mA
ON current	>4.1mA
OFF current	<1.07mA
Input resistance	HCQ0P-1200-D4: 3.3KΩ HCQ1P-1300-D4: 3.3KΩ HCQ3P-1400-D4: 3.3KΩ HCQ5P-1500-U4: 1.5KΩ HCQ7P-1600-U4: 1.5KΩ HCQ9P-1700-U4: 1.5KΩ
Max. input frequency	200kHz
Common mode	One common terminal per 8 channels; Two input common terminals are internally connected

High-Speed IO Output Specifications

Item	Specification
Signal name	16-Channel high-speed output (Q0-Q17, Octal)
Output type	NPN output
Control circuit voltage	DC5V~24V
Rated load current	250mA
Max. voltage drop when ON	0.05V
Leakage current when OFF	<0.1mA
Output frequency	200kHz
Common mode	One common terminal per 8 channels

POWER SUPPLY SPECIFICATIONS

Power Supply Module Specifications

Model	HCQX-PD11-D4		
Appearance			
Compatible controller	HCQ5P-1500-U4	HCQ7P-1600-U4	HCQ9P-1700-U4
Rated voltage	DC24V (-15%~+20%)		
Power consumption	<2W		
Recommended input power	>200W		
Overheating warning	✓		
Undervoltage protection	✓		
Design lifespan	60,000 Hours (ambient temperature 50℃)		
UPS charging time	10s (Tpy.)		
Weight	Net weight: Approx. 190g		

General Specifications

Model			HCQX-PD11-D4
Size (mm)			65 (W) x104.5 (H)x74.5 (D)
Operating environment	Operating temperature		-10~55℃
	Relative humidity		10 - 95% (non-condensing)
	Altitude		2,000m Max.
	Insulation voltage withstand		DC500V, 1 min (leakage current ≤10mA)
	Random drop		1m, 2 times of packaging and transportation
	Vibration	Frequency	5-150Hz
		Displacement	3.5mm, constant amplitude
		Acceleration	1.0g, constant amplitude
		Direction	3 axes
	Shock		Random amplitude 15g, 11ms half-sine wave, 3 mutually perpendicular axes
IP rating		IP20	
Electro-magnetic compatibility requirement	Electrostatic discharge		Contact ±4kV; Air ±8kV
	Electrical Fast Transient/Burst (EFT/B)		±2kV
	Surge		DC500V
Cooling method			Passive cooling, natural air cooling
Installation location			Inside control cabinet
Main material			Standard PPE, UL94 certified, flame retardant class V0

Naming Rule for QP-Series Optional Cards

HCQXB-2RS232-BD

1 2 3 4

1.Product Name

HC

HC: HCFA controller

2.Optional Card Series

QXB

QXB: Q-Series optional expansion

4.Suffix

BD

BD: BD optional card

3.Product Series

2RS232

2RS232: Two RS232 serial ports
2RS485: Two RS485 serial ports
CAN: One CAN communication interface
RTC: Real-Time Clock battery backup card

Specifications

QP-SERIES OPTIONAL CONFIGURATION

Q0P/Q1P Controller Optional Card Specifications

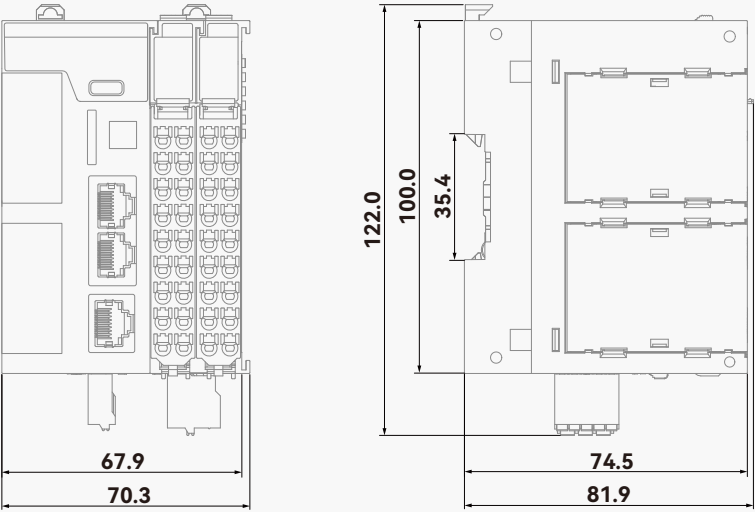
Model	HCQXB-2RS485-BD (Compatible with Q0P/Q1P controllers)	HCQXB-2RS232-BD (Compatible with Q0P/Q1P controllers)
Appearance		
Specification overview	2-Channel RS485 communication card; Standalone master/slave configurable; Modbus & Custom protocol support	2-Channel RS232 communication card; Standalone master/slave configurable; Modbus & Custom protocol support
Communication mode	RTU	
Max. slave stations	32	1
Termination resistor	External 120Ω resistor	-
Baud rate (bps)	9600, 19200, 38400, 57600, 115200	
Max. communication distance	500m (9600bps)	15m (9600bps)

Model	HCQXB-CAN-BD (Compatible with Q0P/Q1P controllers)
Appearance	
Specification overview	CANopen master support, CANBUS custom protocol support
Supported number of slave stations	31
Link layer	CAN2.0 A/B
Termination resistor	External 120Ω resistor
Topology	Daisy chain topology and star topology
Transmission medium	CIA-Compliant CAN cable
Max. communication distance	2500m (20kbps)

Model	HCQXB-RTC-BD (Compatible with Q0P/Q1P controllers)
Appearance	
Specification overview	Real-Time Clock battery backup card (timekeeping during power failure)
Clock accuracy	Monthly accuracy: -1.5 ~ +1.5 min
Clock format	YYYY-MM-DD HH:MM:SS, Weekday
Battery specification	HCFA standard battery (replaceable, 5-year lifespan)

QP-Series Controller

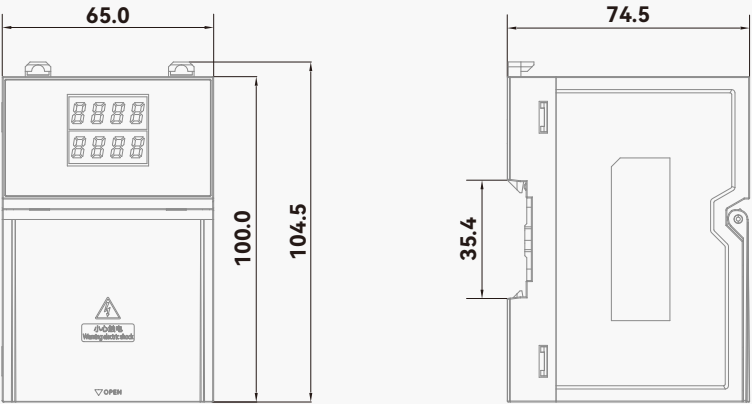
Unit: mm



Compatible Models: HCQ0P-1200-D4, HCQ1P-1300-D4

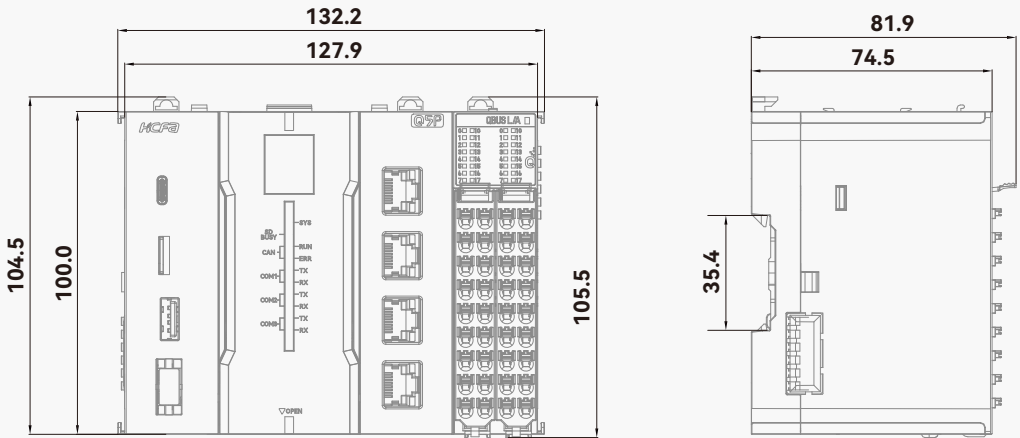
Power Supply Module

Unit: mm



Compatible Models: HCQX-PD11-D4, HCQX-PD11-A4 (This model will be released subsequently.)

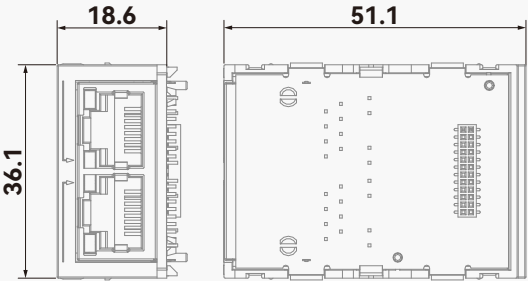
Unit: mm



Compatible Models: HCQ3P-1400-D4, HCQ5P-1500-U4, HCQ7P-1600-U4, HCQ9P-1700-U4

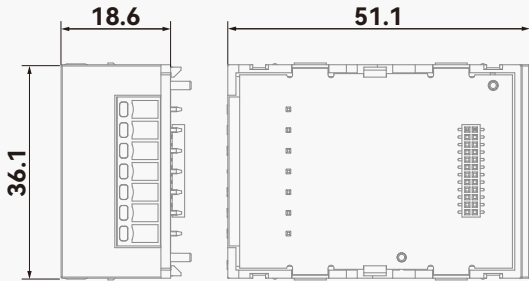
Optional Card

Unit: mm



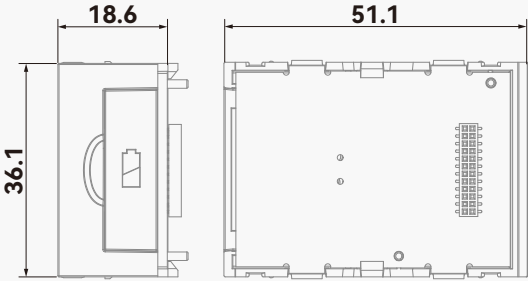
Compatible Models: HCQXB-CAN-BD

Unit: mm



Compatible Models: HCQXB-2RS485-BD, HCQXB-2RS232-BD

Unit: mm



Compatible Models: HCQXB-RTC-BD

3 TYPES OF EtherCAT COUPLERS & 6-CHANNEL EtherCAT SPLITTER

EMPOWERING DIVERSE INDUSTRIAL APPLICATIONS!



RICH CONFIGURATION

- ① 20+ Expansion Modules
- ② 3 EtherCAT Couplers
- ③ 6-Channel EtherCAT Splitter

USER-FRIENDLY & FLEXIBLE

- ① 13mm Ultra-Slim Modules
- ② PUSH-IN Detachable Terminals

SAFE & RELIABLE

- ① Multi-Layer Hardware Protection
- ② Detailed Fault Diagnostics

20+ EXTENDED I/O TYPES DIVERSE SOLUTIONS

50% SPACE SAVING: 13mm Ultra-Slim Modules vs. Traditional Modules; **DETACHABLE TERMINALS:** Module replacement without disconnecting existing connections; **PUSH-IN TOOL-FREE WIRING:** Direct Plug-In Technology.



EC Coupler Module

- HCQX-EC01-D4
- HCQX-EC02-D4
- HCQX-EC03-D4

ES Splitter Module

- HCQX-ES06-D4

16-Channel Digital Module

- HCQX-ID16-D4
- HCQX-OD16-D4
- HCQX-OD16-D4-PNP
- HCQX-MD16-D4
- HCQX-MD16-D4-PNP

32-Channel Digital Module

- HCQX-ID32-D4
- HCQX-OD32-D4
- HCQX-OD32-D4-PNP
- HCQX-MD32-D4
- HCQX-MD32-D4-PNP

Specialized Function Module

- HCQX-AD04-D4
- HCQX-AD08-D4
- HCQX-DA04-D4
- HCQX-TS04-D4
- HCQX-RS02-D4
- HCQX-RS02-D4-M
- HCQX-OC08-D4
- HCQX-HC02-D4
- HCQX-HC04-D4

HCQX-EC01-D4

Q-Series Controller



EtherCAT Technology Group

EC01-D4 Coupler
D4-Series Expansion Modules



EtherCAT Technology Group

Y7S EtherCAT Servo
X5 EtherCAT Servo



- Expansion modules account for the total bus node quantity.
- Application Scenario: EtherCAT master stations with unlimited bus node capacity.

HCQX-EC02-D4

Q-Series Controller



EtherCAT Technology Group

EC02-D4 Coupler
D4-Series Expansion Modules



EtherCAT Technology Group

Y7S EtherCAT Servo
X5 EtherCAT Servo



- Expansion modules do not account for the total bus node quantity.
- Application Scenario: EtherCAT master stations with limited bus node capacity.

HCQX-EC03-D4

Q-Series Controller



EtherCAT Technology Group

EC03-D4 Coupler
NXE-Series Expansion Modules



EtherCAT Technology Group

Y7S EtherCAT Servo
X5 EtherCAT Servo



- Dedicated couplers for HCFA NXE-Series remote expansion modules, NXE expansion modules do not account for the total bus node quantity.
- Application Scenario: EtherCAT master stations with limited bus node capacity using HCFA NXE expansion modules.

HCQX-ES06-D4

Q-Series Controller



EtherCAT Technology Group

ES06-D4 Splitter



- 6-Channel EtherCAT splitter, supporting both star topology and complex bus topology.

Naming Rule for Q-Series Couplers

HCQX-EC01-D4-****

1

2

3

4

5

6

7

1.Product Name

HC

HC: HCFA

2.Product Series

QX

QX: Q-Series
general-purpose
expansion

3.Function Module

EC

EC: EtherCAT
coupler

4.Function Code

01

01: Standard version*¹
02: Function code 2*²
03: Function code 3*³

5.Power Supply Type

D

D: DC power supply

6.Iteration Version

4

7.Non-Standard Specification

*

None: Standard type

Naming Rule for Q-Series Expansion Modules

HCQX-AD04-D4-****

1

2

3

4

5

6

7

1.Product Name

HC

HC: HCFA

2.Product Series

QX

QX: Q-Series
general-purpose
expansion

3.Function Module

AD

AD: Analog input
DA: Analog output
ID: Digital input
OD: Digital output
HC: High-Speed input

MD: Mixed digital
TS: Temperature measurement
RS: Serial communication
ES: Splitter

4.Number of channels

04

5.Power Supply Type

D

D: DC power supply

6.Iteration Version

4

7.Non-Standard Specifications

*

None: Standard type
PNP: PNP output
(European standard)
M : Modbus protocol

Q-Series Expansion Module General Specifications

General Specifications

Item		Specification
Operating environment	Operating temperature	-10~55℃
	Storage temperature	-40~75℃
	Relative humidity	10 - 95% RH (non-condensing)
	Altitude	2,000m MAX.
	Random drop	1m, 2 times of packaging and transportation
	Vibration resistance	5-8.4Hz amplitude 3.5mm, 8.4-150Hz, acceleration 9.8m/s ² (X, Y, Z axes, 100 min each) 5-150Hz
	Shock resistance	147m/s ² (X, Y, Z axes, 3 times each)
	IP rating	IP20
Electromagnetic compatibility requirement	Pollution degree	Pollution degree II
	Isolation method	Refer to the instruction manual
	Electrostatic discharge	Contact ±4kV; Air ±8kV
	Electrical Fast Transient /Burst (EFT/B)	±2kV
Surge		DC DC power supply: 0.5 CM 0.5kV DM
Dielectric voltage withstand		DC500V, 1 min (leakage current<5mA)
Cooling method		Passive cooling, natural air cooling
Installation location		Inside control cabinet
Main material		Standard PPE, UL94 certified, flame retardant class V0

*¹ Standard EtherCAT coupler, expansion modules account for the total bus node quantity.
*² Standard EtherCAT coupler, expansion modules do not account for the total bus node quantity.
*³ Dedicated EtherCAT couplers for NXE-series modules, expansion modules do not account for the total bus node quantity.

21

22

Coupler Module

Model		HCQX-EC01-D4	HCQX-EC02-D4	HCQX-EC03-D4
Appearance				
Communication protocol		EtherCAT		
Expansion module type*1		Compatible with all Q-Series modules	Compatible with Q-series ID/OD/MD/AD/DA/TS/RS modules	Compatible with all NXE-series expansion modules
Max. number of expansion modules		16*2		31
Data transmission medium		Cat5e shielded twisted pair		
Transmission speed		100Mbps		
Max. inter-station distance		100m		
Communication physical layer		10/100BASE-TX (IEEE 802.3)		
QBUS communication cycle		Minimum scan cycle: 125μs; Scan cycle synchronized with the master station	Minimum scan cycle: 500μs; Scan cycle synchronized with the master station	-
QBUS fault tolerance		-	QBUS communication frame loss tolerance: 0 - 255 (default: 12; settable)	-
NXE OUT communication cycle		-		Minimum scan cycle: 500μs; Scan cycle synchronized with the master station
NXE OUT fault tolerance		-		NXE communication frame loss tolerance: 0 - 255 times (default: 12; settable)
Addressing method		Sequential addressing; Configured addressing		
COE		✓		
FOE		✓		
Refreshing method	Free-run	✓		
	SM-Synchron	✓		
	DC	DC supported when used with the master station	DC supported (module built-in DC support)	
Rated voltage		DC 24V (-15%~+20%)		
Rated current		79mA		50mA
QBUS rated output voltage		DC12V		-
QBUS output power		16W MAX.		-
Power supply protection feature	Power supply input undervoltage protection	18V		
	Power supply input overvoltage protection	33V		
	Power supply input overcurrent protection	3.5A		
	Power supply input reverse-connection protection	✓		
	Power supply input voltage anomaly alarm	-	Support over-voltage and under-voltage detection (error: ±0.5V)	
Weight		Net weight: Approx. 90g	Net weight: Approx. 95g	Net weight: Approx. 90g

*1 Refer to the compatibility table on the model selection page.
*2 Ensure total power of all QBUS modules ≤16W during selection.

Splitter Module

Model		HCQX-ES06-D4
Appearance		
Communication protocol		EtherCAT
Number of channels		1 EtherCAT input channel, 5 EtherCAT output channels
Splitter cascade		Max. cascade: 2 ES06 modules
Port priority order		PORT2>PORT3>PORT4>PORT5>PORT6
Transmission mode		Full duplex
Topology		Star topology
Data transmission medium		Cat5e shielded twisted pair
Transmission speed		100Mbps
Max. inter-station distance		100m
Physical layer		10/100BASE-TX (IEEE 802.3)
Min. master station scan cycle		500μs
Addressing method		Sequential addressing; Configured addressing
Refreshing method	DC	DC mode enabled by default; One ES06 splitter module occupies 2 EtherCAT slave station addresses
Rated voltage		DC 24V (-15%~+20%)
Rated current		116mA
Power consumption		2.4W
Power supply protection feature	Power supply input undervoltage protection	18V
	Power supply input overvoltage protection	33V
	Power supply input overcurrent protection	3.5A
	Power supply input reverse-connection protection	✓
Weight		Net weight: Approx. 130g

Digital Input Module

Model		HCQX-ID16-D4	HCQX-ID32-D4
Appearance			
Number of input channels		16	32
Operating temperature vs. Active input channels	Full-Load operation	45°C	-
	75% input channels active	50°C	-
	50% input channels active	55°C	-
Input type		Compatible with NPN and PNP	
Rated input voltage		DC 24V (-15%~+20%)	
Rated input current		4.1mA/channel	
Input impedance		6.35kΩ	
Input OFF voltage		<DC5V	
Input OFF current		<0.65mA	
Input ON voltage		>DC15V	
Input ON current		>2.4mA	
ON/OFF response time		125μs	
Hardware filtering time		1ms	
QBUS power consumption		1.0W	
Weight		Net weight: Approx. 70g	Net weight: Approx. 120g

Digital Output Module

Model		HCQX-OD16-D4	HCQX-OD16-D4-PNP	HCQX-OD32-D4	HCQX-OD32-D4-PNP
Appearance					
Number of output channels		16		32	
Output type		NPN		PNP	
Rated load voltage		DC 24V (-15%~+20%)		DC 24V (-15%~+20%)	
Rated load current		0.5A/channel, 4A/module		0.5A/channel, 8A/module	
Inductive load		12W/channel, 96W/module		12W/channel, 192W/module	
Lamp load		1.5W/channel, 12W/module		1.5W/channel, 24W/module	
Leakage current when OFF		<0.1mA		<0.1mA	
ON/OFF response time		125μs		125μs	
Overcurrent protection		✓		✓	
Overvoltage protection		✓		✓	
QBUS power consumption		1.2W		1.3W	
Weight		Net weight: Approx. 70g		Net weight: Approx. 120g	

Digital Mixed Module

Model			HCQX-MD16-D4	HCQX-MD16-D4-PNP	HCQX-MD32-D4	HCQX-MD32-D4-PNP
Appearance						
Input specifications	Number of input channels		8		16	
	Operating temperature vs. Active input channels	Full-Load operation	45°C		-	
		75% input channels active	50°C		-	
		50% input channels active	55°C		-	
	Input type		Compatible with NPN and PNP		Compatible with NPN and PNP	
	Rated input voltage		DC 24V (-15%~+20%)		DC 24V (-15%~+20%)	
	Rated input current		4.1mA/channel		4.1mA/channel	
	Input impedance		6.35kΩ		6.35kΩ	
	Input OFF voltage		<DC5V		<DC5V	
	Input OFF current		<0.65mA		<0.65mA	
	Input ON voltage		>DC15V		>DC15V	
	Input ON current		>2.4mA		>2.4mA	
	ON/OFF response time		125μs		125μs	
	Hardware filtering time		1ms		1ms	
Output specifications	Number of output channels		8		16	
	Output type		NPN	PNP	NPN	PNP
	Rated load voltage		DC 24V (-15%~+20%)		DC 24V (-15%~+20%)	
	Rated load current		0.5A/channel, 4A/module		0.5A/channel, 4A/module	
	Inductive load		12W/channel, 96W/module		12W/channel, 96W/module	
	Lamp load		1.5W/channel, 12W/module		1.5W/channel, 12W/module	
	Leakage current when OFF		<0.1mA		<0.1mA	
	ON/OFF response time		125μs		125μs	
	Overcurrent protection		✓		✓	
	Overvoltage protection		✓		✓	
	QBUS power consumption		1.0W		1.0W	
	Weight		Net weight: Approx. 70g		Net weight: Approx. 120g	

Relay Output Module

Model	HCQX-OC08-D4
Appearance	
Number of output channels	8
Output type	Relay output
Rated load voltage	DC24V (-15%~+20%), AC220V
Rated load current	2A/channel, 16A/module
Inductive load	48W/channel, 384W/module
Lamp load	6W/channel, 48W/module
Rated power	1.2W
ON/OFF response time	15ms
Common terminal	4 channels per common terminal, 2 independent groups
Switching cycles	>100000 times

Analog Module

Model		HCQX-DA04-D4
Appearance		
Number of output channels		4
Voltage output	Voltage output range	-10~+10V, 0~10V, -5V~+5V, 0~5V, 1~5V
	Voltage load	>5kΩ
	Voltage output type	Single-Ended output
Current output	Current output range	0~20mA, 4~20mA
	Current load	<350Ω
	Current output type	Single-Ended output
Conversion time		1ms/4 channels
Resolution		16bit
Accuracy		<= ±0.3%FSR
Preset I/O values		✓
User calibration		✓
Power supply protection feature	Power supply input undervoltage protection	18V
	Power supply input overvoltage protection	30V
	Power supply reverse polarity protection	Reverse polarity voltage (Max. 60V)
	Voltage output short-circuit protection	Not supported
	Voltage output open-circuit detection	Not supported
Addressing method		Sequential addressing; Configured addressing
COE		✓
FOE		✓
Refreshing method		SM-Synchron support
QBUS power consumption		1.2W
Weight		Net weight: Approx. 70g

Analog Module

Model		HCQX-AD04-D4	HCQX-AD08-D4
Appearance			
Number of input channels		4	8
Voltage input	Voltage input range	-10~+10V, 0~10V, -5V~+5V, 0~5V, 1~5V	
	Voltage input impedance	1MΩ	
	Voltage input type	Differential input	
	Current input range	0~20mA, 4~20mA	
Current input	Current input impedance	240Ω	
	Current input type	Differential input	
Software filtering		Averaging filtering supported, 0 - 4096	
Max. common-mode voltage		35V	
Conversion time		1ms/4 channels	1ms/8 channels
Resolution		16bit	
Accuracy		Accuracy at 25°C: ±0.1% FSR Accuracy across full temperature range: ±0.3% FSR	Accuracy at 25°C: ±0.1% FSR Accuracy across full temperature range: ±0.2% FSR
Overrun testing		✓	
Range detection		✓	
Transient detection		✓	
User calibration		✓	
Power supply protection feature	Power supply input undervoltage protection	18V	
	Power supply input overvoltage protection	30V	
	Power supply reverse polarity protection	✓	
	Input overvoltage protection	-50~+50V	
	Input overcurrent protection	-50~+50mA	
Addressing method		Sequential addressing; Configured addressing	
COE		✓	
FOE		✓	
Refreshing method		SM-Synchron support	
QBUS power consumption		1.2W	
Weight		Net weight: Approx. 70g	Net weight: Approx. 125g

Serial Communication Module

Model		HCQX-RS02-D4	HCQX-RS02-D4-M
Appearance			
Hardware specifications	Number of channels	2	
	Supported serial port	RS232, RS485, RS422	
	Supported protocol	Custom protocol	Modbus protocol
	Number of slave stations	32 (16 per channel)	16 (8 per channel)
	Wiring method	2-wire, 3-wire, 4-wire	
Software specifications	MODBUS function code	-	01, 02, 03, 04, 05, 06, 15, 16
	Parity bit	Odd, Even, None	
	Start bit	1 bit only	
	Stop bit	bit1, bit2	
	Data length	7, 8 Bytes	8 Bytes
	Termination resistor configuration	Software-configurable termination resistor (RS485/RS422 only)	
	Data overflow detection	Slave data overflow detected (indicating data loss)	-
	Parity error detection	Parity errors detected during data transmission	-
	Frame format error detection	Frame format errors detected during data transmission	-
	Data communication control	Data communication control via control word and status word (master-slave)	-
Bus specifications	PDO Max. bytes	32 Bytes output per channel, 32 Bytes input per channel	64 Bytes input per channel, 64 Bytes output per channel
	Receive buffer	1024 Bytes receive buffer, 1024 Bytes transmit buffer	-
	Addressing method	Sequential addressing; Configured addressing	
	COE	✓	
	FOE	✓	
	Refreshing method	SM-Synchron support	
QBUS power consumption		1.2W	
Weight		Net weight: Approx. 120g	

RS232/RS485/RS422 Serial Port Specifications

Item	Specification		
	RS232	RS485	RS422
Wiring method	3-wire	2-wire	4-wire
Communication method	Full duplex	Half duplex	Full duplex
Termination resistor	-	120Ω (software-configurable or external wiring)	
Baud rate (bps)	1200, 2400, 4800, 9600 (default), 19.2k, 38.4K, 57.6k, 115.2k, 230.4k		
Communication distance	10m (related to communication rate)	500m (using termination resistor, related to communication rate)	

Temperature Measurement Module

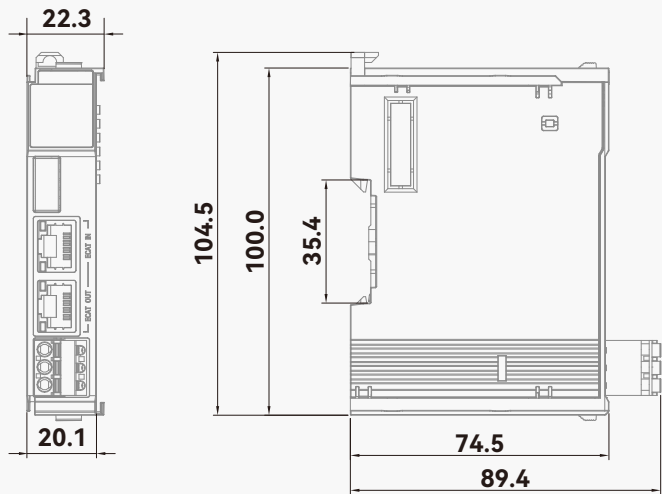
Model		HCQX-TS04-D4				
Appearance						
Hardware specifications	Number of channels	4	Software specifications	Sensor type configuration		Software configurable
	Wiring method	2-wire, 3-wire		Overrun testing		Supported, fixed activation
	RTD sensors	PT100, PT1000, Ni100, Ni1000		Wire-Break detection		Supported, user-selectable. Default: off (Adds ~40ms per channel when enabled)
	Thermocouple sensors	K, J, E, T, N, B, R, S		External cold-junction compensation		Supported. Default: on
	Display sensitivity	0.1°C, 0.1°F		Software filtering		Averaging filtering supported, 0 - 4096
	Digital resolution	24bit		Temperature unit selection		°C or °F
	Accuracy	TC: Full temperature 0~55°C: Total range * (±0.1%) ±4°C (Max. cold junction error 4°C) PT: Full temperature 0~55°C: ±0.5°C		User calibration		✓
	Sampling time (break detection disabled)	TC: 100ms × Number of starting channels × Filtering times of this channel PT: 200ms × Number of starting channels × Filtering times of this channel		Fault handling and alarm	Power supply disconnection	Global error: Auto recovery
	Sampling time (break detection enabled)	TC: 140ms × Number of starting channels × Filtering times of this channel PT: 240ms × Number of starting channels × Filtering times of this channel			Input overrun	Channel error: Auto recovery
	Preheating time	No preheating required			Wire-Break detection	Channel error: Auto recovery
Cold-Junction resistor	10 kΩ (The external cold junction interface includes a default cold junction resistor that is pre-installed at the factory, requiring no additional wiring from the user.)					
Addressing method		Sequential addressing; Configured addressing				
COE		✓				
FOE		✓				
Refreshing method		SM-Synchron support				
QBUS power consumption		1.2W				
Weight		Net weight: Approx. 70g				

High-Speed Counter Module

Model		HCQX-HC02-D4	HCQX-HC04-D4
Appearance			
Number of channels		2	4
Rated power		1.2W	1W
Encoder input mode		Differential input	Single-Ended input
Supported mode		Quadrature phase pulse (1x/2x/4x frequency multiplication); Pulse + Direction; Up/Down pulse	
Max. response frequency		4MHz	200kHz
ON/OFF response time		200ns	2μs
Counter type		Ring counter / Linear counter	
Counter control		Gate control, counter reset, counter preset	
Latch function		Latch using 2 internal latch bits or 2 external signals	Latch using 1 internal latch bit or 1 external signal
Pulse measurement function		Pulse speed measurement & Pulse cycle measurement	
High-Speed comparison		Supported	-
IO input specifications	Number of input channels	6	4
	Input type	NPN/PNP	
	ON voltage / ON current	>DC15V/5mA	
	OFF voltage / OFF current	<5V/2.5mA	
	Hardware response time ON/OFF	1μs	
	Software filtering	1~65535μs (settable)	
IO output specifications	Number of output channels	6	-
	Output type	NPN	-
	Output load (resistive load)	0.5A/channel	-
	Leakage current when OFF	0.1mA	-
	Hardware response time ON/OFF	1μs	-
Weight		Net weight: Approx. 120g	Net weight: Approx. 70g

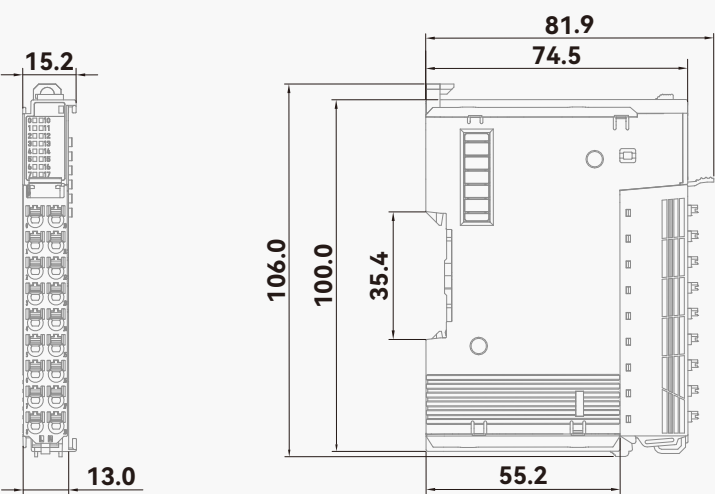
Coupler Module

Unit: mm



Compatible Models: HCQX-EC01-D4, HCQX-EC02-D4, HCQX-EC03-D4

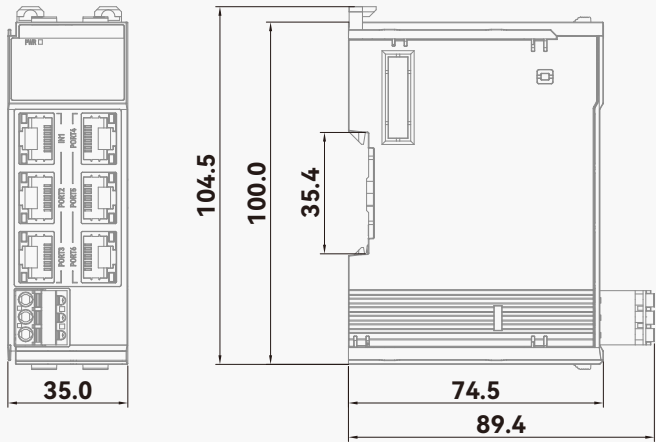
Expansion Module (Narrow)



Compatible Models: HCQX-ID16-D4, HCQX-OD16-D4, HCQX-OD16-D4-PNP, HCQX-MD16-D4, HCQX-MD16-D4-PNP, HCQX-AD04-D4, HCQX-DA04-D4, HCQX-RS02-D4, HCQX-RS02-D4-M, HCQX-TS04-D4, HCQX-HC04-D4

Splitter Module

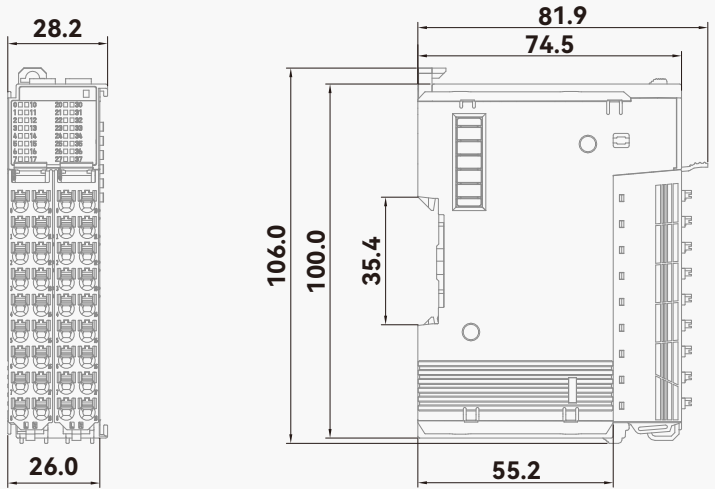
Unit: mm



Compatible Models: HCQX-ES06-D4

Expansion Module (Wide)

Unit: mm



Compatible Models: HCQX-ID32-D4, HCQX-OD32-D4, HCQX-OD32-D4-PNP, HCQX-MD32-D4, HCQX-MD32-D4-PNP, HCQX-AD08-D4, HCQX-OC08-D4, HCQX-HC02-D4

710 COMBINATIONS
EMPOWERING DIVERSE
APPLICATIONS!

HCNxE-SERIES

EtherCAT Distributed I/O Module

RICH CONFIGURATION

USER-FRIENDLY

SAFE & RELIABLE

① Multi-Layer Hardware Protection

► RICH CONFIGURATION



16-Channel EtherCAT Remote Module

- 16-Channel Digital Input
- 16-Channel Digital Output
- 8-Channel DI & 8-Channel DO Mixed

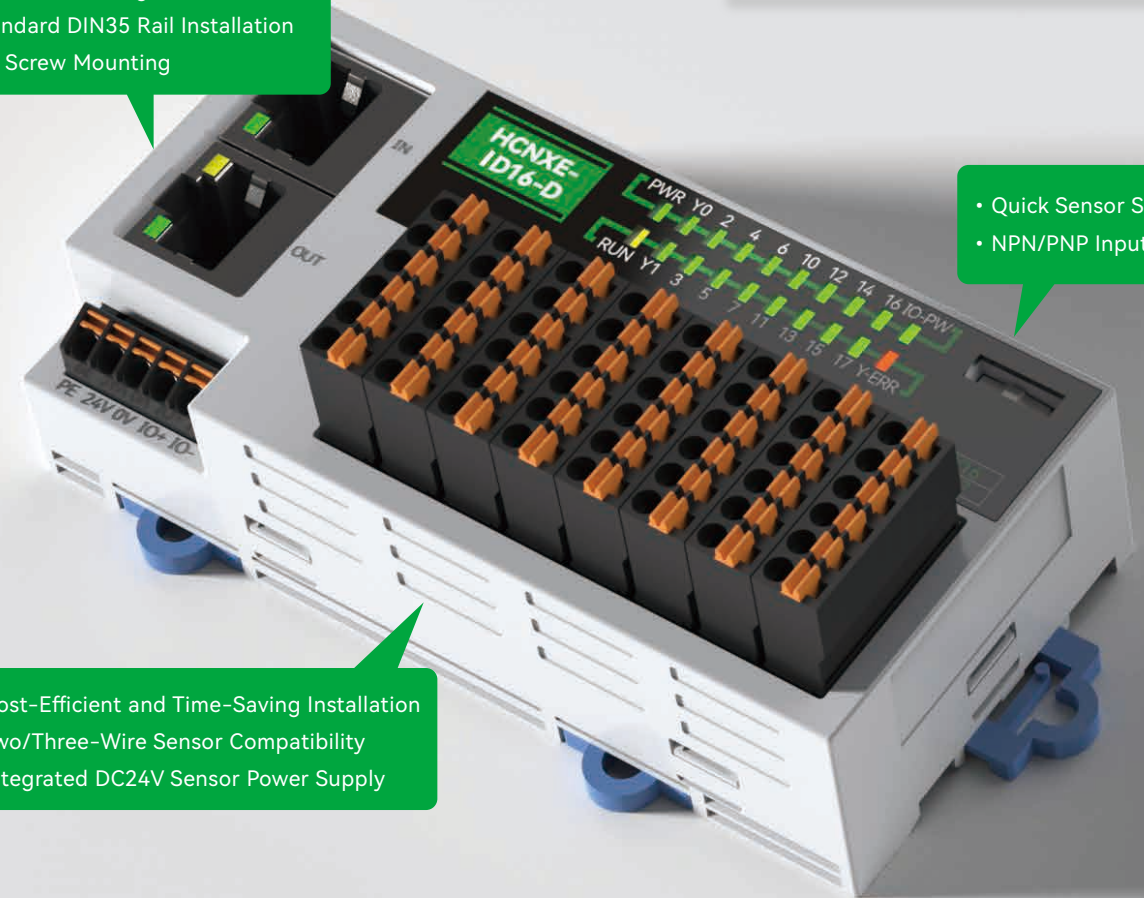


32-Channel EtherCAT Remote Module

- 32-Channel Digital Input
- 32-Channel Digital Output
- 24-Channel DI & 8-Channel DO Mixed
- 16-Channel DI & 16-Channel DO Mixed

USER-FRIENDLY ◀

- Significant Wiring Time Reduction
- Standard DIN35 Rail Installation
- M4 Screw Mounting



- Quick Sensor Signal Adaptation
- NPN/PNP Input Switching

- Cost-Efficient and Time-Saving Installation
- Two/Three-Wire Sensor Compatibility
- Integrated DC24V Sensor Power Supply

► HIGH PROTECTION RATING

- IO Power Terminal 5A Working Current Tolerance with 20A Overcurrent Fuse (Replaceable)
- 1.1A Overcurrent Protection for External Sensors on IO Board (Resettable Fuse)
- EtherCAT Bus Architecture for Avoiding Electromagnetic Interference Resulted from Long IO Signal Wiring
- Multi-Channel IO Signal Consolidation via Single EtherCAT Network

Naming Rule for NXE-Series Expansion Modules

H C N X E - I D 3 2 - D

1 2 3 4 5

1.Product Name

HC **HC:** HCFA

2.Distributed Module

NXE **NXE:** EtherCAT protocol module

3.Function Module

ID **ID:** Digital input
OD: Digital output
MD: Mixed digital

4.Number of Channels

32 **16:** 16 channels
32: 31 channels
Note: For mixed modules with asymmetric I/O, a 4-digit code denotes inputs first, then outputs.
E.g., "2 4 0 8" = 24 inputs, 8 outputs.

5.Power Supply Type

D **D:** DC power supply

NXE-Series Expansion Module General Specifications

General Specifications

Item		Specification	
Operating environment	Operating temperature	-10~55℃	
	Storage temperature	-40~75℃	
	Relative humidity	10 - 95% (non-condensing, 55℃)	
	Altitude	2,000m Max.	
	Random drop	1m, 2 times of packaging and transportation	
	Vibration resistance	Frequency	5-150Hz
		Displacement	3.5mm, constant amplitude
		Acceleration	1.0g, constant amplitude
		Direction	3 axes
	Shock resistance	Random amplitude 15g, 11ms half-sine wave, 3 mutually perpendicular axes	
Isolation method	IP rating	IP40 (with protective cover)	
	Pollution degree	Pollution degree II	
	Inter-Channel isolation	Non-isolation	
	Power supply-to-Interface isolation	Transformer Isolation	
Electromagnetic compatibility requirement	Interface-to-Bus isolation	Digital Isolation	
	Electrostatic discharge	Contact ±4kV; Air ±8kV	
	Electrical Fast Transient/Burst (EFT/B)	±2kV	
	Surge	DC DC power supply: 0.5 CM 0.5kV DM	
Insulation resistance		>1MΩ	
Dielectric withstand voltage		DC500V, 1 min (leakage current<5mA)	
Cooling method		Passive cooling, natural air cooling	
Installation location		Inside control cabinet	
Main material		Standard PPE, UL94 standard, flame retardant class V0	

Power Supply Specifications

Item	Specification
Module body rated power supply	DC 24V
Module body input voltage range	DC 24V (-15%~+20%)
Module body Max. current consumption	50mA/DC24V
IO rated power supply	DC 24V
IO terminal input voltage range	DC 24V (-15%~+20%)
IO Max. current	5A (non-Fusing overcurrent protection)
IO power supply protection	20A (fusing overcurrent protection, housing removal for replacement required)
IO board external sensor protection	1.1A (shared resettable fuse for 8 channels)

Digital Input Module

Model	HCNXE-ID16-D	HCNXE-ID32-D
Appearance		
Number of input channels	16	32
Input type	Compatible with NPN and PNP (switchable via a toggle switch)	
Rated input voltage	DC 24V (-15%~+20%)	DC 24V (-15%~+20%)
Rated input current	4.1mA/Ch	5.2mA/Ch
Input impedance	5.6kΩ	3kΩ
Input ON voltage	>DC15V	
Input ON current	>5mA	
Max. OFF current	2.5mA	
ON/OFF response time	125μs	
Wiring method	2-wire, 3-wire	
Rated power	1.2W	
Weight	Net weight: Approx. 100g	Net weight: Approx. 210g

Digital Output Module

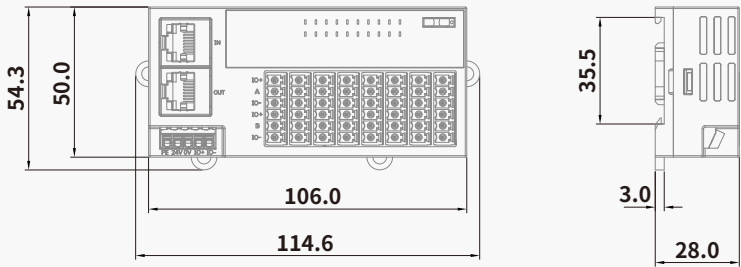
Model	HCNXE-OD16-D	HCNXE-OD32-D
Appearance		
Number of output channels	16	32
Output type	NPN	
Rated load voltage	DC 24V (-15%~+20%)	
Rated load current	0.5A/channel, 4A/16 channels	0.5A/channel, 8A/32 channels
Leakage current when OFF	<0.1mA	
ON/OFF response time	125μs	
Hardware filtering	1ms	-
Wiring method	2-wire	
Protection	Overcurrent protection, overvoltage protection, over temperature protection	
Rated power	1.2W	
Weight	Net weight: Approx. 100g	Net weight: Approx. 210g

Digital Mixed Module

Model		HCNXE-MD0808-D	HCNXE-MD1616-D	HCNXE-MD2408-D
Appearance				
Input specifications	Number of input channels	8	16	24
	Input type	Compatible with NPN and PNP (switchable via a toggle switch)		
	Rated input voltage	DC 24V (-15%~+20%)		
	Rated input current	4.1mA/Ch	5.2mA/Ch	5.2mA/Ch
	Input impedance	5.6kΩ	3kΩ	3kΩ
	Input ON voltage	>DC15V		
	Input ON current	>5mA		
	Max. OFF current	2.5mA		
	ON/OFF response time	125μs		
	Wiring method	2-wire, 3-wire		
Output specifications	Number of output channels	8	16	8
	Output type	NPN		
	Rated load voltage	DC 24V (-15%~+20%)		
	Rated load current	0.5A/channel, 2A/8 channels	0.5A/channel, 4A/16 channels	0.5A/channel, 2A/8 channels
	Leakage current when OFF	<0.1mA		
	ON/OFF response time	125μs		
	Hardware filtering	1ms	-	-
	Wiring method	2-wire		
	Protection	Overcurrent protection, overvoltage protection, over temperature protection		
Rated power		1.2W		
Weight		Net weight: Approx. 100g	Net weight: Approx. 210g	

NXE-Series 16-Channel Expansion Module

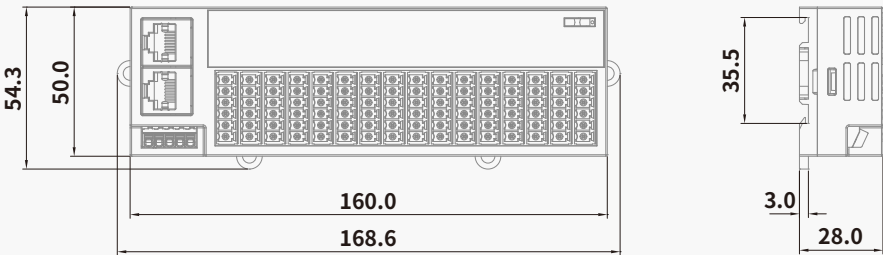
Unit: mm



Compatible Models: HCNXE-ID16-D, HCNXE-OD16-D, HCNXE-MD0808-D

NXE-Series 32-Channel Expansion Module

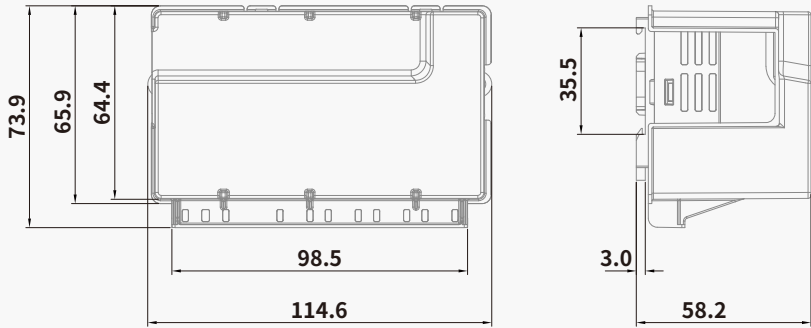
Unit: mm



Compatible Models: HCNXE-ID32-D, HCNXE-OD32-D, HCNXE-MD1616-D, HCNXE-MD2408-D

NXE-Series 16-Channel Protective Cover

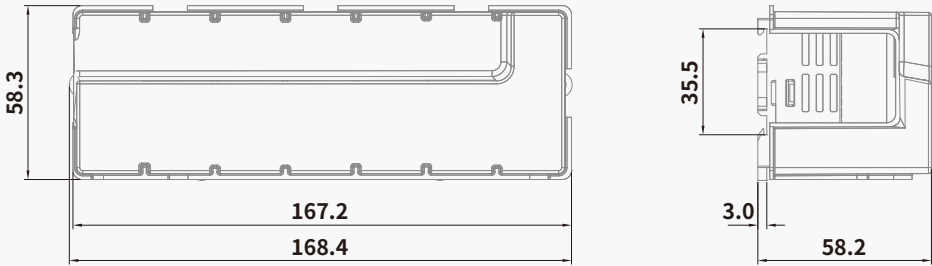
Unit: mm



Compatible Models: HCNXE-PRO16

NXE-Series 32-Channel Protective Cover

Unit: mm



Compatible Models: HCNXE-PRO32

Selection Overview Table

QP-Series Controller Selection Table

Model	Specification	Page
HCQ0P-1200-D4	ARM processor; HDD: 8GB; RAM: 512MB; Persistent data memory: 1MB; 16-ch input & 16-ch output; 8-axis EtherCAT bus; 8-axis pulse; 3 Ethernet ports (EtherNet*2+ EtherCAT*1); RS485*2; USB*1; SD card*1 Supported protocols: Modbus RTU, Modbus TCP, EtherCAT, CANopen (optional cards required), EtherNet/IP, OPCUA	07
HCQ1P-1300-D4	ARM processor; HDD: 8GB; RAM: 512MB; Persistent data memory: 1MB; 16-ch input & 16-ch output; 16-axis EtherCAT bus; 8-axis pulse; 3 Ethernet ports (EtherNet*2+ EtherCAT*1); RS485*2; USB*1; SD card*1 Supported protocols: Modbus RTU, Modbus TCP, EtherCAT, CANopen (optional cards required), EtherNet/IP, OPCUA	
HCQ3P-1400-D4	ARM processor; HDD: 8GB; RAM: 512MB; Persistent data memory: 1MB; 16-ch input & 16-ch output; 32-axis EtherCAT bus; 8-axis pulse; 3 Ethernet ports (EtherNet*2+ EtherCAT*1); RS485*2; RS232*1; CAN*1; USB*1; SD card*1 Supported protocols: Modbus RTU, Modbus TCP, EtherCAT, CANopen, EtherNet/IP, OPC UA	
HCQ5P-1500-U4	Intel Celeron processor; HDD: 64GB; RAM: 2GB; Persistent data memory: 6MB; 16-ch input & 16-ch output; 32+32-axis EtherCAT bus; 8-axis pulse; 4 Ethernet ports (EtherNet*2+EtherCAT*2 or EtherNet*3+EtherCAT*1); RS485*2; RS232*1; CAN*1; USB*1; SD card*1 Supported protocols: Modbus RTU, Modbus TCP, EtherCAT, CANopen, EtherNet/IP, OPC UA	
HCQ7P-1600-U4	Intel i5 processor; HDD: 64GB; RAM: 8GB; Persistent data memory: 6MB; 16-ch input & 16-ch output; 64+64-axis EtherCAT bus; 8-axis pulse; 4 Ethernet ports (EtherNet*2+EtherCAT*2 or EtherNet*3+EtherCAT*1); RS485*2; RS232*1; CAN*1; USB*1; SD card*1 Supported protocols: Modbus RTU, Modbus TCP, EtherCAT, CANopen, EtherNet/IP, OPC UA	
HCQ9P-1700-U4	Intel i7 processor; HDD: 64GB; RAM: 8GB; Persistent data memory: 6MB; 16-ch input & 16-ch output; 128+128-axis EtherCAT bus; 8-axis pulse; 4 Ethernet ports (EtherNet*2+EtherCAT*2 or EtherNet*3+EtherCAT*1); RS485*2; RS232*1; CAN*1; USB*1; SD card*1 Supported protocols: Modbus RTU, Modbus TCP, EtherCAT, CANopen, EtherNet/IP, OPC UA	10
HCQX-PD11-D4	DC24V power supply module for HCQ5P-1500-U4, HCQ7P-1600-U4, HCQ9P-1700-U4 controllers	

Q-Series Controller Selection Table

Model	Specification	Page
HCQ0-1100-D	ARM processor; Recommended axes: 8; Module quantity: Calculated based on module power (output power: 16W); Program capacity: 16MB; Persistent data memory: 800KB; 2 Ethernet ports (EtherNet*1+EtherCAT*1); CAN*1; RS485*2; RS232*1; USB*1; SD card*1 Supported protocols: Modbus RTU, Modbus TCP, EtherCAT, CANopen, EtherNet/IP, OPCUA	-
HCQ1-1200-D3	ARM processor; Recommended axes: 16; Module quantity: Calculated based on module power (output power: 16W); Program capacity: 16MB; Persistent data memory: 800KB; 16-ch input & 16-ch output; 8-axis pulse output; 8-ch pulse input; 3 Ethernet ports (EtherNet*2+EtherCAT*1); CAN*1; RS485*2; RS232*1; USB*1; SD card*1 Supported protocols: Modbus RTU, Modbus TCP, EtherCAT, CANopen, EtherNet/IP, OPCUA	
HCQ1-1300-D3	ARM processor; Recommended axes: 32; Module quantity: Calculated based on module power (output power: 16W); Program capacity: 16MB; Persistent data memory: 800KB; 16-ch input & 16-ch output; 8-axis pulse output; 8-ch pulse input; 3 Ethernet ports (EtherNet*2+EtherCAT*1); CAN*1; RS485*2; RS232*1; USB*1; SD card*1 Supported protocols: Modbus RTU, Modbus TCP, EtherCAT, CANopen, EtherNet/IP, OPCUA	

Optional Card Selection Table

Model	Compatible controller	Specification	Page
HCQXB-CAN-BD	HCQ0P-1200-D4 HCQ1P-1300-D4	Supports CANopen master and CANBUS custom protocol	16
HCQXB-2RS232-BD		2-channel RS232 serial ports; Independently configurable as master/slave; Supports Modbus protocol & user-defined protocols	
HCQXB-2RS485-BD		2-channel RS485 serial ports; Independently configurable as master/slave; Supports Modbus protocol & user-defined protocols	
HCQXB-RTC-BD		RTC Battery Backup Card; Maintains timing during controller power outage	

Q-Series EtherCAT Coupler Module

Model	Output power	Max. number of expansion modules	Specification	Page
HCQX-EC01-D4	16W	16*	Standard EtherCAT coupler (expansion modules occupy bus nodes)	23
HCQX-EC02-D4	16W	16*	Standard EtherCAT coupler (expansion modules excluded from bus nodes)	
HCQX-EC03-D4	-	31	Dedicated EtherCAT couplers for NXE-series modules(expansion modules excluded from bus nodes)	

*Ensure total power of all QBUS modules ≤16W during selection.

Q-Series Splitter Module

Model	Specification	Page
HCQX-ES06-D4	6-port EtherCAT splitter module (1 IN/5 OUT); Supports star topology; Supports splitter module cascade	24

Q-Series I/O Module

Model		Specification					Page
		Power	Input		Output		
Digital input module	HCQX-ID16-D4	1.0W	16-channel	NPN/PNP	-	-	24
	HCQX-ID32-D4		32-channel				
Digital output module	HCQX-OD16-D4	1.2W	-	-	16-channel	NPN	25
	HCQX-OD16-D4-PNP					PNP	
	HCQX-OD32-D4	1.3W			32-channel	NPN	
	HCQX-OD32-D4-PNP					PNP	
Digital mixed module	HCQX-MD16-D4	1.0W	8-channel	NPN/PNP	8-channel	NPN	
	HCQX-MD16-D4-PNP				PNP		
	HCQX-MD32-D4		16-channel		16-channel	NPN	
	HCQX-MD32-D4-PNP				PNP		
Relay output module	HCQX-OC08-D4	1.2W	-		8-channel	Relay	26

Q-Series Specialized Function Module

Model	Power	Specification	Page
Analog input module	HCQX-AD04-D4	4-Channel analog input; Supports -10 to +10V, 0 to 10V, -5V to +5V, 0 to 5V, 1 to 5V differential input; Supports 0 to 20mA, 4 to 20mA differential input	27
	HCQX-AD08-D4	8-Channel analog input; Supports -10 to +10V, 0 to 10V, -5V to +5V, 0 to 5V, 1 to 5V differential input; Supports 0 to 20mA, 4 to 20mA differential input	
Analog output module	HCQX-DA04-D4	4-Channel analog output; Supports -10 to +10V, 0 to 10V, -5V to +5V, 0 to 5V, 1 to 5V single-ended output; Supports 0 to 20mA, 4 to 20mA single-ended input	26
Serial communication module	HCQX-RS02-D4	2-Channel serial communication (custom protocol); Supports RS232, RS485, RS422 interfaces; Supports 32 slave stations;Software-Configurable termination resistor	28
	HCQX-RS02-D4-M	2-Channel serial communication (Modbus protocol); Supports RS232, RS485, RS422 interfaces; Supports 16 slave stations; Software-Configurable termination resistor	
Temperature measurement module	HCQX-TS04-D4	4-Channel temperature measurement; Supports thermistors, thermocouples; Supports 2-wire and 3-wire sensors; 24-bit Resolution	29
High-Speed counter module	HCQX-HC02-D4	2-Channel high-speed counter module; Supports differential input (Max. 4MHz)	30
	HCQX-HC04-D4	4-Channel high-speed counter module; Supports single-ended input (Max. 200KHz)	

NXE-Series I/O Module

Model		Specification					Page
		Power	Input		Output		
Digital input module	HCNXE-ID16-D	1.2W	16-channel	NPN/PNP	-	-	37
	HCNXE-ID32-D	1.2W	32-channel				
Digital output module	HCNXE-OD16-D	1.2W	-	-	16-channel	NPN	
	HCNXE-OD32-D	1.2W			32-channel		
Digital mixed module	HCNXE-MD0808-D	1.2W	8-channel	NPN/PNP	8-channel	NPN	38
	HCNXE-MD1616-D	1.2W	16-channel		16-channel		
	HCNXE-MD2408-D	1.2W	24-channel		8-channel		

NXE-Series Protective Cover

Model	Specification	Page
HCNXE-PRO16	16-Channel expansion module protective cover	-
HCNXE-PRO32	32-Channel expansion module protective cover	-

Accessories

Type	Model	Specification	Page
Expansion module 18-pin terminal	HCQXT-18P-N	Detachable wiring terminal for QP controller IO and expansion module	-
Terminal module	HCQX-END04	Located at the rear of a module	-
DC24V power supply terminal	HCQX-3P-N	DC24V power supply terminal for HCQX-EC01/02/03-D4 coupler and HCQX-ES06-D4 splitter	-