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Control Drive Sensor Transmission Digitalization

BETTER WORK, BETTER LIFE

# HCQX-D4 Series Centralized Extension Module

# HCNXE Series Distributed Extension Module

Initiative Integrity Innovation



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HCFA ATC


All information in this document is subject to change without notice.
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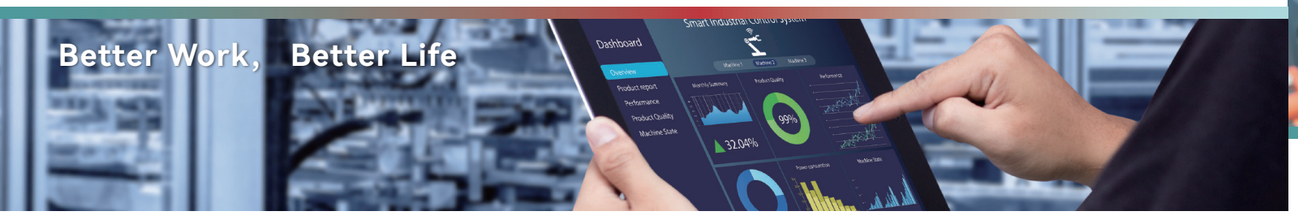
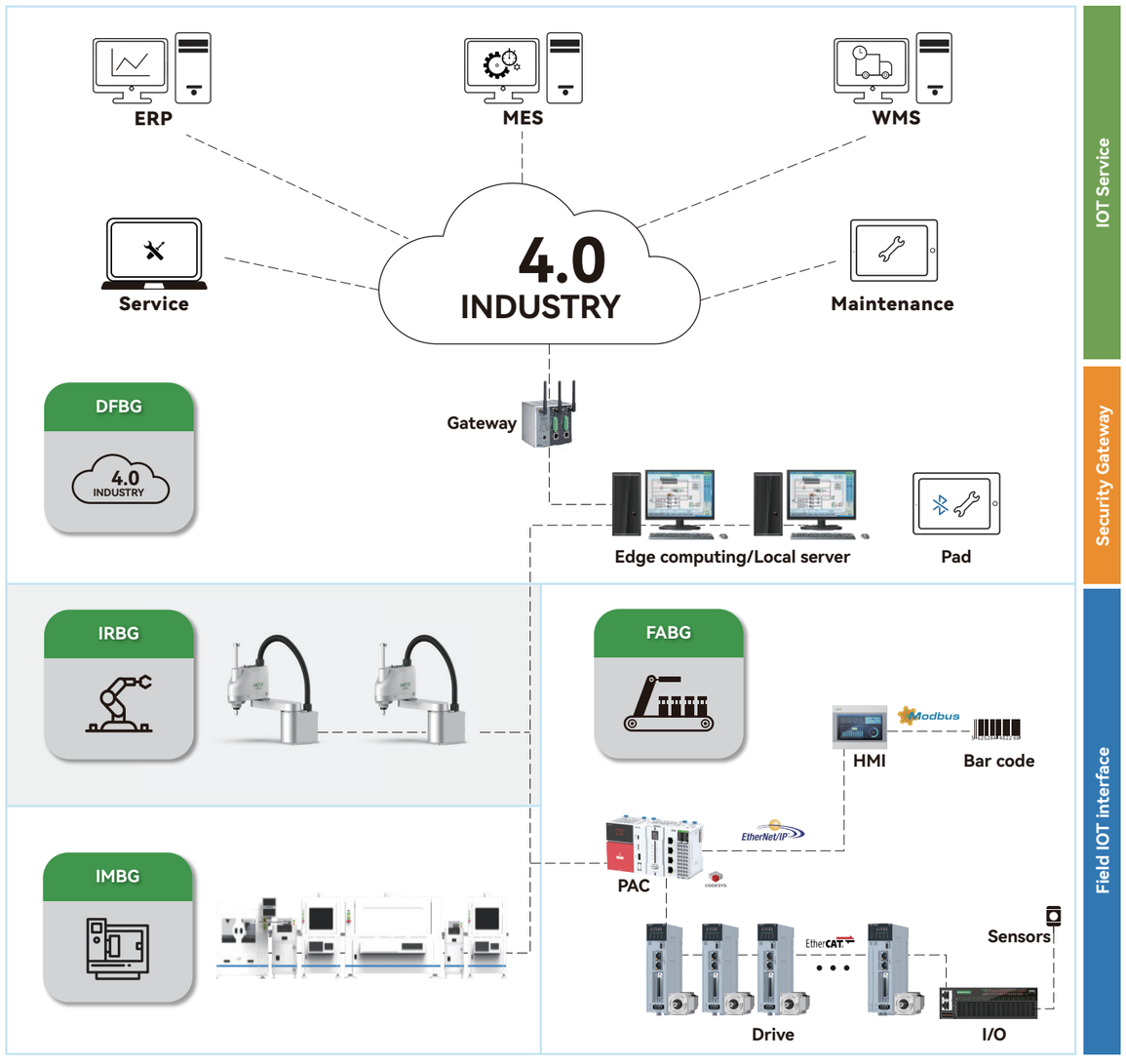
Due to the delay in updating the paper version, please refer to the official website for the latest product information.




**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**





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.


**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

# 3 types of EtherCAT Couplers
# 6-ch EtherCAT Splitter

## Suitable for different application scenarios!


**Rich specifications** ① 20 kinds of extension modules; ② 3 types of EtherCAT couplers; ③ 6-ch EtherCAT splitter.

**Flexible and easy-to-use** ① Ultra-thin module: 13mm; ② PUSH IN terminal.

**Safe and reliable** ① Multiple hardware protection; ② Detailed fault diagnosis.



# More than 20 kinds of I/O extension modules

**13mm** ultra-thin module, **50%** space saved;

**Removable terminals, no wiring when replacing modules ; PUSH IN, direct plug-in wiring.**

**EC coupler module**
HCQX-EC01-D4
HCQX-EC02-D4
HCQX-EC03-D4

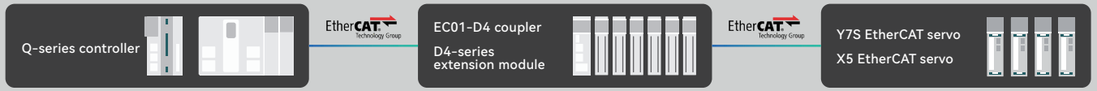
**ES splitter module**
HCQX-ES06-D4

**16-point digital module**
HCQX-ID16-D4
HCQX-OD16-D4
HCQX-OD16-D4-PNP
HCQX-MD16-D4
HCQX-MD16-D4-PNP

**32-point digital module**
HCQX-ID32-D4
HCQX-OD32-D4
HCQX-OD32-D4-PNP
HCQX-MD32-D4
HCQX-MD32-D4-PNP

**Special function module**
HCQX-AD04-D4
HCQX-AD08-D4
HCQX-DA04-D4
HCQX-TS04-D4
HCQX-RS02-D4
HCQX-RS02-D4-M
HCQX-OC08-D4

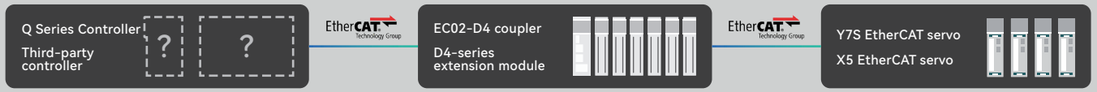
### HCQX-EC01-D4




Extension modules account for the number of bus nodes

Applicable scenarios: EtherCAT master station with unlimited bus nodes

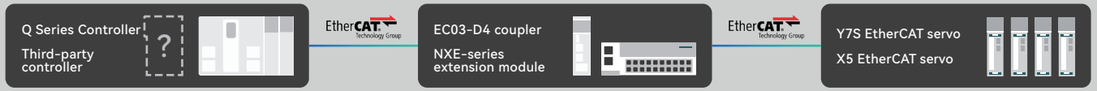
### HCQX-EC02-D4




Extension modules do not account for the number of bus nodes

Applicable scenarios: EtherCAT master station with limited bus nodes

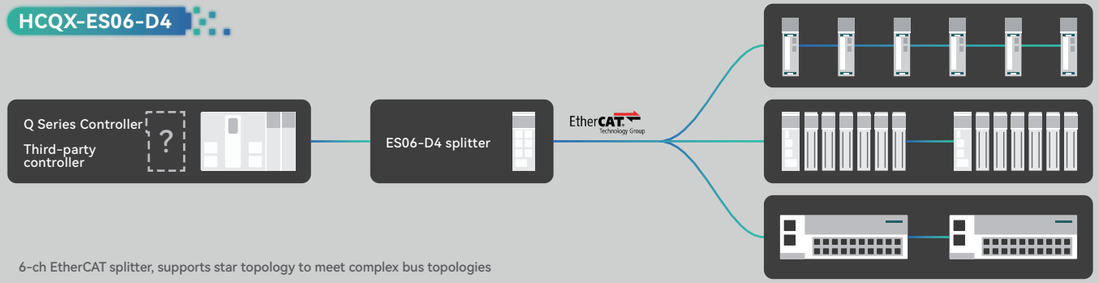
### HCQX-EC03-D4




HCFA NXE-series remote extension module dedicated coupler, NXE extension module does not account for the number of bus nodes

Applicable scenarios: Using HCFA NXE extension module, EtherCAT master station with limited bus nodes

### HCQX-ES06-D4




6-ch EtherCAT splitter, supports star topology to meet complex bus topologies

# Q-SERIES EXTENSION MODULE



## Naming rule for Q-series coupler

**H C Q X - E C 0 1 - D 4 - * * * ***

**1** **2** **3** **4** **5** **6** **7**

**1.Product name**

HC

**HC:** HCFA

**2.Product series**

QX

**QX:** Q-Series general extension

**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 type**

D

**D:** DC power

**6. Iterative version**

4

**7.Non-standard specifications**

*

**None:** Standard version

## Naming rule for Q-series extension module

**H C Q X - A D 0 4 - D 4 - * * * ***

**1** **2** **3** **4** **5** **6** **7**

**1.Product name**

HC

**HC:** HCFA

**2.Product series**

QX

**QX:** Q-Series general extension

**3.Function module**

AD

**AD:** Analog input
**DA:** Analog output
**ID:** Digital input
**OD:** Digital output
**MD:** Digital I/O
**TS:** Temperature measurement
**RS:** Serial communication
**ES:** Splitter

**4.Number of channels**

04

**5.Power type**

D

**D:** DC power

**6.Iterative version**

4

**7.Non-standard specifications**

*

**None:** Standard version
**PNP:** PNP output
**M :** Modbus protocol

*1 Standard EtherCAT coupler, extension module accounts for the number of bus nodes;
*2 Standard EtherCAT coupler, extension module does not account for the number of bus nodes;
*3 NXE-series module EtherCAT coupler, extension modules do not account for the number of bus nodes.

## General specifications of Q-series extension module

### General specifications

| Items | | Specifications |
|---|---|---|
| Ambient environment | Working temperature | -10~55°C |
| | Storage temperature | -40~75°C |
| | Relative humidity | 10~95%RH,(no condensation) |
| | Altitude | 2,000m MAX. |
| | Random drop | 1m. twice with outer packaging |
| | Vibration resistance | 5~8.4Hz, amplitude 3.5mm, 8.4~150Hz, acceleration 9.8m/s$^2$ (100 minutes each in X, Y, Z directions) 5-150Hz |
| | Impact resistance | 147m/s$^2$, 3 times each in X, Y and Z directions |
| | Protection level | IP20 |
| | Pollution level | Pollution degree II |
| Insulation method | | Please refer to the instructions |
| EMC requirements | Electrostatic discharge | Contact ±4kV, air ±8kV |
| | EFT | ±2kV |
| | Surge | DC power: 0.5 CM 0.5kV DM |
| Withstand voltage | | 500VDC for 1 minute (leakage current 5mA or less) |
| Heat dissipation method | | Passive heat dissipation, natural air cooling |
| Installation location | | Inside control cabinet |
| Main material | | Standard PPE, UL94, fire protection grade V0 |

Specification

# Q-SERIES UNIT

## Coupler module

| Models | | HCQX-EC01-D4 | HCQX-EC02-D4 | HCQX-EC03-D4 |
|---|---|---|---|---|
| Appearance | |  |  |  |
| Transfer protocol | | EtherCAT | | |
| Extension module type *1 | | Applicable to all types of Q-series modules | Applicable to Q-series ID/OD/MD/AD/DA/TS/RS modules | Applicable to all NXE series extension modules |
| Max. number of extension modules | | 16*2 | | 31 |
| Data transmission medium | | Category 5e shielded twisted pair | | |
| Transmission rate | | 100Mbps | | |
| Max. communication distance between stations | | 100m | | |
| Communication physical layer | | 10/100BASE-TX（IEEE 802.3） | | |
| QBUS communication cycle | | Mini. scan period 125μs; The scan cycle time is same as master station scan cycle | Mini. scan period 500μs; The scan cycle time is same as the master station scan cycle | - |
| QBUS fault tolerance | | - | The number of frame loss tolerances for QBUS communication: 0~255 times, 12 times by default, this can be set. | - |
| NXE OUT communication cycle | | - | | Mini. scan cycle 500μs; The scan cycle time is same as master station scan cycle. |
| NXE OUT fault tolerance | | - | | The number of frame loss tolerances for QBUS communication: 0~255 times, 12 times by default, this can be set. |
| Addressing mode | | Sequential addressing, setting addressing | | |
| COE | | ✓ | | |
| FOE | | ✓ | | |
| Refresh method | Free-run | ✓ | | |
| | SM-Synchron | ✓ | | |
| | DC | Support DC with master station | Supported(The module itself supports DC) | |
| Rated voltage | | DC 24V（-15%~+20%） | | |
| Rated current | | 79mA | | 50mA |
| QBUS rated output voltage | | DC12V | | - |
| QBUS output power | | 16W MAX. | | - |
| Power protection features | Undervoltage protection | 18V | | |
| | Overvoltage protection | 33V | | |
| | Overcurrent protection | 3.5A | | |
| | Anti-reverse connection function | ✓ | | |
| | Abnormal voltage alarm | - | Supports overvoltage and undervoltage detection (error: ±0.5V) | |
| Weight(g) | | About 90 | About 95 | About 90 |

*1 Please refer to the selection guide.

*2 Users should ensure that the power of all modules on QBUS is not greater than 16W when selecting modules.





## Splitter module

| Items | | HCQX-ES06-D4 |
|---|---|---|
| Appearance | |  |
| Transfer protocol | | EtherCAT |
| Number of channels | | 1-ch EtherCAT signal input, 5-ch EtherCAT signal output |
| Splitter cascade | | Support up to 2 ES06 splitter cascade |
| Port data priority | | PORT2>PORT3>PORT4>PORT5>PORT6 |
| Transmission mode | | Full duplex |
| Topology | | Star topology |
| Data transmission medium | | Category 5e shielded twisted pair |
| Transmission rate | | 100Mbps |
| Max. communication distance between stations | | 100m |
| Communication physical layer | | 10/100BASE-TX（IEEE 802.3） |
| Mini. scan cycle of the master station | | 500μs |
| Addressing mode | | Sequential addressing, setting addressing |
| Refresh method | DC | DC mode by default, One ES06 splitter occupies 2 EtherCAT slave numbers |
| Rated voltage | | DC 24V（-15%~+20%） |
| Rated current | | 106mA |
| Power consumption | | 2.4W |
| Power protection features | Undervoltage protection | 18V |
| | Overvoltage protection | 33V |
| | Overcurrent protection | 3.5A |
| | Anti-reverse connection function | ✓ |
| Weight (g) | | About 130 |

## Digital input module

| Models | | HCQX-ID16-D4 | HCQX-ID32-D4 |
|---|---|---|---|
| Appearance | |  |  |
| Input points | | 16 | 32 |
| Operating temperature based on different input points and channels | Full load working | 45°C | - |
| | Inputs conduction 75% | 50°C | - |
| | Inputs conduction 50% | 55°C | - |
| Input format | | NPN/PNP | |
| Rated input voltage | | DC 24V（-15%~+20%） | |
| Rated input current | | 4.1mA/DC24V (Typ.) | |
| 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（g） | | About 70 | About 120 |

## Digital output module

| Model | HCQX-OD16-D4 | HCQX-OD16-D4-PNP | HCQX-OD32-D4 | HCQX-OD32-D4-PNP |
|---|---|---|---|---|
| Appearance |  |  |  |  |
| Output points | 16 | | 32 | |
| Output form | NPN | PNP | NPN | PNP |
| Rated load voltage | DC 24V（-15%~+20%） | | DC 24V（-15%~+20%） | |
| Rated load current | 0.5A/ch 4A/module | | 0.5A/ch 8A/module | |
| Inductive load | 12W/ch 96W/module | | 12W/ch 216W/module | |
| Lamp load | 1.5W/ch 12W/ module | | 1.5W/ch 24W/ module | |
| Leakage current at OFF | 0.1mA or less | | 0.1mA or less | |
| ON/OFF response time | 125μs | | 125μs | |
| Overcurrent protection | ✓ | | ✓ | |
| Overvoltage protection | ✓ | | ✓ | |
| QBUS power consumption | 1.2W | | 1.3W | |
| Weight（g） | About 70 | | About 120 | |

## Digital I/O module

| Model | | | HCQX-MD16-D4 | HCQX-MD16-D4-PNP | HCQX-MD32-D4 | HCQX-MD32-D4-PNP |
|---|---|---|---|---|---|---|
| Appearance | | |  |  |  |  |
| Input specifications | Input points | | 8 | | 16 | |
| | Operating temperature based on different input points and channels | Full load working | 45°C | | - | |
| | | Inputs conduction 75% | 50°C | | - | |
| | | Inputs conduction 50% | 55°C | | - | |
| | Input format | | NPN/PNP | | NPN/PNP | |
| | Rated input voltage | | DC 24V（-15%~+20%） | | DC 24V（-15%~+20%） | |
| | Rated input current | | 4.1mA/DC24V (Typ.) | | 4.1mA/DC24V (Typ.) | |
| | 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 | Output points | | 8 | | 16 | |
| | Output form | | NPN | PNP | NPN | PNP |
| | Rated load voltage | | DC 24V（-15%~+20%） | | DC 24V（-15%~+20%） | |
| | Rated load current | | 0.5A/ch 4A/module | | 0.5A/ch 4A/module | |
| | Inductive load | | 12W/ch 96W/ module | | 12W/ch 96W/ module | |
| | Lamp load | | 1.5W/ch 12W/ module | | 1.5W/ch 12W/ module | |
| | Leakage current at OFF | | 0.1mA or less | | 0.1mA or less | |
| | ON/OFF response time | | 125μs | | 125μs | |
| | Overcurrent protection | | ✓ | | ✓ | |
| | Overvoltage protection | | ✓ | | ✓ | |
| QBUS power consumption | | | 1.0W | | 1.0W | |
| Weight （g） | | | About 70 | | About 120 | |





## Relay output module

| Model | HCQX-OC08-D4 |
|---|---|
| Appearance |  |
| Output points | 8 |
| Output format | 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 points share one common terminal, 2 groups in total, 2 groups of common terminals are independent |
| Switching times | >100000 |

## Analog module

| Model | | HCQX-DA04-D4 |
|---|---|---|
| Appearance | |  |
| Number of output channels | | 4-ch |
| 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-ch |
| Resolution | | 16bit |
| Accuracy | | <=±0.3%FSR |
| Preset input/output values | | ✓ |
| User calibration | | ✓ |
| Power protection characteristic | Under-voltage protection | 18V |
| | Overvoltage protection | 30V |
| | Reverse phase protection | (max. voltage 60V for reverse connection) |
| | Voltage output short-circuit protection | Not supported |
| | Voltage output open-circuit detection | Not supported |
| Addressing mode | | Sequential addressing, setting addressing |
| COE | | ✓ |
| FOE | | ✓ |
| Refresh mode | | SM-Synchron supported |
| QBUS power consumption | | 1.2W |
| Weight（g） | | About 70 |

## Analog module

| Model | | HCQX-AD04-D4 | HCQX-AD08-D4 |
|---|---|---|---|
| Appearance | |  |  |
| Number of output channels | | 4-ch | 8-ch |
| 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 | Current input range | 0~20mA，4~20mA | |
| | Current input impedance | 240Ω | |
| | Current input type | Differential input | |
| Software filtering | | Supports average filtering, 0~4096 | |
| Max. common-mode voltage | | 35V | |
| Conversion time | | 1ms/4-ch | 1ms/8-ch |
| Resolution | | 16bit | |
| Accuracy | | 25℃：±0.1% FSR Full temperature：±0.3% FSR | 25℃：±0.1% FSR Full temperature：±0.2% FSR |
| Over-limit detection | | ✓ | |
| Range detection | | ✓ | |
| Rapid change detection | | ✓ | |
| User calibration | | ✓ | |
| Power protection charact -eristic | Under-voltage protection | 18V | |
| | Overvoltage protection | 30V | |
| | Reverse phase protection | ✓ | |
| | Overvoltage protection | -50~+50V | |
| | Overcurrent protection | -50~+50mA | |
| Addressing mode | | Sequential addressing, setting addressing | |
| COE | | ✓ | |
| FOE | | ✓ | |
| Refresh mode | | SM-Synchron supported | |
| QBUS power consumption | | 1.2W | |
| Weight（g） | | About 70 | About 125 |





## Serial communication module

| Models | | HCQX-RS02-D4 | HCQX-RS02-D4-M |
|---|---|---|---|
| Appearance | |  |  |
| Hardware specifications | Number of channels | 2-ch | |
| | Supported serial ports | RS232、RS485、RS422 | |
| | Supported Protocol | Free protocol master | Modbus RTU master |
| | Number of slave | 32 (16 for each channel) | 16 (8 for each channel) |
| | Wiring mode | 2-wire, 3-wire, 4-wire | |
| Software specifications | MODBUS function code | - | 01、02、03、04、05、06、15、16 |
| | Parity bit | odd parity, even parity, no parity | |
| | Start bit | Only bit1 | |
| | Stop bit | bit1、bit2 | |
| | Data length | 7、8bytes | 8bytes |
| | Termination resistor configuration | Software control whether the terminal resistor is configured (only RS485/RS422) | |
| | Data overflow detection | Detect whether the data received from the slave station overflows, indicating that data has been lost | - |
| | Check error detection | Detect whether there are check errors during data transmission | - |
| | Frame format error detection | Detect whether there are frame format errors during data transmission | - |
| | Data communication control | Control data communication between the master station and slave stations through control words and status words | - |
| Bus specification | PDO maximum number of bytes | Output 32 bytes and input 32 bytes for each channel | Input 64 bytes and output 64 bytes for each channel |
| | Receive buffer | 1024 bytes for sending and receiving | - |
| | Addressing mode | Sequential addressing, setting addressing | |
| | COE | ✓ | |
| | FOE | ✓ | |
| | Refresh mode | SM- Synchron supported | |
| QBUS power consumption | | 1.2W | |
| Weight (g) | | About 70 | |

## RS232/RS485/RS422 serial port specifications

| Items | Specifications | | |
|---|---|---|---|
| | RS232 | RS485 | RS422 |
| Wiring method | 3-wire | 2-wire | 4-wire |
| Communication method | Full duplex | Half duplex | Full duplex |
| Termination resistor | - | 120Ω (By software configuration 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 terminal resistor, and related to communication rate) | |

## Temperature measurement module

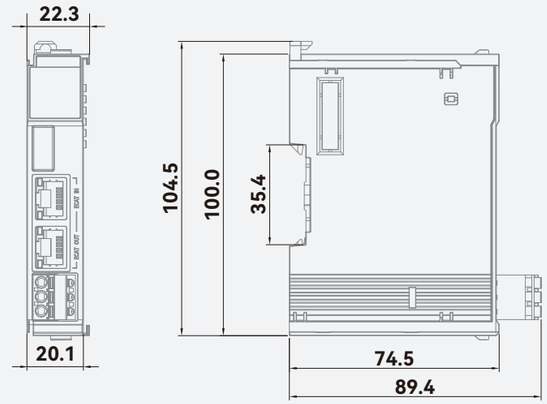
| HCQX-TS04-D4 | | | | | |
|---|---|---|---|---|---|
| Appearance |  | | | | |
| Hardware specifications | Number of channels | 4-ch | Software specifications | Sensor type setting | Can be set by software |
| | Wiring mode | 2-wire, 3-wire | | Over-limit detection | Supported |
| | Thermal resistance sensors | PT100、PT1000、Ni100、Ni1000 | | Disconnection detection | Supported, user chooses to turn it on, and it's turned off by default. (After turning on, the sampling time of each channel increases by about 40ms) |
| | Thermocouple sensors | K、J、E、T、N、B、R、S | | External cold junction compensation | Supported, enabled by default |
| | Display sensitivity | 0.1°C，0.1°F | | Software filtering | Supports average filtering, 0~4096 |
| | Digital resolution | 24bit | | Temperature unit | °C or °F |
| | Accuracy | TC: Full temperature 0~55°C: Full range* (±0.1%) ± 4°C (Max. cold-junction error 4°C)<br>PT：Full temperature 0~55°C：±0.5°C | | User calibration | ✓ |
| | Sampling time (Disconnection disabled) | TC: 100ms*Number of starting channels*Number of filtering times for this channel<br>PT: 200ms*Number of starting channels*Number of filtering times for this channel | Troubleshooting | Power not connected | Global error: Automatic recovery |
| | Sampling time (Disconnection disabled) | TC: 140ms*Number of starting channels*Number of filtering times for this channel<br>PT: 240ms*Number of starting channels*Number of filtering times for this channel | | Input over-limit | Channel error: Automatic recovery |
| | Preheat time | No preheating required | | Disconnection detection | Channel error: Automatic recovery |
| | Cold-junction resistor | 10kΩ<br>(The external cold-end resistor is built-in by default) | | | |
| Addressing mode | | Sequential addressing, setting addressing | | | |
| COE | | ✓ | | | |
| FOE | | ✓ | | | |
| Refresh mode | | SM- Synchron supported | | | |
| QBUS power consumption | | 1.2W | | | |
| Weight (g) | | About 70 | | | |



# Q-SERIES UNIT DIMENSION DRAWING

## Coupler module

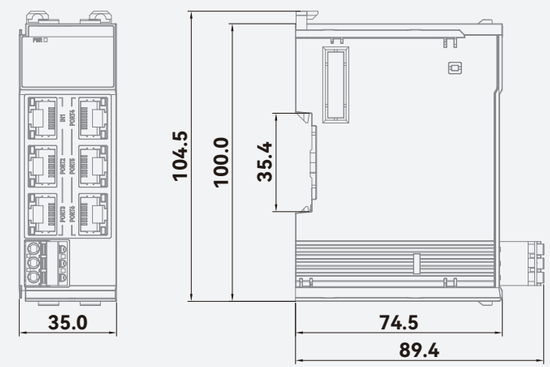
Unit: mm




| Models | | |
|---|---|---|
| HCQX-EC01-D4 | HCQX-EC02-D4 | HCQX-EC03-D4 |

## Splitter module

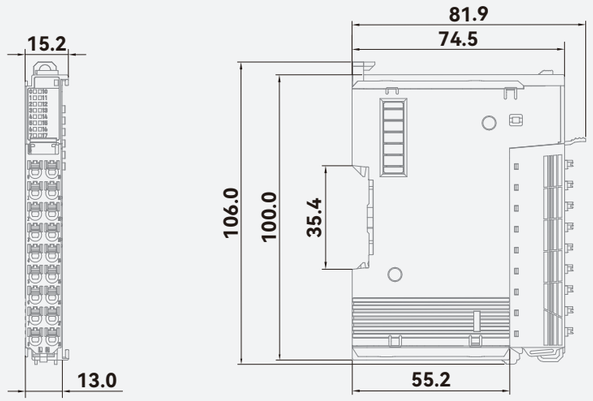
Unit: mm




| Models |
|---|
| HCQX-ES06-D4 |

## Extension module (narrow type)

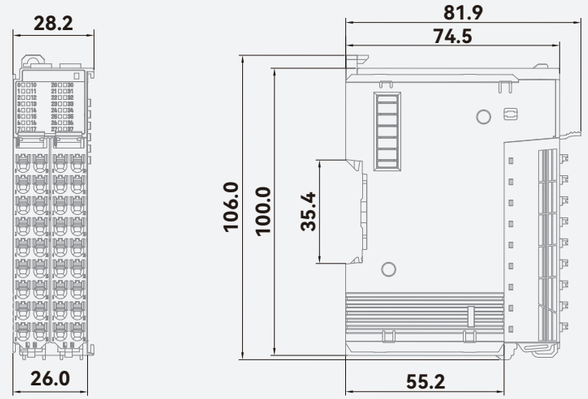
Unit: mm




| 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 | | |

## Extension module (wide type)

Unit: mm




| Models | | | | | | |
|---|---|---|---|---|---|---|
| HCQX-ID32-D4 | HCQX-OD32-D4 | HCQX-OD32-D4-PNP | HCQX-MD32-D4 | HCQX-MD32-D4-PNP | HCQX-AD08-D4 | HCQX-OC08-D4 |

MEMO

# 7 I/O combination modules
# Meet various application scenarios !


# HCNXE Series

EtherCAT distributed I/O module

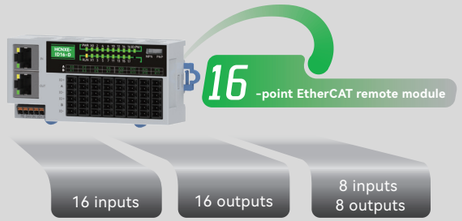


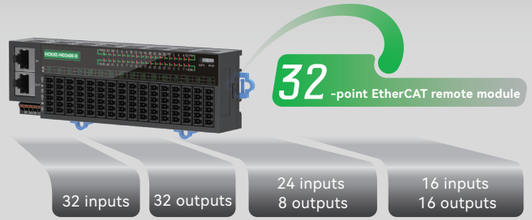
**Rich specifications** ① 7 I/O combinations available; ② Supports 16 points and 32 points; ③ Supports I/O.

**Convenient and easy-to-use** ① Standard DIN35 rail; ② Supports NPN/PNP input switching; ③ Supports 2-wire/3-wire sensors; ④ Provide external 24VDC sensor power supply.

**Safe and reliable** ① Multiple hardware protection.

## Rich Specifications




## Easy-to-use


## High protection

- The fuse will not break if the current exceeds 5A, and max. 20A (the fuse can be replaceable)
- I/O board external sensor protection 1.1A (recoverable fuse)
- EtherCAT bus to avoid electromagnetic interference caused by too long I/O signal cables
- Multiple I/O signals are connected through EtherCAT

# NXE-SERIES EXTENSION MODULE LINEUP



## Naming rule for NXE series extension module

**HCNXE-ID32-D**

1 2 3 4 5

**1.Product name**

HC

**HC:** HCFA

**2.Distributed module**

NXE

**NXE:** EtherCAT protocol module

**3.Function modules**

ID

**ID:** Digital input
**OD:** Digital output
**MD:** Digital I/O

**4.Number of channels**

32

**16:** 16-ch
**32:** 32-ch
**Note:** For I/O module, use a 4-digit number to indicate input and output. For example: 2408, representing 24 inputs and 8 outputs.

**5.Power type**

D

**D:** DC power

## General specifications of NXE series extension modules

### General specifications

| Items | | | Specifications |
|---|---|---|---|
| Working environment | Working temperature | | -5~55°C |
| | Storage temperature | | -40~70°C |
| | Relative humidity | | 10%~95% (no condensation, temperature 55°C) |
| | Altitude | | 2,000m Max. |
| | Random drop | | 1m. twice with outer packaging |
| | Vibration resistance | Frequency | 5-150Hz |
| | | Displacement | 3.5mm, constant amplitude |
| | | Acceleration | 1.0g, constant amplitude |
| | | Direction | X/Y/Z-axis |
| | Shock resistance | | Random amplitude 15g, 11ms half sine wave, 3 mutually perpendicular axes |
| | Protection grade | | IP40 (with protective cover) |
| | Pollution level | | Pollution degree II |
| Insulation method | Between channels | | Not isolated |
| | Between power supply and interface | | Transformer isolation |
| | Between interface and bus | | Digital isolation |
| EMC requirements | Electrostatic discharge | | Contact ±4kV, air ±8kV |
| | EFT ±2kV | | ±2kV |
| | Surge | | DC power：0.5 CM 0.5kV DM |
| Insulation resistance | | | >1MΩ |
| Withstand voltage | | | 500VDC for 1 minute (leakage current 5mA or less) |
| Heat dissipation | | | Passive heat dissipation, natural air cooling |
| Installation location | | | Inside the control cabinet |
| Main material | | | Standard PPE, UL94, fire protection grade V0 |

### Power Specifications

| Items | Specifications |
|---|---|
| Rated power supply for module | DC 24V |
| Input voltage range for module | DC 24V（-15%~+20%） |
| Max. current for module | 50mA/DC24V |
| Rated power supply for I/O terminal | DC 24V |
| Input voltage range for I/O terminal | DC 24V（-15%~+20%） |
| Max. current for I/O terminal | 5A (The fuse will not blow at overcurrent) |
| IO power supply protection | 20A(Blow at overcurrent, need to remove the shell and replace) |
| I/O board external sensor protection | 1.1A (recoverable fuse, 8-ch share 1 fuse) |

Specifications

# NXE-SERIES UNIT

## Digital input module

| Models | HCNXE-ID16-D | HCNXE-ID32-D |
|---|---|---|
| Appearance |  |  |
| Input points | 16 points | 32 points |
| Input form | NPN /PNP (can be switched) | |
| Rated input voltage | DC 24V（-15%~+20%) | DC 24V（-15%~+20%) |
| Rated input current | 4.1mA/DC24V (Typ.) | 6mA/DC24V (Typ.) |
| Input impedance | 5.6kΩ | 3kΩ |
| Input ON voltage | >DC15V | |
| Input ON current | >5mA | |
| Max. OFF current | 2.5mA | |
| ON/OFF response time | 125μs | |
| Wiring mode | 2-wire, 3-wire | |
| QBUS power consumption | 1.0W | |
| Weight (g) | About 100 | About 210 |

## Digital output module

| Models | HCNXE-OD16-D | HCNXE-OD32-D |
|---|---|---|
| Appearance |  |  |
| Output points | 16 points | 32 points |
| Output form | NPN | |
| Rated load voltage | DC 24V（-15%~+20%) | |
| Rated load current | 0.5A/ch，4A/module | 0.5A/ch，2A/module |
| Leakage current at OFF | 0.1mA or less | |
| ON Residual voltage | 0.3V or less | |
| ON/OFF response time | 125μs | |
| Hardware filtering | 1ms | - |
| Wiring method | 2-wire | |
| Protection items | Overcurrent/overvoltage/ overheat protection | |
| QBUS power consumption | 1.0W | |
| Weight (g) | About 100 | About 210 |





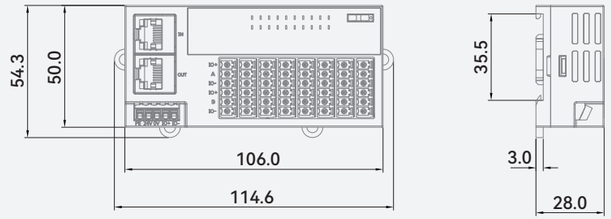
## Digital I/O module

| Models | | HCNXE-MD0808-D | HCNXE-MD1616-D | HCNXE-MD2408-D |
|---|---|---|---|---|
| Appearance | |  |  |  |
| Input specifications | Input points | 8 points | 16 points | 24 points |
| | Input form | NPN /PNP (can be switched) | | |
| | Rated input voltage | DC 24V（-15%~+20%) | | |
| | Rated input current | 4.1mA/DC24V (Typ.) | 6mA/DC24V (Typ.) | 6mA/DC24V (Typ.) |
| | 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 mode | 2-wire, 3-wire | | |
| Output specifications | Output points | 8 points | 16 points | 8 points |
| | Output form | NPN | | |
| | Rated load voltage | DC 24V（-15%~+20%) | | |
| | Rated load current | 0.5A/ch，2A/module | 0.5A/ch，4A/ module | 0.5A/ch，2A/ module |
| | Leakage current at OFF | 0.1mA or less | | |
| | Residual voltage | 0.3V or less | | |
| | ON/OFF response time | 125μs | | |
| | Hardware filtering | 1ms | - | - |
| | Wiring method | 2-wire | | |
| | Protection items | Overcurrent/overvoltage/ overheat protection | | |
| QBUS power consumption | | 1.0W | | |
| Weight (g) | | About 100 | About 210 | |

# NXE-SERIES UNIT DIMENSION DRAWING

## NXE-series 16 points

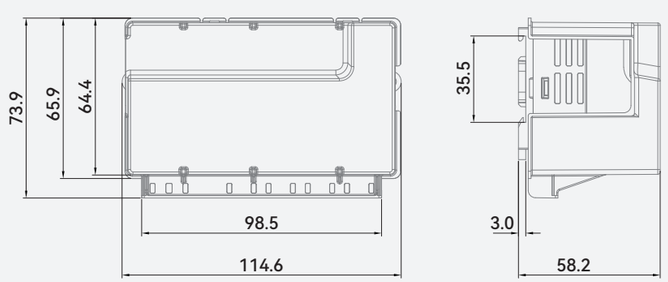
Unit:mm




| Models | | |
|---|---|---|
| HCNXE-ID16-D | HCNXE-OD16-D | HCNXE-MD0808-D |

## NXE-series 16 points Protective cover

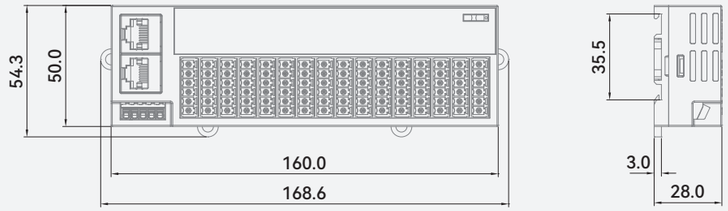
Unit:mm




| Models |
|---|
| HCNXE-PRO16 |

## NXE-series 32 points

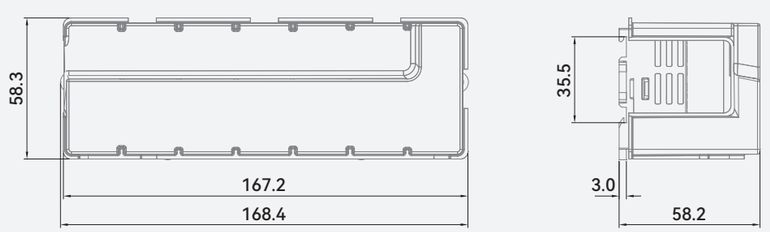
Unit:mm




| Models | | | |
|---|---|---|---|
| HCNXE-ID32-D | HCNXE-OD32-D | HCNXE-MD1616-D | HCNXE-MD2408-D |

## NXE-series 32 points Protective cover

Unit:mm




| Models |
|---|
| HCNXE-PRO32 |

# Selection Guide for Modules

## Q-Series EtherCAT Coupler

| Model name | Output power | Max. number of extension modules | Specification | Page |
|---|---|---|---|---|
| **HCQX-EC01-D4** | 16W | 16* | Standard EtherCAT coupler, extension module accounts for the number of bus nodes | 05 |
| **HCQX-EC02-D4** | 16W | 16* | Standard EtherCAT coupler, extension module does not account for the number of bus | 05 |
| **HCQX-EC03-D4** | - | 31 | EtherCAT coupler for NXE series modules, and extension module does not account for the number of bus nodes | 05 |

*Make sure that the power of all modules on QBUS is not greater than 16W when selecting modules.

## Q series splitter module

| Model name | Specification | Page |
|---|---|---|
| **HCQX-ES06-D4** | EtherCAT 6-ch splitter (1 input and 5 outputs); support star topology; support splitter cascade | 06 |

## Q-series I/O module

| Model | | Specification | | | | | Page |
|---|---|---|---|---|---|---|---|
| | | Power | Input | | Output | | |
| Digital input module | HCQX-ID16-D4 | 1.0W | 16 points | NPN/PNP | - | - | 06 |
| | HCQX-ID32-D4 | | 32 points | | | | 06 |
| Digital output module | HCQX-OD16-D4 | 1.2W | - | - | 16 points | NPN | 07 |
| | HCQX-OD16-D4-PNP | | | | | PNP | 07 |
| | HCQX-OD32-D4 | 1.3W | | | 32 points | NPN | 07 |
| | HCQX-OD32-D4-PNP | | | | | PNP | 07 |
| Digital I/O module | HCQX-MD16-D4 | 1.0W | 8 points | NPN/PNP | 8 points | NPN | 07 |
| | HCQX-MD16-D4-PNP | | | | | PNP | 07 |
| | HCQX-MD32-D4 | | 16 points | | 16 points | NPN | 07 |
| | HCQX-MD32-D4-PNP | | | | | PNP | 07 |
| Relay output module | HCQX-OC08-D4 | 1.2W | - | | 8 points | Relay | 08 |

## Q-series special function module

| Model | | Power | Specifications | Page |
|---|---|---|---|---|
| Analog input module | HCQX-AD04-D4 | 1.2W | 4-ch analog input; support -10~+10V, 0~10V, -5V~+5V, 0~5V, 1~5V differential input; support 0~20mA, 4~20mA differential input | 09 |
| | HCQX-AD08-D4 | 1.2W | 8-ch analog input; support -10~+10V, 0~10V, -5V~+5V, 0~5V, 1~5V differential input; support 0~20mA, 4~20mA differential input | 09 |
| Analog output module | HCQX-DA04-D4 | 1.2W | 4-ch analog output; support -10~+10V, 0~10V, -5V~+5V, 0~5V, 1~5V single-ended output; support 0~20mA, 4~20mA single-ended output | 08 |
| Serial communication module | HCQX-RS02-D4 | 1.2W | 2-ch serial communication (free protocol); supports RS232, RS485, RS422 interfaces; supports 32 slave stations; software configured terminal resistor | 10 |
| | HCQX-RS02-D4-M | 1.2W | 2-ch serial communication (Modbus protocol); support RS232, RS485, RS422 interfaces; support 16 slave stations; software configured terminal resistor | 10 |
| Temperature measure -ment module | HCQX-TS04-D4 | 1.2W | 4-ch temperature measurement; support thermal resistors and thermocouples; support 2-wire and 3-wire sensors; 24bit resolution | 11 |

## NXE series I/O module

| Model | | Specifications | | | | | Page |
|---|---|---|---|---|---|---|---|
| | | Power | Inputs | | Outputs | | |
| Digital input module | HCNXE-ID16-D | 1.0W | 16 points | NPN/PNP | - | - | 19 |
| | HCNXE-ID32-D | 1.0W | 32 points | | | | 19 |
| Digital output module | HCNXE-OD16-D | 1.0W | - | - | 16 points | NPN | 19 |
| | HCNXE-OD32-D | 1.0W | | | 32 points | | 19 |
| Digital I/O module | HCNXE-MD0808-D | 1.0W | 8 points | NPN/PNP | 8 points | NPN | 20 |
| | HCNXE-MD1616-D | 1.0W | 16 points | | 16 points | | 20 |
| | HCNXE-MD2408-D | 1.0W | 24 points | | 8 points | | 20 |

## NXE-series protective cover

| Model name | Specification | Page |
|---|---|---|
| **HCNXE-PRO16** | Protective cover for 16-point extension module | - |
| **HCNXE-PRO32** | Protective cover for 32-point extension module | - |

## Accessories

| Type | Model name | Specifications | Page |
|---|---|---|---|
| **Extension module 18-pin terminal** | **HCQXT-18P-N** | Removable terminal block, suitable for QP controller I/O and extension module. | - |
| **Terminal module** | **HCQX-END04** | Attached to the end of the module. | - |
| **24VDC power terminal** | **HCQX-3P-N** | 24VDC power terminal for HCQX-EC01/02/03-D4 coupler and HCQX-ES06-D4 splitter | - |

## Matching table for EC coupler and module

| Module \ EC | EC01 | EC02 | EC03 |
|---|---|---|---|
| HCQX-ID16-D4 | ✓ | ✓ | - |
| HCQX-ID32-D4 | ✓ | ✓ | - |
| HCQX-OC08-D4 | ✓ | ✓ | - |
| HCQX-OD16-D4 | ✓ | ✓ | - |
| HCQX-OD16-D4-PNP | ✓ | ✓ | - |
| HCQX-OD32-D4 | ✓ | ✓ | - |
| HCQX-OD32-D4-PNP | ✓ | ✓ | - |
| HCQX-MD16-D4 | ✓ | ✓ | - |
| HCQX-MD16-D4-PNP | ✓ | ✓ | - |
| HCQX-MD32-D4 | ✓ | ✓ | - |
| HCQX-MD32-D4-PNP | ✓ | ✓ | - |
| HCQX-AD04-D4 | ✓ | ✓ | - |
| HCQX-AD08-D4 | ✓ | ✓ | - |
| HCQX-DA04-D4 | ✓ | ✓ | - |
| HCQX-RS02-D4 | ✓ | ✓ | - |
| HCQX-RS02-D4-M | ✓ | ✓ | - |
| HCQX-TS04-D4 | ✓ | ✓ | - |
| HCNXE-ID16-D | - | - | ✓ |
| HCNXE-ID32-D | - | - | ✓ |
| HCNXE-OD16-D | - | - | ✓ |
| HCNXE-OD32-D | - | - | ✓ |
| HCNXE-MD0808-D | - | - | ✓ |
| HCNXE-MD1616-D | - | - | ✓ |
| HCNXE-MD2408-D | - | - | ✓ |