

Zhejiang Hechuan Technology Co.,Ltd.

Headquarters: No. 5, Qinshan Road, Longyou Industrial Park, Quzhou City, Zhejiang Province  
Hangzhou R & D Center: No. 299 Lixin Road, Qingshanhu Street, Hangzhou City, Zhejiang Province



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BETTER WORK, BETTER LIFE

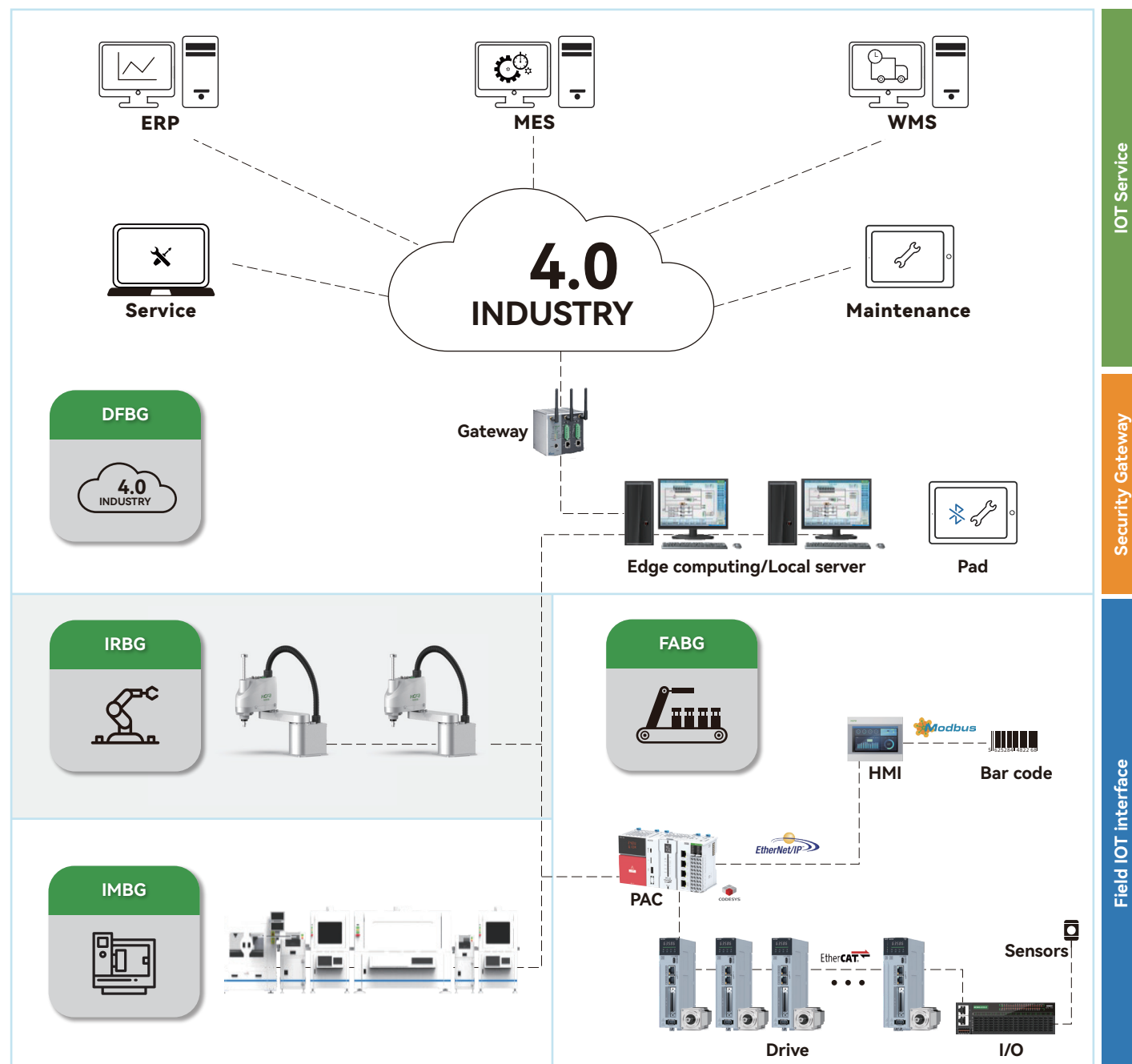
Focus on high-end automation  
QP-series Smart PAC



Better Work, Better Life



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**



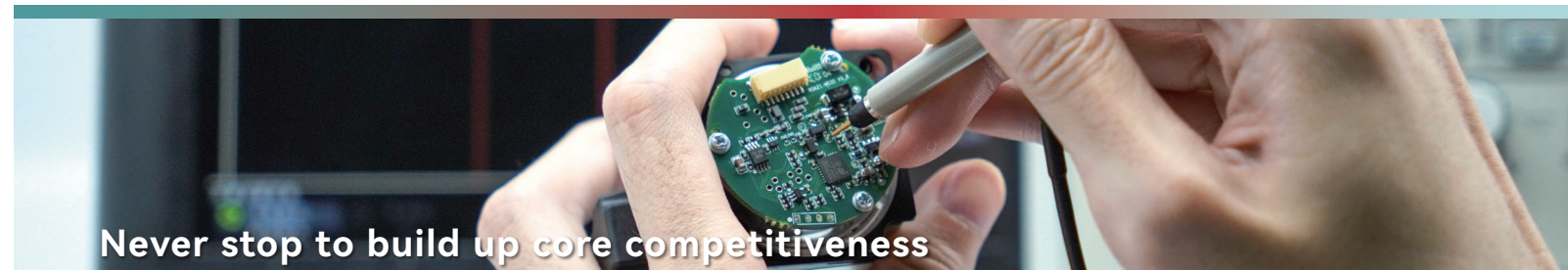
Be dedicated to creating values in automation industry

Zhejiang Hechuan Technology Co., Ltd., established in 2011, is a company that focuses on the research and development, manufacturing, sales and application integration of industrial automation products, and committed to providing core components and system integration solutions for smart factories.

The main products include controllers, servo systems, vision systems, encoders, VFDs, HMIs, electric rollers, precision transmission components, etc., covering the entire field of industrial automation.

We have newly established a 200-mu high-efficiency precision industrial transmission industrialization base. By introducing industry professionals, it has orderly promoted the industrialization application of precision guide rails, lead screws and other transmission components.

In November 2023, HCFA Technology and Bosch Rexroth signed a strategic cooperation agreement. Bosch Rexroth strategically invested in HCFA Technology and planned to cooperate to establish a subsidiary. Based on common innovation concepts and innovative thinking, the two parties will integrate their respective advantages, form resource complementarity, and carry out in-depth cooperation, striving to become ecological partners in the entire value chain of industrial automation and promote the further development of China's industrial automation industry.



Never stop to build up core competitiveness

R&D Centers

6

Set up nationally

R&D investment

10%+

Proportion of revenue

R&D personnel

300+

Elite gathering

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



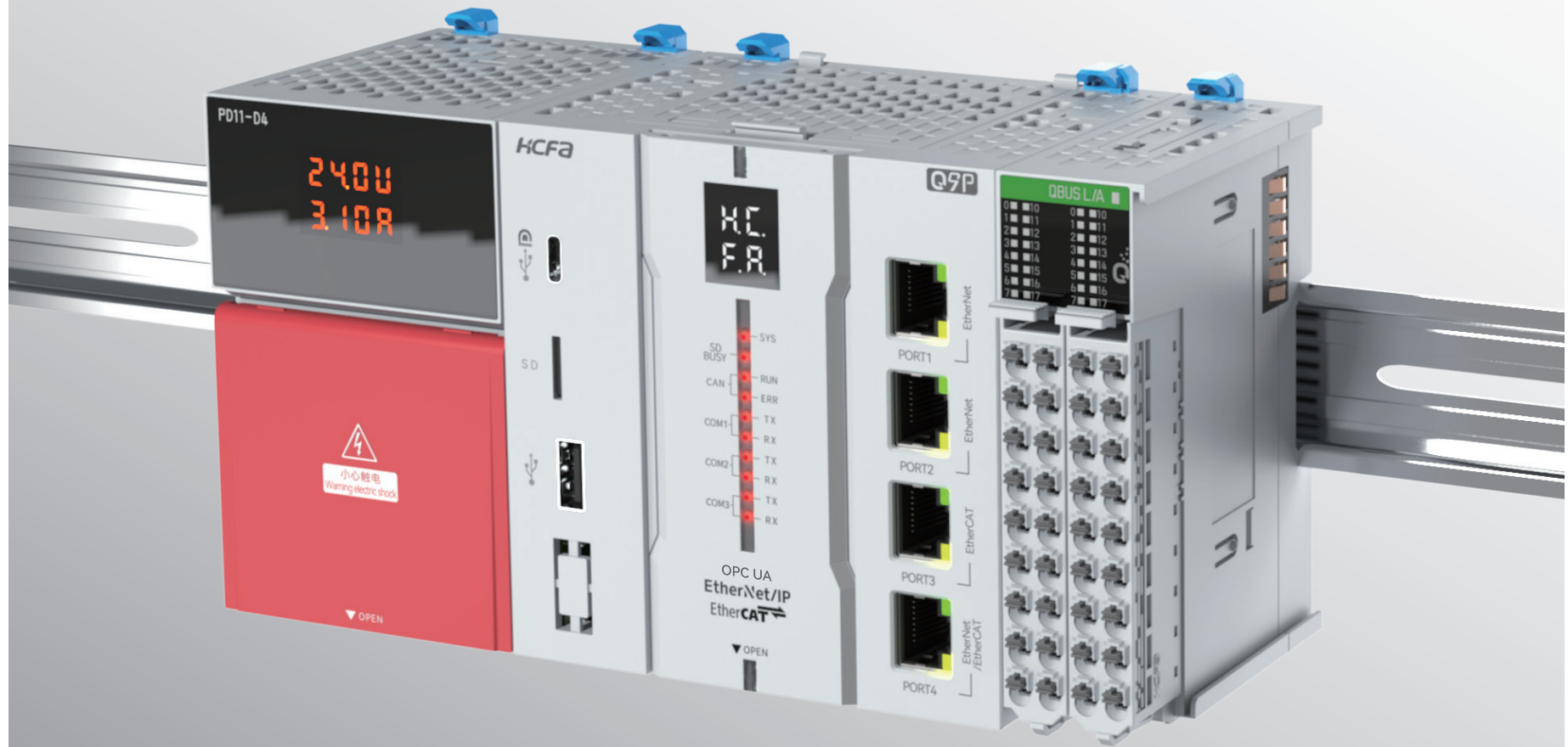
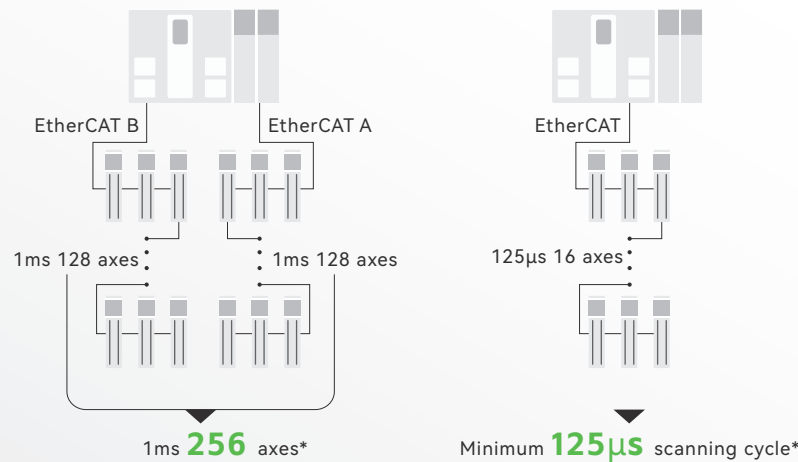
HIGH PERFORMANCE CONTROL

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

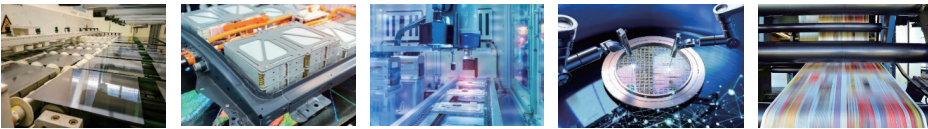
HIGH INTEGRATION

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

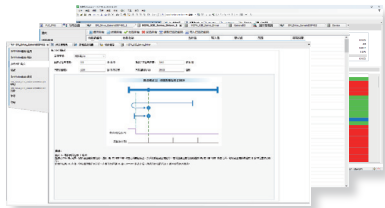


EASY TO DEVELOP

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



OPC UA

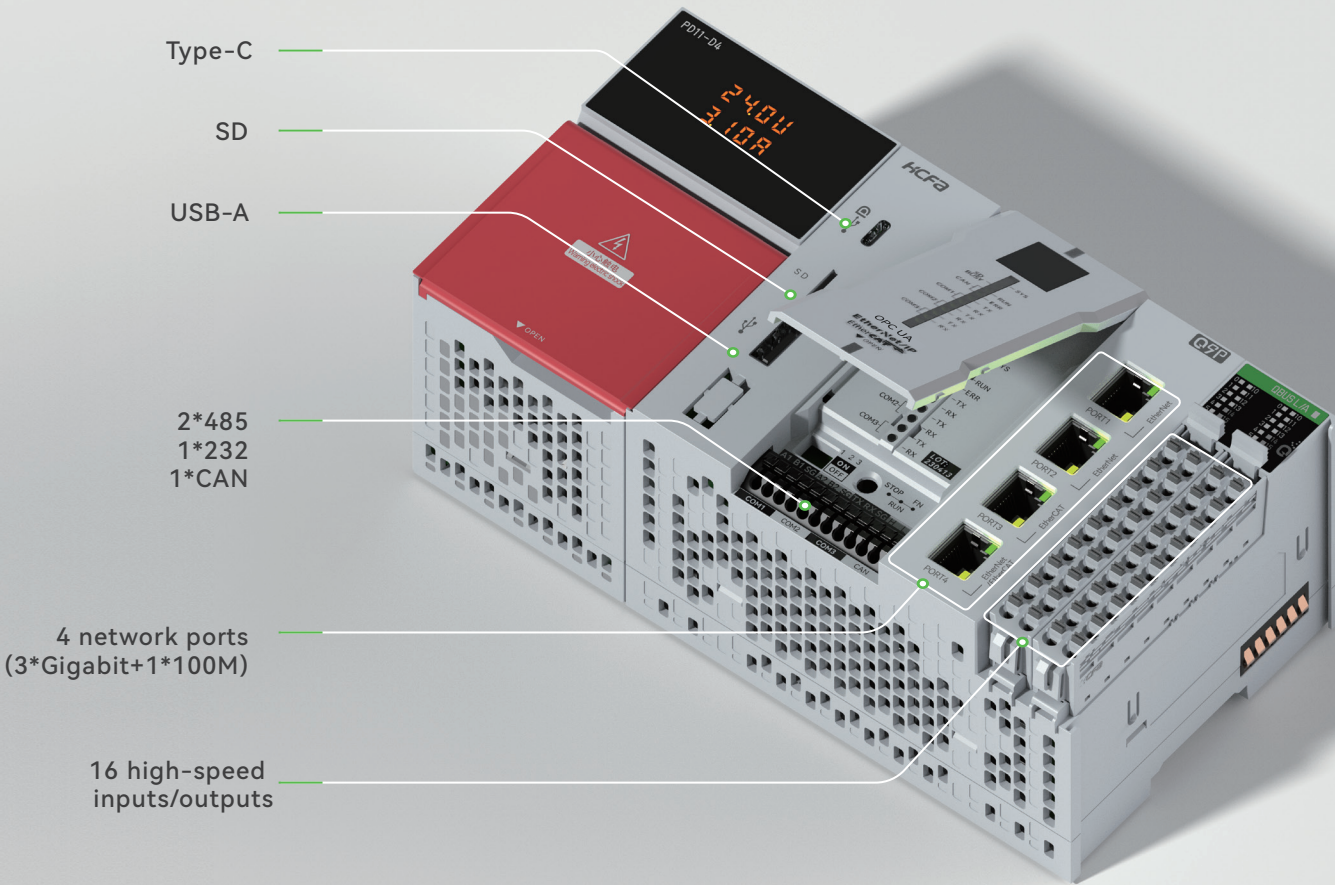
EtherNet/IP



\*Note: Supported by some models

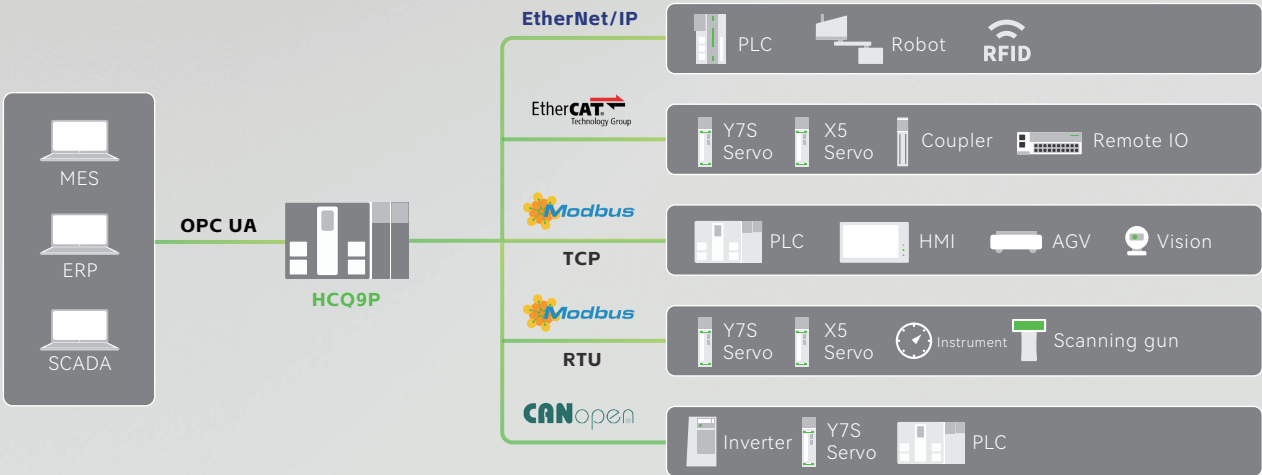
RICH HARDWARE INTERFACE/

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

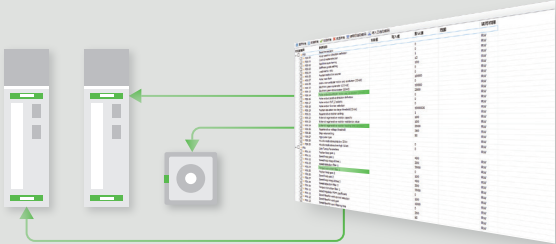


BRAND-NEW SECONDARY DEVELOPMENT IDE --HCP WORKS3

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:**

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

Number of command pulses for one revolution of the motor [DINT]

Gear ratio numerator [DINT]

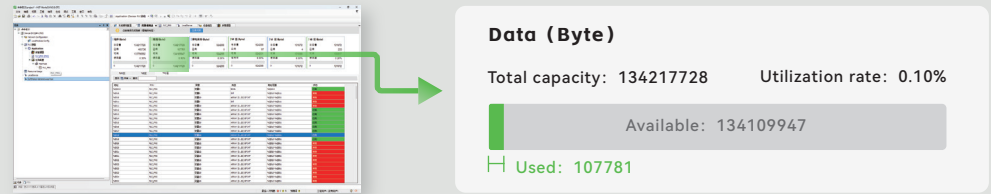
Gear ratio denominator [DINT]

Working stroke for one revolution of the worktable [LREAL]

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

Q3: High-end Bus Motion Controller  
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  
D: DC power

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	HCQ3P-1400-D4	HCQ5P-1500-U4	HCQ7P-1600-U4	HCQ9P-1700-U4
Processor	ARM	Celeron	Intel i5	Intel i7
Hard disk / storage	4G/512M	64G/2G	64G/8G	64G/8G
Program capacity	128MBytes			
Power-off holding capacity	1MBytes	6MBytes		
EtherCAT axis number (1ms)	32 axes	32 axes + 32 axes	64 axes + 64 axes	128 axes + 128 axes
Pulse axes	8 axes			
Main unit I/O	16 inputs, 16 outputs			
Right-side expansion (output power)	16W			
Applicable power module	No need to use UPS, 24V input for main unit	Requires UPS module: HCQX-PD11-D4 (24VDC) 、HCQX-PD11-A4 (220VAC) *1		
Ethernet port	Gigabit*2+100M*1	Gigabit*3+100M*1		
Download monitoring protocol	Supported			
EtherNet/IP	Support Scanner and Adapter			
Modbus TCP/IP	Support Server and Client			
OPC UA	Support Server			
EtherCAT	1-ch	2-ch		
CANopen	1-ch			
Serial port	2-ch RS485 + 1-ch RS232			
USB	1-ch USB2.0, 1-ch Type-C			
SD card	1-ch			
Programming software	HCP Works3			
Programming language	LD、ST、SFC、CFC、FBD			

\*1This model will be launched subsequently

QP series Controller Specifications

Model name			HCQ3P-1400-D4	HCQ5P-1500-U4	HCQ7P-1600-U4	HCQ9P-1700-U4
Appearance						
			-	Note: HCQ5P,HCQ7P,HCQ9P Series controllers must be used with PD11 power modules (refer to page 10 for details).		
Processor			ARM	Celeron	Intel i5	Intel i7
Hard disk/ storage (Bytes)			4G/512M	64G/2G	64G/8G	64G/8G
Programming	Program capacity		128MBytes			
	I-zone/Q-zone/M-zone		128KBytes / 128KBytes / 512KBytes			
	Power-failure holding area		1MBytes	6MBytes		
	Other variables		Unlimited			
	User data storage capacity		128MBytes (Folder name: FlashFiles)			
Configuration	Number of main unit extensions	Digital/analog/ other extension	Calculated on the basis of the current consumption			
		External power supply	DC12V/16W			
	Applicable power module		-	HCQX-PD11-D4, HCQX-PD11-A4*		
Axis capacity	Dual EtherCAT master 1ms recommended number of axes		32 axes	32 axes + 32 axes	64 axes + 64 axes	128 axes + 128 axes
EtherCAT	Pulse axis		8-axis 200kHz (open collector output)			
	Communication standards		IEC 61158 Type12			
	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	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. 500μs	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		HCQ3P-1400-D4	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	USB2.0
5V, Max. output current	1A	
Max. communication rate	480 Mbps (theoretically)	
Insulation	Non-Isolated	-

\*HCQ3P-1400-D4 does not support



General Specifications

Item		Specification	
Weight(g)		710	
Dimensions(mm)		132.2 (W) *105.5 (H) *81.9 (D)	
Operating environment	Working temperature		-10~55℃
	Storage temperature		-40~75℃
	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	HCQ3P-1400-D4	HCQ5P-1500-U4	HCQ7P-1600-U4	HCQ9P-1700-U4
Power supply voltage	DC24V			
Voltage fluctuation range	-15%~+20%			
Rated power consumption	26W	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	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	1 common terminal for every 8 points, and the two input common terminals are internally connected

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

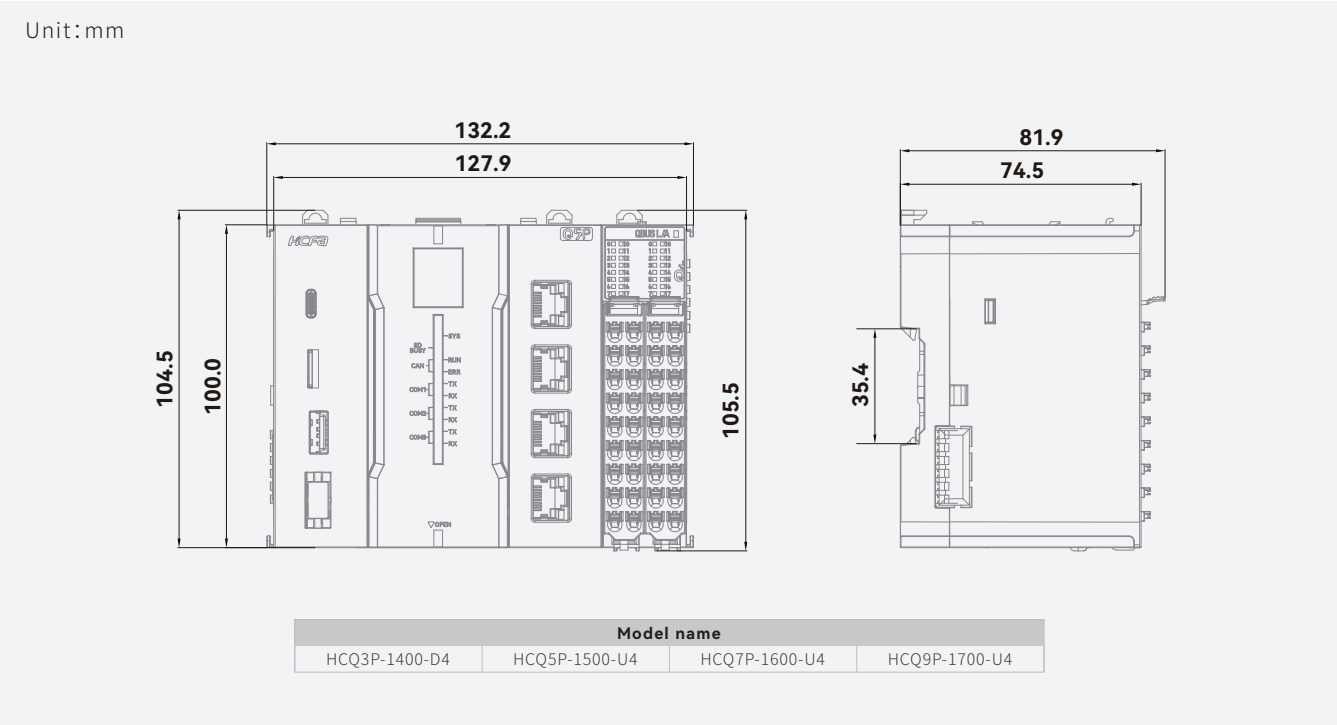
Power Module Specifications

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 charging time	10s (Tpy.)		
Weight (g)	Net weight approx. 190		

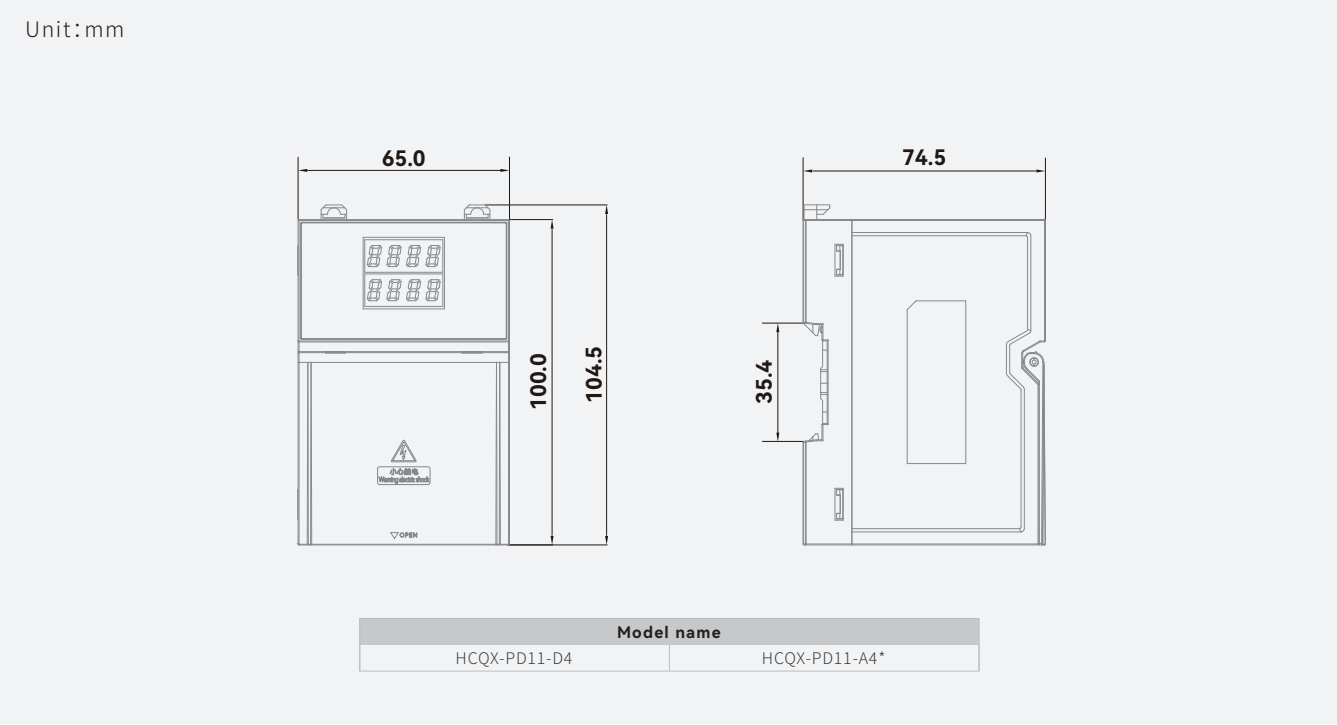
General specifications

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	Specifications	Page
HCQ3P-1400-D4	ARM processor, 4G hard disk, 512M RAM, 1M power-off holding area, 16 inputs, 16 outputs, 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	07
HCQ5P-1500-U4	Intel Celeron processor, 64G hard disk, 2G RAM, 6M power-off holding area, 16 inputs and 16 outputs, 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	07
HCQ7P-1600-U4	Intel I5 processor, 64G hard disk, 8G RAM, 6M power-off holding area, 16 inputs, 16 outputs, 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	07
HCQ9P-1700-U4	Intel I7 processor, 64G hard disk, 8G RAM, 6M power-off holding area, 16 inputs, 16 outputs, 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	07
HCQX-PD11-D4	DC24V DC power module, used with HCQ5P-1500-U4, HCQ7P-1600-U4, HCQ9P-1700-U4	10