Control Drive Sensor M&E Info.

HCFA

Create a better life through our work

Innovation Integrity Service

Selection Guide for Control Products

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HCFA

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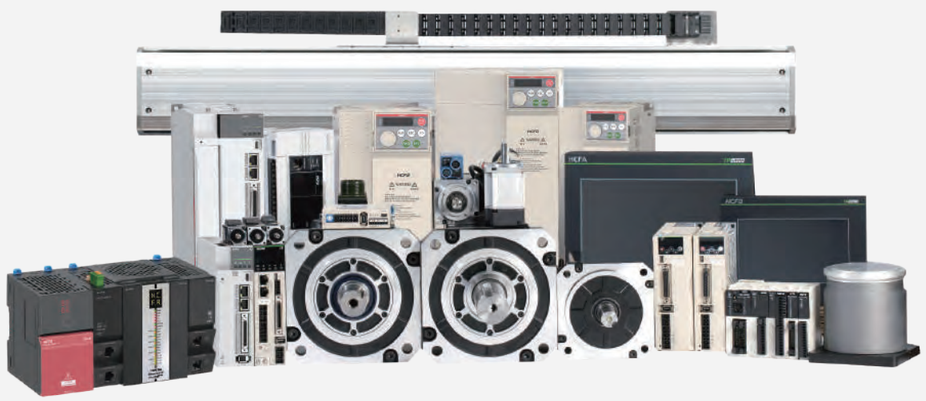
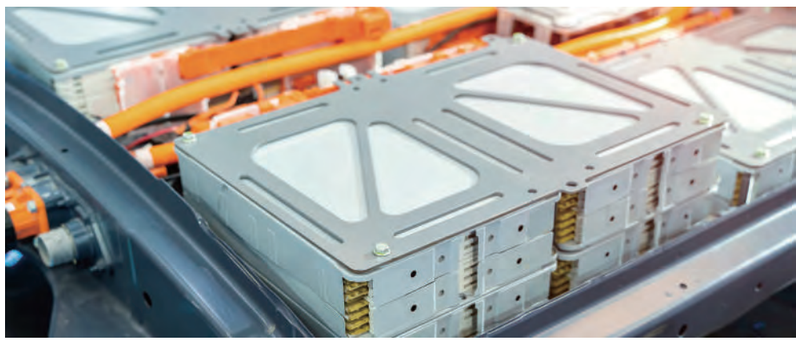
HCFA ATC

Manual No.; November, 2021 Version No. 6

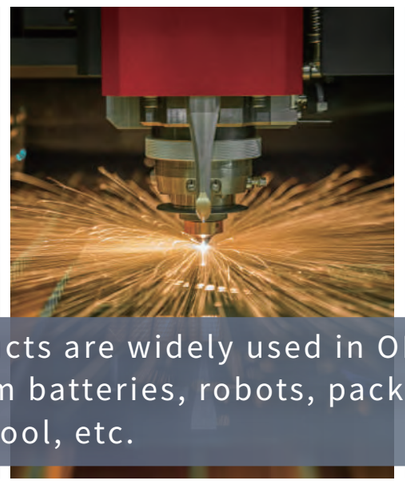
To be the most valuable industrial automation core components and solution provider

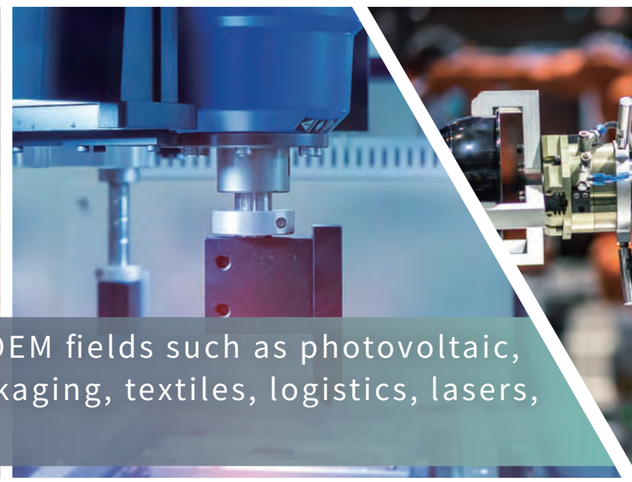


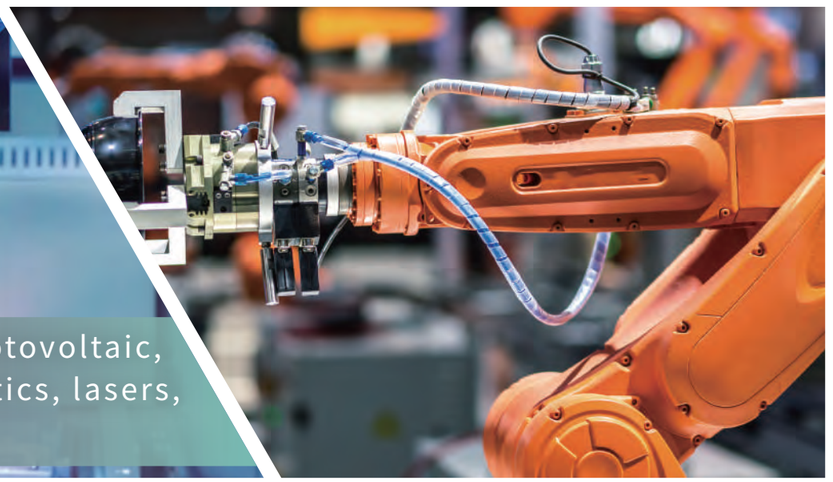


HCFA

R&D Centers	Sales Office	Global Distributor
4	40+	400+
Set up nationally	Sales elites gathering	Products sold worldwide

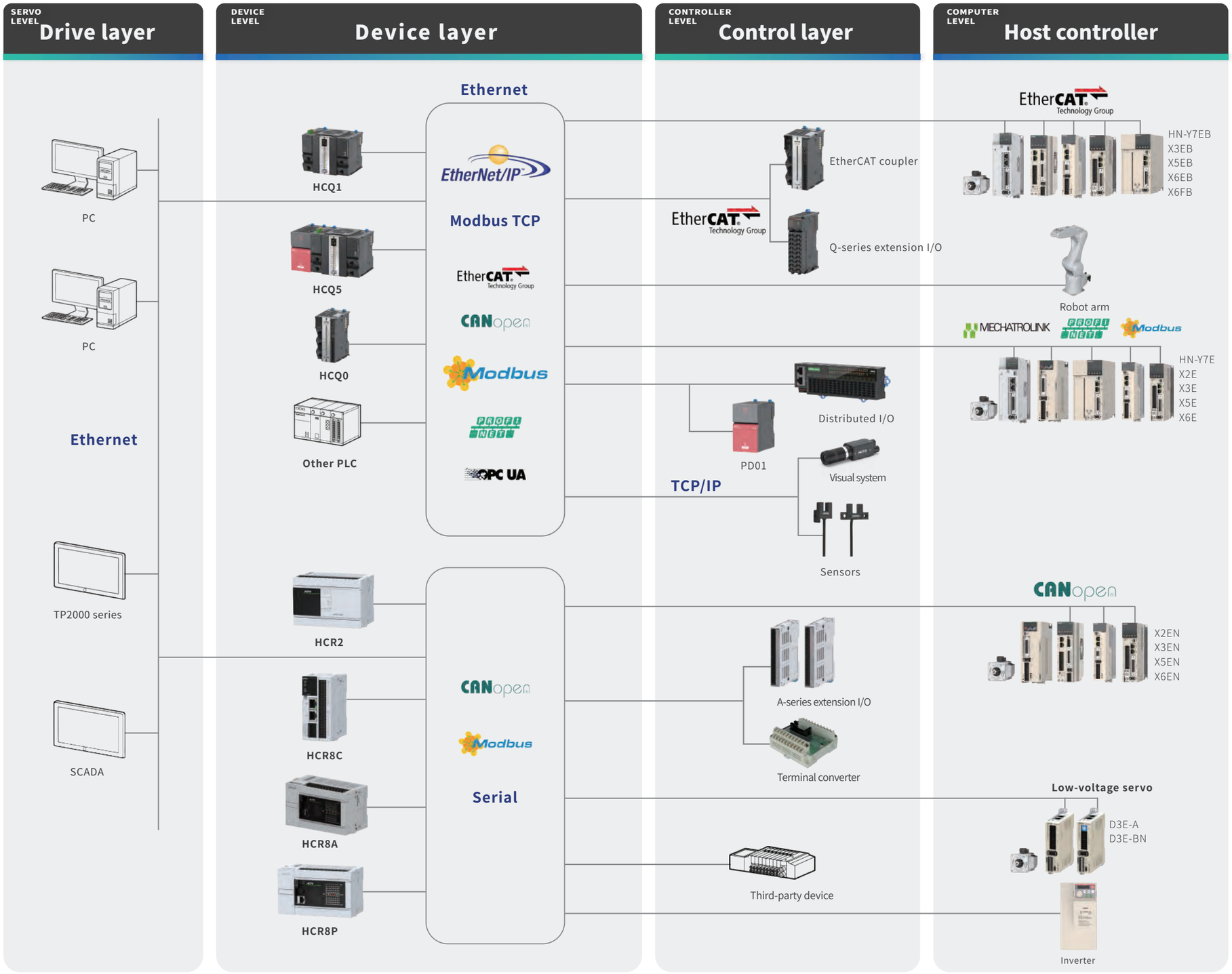






The products are widely used in OEM fields such as photovoltaic, 3C, lithium batteries, robots, packaging, textiles, logistics, lasers, machine tool, etc.

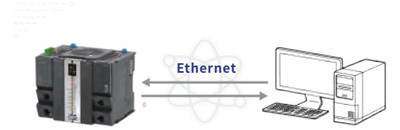
CONTROL SYSTEM TOPOLOGY



COMPUTER LEVEL

Ethernet cable / USB to achieve program download

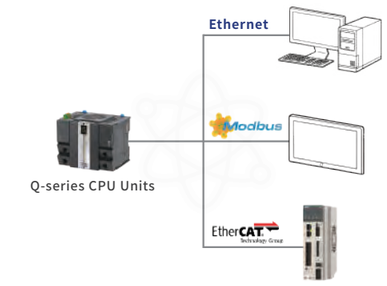
The upper controller transmits the internal data of the program through the Ethernet cable, and the user can also upload and download the program through the USB port.



COMPUTER LEVEL

Multiple communication protocol supported:

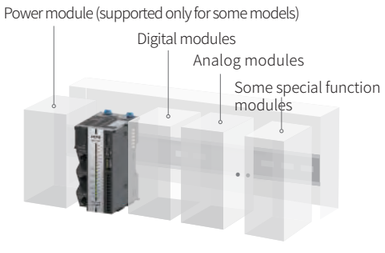
Various communication protocol: Modbus TCP
Modbus RTU EtherNet/IP OPC UA
EtherCAT CANopen RS232/RS485



COMPUTER LEVEL

Up to 16 local extension modules

Q series CPU unit supports power modules on the left side, and supports digital, analog, temperature measurement, high-speed counting extension modules, etc. on the right side.



*The number of local extension modules needs to be calculated based on the current consumption of the module

Overall solutions

Q1 standard PACs are the solution to a control device that integrates logical operations, motion control, visualized interfaces, and multiple communications in a single control device.

Customer-centric

The brain of the control system, rich communication interfaces make information interaction more easier, software motion control enrich the hardware options, and graphical data collection makes the variable monitoring more intuitive.

Up to 128 axes in 4ms

Help improve production accuracy and efficiency

Q-SERIES LINEUP

Naming rule for Q-series PACs

H C Q 1 □ - 1 3 0 0 - D 2

Product name

HC: HCFA controller

Series name

Q1

- **Q0**: Basic bus motion controller
- **Q1**: Standard bus motion controller
- **Q3**: High-end bus motion controller
- **Q5**: Basic intelligent mechanical controller
- **Q7**: Standard intelligent mechanical controller
- **Q9**: High-end intelligent mechanical controller

Series models

□

- **N/A**: Standard type
- **S**: Basic type
- **J**: Modular type

Operating system

1

- **1**: Linux
- **2**: Windows10
- **3**: Windows7
- **4**: QNX

Number of motion control axis

3

n (0~8): 2^{n+2}

Note: Number of axes recommended by the controller.

Control software module

0

- **0**: CODESYS
- **1**: HCPACS
- **2**: ROBOT
- **3**: CNC
- **4**: MC
- **9**: N/A

Additional function software module

0

- **0**: Standard software
- **1**: Machine vision
- **2**: Edge computing

Power type

D

- **D**: DC power
- **A**: AC power

Product iteration serial number

2

Recommended number of axes

Series name	Classification	Recommended number of axes	Max. number of axes
HCQ0S*	1200	CANOpen: 16axes	Unlimited
HCQ0	1100	EtherCAT: 8 axes	Up to 8 axes
	1200	EtherCAT: 16 axes	Unlimited
HCQ1	1200	EtherCAT: 16 axes	Up to 16 axes
	1300	EtherCAT: 32 axes	Unlimited
HCQ5	1400	EtherCAT: 64 axes	Up to 64 axes
	1500	EtherCAT: 128 axes	Unlimited
HCQ7*	1500	EtherCAT: 128 axes	Up to 128 axes
	1600	EtherCAT: 256 axes	Unlimited
HCQ9*	1600	EtherCAT: 256 axes	Up to 256 axes
	1700	EtherCAT: 256*2 axes	Unlimited

* Under development

HCQ0-1□00-D

Basic bus motion controller

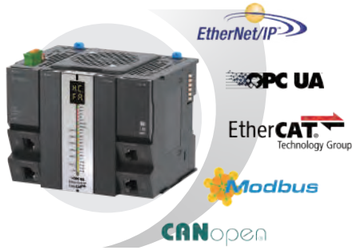
Basic performance
- Program capacity 16MB
- Recommend number of axes: 16*1
- Output power 16W
- 16 local extension modules supported

Functions
- Number of IO points for main unit
- Single-axis positioning and fixed-speed
- Electric cam/flying shear/rotary shear
- Electronic gear
- CNC G-code control/Robot control
- Linear interpolation/circular interpolation/helical interpolation

Supported protocol
- EtherCAT
- CANOpen
- Modbus TCP
- Modbus RTU

HCQ1-1□00-D2

Standard bus motion controller



Basic performance
- Program capacity 16MB
- Recommend number of axes: 32*1
- Output power 16W
- 16 local extension modules supported

Functions
- Number of IO points for main unit
- Single-axis positioning and fixed-speed
- High-speed pulse input/output
- Electric cam/flying shear/rotary shear
- Electronic gear
- CNC G-code control/Robot control
- Linear interpolation/circular interpolation/helical interpolation

Supported protocol
- EtherCAT
- CANOpen
- OPC/UA
- EtherNet / IP
- Modbus TCP
- Modbus RTU

HCQ5-1□00-A

Basic intelligent mechanical controller

Basic performance
- Program capacity 16MB
- Recommend number of axes: 128*1
- Output power 16W
- 16 local extension modules supported

Functions
- Single-axis positioning and fixed-speed
- Electronic gear
- Electric cam/flying shear/rotary shear
- Linear interpolation/circular interpolation/helical interpolation
- CNC G-code control/Robot control

Supported protocol
- EtherCAT
- CANOpen*2
- OPC/UA
- EtherNet / IP
- Modbus TCP
- Modbus RTU

*1 Recommended axis number for high-configuration models 4ms. For specific models, please refer to product naming rules.
*2 Will be supported.

PAC

Basic bus motion controller

HCQO-I□OO-D

> Electrical specifications

Items	Technical specifications				
Dielectric withstand voltage	AC1000V for 1 min, between power terminal and I/O terminal, between external terminal and shell				
Noise resistance	1500Vp-p or more, Noise width 1μs, 50ns (based on noise simulator), comply with (IEC61000-4-2/3/4/6)				
Vibration resistance	Installation	Frequency (Hz)	Acceleration (m/s²)	Single amplitude (mm)	10 times of testing in each direction (X-, Y-, and Z-axis directions) (Total: 80 min, each)
	DIN rail mounting	10-57	-	0.035	
		57-150	4.9	-	
Insulation resistance	50 MΩ or more using 500 V DC insulation resistance meter (Between all terminals and ground terminal)				
IP protection level	IP20				
Working atmosphere	Max. 50℃, free from excessive dust and corrosive gas				
Working altitude	2000m (80kPa)				
Degree of pollution	2, Normally there is only non-conductive pollution, but temporary conductivity caused by condensation should also be expected				

> Environment specifications

Classifications	Items	Working environment	Transport environment	Storage environment
Environment parameter (IEC60721-3)	Temperature	0~50℃ (No freezing)	-40~75℃	-25~75℃
	Humidity	5-95%RH (No condensation)		
	Impact (collision)	Acceleration 150m2, action time 11ms, twice in each direction (X-, Y-, and Z-axis directions)		
	Altitude/Atmosphere	Max.2000m	Max.3000m (>70kPa)	

> Input specifications*

Items	Specifications
Signal name	Transistor input (I0-I2)
Rated input voltage	DC 24V (+20%~-15%, pulse ripple within 10%)
Input type	NPN
Rated input current	3.65mA
ON current	>4.14mA
OFF current	<3.88mA
Input impedance	1.5KΩ
Max. input frequency	1kHz
Common method	Shared with power supply 0V, short-circuited internally

> Output specifications*

Items	Specifications
Signal name	Transistor output (Q0-Q1)
Output polarity	NPN
Control circuit voltage	DC 5~24V
Rated load current	50mA
Max. voltage drop at power-ON	0.05V
Leakage current at power-OFF	<0.1mA
Output frequency	Max. 1kHz
Common method	Shared with power supply 0V, short-circuited internally

*Will be supported.

> Power specifications

Items	Power voltage	Voltage fluctuation range	Input power	Undervoltage level	Output voltage	Voltage fluctuation	Output power
Specifications	DC 24V	-15%~20%	36W	19V	12V	±5%	16W

> Performance specifications

Items	Specifications		
Programming	Program capacity		16MBytes
	I-area (%I)		128KBytes
	Q-area (%Q)		128KBytes
	M-area (%M)		512KBytes
	Power-failure retention area		800KBytes
	Other variables		Not defined
Configuration	Number of extension modules	Digital module	Calculated based on current consumption
		Analog module	
		External power supply	12V/16W
EtherCAT	Communication standard		IEC 61158 Type12
	Physical layer		100BASE-TX
	Transmission speed		100Mbps (100Base-TX)
	Duplex mode		Full duplex
	Topology		Linear, bus and star-type
	Transmission medium		Cat.5E twisted pair cables
	Maximum transmission distance between nodes		100m
	Max. process data		Input: 5,736 bytes Output: 5,736 bytes (but the max. number of frames of process data is 4)
	Communication cycle		Mini.1ms
CANOpen master	Link layer		CAN2.0A
	Terminal resistor		Built-in 120Ω. Do not support disconnection
	Support baud rate bps		20K,50K,100K,125K,250K,500K,800K和1M
	Transmission medium		Cat.5E twisted pair cables
	Max. communication distance		2500 m (20Kbit/s)
	Maximum number of the slaves		32
	Communication cycle		Mini.1ms
Serial ports	Physical layer	COM1	RS485
		COM2	RS485 only support master station
		COM3	RS232
	Terminal resistor	COM1	Built-in 120Ω, support DIP switch
		COM2	Built-in 120Ω. Do not support disconnection
	Baud rate bps		4800~115200
	Max. communication distance	COM1, COM2	500m
		COM3	15m
	Maximum number of the slaves	COM1, COM2	32
		COM3	1
	Transmission medium		Cat.5E twisted pair cables

PAC

Standard bus motion controller

HCQ1-I□00-D2

> Electrical specifications

Items	Technical specifications				
Dielectric withstand voltage	AC1000V for 1 min, between power terminal and I/O terminal, between external terminal and shell				
Noise resistance	1500Vp-p or more, Noise width 1μs, 50ns (based on noise simulator), comply with (IEC61000-4-2/3/4/6)				
Vibration resistance	Installation	Frequency (Hz)	Acceleration (m/s²)	Single amplitude (mm)	10 times of testing in each direction (X-, Y-, and Z-axis directions) (Total: 80 min, each)
	DIN rail mounting	10-57	-	0.035	
		57-150	4.9	-	
Insulation resistance	50 MΩ or more using 500 V DC insulation resistance meter (Between all terminals and ground terminal)				
IP protection level	IP20				
Working atmosphere	Max. 50°C, free from excessive dust and corrosive gas				
Working altitude	2000m (80kPa)				
Degree of pollution	2, Normally there is only non-conductive pollution, but temporary conductivity caused by condensation should also be expected				

> Environment specifications

Classifications	Items	Working environment	Transport environment	Storage environment
Environment parameter (IEC60721-3)	Temperature	0~50℃ (No freezing)	-40~75℃	-25~75℃
	Humidity	5-95%RH (No condensation)		
	Impact (collision)	Acceleration 150m2, action time 11ms, twice in each direction (X-, Y-, and Z-axis directions)		
	Altitude/Atmosphere	Max.2000m	Max.3000m (>70kPa)	

> High-speed input specifications

Items	Specifications
Signal name	High-speed input (DI0-DI15)
Rated input voltage	DC 24V (+20%~-15%, pulse ripple within 10%)
Input type	NPN、PNP
Rated input current	3.65mA
ON current	>4.14mA
OFF current	<3.88mA
Input impedance	1.5KΩ
Max. input frequency	100kHz(Version 2.XX.XX) 200kHz (Version 3.XX.XX or more)
2-phase input worst duty ratio	(40%:60%) ~ (60%:40%)
Common method	Every 8 points share a common terminal.

> High-speed output specifications

Items	Specification
Signal name	Output (DO0-DO15)
Output polarity	NPN
Control circuit voltage	DC 5~24V
Rated load current	250mA
Max. voltage drop at power-ON	0.05V
Leakage current at power-OFF	<0.1mA
Output frequency	100KHZ (Version 2.XX.XX) 200KHz (Version 3.XX.XX or more)
Common method	Every 8 points share a common terminal.

> Power specifications

Items	Power voltage	Voltage fluctuation range	Input power	Undervoltage level	Output voltage	Voltage fluctuation	Output power
Specifications	DC 24V	-15%~20%	36W	19V	12V	±5%	16W

> Performance specifications

Items	Specifications		
Programming	Program capacity		16MBytes
	I-area (%I)		128KBytes
	Q-area (%Q)		128KBytes
	M-area (%M)		512KBytes
	Power-failure retention area		800KBytes
	Other variables		Not defined
Configuration	Number of extension modules	Digital module	Calculated based on current consumption
		Analog module	
		External power supply	12V/16W
EtherCAT	Communication standard		IEC 61158 Type12
	Physical layer		100BASE-TX
	Transmission speed		100Mbps (100Base-TX)
	Duplex mode		Full duplex
	Topology		Linear, bus and star-type
	Transmission medium		Cat.5E twisted pair cables
	Maximum transmission distance between nodes		100m
	Max. process data		Input: 5,736 bytes Output: 5,736 bytes (but the max. number of frames of process data is 4)
	Communication cycle		Mini.1ms
CANOpen master	Link layer		CAN2.0A
	Terminal resistor		Built-in 120Ω. Do not support disconnection
	Support baud rate bps		20K,50K,100K,125K,250K,500K,800K和1M
	Transmission medium		Cat.5E twisted pair cables
	Max. communication distance		2500 m (20Kbit/s)
	Maximum number of the slaves		32
	Communication cycle		Mini.1ms
Serial ports	Physical layer	COM1, COM2	RS485
		COM3	RS232
	Terminal resistor	COM1, COM2	Built-in 120Ω, support DIP switch
	Baud rate bps		4800~115200
	Max. communication distance	COM1, COM2	500m
		COM3	15m
	Maximum number of the slaves	COM1, COM2	32
		COM3	1
	Transmission medium		Cat.5E twisted pair cables

Basic intelligent mechanical controller

HCQ5-I□00-A

> Electrical specifications

Items	Technical specifications				
Dielectric withstand voltage	AC1000V for 1 min, between power terminal and I/O terminal, between external terminal and shell				
Noise resistance	1500Vp-p or more, Noise width 1μs, 50ns (based on noise simulator) , comply with (IEC61000-4-2/3/4/6)				
Vibration resistance	Installation	Frequency (Hz)	Acceleration (m/s^2)	Single amplitude (mm)	10 times of testing in each direction (X-, Y-, and Z-axis directions) (Total: 80 min, each)
	DIN rail mounting	10-57	-	0.035	
		57-150	4.9	-	
Insulation resistance	50 MΩ or more using 500 V DC insulation resistance meter (Between all terminals and ground terminal)				
IP protection level	IP20				
Working atmosphere	Max. 50℃, free from excessive dust and corrosive gas				
Working altitude	2000m (80kPa)				
Degree of pollution	2, Normally there is only non-conductive pollution, but temporary conductivity caused by condensation should also be expected				

> Environment specifications

Classifications	Items	Working environment	Transport environment	Storage environment
Environment parameter (IEC60721-3)	Temperature	0~50℃ (No freezing)	-40~75℃	-25~75℃
	Humidity	5-95%RH (No condensation)		
	Impact (collision)	Acceleration 150m2, action time 11ms, twice in each direction (X-, Y-, and Z-axis directions)		
	Altitude/Atmosphere	Max.2000m	Max.3000m (>70kPa)	

> Power specifications (PD01)

Items	Power voltage	Voltage fluctuation range	Input power	Undervoltage level	Output voltage	Voltage fluctuation	Output power
Specifications	AC 100~240V	-15%~20%	100W	80V	12V	±5%	60W

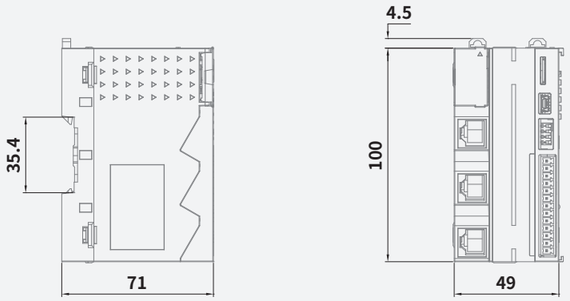
> Performance specifications

Items	Specifications		
Programming	Program capacity		16MBytes
	I-area (%I)		128KBytes
	Q-area (%Q)		128KBytes
	M-area (%M)		512KBytes
	Power-failure retention area		800KBytes
	Other variables		Not defined
Configuration	Number of extension modules	Digital module	Calculated based on current consumption
		Analog module	
		External power supply	12V/16W
EtherCAT	Communication standard		IEC 61158 Type12
	Physical layer		100BASE-TX
	Transmission speed		100Mbps (100Base-TX)
	Duplex mode		Full duplex
	Topology		Linear, bus and star-type
	Transmission medium		Cat.5E twisted pair cables
	Maximum transmission distance between nodes		100m
	Max. process data		Input: 5,736 bytes Output: 5,736 bytes (but the max. number of frames of process data is 4)
	Communication cycle		Mini.1ms
Serial ports	Physical layer	COM1, COM2	RS485
		COM3	RS232
	Terminal resistor	COM1, COM2	Built-in 120Ω, support DIP switch
	Baud rate bps		4800~115200
	Max. communication distance	COM1, COM2	500m
		COM3	15m
	Maximum number of the slaves	COM1, COM2	32
		COM3	1
	Transmission medium		Cat.5E twisted pair cables

Q-SERIES PAC DIMENSION DRAWING

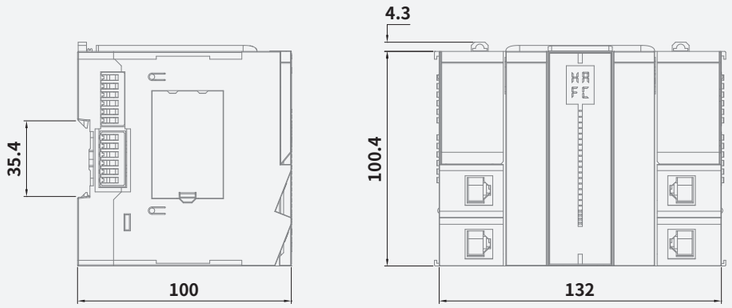
HCQ0-1□00-D

Unit:mm



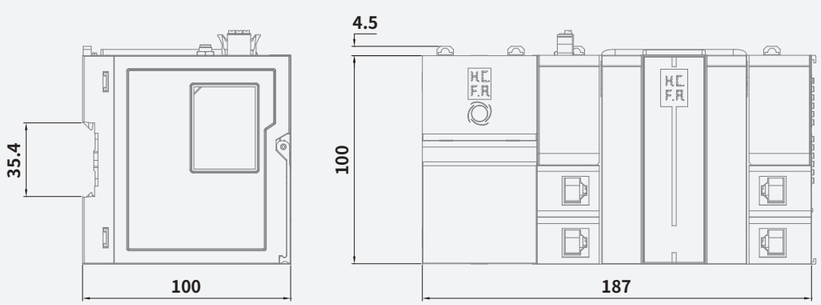
HCQ1-1□00-D

Unit:mm



HCQ5-1□00-A

Unit:mm



IQ8000-SERIES LINEUP

Q-SERIES PAC EXTERNAL DIMENSIONS

Naming rule for IQ8000 series

HC-IQ8560-1050-D

Product name
HC
HC: HCFA controller

Series name
IQ8
IQ8: Industrial PC: 8000 series

Processor
5
5: X86-J1900
6: X86-8145
7: X86-I3
8: X86-I5
9: X86-I7

Storage specifications
6
5: 2G+64G
6: 4G+128G
7: 8G+256G
8: 16G+512G

Display specifications
0
0: No display screen

Operating system
1
1: Linux(Ubuntu)
2: Windows10
3: Windows7
4: QNX

Reserved
0
0: Reserved

Control software module
5
0: CODESYS
1: HCPACS
2: ROBOT
3: CNC
4: MC
5: N/A

Additional function software module
0
0: Standard software
1: Machine vision
2: Edge computing

Power type
D
D: DC power
A: AC power

Modular Compact Easy-to-use

Digital module

High-density compact design, up to 16 I/O points on the module with a thickness of only 12mm

Analog module

Support a variety of voltage and current input and output

Temperature measurement module

Support a variety of thermocouples, thermal resistance etc., and can get the temperature data through the host controller easily

High-speed pulse I/O module

Support encoder input and high-speed pulse output, up to 200kHz pulse I/O

Coupler module

· Support EtherCAT input/output

Coupler module

· Support EtherCAT input/output

Digital input module

• 16/32- point digital input module

Digital output module

• 16/32-point digital output module

Digital I/O module

• 8-point input/8-point output

• 16-point input/16-point output

Analog input module

• 4-ch analog input

• Voltage input:
0~10V
-10~10V
-5~5V
0~5V
1~5V

• Current input:
0~20mA
4~20mA

Analog output module

• 4-ch analog input

• Voltage input:
0~10V
-10~10V
-5~5V
0~5V
1~5V

• Current input:
0~20mA
4~20mA

Temperature measurement module

• Support thermocouple: K, J, E, T, N, B, R, S (Default: K-type)

• Support thermal resistance: PT100, PT1000, Ni100, Ni1000 (Default: PT100) three-wire system

High-speed counter

• 4-ch high-speed counter (encoder) module, input signal supports pulse + direction, up to 200kHz

Pulse output

Step drive module

• 20-50V DC single-axis, support PP PV CSP and other motor control modules

Terminal module

Note: The -D2 models are the upgraded version of the corresponding -D, and there is no difference in their functions. It is recommended to purchase the D2 models.

HCQX-SERIES UNIT LINEUP

Naming rule for HCQX-series extension modules

HCQX-ID16-D2

Product name
HC — **HC:** HCFA controller

Series name
QX — **QX:** Q-series modules

Function modules
ID — **EC:** Coupler; **ID:** Digital input; **OD:** Digital output; **MD:** Digital I/O; **AD:** Analog input; **DA:** Analog output; **PD:** Power extension; **TS:** Temperature measurement; **HC:** High-speed counter

Number of channels
16 — **16:** Number of channels

Power type
D — **D:** DC power; **A:** AC power

Product iteration serial number
2

HCQX-ST1505-D2

Product name
HC — **HC:** HCFA controller

Series name
QX — **QX:** Q-series modules

Function modules
ST — **ST:** Step drive

Number of channels
1 — **1:** Single-axis; **2:** Two-axis

Working voltage
5 — **5:** 50V (×10)

Peak current
05 — **05:** 5A

Power type
D — **D:** DC power; **A:** AC power

Product iteration serial number
2

Coupler module

Models		Output power	Max. distance between stations	Max. number of local extension modules	External dimension WxDxH(mm)
	HCQX-EC01-D	16W	100m*	16	49x71.2x100
	HCQX-EC02-D	16W	100m*	16	49x71.2x100

Power module

Models		Output power	Max. distance between stations	Max. number of local extension modules	External dimension WxDxH(mm)
	HCQX-PD01-A	AC100~240V 50/60Hz	12V 60W	5 years, Based on working20 hoursa day at an ambient temperature of 30°C	50x100x100

Digital input module

Models		Number of channels	Input/output type				External dimension WxDxH(mm)
			Input		Output		
	HCQX-ID16-D2	16	16	DC24V (NPN/PNP)	-	-	15.2x71.2x100
	HCQX-ID16-D	16	16	DC24V (NPN/PNP)	-	-	14.7x100x100
	HCQX-ID32-D2	32	32	DC24V (NPN/PNP)	-	-	28.2x71.2x100

*The transmission medium between the two stations is Ethernet cable;

Digital output module

Models		Number of channels	Input/output type				External dimension WxDxH(mm)
			Input		Output		
	HCQX-OD16-D2*	16	-	-	16	NPN	15.2x71.2x100
	HCQX-OD16-D	16	-	-	16	NPN	14.7x100x100
	HCQX-OD32-D2*	32	-	-	32	NPN	28.2x71.2x100

Digital I/O module

Models		Number of channels	Input/output type				External dimension WxDxH(mm)
			Input		Output		
	HCQX-MD16-D2*	16	8	DC 24V (NPN/PNP)	8	NPN	15.2x71.2x100
	HCQX-MD16-D	16	8	DC 24V (NPN/PNP)	8	NPN	14.7x100x100
	HCQX-MD32-D2*	32	16	DC 24V (NPN/PNP)	16	NPN	28.2x71.2x100

Analog input module

Models		Number of channels	Input type		Channel data update time	External dimension WxDxH(mm)
			Voltage	Current		
	HCQX-AD04-D	4	0~10V -10~10V -5~5V 0~5V 1~5V	0~20mA 4~20mA	1ms	14.7x100x100

*PNP output needs to be customized, the model name is: HCQX-□□□□, If needed, please contact HCFA sales or distributors.

Analog output module

Models		Number of channel	Output type		Channel data update time	External dimension WxDxH(mm)
			Voltage	Current		
	HCQX-DA04-D	4	0~10V -10~10V -5~5V 0~5V 1~5V	0~20mA 4~20mA	1ms	14.7x100x100

Temperature measurement module

Models		Number of channels	Corresponding sensor	Intput type		External dimension WxDxH(mm)
				Items	Input temperature*	
	HCQX-TS04-D	4	Thermocouple: K, J, E, T, N, B, R, S (Default: K-type)	Input range	-200~1370°C	14.7x100x100
				Resolution	<±0.3%(For full scale)	
			Thermal resistance: PT100, PT1000, Ni100, Ni1000(Default: PT100) 3-wire	Input range	-200~850°C	
				Resolution	<±0.5°C	

High-speed counter module

Models		Number of channel	Pulse input method	Max. response frequency (A/B-phase)	External dimension WxDxH(mm)
	HCQX-HC04-D2	4	Phase difference pulse(x1/2/4) , Pulse + direction input, up/down pulse input	Single-phase 200kHz	15.2x71.2x100

Step drive module

Models		Number of channel	Motor control mode	Max. output current	Input voltage	External dimension WxDxH(mm)
	HCQX-ST1505-D2	Single-axis	PP、PV、CSP、Homing	Max.5A (peak current)	20/50V	15.2x71.2x100

End unit

Models		Functions	External dimension WxDxH(mm)
	End unit	Attached to the end of the CPU units or extension modules	1x90x100

*The specific temperature range may vary depending on the sensor type。

General Specifications for HCQX-series Extension Modules

Electrical specifications

Items		Specifications
Insulation voltage	Electrostatic	AC 500V60s
Insulation resistance	Electrostatic	1MΩ
EMC requirements	Discharge	Contact ±4kV, air ±8kV
	EFT	±2kV
	Surge	DC500V

Environment specifications

Items	Specifications
Working temperature	0~55°C
Storage temperature	-25~75°C
Relative numidity	95%no condensation
Altitude	2km or less
Atmosphere	108kPa~66kPa
Noise resistance	±2kV 5~100kHz
Sinusoidal vibration	9Hz<f<100Hz, 1.0 acceleration, constant amplitude
Drop	1m, 10 times, for packaging transportation

Power specification for IO special modules

Items	Specifications
Rated power for control end	DC 12V
Input voltage range	DC 10.8~13.2V
Max. current consumption	100mA/12V
Rated power for signal end	DC 24V
Input voltage range	DC 20.4~28.8V

ETHERCAT COUPLER

HCQX-EC01-D
EtherCAT
Fast Ethernet

ETHERCAT COUPLER

HCQX-EC02-D
EtherCAT
Fast Ethernet
Support SLOT nodes

AC POWER

HCQX-PD01-A
AC 110V~220V

END UNIT

HCQX-END
Attached to the end of the modules

Coupler module— Performance specifications

Items	Specifications	
Models	HCQX-EC01-D	HCQX-EC02-D
Functions	Connect the terminal module and the 100BASE-TX EtherCAT network	Connect terminal module and 100BASE-TX EtherCAT network, support SLOT node
Number of local extension	Up to 16	Up to 16
Data transmission medium	EtherNet/EtherCAT (Cat.5E twisted pair cables at least) Shielded	EtherNet/EtherCAT (Cat.5E twisted pair cables at least) Shielded
Distance between station	Ethernet transmission, max.100m	Ethernet transmission, max.100m
Transmission protocol / transmission rate	EtherCAT/100Mbaud	EtherCAT/100Mbaud
Delay	about 1μs	About 1μs
Bus interface	2 × RJ45	2 × RJ45
Power supply	DC 24V (-15%~+20%)	DC 24V (-15%~+20%)
Current consumption	70mA+ (Σ QBUS current/4)	70mA+ (Σ QBUS current/4)
QBUS Load power	Max.1750mA (21W) (-25°C~+55°C) Max.1333mA (16W) (>+55°C)	Max.1750mA (21W) (-25°C~+55°C) Max.1333mA (16W) (>+55°C)
Electrical isolation	Isolated power supply	Isolated power supply

AC power module - Power specifications

Items	Specifications
Models	HCQX-PD01-A
Input voltage	AC 100~240V 50/60Hz
Output voltage	12V
Load power	60W

HCQX SERIES

DIGITAL INPUT

HCQX-ID16-D2
16-point digital input
Support NPN/PNP input

HCQX-ID16-D
16-point digital input
Support NPN/PNP input

HCQX-ID32-D2
32-point digital input
Support NPN/PNP input

DIGITAL OUTPUT

HCQX-OD16-D2*
16-point digital output
Support NPN output

HCQX-OD16-D
16-point digital output
Support NPN output

HCQX-OD32-D2*
32-point digital output
Support NPN output

DIGITAL IN/OUT

HCQX-MD16-D2*
16-point digital I/O
Support NPN/PNP input
Support NPN output

HCQX-MD16-D
16-point digital I/O
Support NPN/PNP input
Support NPN output

HCQX-MD32-D2*
32-point digital I/O
Support NPN/PNP input
Support NPN output

*PNP output needs to be customized, the model name is：HCQX-□□□□，If needed, please contact HCFA sales or distributors.

Digital input modules — Performance Specifications

Items	Specifications	
Models	HCQX-ID16-D / HCQX-ID16-D2	HCQX-ID32-D2
Input points	16	32
Input form	NPN/PNP	NPN/PNP
Input voltage range	DC 24V (+20%~-15%)	DC 24V (+20%~-15%)
Input signal current	7mA / DC 24V	7mA / DC 24V
Input resistance	4.86kΩ	4.86kΩ
Input sensitivity ON-current	5.35mA or more	5.35mA or more
Input sensitivity OFF-current	2.1mA or less	2.1mA or less
Input voltage threshold	VIH_Min：15V VIL_Max：5V	VIH_Min：15V VIL_Max：5V
Input frequency response	5kHz	5kHz
Input response time	0.1ms or less	0.1ms or less
Pulse shape	Pulse width：100us or more Rising/falling edge：50us or less	Pulse width：100us or more Rising/falling edge：50us or less
Wiring method	2-wire, Shared by common terminal	2-wire, Shared by common terminal
Common method	Every 8 points share a common terminal	Every 8 points share a common terminal
Isolation voltage level	1.5kVrms	1.5kVrms

Digital output modules — Performance Specifications

Items	Specifications	
Models	HCQX-OD16-D / HCQX-OD16-D2	HCQX-OD32-D2
Output points	16	32
External power range	DC 5V~30V	DC 5V~30V
Output form	The standard models support NPN; PNP needs to be customized	The standard models support NPN; PNP needs to be customized
Max. load current	0.25A/point 2A/8point	0.25A/point 2A/8point
Voltage drop at power-ON	1V or less	1V以下
Leakage current at -OFF	0.1mA/DC 24V	0.1mA/DC 24V
Output response	5kHz	5kHz
Output response time	0.1ms point	0.1ms or less
Wiring method	2-wire, Shared by common terminal	2-wire, Shared by common terminal
Common method	Every 8 points share a common terminal	Every 8 points share a common terminal
Isolation voltage level	1.5kVrms	1.5kVrms

Digital I/O module — Performance Specifications

Items	Specifications	
Models	HCQX-MD16-D / HCQX-MD16-D2	HCQX-MD32-D2
I/O points	8, 8	16, 16
Input form	NPN/PNP	NPN/PNP
Output form	The standard models support NPN; PNP needs to be customized	The standard models support NPN; PNP needs to be customized
Input voltage range	DC 24V (+20%~-15%)	DC 24V (+20%~-15%)
Input signal current	7mA / DC 24V	7mA / DC 24V
Input resistance	4.86kΩ	4.86kΩ
Input sensitivity ON-current	5.35mA or more	5.35mA or more
Input sensitivity OFF-current	2.1mA or less	2.1mA or less
Input voltage threshold	VIH_Min：15V VIL_Max：5V	VIH_Min：15V VIL_Max：5V
Input frequency response	5kHz	5kHz
Input response time	0.1ms or less	0.1ms or less
Input pulse waveform	Pulse width：100us or more Rising/falling edge：50us or less	Pulse width：100us or more Rising/falling edge：50us or less
External power range	DC 5V~30V	DC 5V~30V
Max. load current	0.25A/point 2A/8point	0.25A/point 2A/8point
Voltage drop at power-ON	1V or less	1V or less
Leakage current at power-OFF	0.1mA/DC 24V	0.1mA/DC 24V
Output response frequency	5kHz	5kHz
Output response time	0.1ms or less	0.1ms or less
Wiring method	2-wire, Shared by common terminal	2-wire, Shared by common terminal
Common method	Every 8 points share a common terminal	Every 8 points share a common terminal
Isolation voltage level	1.5kVrms	1.5kVrms

Analog/Temperature module

HCQX SERIES

ANALOG INPUT

HCQX-AD04-D

4-ch analog input

Input voltage range：0~10V、-10~10V、-5~5V、0~5V、1~5V

Differential/
single-ended input

Input current range：0~20mA、4~20mA

ANALOG OUTPUT

HCQX-DA04-D

4-ch analog output

Input voltage range：0~10V、-10~10V、-5~5V、0~5V、1~5V

Single-ended output

Input current range：0~20mA、4~20mA

TEMPERATURE MEASURMENT

HCQX-TS04-D

4-ch temperature measurement

Thermocouple type：K, J, E, T, N, B, R, S

Thermal resistance：PT100，PT1000，Ni100，Ni1000

Analog input module — Performance Specifications

Items	Specifications
Models	HCQX-AD04-D
Analog current consumption	Type：80mA
Voltage sampling input	0~10V、-10~10V、-5~5V、0~5V、1~5V
Max. voltage input	-50V~+50V
Current sampling input	0~20mA、4~20mA
Max. current sampling input	-50mA~+50mA
Voltage input type	Differential input/single-ended input
Current input type	Single-ended input
Sampling rate	4ksps
Accuracy	±0.3%FSR(Full scale range)
Voltage channel temperature drift	±7uV/℃ (0.003%FSR)
Current channel temperature drift	±3nA/℃

Analog output module — Performance Specifications

Items	Specifications
Models	HCQX-DA04-D
Analog current consumption	Type：160mA
Voltage conversion output	0~10V、-10~10V、-5~5V、0~5V、1~5V
Current conversion output	0~20mA、4~20mA
Voltage output type	Single-ended output
Current output type	Single-ended output
Conversion rate	4ksps
Accuracy	±0.3%FSR
Voltage channel temperature drift	±0.03%FSR
Current channel temperature drift	±0.05%FSR
Voltage output load	Min：1kΩ
Current output load	Max：0.625 kΩ

Temperature measurement module — Performance Specifications

Items	Specifications
Models	HCQX-TS04-D
Signal voltage	Thermocouple：K, J, E, T, N, B, R, S (Default K-type)
	Thermal resistance：PT100，PT1000，Ni100，Ni1000 (Default PT100) 3-wire system
Settings	No need to set the address in the software, codesys will make the configuration automatically; Functions include overrun detection / disconnection detection / sampling cycle setting / sensor-type setting /Input filter setting and temperature unit conversion setting Typical 1Khz; Depends on sensor-type, conversion time and length
Input filter limit frequency	Typical 1Khz；Depends on sensor type, conversion time and length
Resolution	0.1 °C per digit ，0.1°F per digit
Warm-up time during TC test	30 mins
Absolute max. ratings	±150mV
Conversion time	About 100ms~1.3s, according to the configuration and filter settings and provide disconnection detection. (Turned on by default) and takes 460ms. TC time: 100ms* number of open channels*filtering times of this channel PT time: 200ms* number of open channels*filtering times of this channel
Temperature range	Determined by the corresponding sensor type； For TC, default setting K: -200~1370 °C, -7~55mV; For PT, default setting PT100: -200~850°C, 18~391Ω.
Measurement error (total error range)	TC：<±0.3% (For full scale) PT：<±0.5°C

High-speed counter/step drive modules

HCQX SERIES

HIGH SPEED COUNTER

HCQX-HC04-D2

4-ch high-speed counting

Single-ended input

Single-phase / dual-phase pulse input

STEP DRIVER

HCQX-ST1505-D2

Single-axis control

Supported mode：PP PV CSP HM

High-speed counter module —Line drive specifications

Items	specifications
Models	HCQX-HC04-D2
Collector input	DC 24V/8.4mA
ON-voltage/ON-current	DC 15V or more/5mA or more
Single-phase max. response frequency (A/B-phase)	200kHz
ON/OFF response time	Less than 2μs

High-speed counter module — Input specifications

Items	specifications
Models	HCQX-HC04-D2
Number of channel	4
Number of input points per channel	4
Rated input voltage	DC 24V (DC 20.4~28.8V)
Input resistance	3kΩ
Input type	NPN /PNP
Wiring method	Three-wire encoder
Pulse input method	Orthogonal phase pulse(x2/4)/Pulse + direction/Up/down pulse
Counting unit	Pulse
Counting range	- 2,147,483,648～2,147,483,647

High-speed counter module — Counting functions

Items	specifications
Models	HCQX-HC04-D2
Counter type	Ring counter or linear counter
Counter control	Gate control, counter reset and counter preset
Lock function	1 external input lock and 1 internal lock
Measurement method	Pulse rate measurement and pulse period measurement

Step drive module — Power Specifications

Items	Specifications
Models	HCQX-ST1505-D2
QBUS rated voltage	DC 12V
QBUS current consumption	Type：100mA (without encoder) Max：300mA (with encoder)
Input voltage range	DC 20~50V
Max. input current	5A

Step drive module — Control Specifications

Items	Specifications
Models	HCQX-ST1505-D2
Control protocol	CiA402
Communication scan cycle	250μs、500μs、1ms、2ms、4ms、8ms
Subdivision level	32~256 step
Power supply to the encoder	4.5~5V，200mA (Max)
Encoder input type	Differential input
Encoder max. response frequency	200kHz
Motor control mode	PP、PV、CSP、Homing
Digital input	I0~I4，single-ended DC 24V，max. pulse frequency 5kHz
Digital output	Q0~Q1, open-drain collector, max. 30V/250mA, max. pulse frequency 2kHz
Motor parameters	The motor parameters can be detected by servo drive automatically

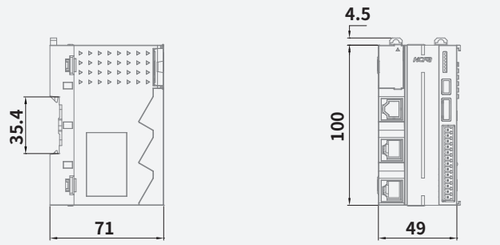
Step drive module — Drive Specifications

Items	Specifications
Models	HCQX-ST1505-D2
Power output type	Dual H-bridge
Current control	PWM frequency 25kHz
Output current	Continuous max. peak current 5A
Protection functions	Overcurrent protection, undervoltage protection, overvoltage protection, over-temperature protection

HCQX-SERIES UNIT DIMENSION DRAWING

Coupler modules

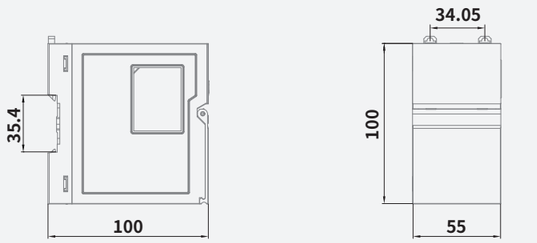
Unit:mm



Model	
HCQX-EC01-D	HCQX-EC02-D

Power modules

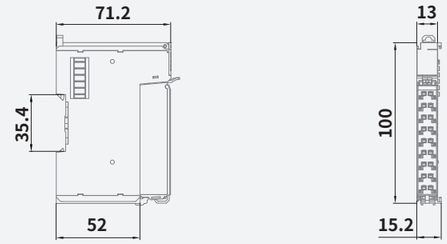
Unit:mm



Model
HCQX-PD01-A

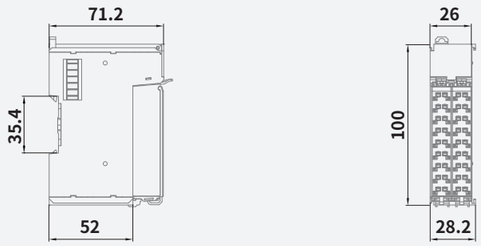
Extension modules

Unit:mm



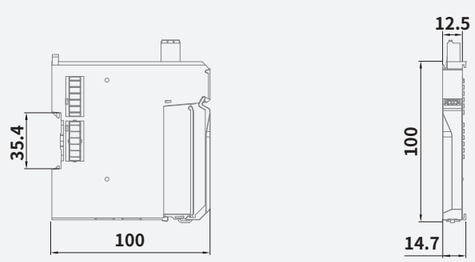
Model			
HCQX-ID16-D2	HCQX-OD16-D2	HCQX-MD16-D2	HCQX-HC04-D2

Unit:mm



Model			
HCQX-ID32-D2	HCQX-OD32-D2	HCQX-MD32-D2	HCQX-ST1505-D2

Unit:mm



Model			
HCQX-ID16-D	HCQX-OD16-D	HCQX-MD16-D	HCQX-AD04-D
HCQX-DA04-D	HCQX-TS04-D		