# PLC Product


FRECON

## ABOUT US

FRECON Electric (Shenzhen) Co., Ltd. is a national key high-tech enterprise, a dual-soft enterprise in Shenzhen, and a professional company in the fields of industrial automation, high efficiency and energy saving, and green new energy which was founded in 2013. We have more than 16 years of experience in the development and application of frequency converters, servo drives, energy-saving control cabinets, solar inverter systems etc.


# Product feature

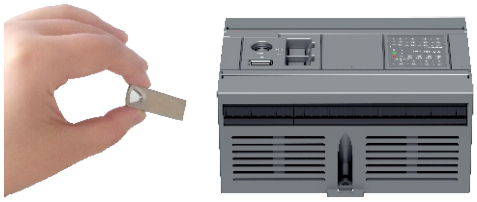
## Multiple modes of communication

■ RS232 ■ RS485 ■ BUS ■ USB ■ Ethernet

Communication protocol: support MODBUS RTU, MODBUS ASCII, custom protocol RS, MODBUS TCP/IP, EtherCAT, RTX, etc.

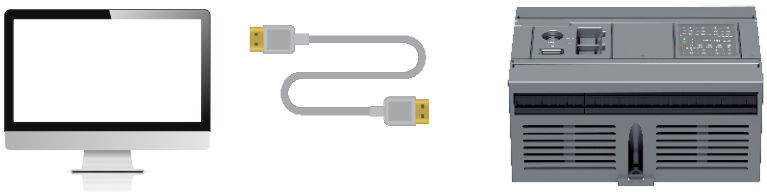
## USB interface communication

Function 1: Use USB to upgrade PLC firmware



- Insert the USB flash drive into the PLC and the program will automatically update in about 1s
- Programs can be downloaded to PLC in batches via USB flash drive
- The files in the USB flash drive have been encrypted and cannot be opened directly by the programming software to protect the user's intellectual property rights

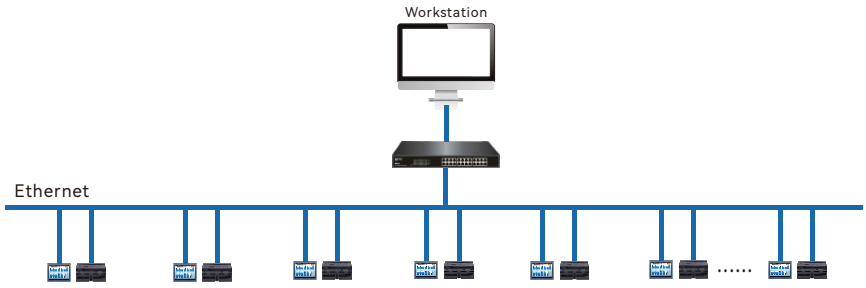
Function 2 PLC online monitoring



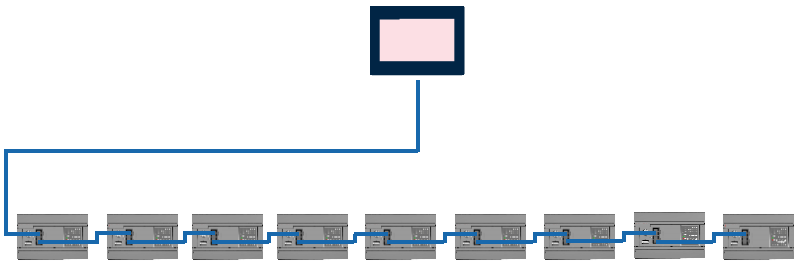
## Ethernet communication

Through Ethernet communication, one PC can monitor multiple PLC online and download programs.

■ Ethernet implements multi-machine and multi-screen data exchange




■ Dual Ethernet ports implement switch functions



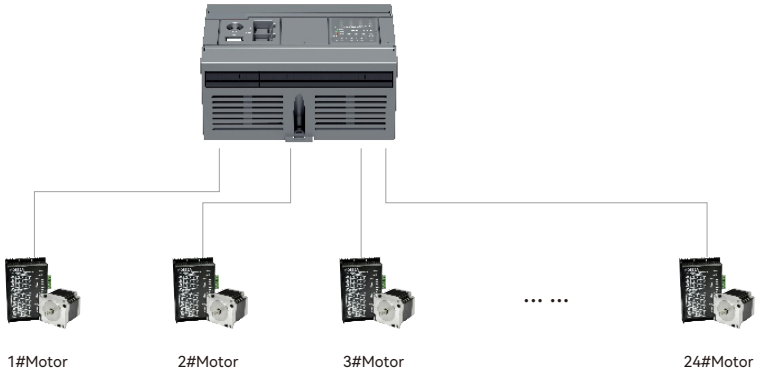
PLC

# Product feature

## Motion control function

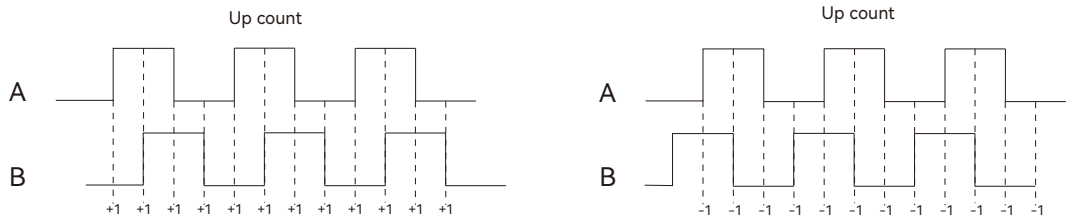
### High speed output

Pulse + Direction: A single board can drive up to 24 stepper/servo motors with a maximum frequency of 200khz high-speed output.



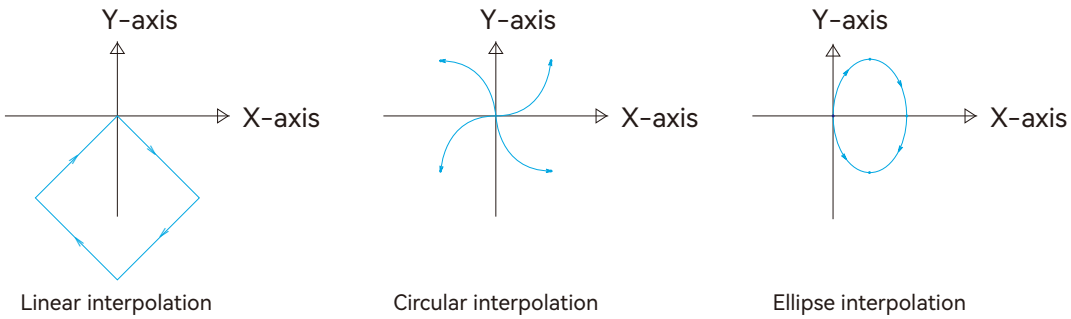

### High speed input

Supports single-phase high-speed counting up to 12 channels, the hardware single-phase maximum frequency is 100Khz, and the software single-phase maximum frequency is 10Khz. AB phase high-speed counting up to 6 channels: the maximum frequency is 200khz. AB phase counting 4 times frequency mode.




### Interpolation function

Supports two-axis linkage (linear interpolation/circular interpolation/elliptical interpolation).



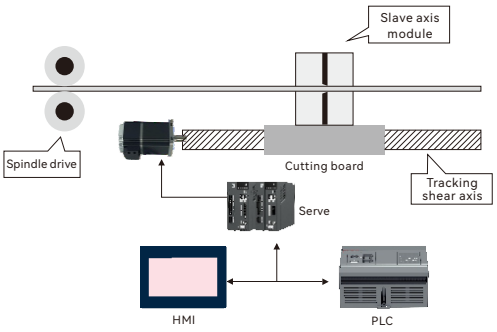

PLC

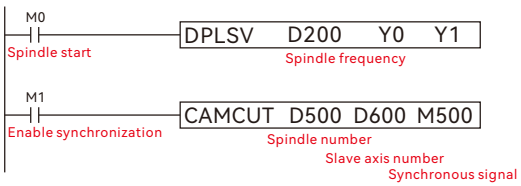
# Product feature

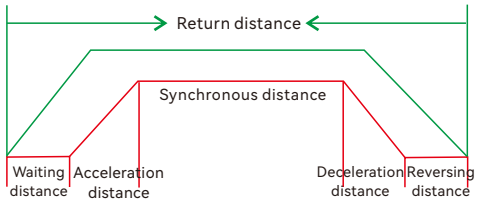
## Electronic cam: wheel cutting, rolling cutting, chasing shearing, pillow packaging, custom cam

- Support calibration of multiple sections with variable length chasing shear
- It has the function of fixed length and fixed calibration, and is suitable for a variety of occasions.
- The acceleration zone, deceleration zone and return zone have optimized curves, and the system runs smoothly without any abruptness.
- The electronic cam speed curve is adopted, and the positioning is highly accurate without any cumulative deviation.。

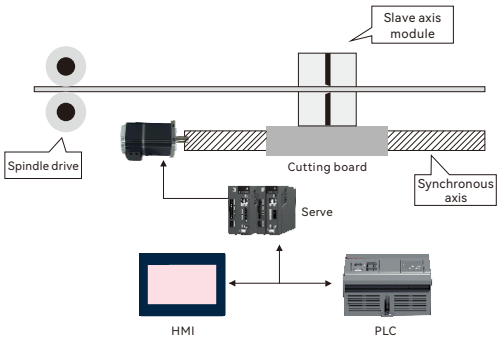
### Chasing shearing solution

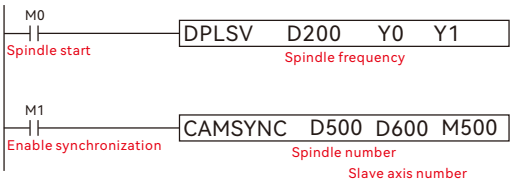



### Synchronous solution

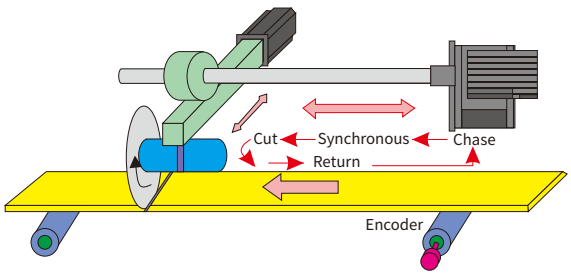


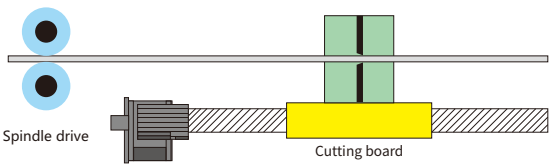

- The electronic cam synchronization programming is simple, and the CAMSYNC instruction can be used to achieve synchronous movement of the slave axis and the main axis.

- Return distance = cutting length - waiting distance - acceleration distance - synchronization distance - deceleration distance - reversing distance
- The shearing system only needs to set the required waiting, acceleration, synchronization, deceleration, and reversing distance parameters to meet the customer's cam adjustment and alignment functions.

### Motion control function



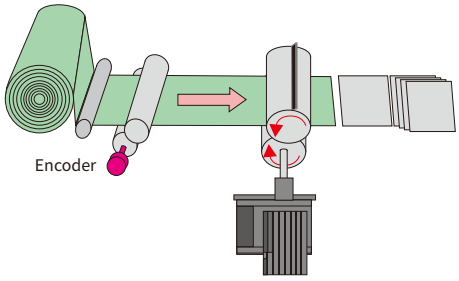

**Chasing Shear CAMCUT**



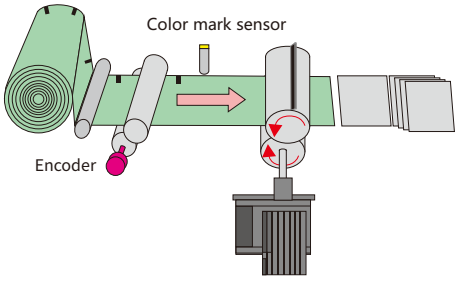

**Flying Shears CAM**

PLC

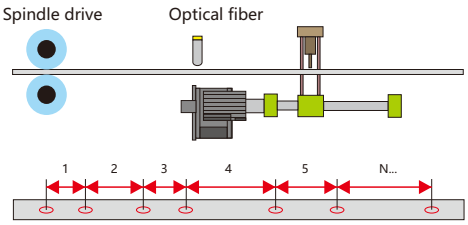
# Product feature



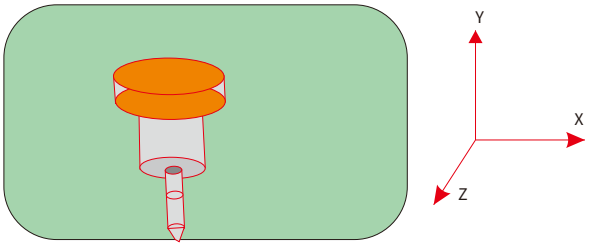

**Fixed length cam CAM**



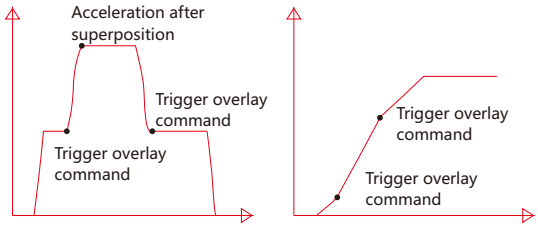

**Variable length cam CAM**



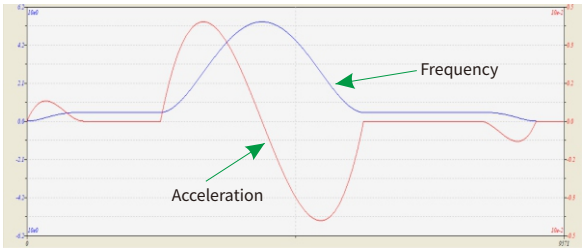

**Variable length shear CAM**




**Multi-axis linkage interpolation TRACK**




**Motion Overlay CAMADD**



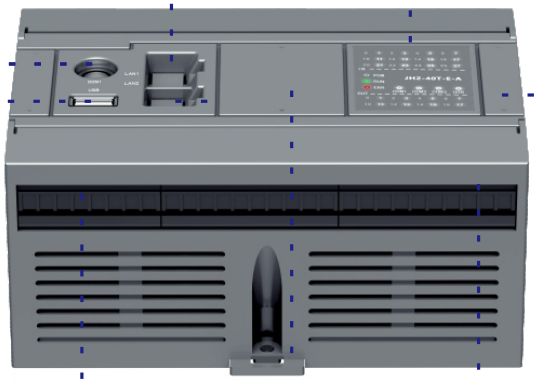

**Custom CAM**

PLC

# PLC series introduction

## System chart

**40 point block diagram**




## HC series PLC controller

- Non-bus type PLC series, providing 16-60 points of digital input, and the input and output can be expanded to 256/256 at most.
- High-speed input/output: supports up to 4 AB phase high-speed inputs and 12-axis high-speed outputs

## HCM series PLC controller

- Based on the HC series, motion control function is added.
- Rich functions: chasing shear, flying shear, synchronization, following, motion superposition, virtual axis, custom cam, etc.

## H2 series PLC controller

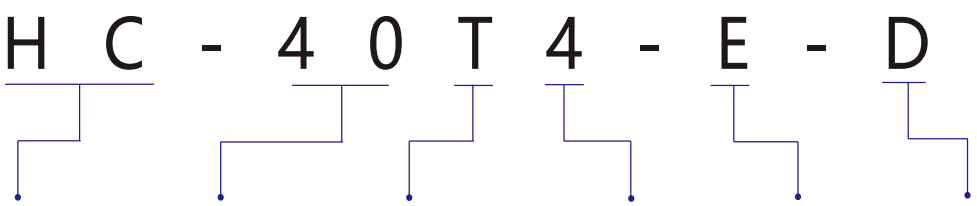
- EtherCAT bus type PLC series host provides 16-60 points of digital input and output, and the input and output can be expanded to 256/256 at most.
- Supports up to 4 AB phase high-speed inputs, 8 pulse axis high-speed outputs, and 32 bus axis outputs.

## H2M series PLC controller

- Based on the H2 series PLC, motion control function is added.
- Rich functions: chasing shear, flying shear, synchronization, following, motion superposition, virtual axis, custom cam, etc.

# PLC series introduction

## Controller naming instructions




**Product series**

HC:HC series controller
HCM:HCM series controller
H2:H2 series controller
H2M:H2M series controller

**Product points**

40:40 point controller
32:32 point controller
60:60 point controller
68:68 point controller

**Output Type**

T:NPN transistor

**High-frequency output number**

4:Drive motor 4 axes
8:Drive motor 8 axes
12:Drive motor 12 axes

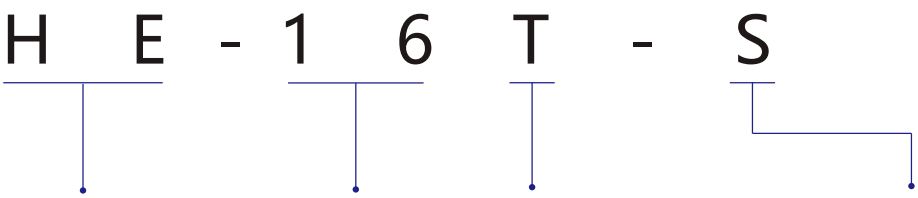
**Ethernet**

E:Ethernet

**Power types**

D:DC power

## Expansion module naming instructions




**Product series**

HE:HE expansion module

**Count**

8:8 Points
16:16 Points
32:32 Points

**Types**

X:Pure input type
YT:Pure output NPN transistor type
YP:Pure output PNP transistor type
YR:Pure output relay type
T:With Input and Output (NPN) Type
P:With input and output (PNP) type
R:With input and output (relay) type

**Input types**

With S:input is NPN/PNP type
Without S:Input is NPN type

PLC

# PLC Technical parameters

## HC non-bus type PLC model and technical parameters

| Series model HC- | 16T4-D | 24T4-D | 32T4[/8]-D | 40T4[/8]-D | 48T4[/12]-D | 60T4[/12]-D |
|---|---|---|---|---|---|---|
| Output method | T: Transistor NPN output; | | | | | |
| Total points | 16 Points | 24 Points | 32 Points | 40 Points | 48 Points | 60 Points |
| Number of digital input points | 8 | 14 | 16 | 24 | 24 | 36 |
| Number of digital output points | 8 | 10 | 16 | 16 | 24 | 24 |
| High-speed input counter | 3 way AB phase | 3 way AB phases | 4 way AB phases | 4 way AB phases | 4 way AB phases | 4 way AB phases |
| High-speed input maximum | 200kHz | | | | | |
| Right module | 16 | | | | | |
| Left module | Support for communication expansion | | | | | |
| BD board | Support 1 | | | | Support 2 | |
| Serial communication port | RS232/RS485*2 | | | | | |
| USB communication port | No | | Programme download/firmware upgrade | | | |
| Ethernet port | No | | | | | |
| Number of pulse axes | 4 axes | | 4/8 axes | | 4/12 axes | |
| Maximum frequency | 200kHz | | | | | |
| Bus function | No | | | | | |
| Number of bus axes | No | | | | | |
| Programme volume | 30k | | | | | |
| Perpetual calendar | Support | | | | | |
| Size (mm) | 114*100*73 | | 155*100*73 | | 218*100*73 | |
| Whether to support C language | Support | | | | | |
| Protection class | IP20 | | | | | |
| Working environment temperature | 5~55℃ (41~131℉) frost-free | | | | | |
| Relative humidity | 5~95% | | | | | |
| Ambient temperature for transport | -25~70℃ (-13~158℉) | | | | | |
| Vibration Resistance | 10M/S² | | | | | |

Note: 1. The above is the technical parameters of PLC with network port, and other PLC models without network port have the same technical parameters.
2. C language function, only HC-16T/R/P does not support, other models are supported

## Input point electrical specifications

| Series model HC- | | 16T、24T | | 32T、40T、48T、60T | |
|---|---|---|---|---|---|
| Input point | | X0~X5 | X6~ | X0~X7 | X10~ |
| Input point type | | Digital input | | | |
| Input form | | DC (NPN type) | | | |
| Input current | | 5mA | | | |
| Input impedance | | 4.5KΩ | | | |
| Max frequency | | 200kHz | 10kHz | 200kHz | 10kHz |
| Response time | Off→On | <2.5μs | <20μs | <2.5μs | <20μs |
| | On→Off | <5μs | <50μs | <5μs | <50μs |

## Electrical specifications for output points

| Series model HC- | | 16T、24T、32T、40T、48T、60T | | 32T8、40T8 | 48T12、60T12 |
|---|---|---|---|---|---|
| Output point | | Y0、Y2、Y4、Y6 | Y1、Y3、Y5、Y7~Y17 | Y0、Y2.3..Y16 (8 even output outlets) | Y0、Y2.3..Y26 (8 even output outlets)) |
| Max frequency | | 200Khz | 10Khz | 200Khz | 200Khz |
| Max load | Resistive | 0.3A/1点(2.4A/COM) | | | |
| | Inductive | 15W | | | |
| Response time | Off→On | <2μs | <20μs | <2μs | <2μs |
| | On→Off | <3μs | <30μs | <3μs | <3μs |

PLC

# PLC Technical parameters

## H2 EtherCAT bus PLC model and technical parameters

| Series model HC- | 16T8[/16]-D | 24T8[16/32]-D | 32T8[16/32]-E-D | 40T8[16/32]-E-D | 48T12[/32]-E-D | 60T12[/32]-E-D |
|---|---|---|---|---|---|---|
| Output method | T：Transistor NPN output； | | | | | |
| Total points | 16 points | 24 points | 32 points | 40 points | 48 points | 60 points |
| Number of digital input points | 8 | 14 | 16 | 24 | 24 | 36 |
| Number of digital output points | 8 | 10 | 16 | 16 | 24 | 24 |
| High-speed input counter | 3 way AB phase(X0~X5) | | 4 way AB phase(X0~X7) | | | |
| High-speed input maximum frequency | 200kHz | | | | | |
| Right module | 16 | | | | | |
| Left module | Support for communication expansion | | | | | |
| BD board | Support 1 | | | | Support 2 | |
| Serial communication port | RS232/RS485*2 | | | | | |
| USB communication port | No | | Programme download/firmware upgrade | | | |
| Ethernet port | No | | | | | |
| Number of pulse axes | 4 axes | 5 axes | 8 axes | | | |
| Maximum frequency for high speed output | 200kHz | | | | | |
| Bus function | EtherCAT bus | | | | | |
| Number of bus axes | 8/16 axes | 8/16/32 axes | | | 12/32 axes | |
| Programme volume | 60k | | | | | |
| Perpetual calendar | Support | | | | | |
| Size（mm） | 114*100*73 | | 155*100*73 | | 218*100*73 | |
| Whether to support C language | Support | | | | | |
| Protection class | IP20 | | | | | |
| Working environment temperature | 5~55℃（41~131℉）frost-free | | | | | |
| Relative humidity | 5~95% | | | | | |
| Ambient temperature for transport | -25~70℃（-13~158℉） | | | | | |
| Vibration Resistance | 10M/S² | | | | | |

Note: If the bus PLC model is H2-32T16-E-D, it means that the pulse and bus axes total 16 axes, and the number of axes can be customised by the PLC program.If the number of pulse axes is defined as 2 axes, the bus axes will be 14 axes.

## Input point electrical specifications

| Series model H2- | | 16~24 | | 32~60 | |
|---|---|---|---|---|---|
| Input point | | X0~X5 | X6~ | X0~X7 | X10~ |
| Input point type | | Digital input | | | |
| Input current | | 5mA | | | |
| Input impedance | | 4.5KΩ | | | |
| Max frequency | | 200kHz | 10kHz | 200kHz | 10kHz |
| Response time | Off→On | <2.5μs | <20μs | <2.5μs | <20μs |
| | On→Off | <5μs | <50μs | <5μs | <50μs |

## Electrical specifications for output points

| Series model H2- | | 16T、24T、32T、40T、48T、60T | |
|---|---|---|---|
| Output point | | Y0、Y2、Y4、Y6 | Y1、Y3、Y5、Y7~Y17 |
| Max frequency | | 200Khz | 10Khz |
| Max load | Resistive | 0.3A/1points(2.4A/COM) | |
| | Inductive | 15W | |
| Response time | Off→On | <2μs | <20μs |
| | On→Off | <3μs | <30μs |

PLC

# PLC technical parameters

## HCM Non-Bus Motion Control PLC Model List

| Series model HCM- | 32T4-D | 40T4-D | 48T12-D | 60T4[/12]-D |
|---|---|---|---|---|
| Output mode | T: Transistor NPN output; | | | |
| Total points | 32 points | 40 points | 48 points | 60 points |
| Number of digital input points | 16 | 24 | 24 | 36 |
| Number of digital output points | 16 | 16 | 24 | 24 |
| Ethernet port | No | | | |
| Number of pulse axes | 4 axes | 4 axes | 12 axes | 4/12 axes |

Note: HCM is a pulse type PLC with electronic cam function, other functions are the same as those of the corresponding HC model, please refer to the previous section for the series description.

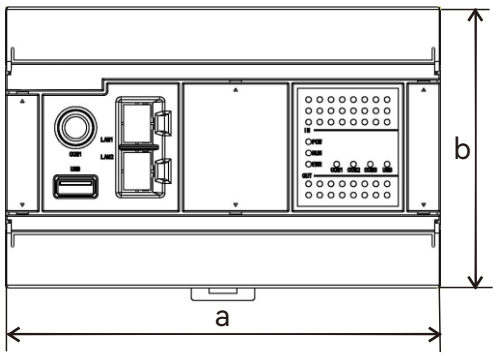
## H2M Bus Motion Control PLC Model List

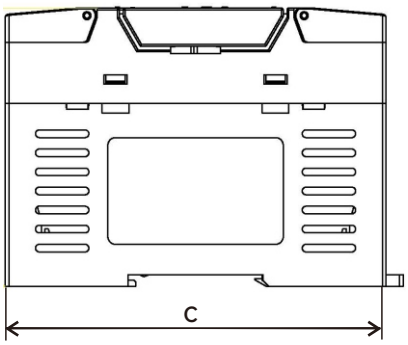
| Series model HCM- | 16T8[16/32]-D | 24T8[16/32]-D | 32T8[16/32]-D | 40T8[/32]-D | 48T12[/32]-D | 60T12[/32]-D |
|---|---|---|---|---|---|---|
| Output mode | T: : Transistor NPN output; | | | | | |
| Total points | 16 points | 24 points | 32 points | 40 points | 48 points | 60 points |
| Number of digital input | 8 | 14 | 16 | 24 | 24 | 36 |
| Number of digital output | 8 | 10 | 16 | 16 | 24 | 24 |
| Ethernet port | No | No | 1 | | | |
| Number of pulse axes | 4 axes | 5 axes | 8 axes | | | |
| Number of bus axes | 8/16/32 axes | | | 8/32 axes | 12/32 axes | |

Note: H2M is a bus type PLC with electronic cam function, other functions are the same as those of the corresponding H2 model, please refer to the previous section for the series description.

# PLC sizes

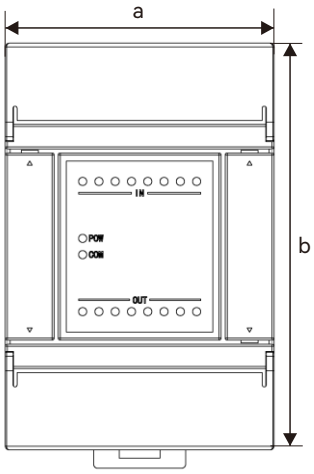
## HC/H2/HCM/H2M series mainframe mounting dimensions

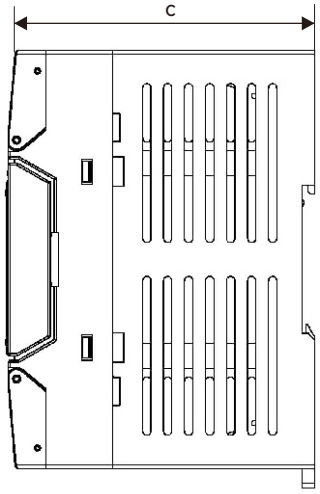



| Controller | Size(mm) | | |
|---|---|---|---|
| | a | b | c |
| 14-24 points | 114 | 100 | 73 |
| 32-40 points | 155 | 100 | 73 |
| 48-60 points | 218 | 100 | 73 |

## HE Series extended product dimensions




| Expansion module | Size(mm) | | |
|---|---|---|---|
| | a | b | c |
| Digital volume expansion: 8-16 points<br>Analogue expansion: HE-4AI2AO、HE-4AO、HE-8AO、HE-8AI、HE-2L、HE-4L、HE-2TCY、HE-2TCY2、HE-4TCY、HE-4TCY2、HE-8PT、HE-4PT、HE-4PT2 | 66 | 100 | 73 |
| Digital volume expansion: 24-32 points、HE-8AI4AOS2、HE-8AI8AOS2、HE-8PT2 | 114 | 100 | 73 |

# HE-series - Standard Expansion

In order to meet the application needs of more occasions, the controller can be equipped with a variety of expansion modules. The expansion modules are mainly divided into digital input and output expansion modules, analog input and output expansion modules, temperature expansion modules, weighing expansion modules and other categories. Each type of module has a variety of points, which can flexibly configure the company's various I/O scales to achieve a higher cost performance.

## Performance characteristics

- Each input and output channel adopts photoelectric isolation, which has high reliability and strong anti-interference ability.
- The power supply has reverse connection protection and surge absorption function, which can be applied to a variety of working environments.
- The maximum number of digital I/O points is: 256DI/256DO.
- One main unit can carry 16 expansion modules

## HE Series Digital Expansion

**Digital Input Expansion**

| Model | Function | Specification |
|---|---|---|
| HE-8X | 8 channel digital NPN input | DC24V power supply, no external power supply needed<br>Maximum frequency of input points 10Khz |
| HE-8X-S | 8 channel digital NPN input /PNP input | |
| HE-16X | 16 channel digital NPN input | |
| HE-16X-S | 16 channel digital NPN input /PNP input | |
| HE-16X2 | 16 channel digital NPN input ,1 way RS485 communication | |

**Digital Output Expansion**

| Model | Function | Specification |
|---|---|---|
| HE-8YT | 8 channel transistor NPN output | DC24V power supply, no external power supply required<br>R: relay output<br>T: NPN transistor output<br>P: PNP transistor output<br>R response time: about 10ms<br>T/P response time: about 50μs<br>R maximum output current: maximum 2A<br>T/P maximum output current: 0.3A per point |
| HE-16YT | 16 channel transistor NPN output | |
| HE-8YR | 8 channel relay output | |
| HE-16YR | 16 channel relay output | |
| HE-32YT | 32 channel transistor NPN output | |
| HE-32YR | 32 channel relay output | |

**Digital Input/Output Expansion**

| Model | Function | Specification |
|---|---|---|
| HE-8T | 4 channel digital input，4 channel transistor output | DC24V power supply, no external power supply required<br>R: relay output<br>T: NPN transistor output<br>P: PNP transistor output<br>R response time: about 10ms<br>T/P response time: about 50μs<br>R maximum output current: maximum 2A<br>T/P maximum output current: 0.3A per point |
| HE-8T(/P)-S | 4 channel digital input，4 channel transistor output | |
| HE-16T | 8 channel digital input，8 channel transistor output | |
| HE-16T2 | 8 channel digital input，8 channel transistor output，1 RS485 communication | |
| HE-16T(/P)-S | 8 channel digital input，8 channel transistor output | |
| HE-16R | 8 channel digital input，8 channel relay output | |
| HE-16R-S | 8 channel digital input，8 channel relay output | |
| HE-32T | 16 channel digital input，16 channel transistor output | |
| HE-32T(/P)-S | 16 channel digital input，16 channel transistor output | |
| HE-32R | 16 channel digital input，16 channel relay output | |
| HE-32R-S | 16 channel digital input，16 channel relay output | |
| HE-40T | 24 channel digital input，16 channel transistor output | |
| HE-40T(/P)-S | 24 channel digital input，16 channel transistor output | |

**HE series HBD board**


| Model | Function | Specification |
|---|---|---|
| HBD-1AI 1AOS | 1 channel analog input,<br>1 channel analog output | Voltage range:0V~10V; Current range:0-20mA |
| HBD-2AI | 2 channel analog input | |
| HBD-2AOS | 2 channel analog output | |
| HBD-2RS485 | 2 channel RS485 | With Isolation |
| HBD-2TC | 2 temperature acquisition inputs | 2-way K-type thermocouple temperature acquisition input |
| HBD-CAN | 1 CAN bus | With 16 slave stations: such as servo, stepper, valve island, etc. |

# HE series - Standard expansion

## HE series analog expansion

### Performance feature

- High reliability and anti-interference capability.
- Power supply with reverse connection protection, surge absorption function, can be applied to a variety of working environments

**Analogue input expansion**

| Model | Function | Specification |
|---|---|---|
| HE-4AI | 4 channel analog input | Voltage range: 0V~10V<br>Current range: 0~20mA<br>Resolution: 12bit |
| HE-4AI2 | 4 channel analog input，1 RS485 communication | |
| HE-8AI | 8 channel analog input | |
| HE-8AI2 | 8 channel analog input，1 RS485 communication | |

**Analogue output expansion**

| Model | Function | Specification |
|---|---|---|
| HE-4AO | 4 channel analog input | Voltage range: -10V~10V<br>Current range: 0~20mA; 4~20mA<br>Resolution: 12bit |
| HE-8AO | 8 channel analog input | |

**Analogue input/output expansion**

| Model | Function | Specification |
|---|---|---|
| HE-4AI2AO | 4 channel analog input，2 channel analog input | Voltage range: (input: 0V~5V, 0V~10V)(output: -10V~10V)<br>Current range: (input/output: 0~20mA; 4~20mA) Resolution: 12bit |
| HE-4AI2AO2 | 4 channel analog input，2 channel analog input，1 RS485 communication | |
| HE-8AI4AO2 | 8 channel analog input，4 channel analog input，1 RS485 communication | Voltage range: (input/output: 0V~10V)<br>Current range: (input/output: 0~20mA; 4~20mA) Resolution: 12bit |
| HE-8AI8AO2 | 8 channel analog input，8 channel analog input，1 RS485 communication | |

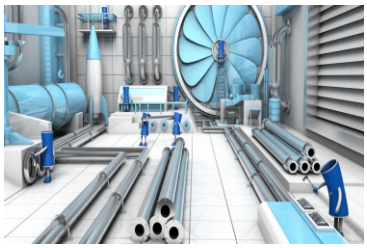
**Temperature expansion**

| Model | Function | Specification |
|---|---|---|
| HE-2TCY | 2 channel temperature input，2 channel transistor NPN output | Supports K-type thermocouple, measuring range 0~900℃, accuracy 1℃ |
| HE-2TCY2 | 2 channel temperature input，2 channel transistor NPN output，with RS485 | |
| HE-4TCY | 4 channel temperature input，4 channel transistor NPN output | |
| HE-4TCY2 | 4 channel temperature input，4 channel transistor NPN output，with RS485 | |
| HE-8TC | 8 channel temperature input | |
| HE-8TCY | 8 channel temperature input，8 channel transistor NPN output | |
| HE-8TCY2 | 8 channel temperature input，8 channel transistor NPN output，withRS485 | |
| HE-4PT | 4 channel temperature input | Supports PT100 thermocouple, measurement range -50~300℃, accuracy 1℃ |
| HE-4PT2 | 4 channel temperature input，with RS485 | |
| HE-8PT | 8 channel temperature input | |
| HE-8PT2 | 8 channel temperature input，with RS485 | |

**Weight expansion**

| Model | Function | Specification |
|---|---|---|
| HE-2L | 2 channels weighing input | DC24V power supply, no external power supply required Resolution 24 bits, accuracy ±1% |
| HE-4L | 4 channels weighing input | |

## Application



Electronic cam

Pillow Packaging

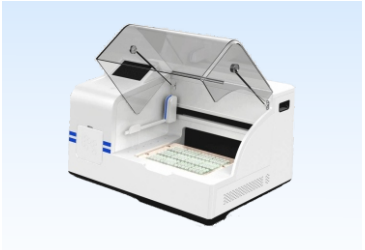
Data acquisition

Automatic dispensing

Control cabinet system


Automatic sewing

Automatic printing



Medical Devices

Automatic weaving

## Case show

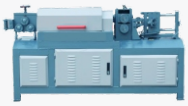
### Pillow packaging machine

It can realize fixed length, variable length, labeling, anti-cutting, anti-empty packaging, anti-scalding film and other functions. The fastest production capacity is 1200 .bags/min.

### Automatic tea packaging machine

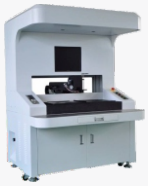
Simultaneous packaging of inner and outer bags. Automatically complete bag making, measuring, filling, sealing, slitting, counting and other processes. Packaging speed 18-20 bags/minute.Weighing accuracy can reach ±0.1g.

### Steel bar adjustment machine



Automatically calculates the distance of the flight, the fastest speed of automatic calculation of the line, and the product speed can reach 100m/min. The cut length is within 40 cm, and the system is fast.

### Visual dispensing machine



Communication instruction and PC model introduction method, high performance inset type movement control equipment core, integrated industrial droplet plastic processing process control function. Introducing multiple types of calculations, route path calculations, and supporting multiple sentence case forms.

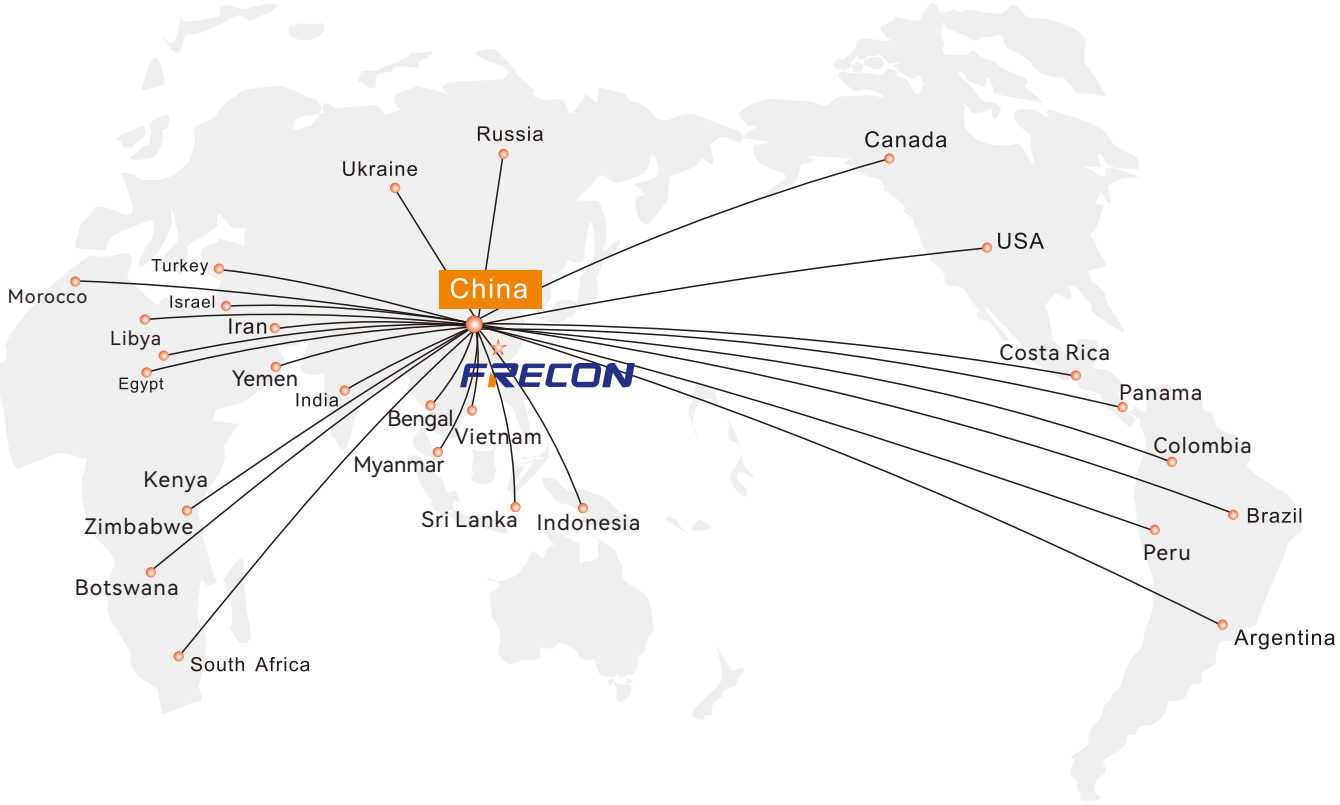
### Fully automatic granule packaging machine

Actually, 4 scales, 8 scales, and 12 scales are constructed in a symmetrical heavy system. Automatic bag completion system, counting, filling, sealing, dividing, counting, etc. functions. Weight accuracy is ±0.1g.

### Bag-type vacuum packaging machine

Really high-speed shipping, packaging, and packaging speed of 100 packages/min. Liquid packaging, lozenge packaging, granular packaging, and powder packaging.

PLC

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