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Control



Drive



Sensor



M&E



Info.



Initiative Integrity Innovation

BETTER WORK, BETTER LIFE

Focus on high-end automation

QP-series Smart PAC



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Due to the delay in updating the paper version, please refer to the official website for the latest product information



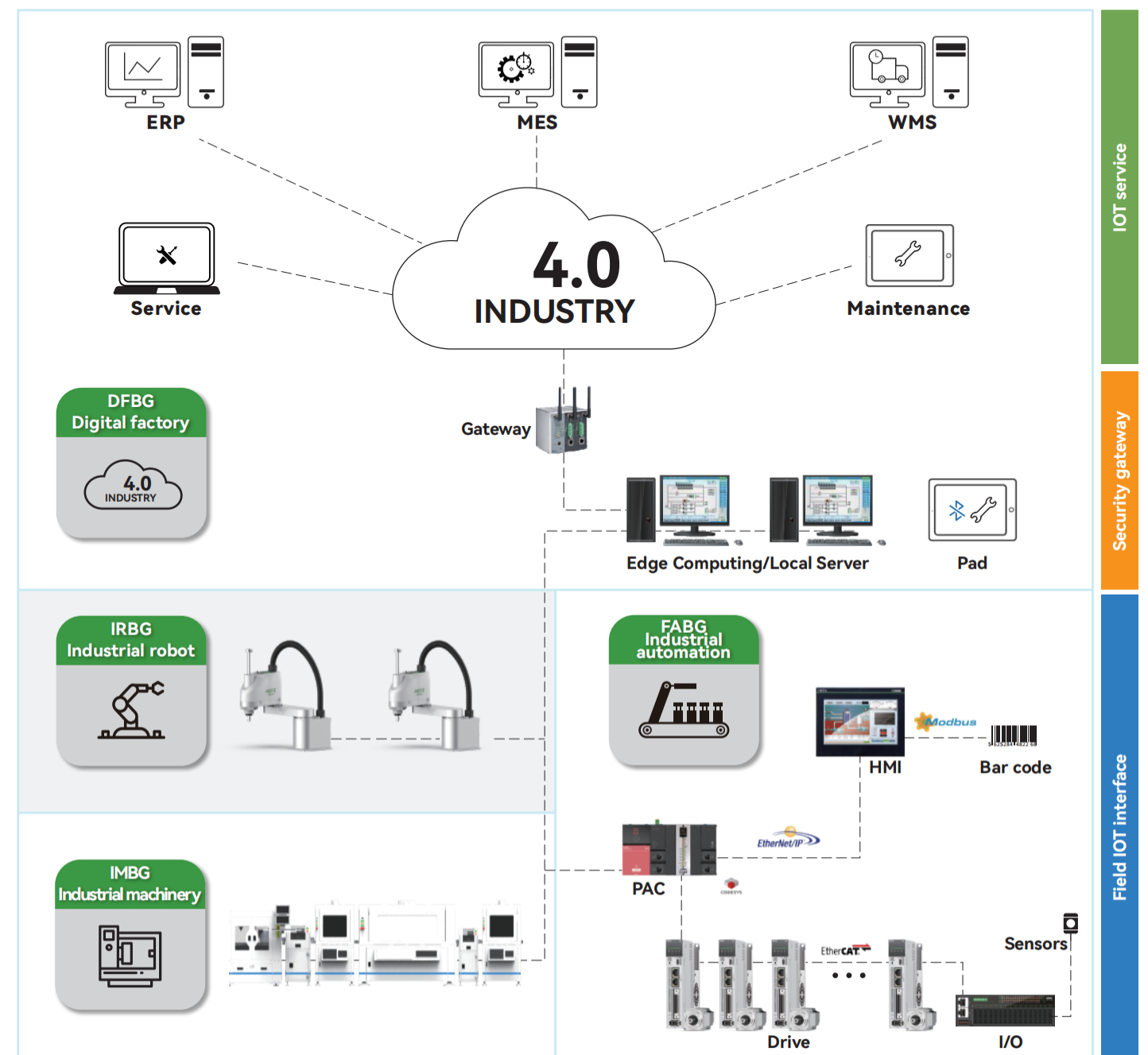
Be dedicated to creating values in
automation industry

Better Work, Better Life

Founded in 2011, Zhejiang Hechuan Technology Co., Ltd. is an enterprise focusing on the R&D, manufacturing, sales and application integration of industrial automation products, and is committed to providing core components and system integration solutions for smart factories. The main products include PLCs, servo systems, vision systems, encoders, inverters, touch screens, electric drums, etc., covering the entire field of industrial automation



We not only provide the core components of industrial automation, but also engage in the industrial process, industrial robots, industrial machines, and digital factories, and can provide enterprises with comprehensive solutions of **automation + intelligent equipment + digitalization**



Never stop to build up core competitiveness

R&D Centers
5
Set up nationally

R&D investment
10%+
Proportion of revenue

R&D personnel
300+
Elite gathering

- Established five R&D centers in Longyou, Hangzhou, Shenzhen, Dalian and Suzhou
- Self-designed ASIC and SOC chips, realize localization replacement
- First-class AMR magnetic technology/high-precision encoder in the industry

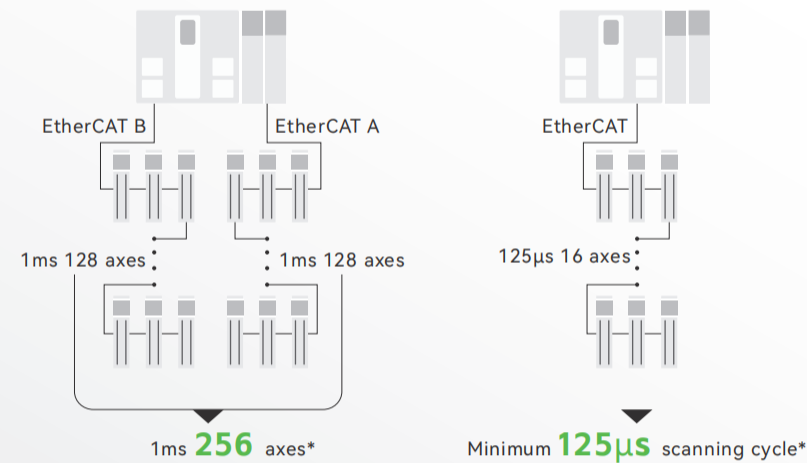
HIGH PERFORMANCE CONTROL

Focusing on high-end industrial automation, the QP series controllers are suitable for a wide range of industries such as **photovoltaic, lithium-ion, semiconductor, printing, etc.**, with its high performance, low scan cycle and super axes-carrying capability

Intel HIGH-PERFORMANCE 4-CORE PROCESSOR



EtherCAT Dual Master



QP-SERIES SMART MECHANICAL CONTROLLER

HIGH INTEGRATION

Rich interfaces

16 inputs, 16 outputs, 2*RS485+1*RS232, 3*Gigabit+1*100M Ethernet, 1*Type-C, 1*USB-A, 1*SD card

3-ch Gigabit Ethernet, no gateway module required, independent IP

192.168.188.XXX

EMS/ERP/SCADA

192.168.88.XXX

PLC/Robot/Rfid

192.168.8.XXX

PLC/HMI/AGV/Vision

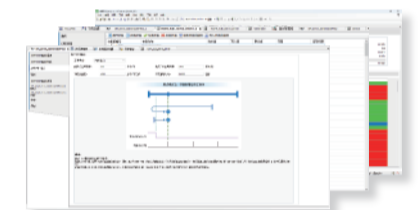


EASY TO DEVELOP

New secondary development
IDE platform HCP Work3

Support IEC 61131-3 programming language
and follow PLCopen 2.0 specification.

Clear topology, graphical device configuration
interface, local configuration interface



*Note: Supported by some models



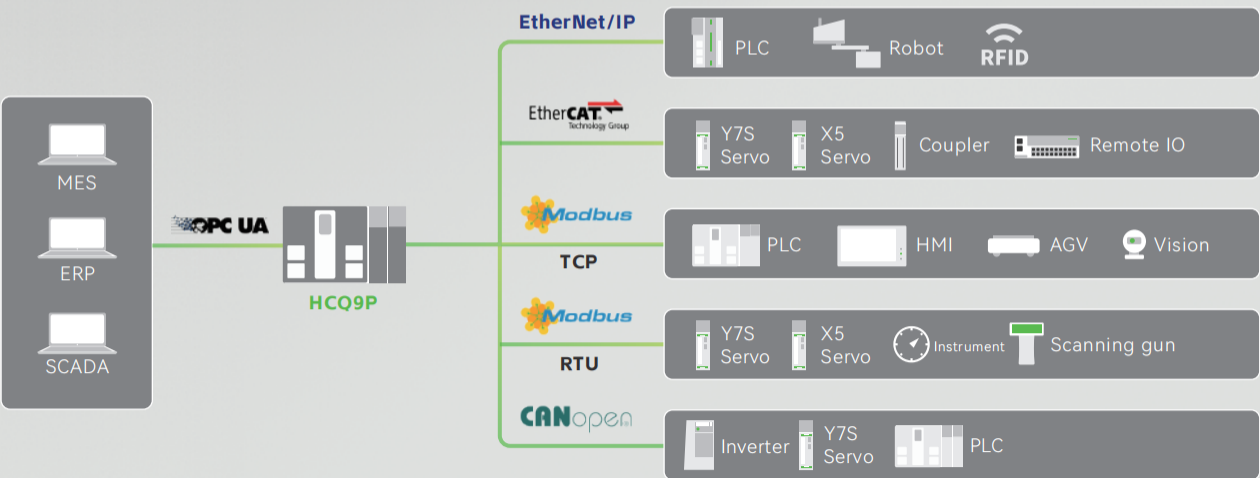
RICH HARDWARE INTERFACE/

The QP-series controllers provide a wide range of communication interfaces, including Ethernet, serial port, CAN bus, etc. The rich communication interfaces enable HCQP series controllers to exchange data and communicate with other devices and systems quickly and reliably.



SUPPORTS VARIOUS BUS PROTOCOLS/

QP-series intelligent machine controllers support a variety of bus protocols, including Modbus, CANopen, EtherCAT, OPC UA, and EtherNet/IP. Users can easily interconnect with other devices, sensors and actuators

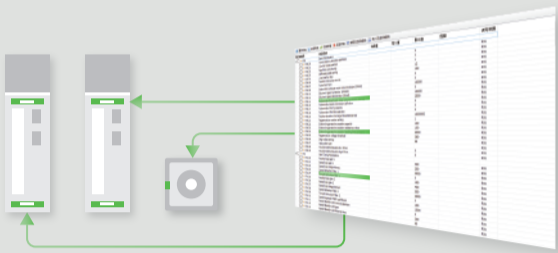


BRAND-NEW SECONDARY DEVELOPMENT IDE --HCP WORKS3

HCP Works3 support IEC 61131-3 programming language and follow PLCopen 2.0 specification. Built-in servo parameter debugging interface, one-click addition of slave devices, resource usage table and other functions enhance user convenience; And the features with clear topology structure, graphical device configuration interface, local configuration interface.

Servo parameter debugging interface/

The built-in servo parameter fast transmission interface supports batch import and export operations of HCFA's full series of servo parameters on the host computer, without the need for additional servo debugging software,



Graphical configuration interface

HCP works3 provides a graphical configuration screen for Q series products. When users configure the hardware, they only need to right-click on the module library on the right side and select the module they want to add.

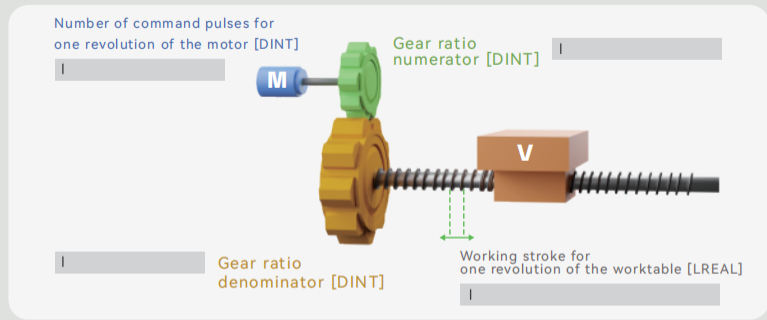


Visualization of parameters configuration/

Provides a clear visualization of the external physical topology (differentiated by linear and rotary axes) to configure the electronic gear ratios, and the unit conversion process is integrated into the actual application scenario, making it easier for the user to understand.

Unit conversion:

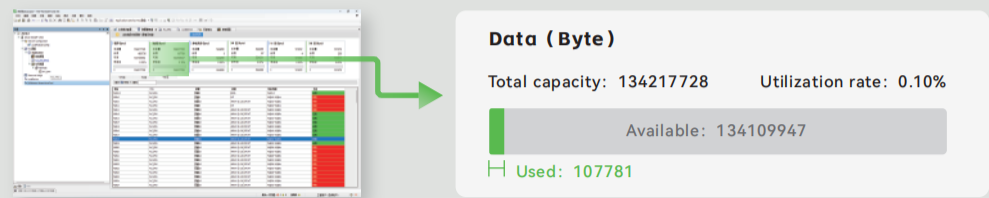
$$\text{Number of pulses} = \frac{\text{Number of commanded pulses for one revolution of the motor [DINT]}}{\text{Working stroke for one revolution of the worktable [LREAL]}} \times \frac{\text{Gear ratio numerator [DINT]}}{\text{Gear ratio denominator [DINT]}} \times \text{Travel distance [user unit]}$$



Visual processing

Intuitive resource allocation /

In the resource usage table, users can clearly understand the usage of current programs, data, power-failure hold, I-area, Q-area, M-area, etc., including total capacity, available space, usage rate, etc., as well as the data address and conflict status , which avoids data coverage problems caused by reusing the same address and helps customers allocate resources more rationally.



Naming Rules for QP-Series Controller

HCQ5P-1500-U4-****

1

2

3

4

5

6

7

8

9

10

1.Product name

HC

HC: HCFA

2.Product Series

Q5

Q5: Basic Intelligent Mechanical Controller
Q7: Standard Intelligent Mechanical Controller
Q9: High-end Intelligent Mechanical Controller

3.Series Type

P

None: Standard type
P : PLUS

4.Operation system

1

1: Linux

5.Internal code

5

n: Reserved

6.Control software module

0

0: CODESYS

7.Additional functions software module

0

0: Standard software

8.Power type

U

U: UPS power supply

9.Product iteration serial number

4

10.Control version No. and non-standard specifications

*

Naming Rules for Power Module

HCQX-PD11-D4-****

1

2

3

4

5

6

7

1.Product name

HC

HC: HCFA

2.Extension series

QX

QX: Q series general extension

3.Series type

PD

PD: System power extension

4.Function identification number

11

11: 100W Power
(Compatible with Q-U4 series main units)

5.Power type

D

D: DC power
A: AC power

6.Product iteration serial number

4

7.Control version No. and non-standard specifications

*

QP-series Products Comparison

Model name	HCQ5P-1500-U4	HCQ7P-1600-U4	HCQ9P-1700-U4
Processor	Celeron	Intel I5	Intel I7
Hard disk / storage	32G/2G	64G/4G	64G/4G
Programming language	IL, LD, ST, SFC, CFC, FBD		
Program capacity	128Mbytes		
Data capacity	I-zone: 128kBytes, Q-zone: 128kBytes, M-zone: 512kBytes, Power-failure hold area: 6MBytes, Other variables: Unlimited		
Dual EtherCAT master station 1ms recommended number of axes	32 axes + 32 axes	64 axes + 64 axes	128 axes + 128 axes
Pulse axes	8 axes 200kHz pulse		
Main unit I/O	16 inputs, 16 outputs		
Right side expansion (output power)	16W		
Applicable power module	HCQX-PD11-D4, HCQX-PD11-A4*1		
Ethernet	Gigabit*3+100M*1		
Download monitoring protocol	✓	✓	✓
EtherNet/IP Scanner and Adapter	✓	✓	✓
Modbus TCP/IP Server and Client	✓	✓	✓
OPC UA Server	✓	✓	✓
EtherCAT	*2	*2	*2
CANopen	1-ch: Max. 31 slaves Baud rate (bps): 20k, 50k, 100k, 125k, 250k, 500k, 800k and 1M		
Serial port	COM1, COM2, COM3 (115.2kbps max.)		
RS485-Modbus RTU master-slave (max. 31 slaves)	✓	✓	✓
RS232-Modbus RTU master-slave (max. 1 slave)	✓	✓	✓
Free communication protocol	✓	✓	✓
USB	Type-C: USB 2.0, DP display function will be supported USB A: USB 2.0, supports USB format (ext2 ext3 ext4) Supports program export, file reading and writing		
SD card	1-ch: Max. expansion 128GB, support program export, file reading and writing		

*1This model will be available subsequently

QP series Controller Specifications

Model name		HCQ5P-1500-U4	HCQ7P-1600-U4	HCQ9P-1700-U4
Appearance				
		Note: QP-Series controllers must be used with PD11 power modules (refer to page 10 for details).		
Processor		Celeron	Intel I5	Intel I7
Hard disk/ storage (Bytes)		32G/2G	64G/4G	64G/4G
Programming	Program capacity	128MBytes		
	I-zone/Q-zone/M-zone	128kBytes / 128kBytes / 512kBytes		
	Power-failure holding area	6Mbytes		
	Other variables	Unlimited		
Configuration	User data storage capacity	128MBytes (Folder name: FlashFiles)		
	Number of main unit extensions	Calculated on the basis of the current consumption.		
	Digital/analog/other extension			
	External power supply	DC12V/16W		
Axis capacity	Applicable power module	HCQX-PD11-D4, HCQX-PD11-A4*		
	Dual EtherCAT master 1ms recommended number of axes	32 axes + 32 axes	64 axes + 64 axes	128 axes + 128 axes
	Pulse axis	8-axis 200kHz (open collector output)		
	Communication standards	IEC 61158 Type12		
EtherCAT	EtherCAT Master Specifications	Class B (Compatible with Function Pack Motion Control)		
	Physical layer	100Base-TX		
	Modulation	Baseband		
	Transmission speed	100Mbps (100Base-TX)		
	Duplex mode	Full duplex		
	Topology	Line/Star-type		
	Transmission medium	Category 5 Shielded Twisted Pair		
	Max. transmission distance between nodes	100m		
	Max. number of slaves	65535		
	Max. process data	Input : 5,736Bytes, Output : 5,736Bytes (but max. frame size for process data is 4)		
	Mini. communication cycle	500μs	250μs	125μs
CANOpen Master	Link layer	CAN2.0A		
	Termination resistor	Built-in 120Ω, supports dip switch switching		
	Supported Baud Rate (bps)	20k, 50k, 100k, 125k, 250k, 500k, 800k and 1M		
	Topology	Line-type		
	Transmission medium	Category 5 Shielded Twisted Pair		
	Max. communication distance	2500m (20kbps)		
	Max. number of slaves	31		
	Communication cycle	Mini. 125μs		
Serial port	Physical layer	COM1,COM2	RS485	
		COM3	RS232	
	Terminating resistor	COM1,COM2	Supports 120Ω, supports dip switch switching	
	Baud rate		1200bps~115200bps	
	Max. communication distance	COM1,COM2	500m	
		COM3	5m	

*This model will be launched subsequently

Model name			HCQ5P-1500-U4	HCQ7P-1600-U4	HCQ9P-1700-U4	
Serial port	Topology	COM1,COM2	Line-type			
		COM3	Point-to-Point			
	Max. number of slaves	COM1,COM2	31			
		COM3	1			
Internal clock	At ambient temperature 55℃		Monthly error of -3.5 min~+0.5 min			
	At ambient temperature 25℃		Monthly error of -1.5 min~+1.5 min			
	At ambient temperature 0℃		Monthly error of -3 min~+1 min			
Ethernet Specifications						
Items			PORT1	PORT2	PORT3	PORT4
Functions			Communication, program upload/download, firmware update		Ethercat master	Communication, program upload/download, firmware update, Ethercat master
Data transfer speed			1000/100/10Mbps		100Mbps	1000/100/10Mbps
Communication mode			Full duplex/half duplex			
Interface			RJ45 connector			
Max. segment length (length between hub and node)			100m			
Supported protocol	Download monitoring protocol		✓	✓	-	✓
	Modbus TCP/IP server and client		✓	✓	-	✓
	OPC UA server		✓	✓	-	✓
	EtherNet/IP Scanner and Adapter		✓	✓	-	✓
	EtherCAT master		-	-	✓	✓
Initial IP address			192.168.188.100	192.168.88.100	-	192.168.8.100
Cable			Category 5 Shielded Twisted Pair			
Serial Port Specifications						
Items			COM1、COM2		COM3	
Interface			RS485 connector		RS232 connector	
Data transfer rate			Max. 115200bps			
Communication mode			Half-duplex		Full-duplex	
Max. transmission distance			500m (at baud rate 9600bps)		5m	
Supported protocols			Modbus RTU Master-slave Serial Free Protocols			
Insulation			Digital isolator insulation			
Terminal resistance			Built-in 120Ω, can be switchable		-	
Number of slaves supported			31		1	
CAN Specifications						
Items			Specification			
Interface			CAN interface			
Number of Interfaces			1-ch			
Data transfer rate			Max. 1Mbps			
Communication mode			Half-duplex			
Max. transmission distance			2500m (at 20kbit/s)			
Supported protocols			CANOpen			
Insulation			Digital isolator insulation			
Terminal resistance			Built in 120Ω, can be switchable			
Number of supported slaves			31			
USB specifications						
Items			Type-C		USB-A	
Transmission specification			USB2.0 Type-C , will support DP display		USB2.0	
5V, Max. output current			1A			
Max. communication rate			480 Mbps (theoretically)			
Supports USB format			-		ext2 ext3 ext4 squashfs vfat btrfs	
Insulation			Non-Isolated		-	

General Specifications

Item			Specification
Weight(g)			710
Dimensions(mm)			132.2 (W) *105.5 (H) *81.9 (D)
Operating environment	Working temperature		0~55℃
	Storage temperature		-25~75℃
	Relative humidity		10~95% (no condensation)
	Altitude		2,000m Max.
	Random drop		Twice from 1m, with outer package
	Vibration	Frequency	5 Hz ~150Hz
		Displacement	3.5mm, constant amplitude
		Acceleration	1.0g, constant amplitude
		Direction	X/Y/Z-axis
	Shock		Random amplitude 15g, 11ms half sine wave, 3 mutually perpendicular axes
	Pollution level		Pollution degree II
Protection class		IP20	
EMC requirements	Electrostatic discharge		Contact ±4kV, Air ±8kV
	EFT		±2kV
	Surge		DC1kV
Insulation resistance			>1MΩ
Voltage resistance			2000V, 1min
Cooling method			Active cooling, fan cooling
Mounting position			Inside the control box
Main material			Standard PPE, UL94, fire-proof level V0
Certification			CE

Power specifications

Item	HCQ5P-1500-U4	HCQ7P-1600-U4	HCQ9P-1700-U4
Power supply voltage	DC24V		
Voltage fluctuation range	-15%~+20%		
Rated power consumption	35W	46W	50W
Power efficiency	80%		
Allowable instantaneous power-failure time	Continue to operate for momentary power failure of less than 5ms		
Output voltage	DC12V		
Output power	16W		

High-speed I/O input specifications

Item	Specification
Signal Name	16-point high-speed input (I0-I17, octal)
Rated input voltage	DC24V (-15%~+20%, within ±10% pulse)
Input type	Supports NPN, PNP inputs
Rated input current	6.81mA
ON current	>4.1mA
OFF current	<1.07mA
Input resistance	1.5kΩ
Max. Input Frequency	200kHz
Common Mode	1 common terminal for every 8 points

High-speed I/O output specifications

Item	Specification
Signal name	16 high-speed outputs (Q0-Q17, octal)
Output type	Support NPN output
Control circuit voltage	DC5V~24V
Rated load current	250mA
Max. voltage drop at ON	0.05V
Leakage current at OFF	<0.1mA
Output frequency	200kHz
Common mode	1 common terminal for every 8 points

POWER SPECIFICATIONS

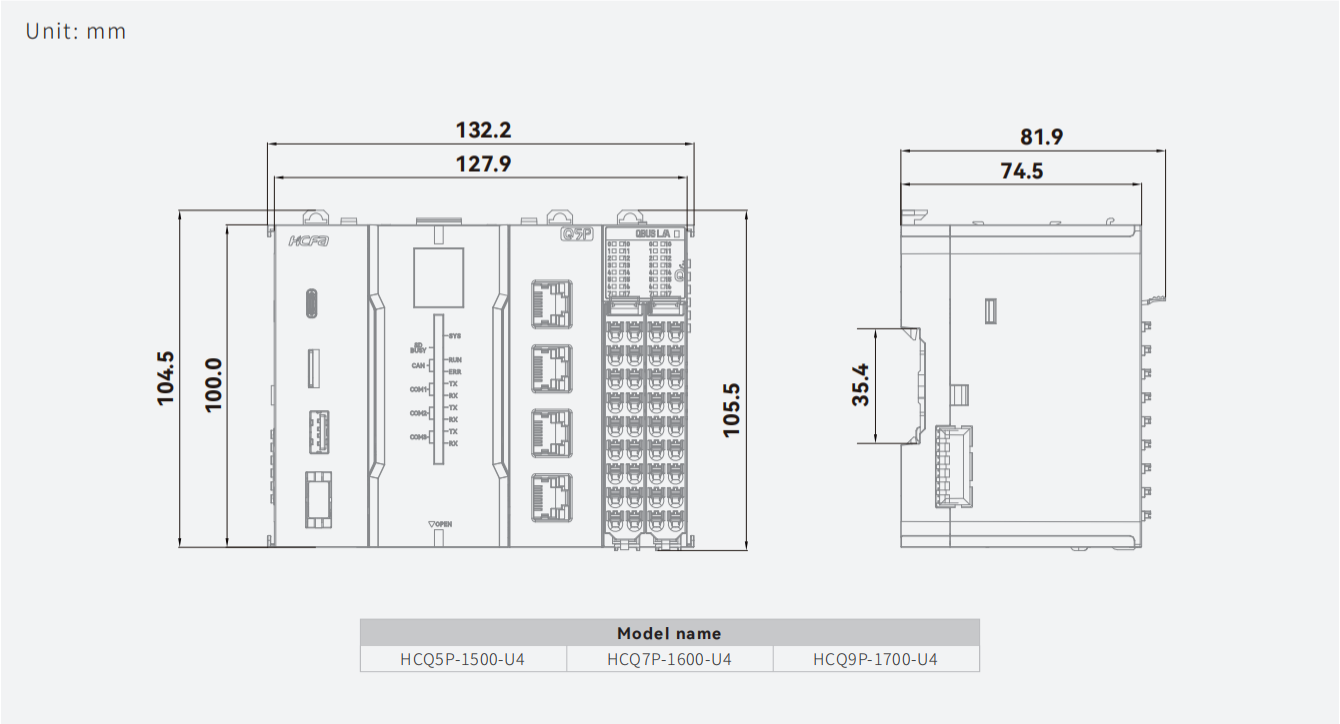
Power Module Specifications

Model name		HCQX-PD11-D4	
Appearance			
Applicable controller		HCQ5P-1500-U4	HCQ7P-1600-U4 HCQ9P-1700-U4
Rated voltage		DC24V (-15%~+20%)	
Power consumption		<2W	
Recommended input power		>200W	
Overheat indication		✓	
Under-voltage protection		✓	
Design life-time		60,000 hours (at ambient temperature 50℃)	
UPS hold time		9s (35W output power)	
UPS charging time		10s (Tpy.)	
Weight (g)		Net weight approx. 190	

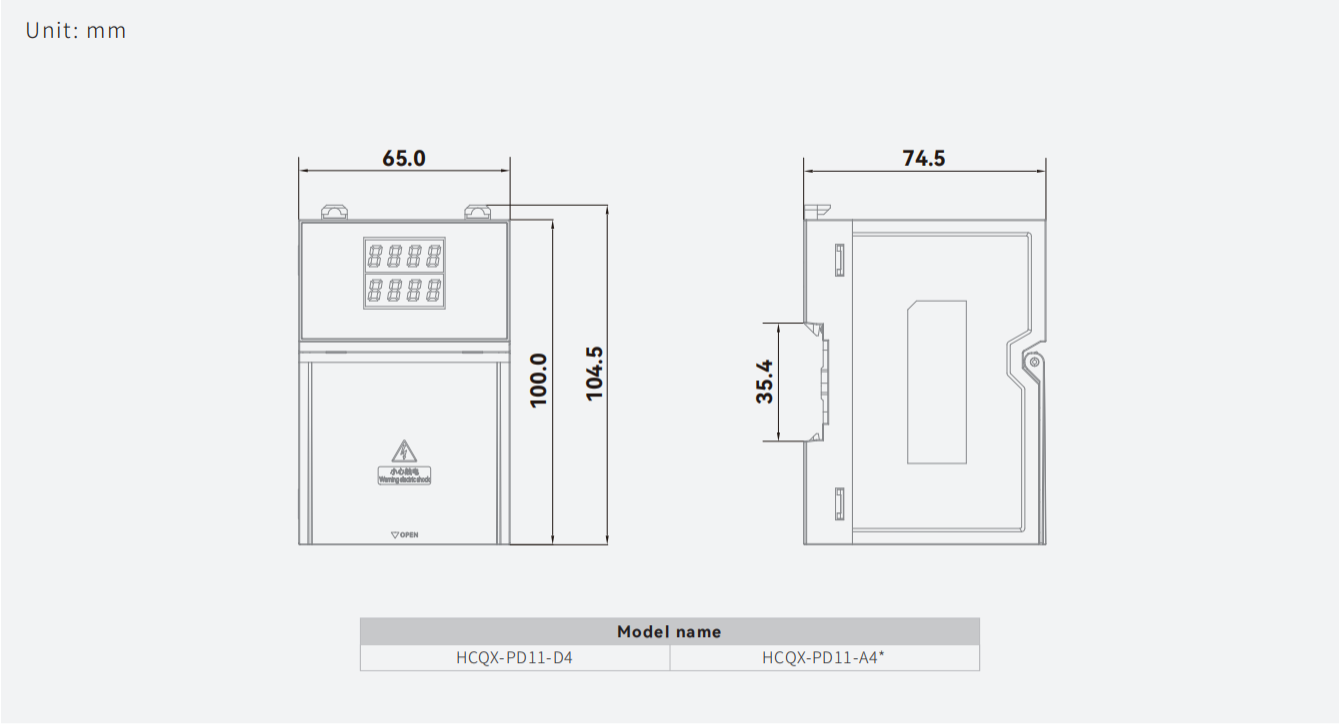
General specifications

Model name		HCQX-PD11-D4	
Dimensions (mm)		65(W) x104.5(H)x74.5(D)	
Operating environment	Operating temperature		0~55℃
	Relative humidity		10~95% (no condensation)
	altitude		2,000m Max.
	Insulation withstand voltage		DC500V 1 minute (leakage current 10mA or less)
	Random drop		Twice from 1m, with outer package
	Vibration	Frequency	5-150Hz
		Displacement	3.5mm, constant amplitude
		Acceleration	1.0g, constant amplitude
		Direction	X/Y/Z-axis
	Shock		Random amplitude 15g, 11ms half sine wave, 3 mutually perpendicular axes
	Protection class		IP20
EMC requirements	Electrostatic discharge		Contact ±4kV, Air ±8kV
	EFT		±2kV
	Surge		DC500V
Heat dissipation method		Passive cooling, natural air cooling	
Installation location		Inside the control cabinet	
Main material		Standard PPE, UL94 standard, fire-proof level V0	

QP-Series Controller



Power module



*This model will be launched later

Selection Guide

QP-Series PAC Selection Table-1

Model name	Recommended number of axes*	Output power	High-speed I/O		Interface								Page
			Input	Output	Ethercat master	Ethernet	CAN	RS232	RS485	Type-C	USB-A	SD Card	
HCQ5P-1500-U4	32+32 axes	16W	16 pionts	16 pionts	✓	✓	✓	✓	✓	✓	✓	✓	07
HCQ7P-1600-U4	64+64 axes				✓	✓	✓	✓	✓	✓	✓	✓	07
HCQ9P-1700-U4	128+128 axes				✓	✓	✓	✓	✓	✓	✓	✓	07

*Dual EtherCAT master 1ms recommended number of axes

QP-Series PAC Selection Table-2

Model name	Communication Protocol							Page
	ModbusTCP	ModbusRTU	CANOpen	EtherCAT	OPC UA	EtherNet/IP	Serial free protocol	
HCQ5P-1500-U4	✓	✓	✓	✓	✓	✓	✓	07
HCQ7P-1600-U4	✓	✓	✓	✓	✓	✓	✓	07
HCQ9P-1700-U4	✓	✓	✓	✓	✓	✓	✓	07

Power Module Selection Table

Model name	Specifications	Page
HCQX-PD11-D4	24VDC power module, mounted on the left side of the QP series controller	10
HCQX-PD11-A4*	100~240VAC power module, mounted on the left side of QP series controller	10

*This model will be launched subsequently

PAC and Power Module Matching Table

Power \ CPU	HCQ5P-1500-U4	HCQ7P-1600-U4	HCQ9P-1700-U4
HCQX-PD11-D4	✓	✓	✓
HCQX-PD11-A4*	✓	✓	✓
HCQX-PD01-A	✗	✗	✗

* This model will be released subsequently