

# COTRUST

Focus on Industrial Control,  
Driving the Intelligent Future.

PLC | Motion control | Servo drive | HMI | Dedicated system | Software

 COTRUST TECHNOLOGIES CO., LTD.



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## CTH300 Series PLC

• 2023

COTRUST TECHNOLOGIES CO., LTD.

# COTRUST Overview

COTRUST Technologies Co., Ltd. founded in 2003, is dedicated to R&D, manufacturing and sales of industrial automation control products. Relying on high quality, high performance automation control products and solutions to create maximum value for customers, determined to become the world's leading industrial automation solutions supplier.

As a high-tech enterprise, COTRUST provides a wide business coverage of intelligent equipment & robot, new energy vehicles, industrial Internet, smart factory. Main products include PLC, Motion control&servo drive, HMI, dedicated control system and automation software MagicWorks programming software (PLC/HMI/TUNER/OPC), the new launch MiCo remote solution, multi-robot cooperative control system widely used in customer solutions.

COTRUST built a long-term partnerships with customers. To achieve this, COTRUST offers more than just products: working with COTRUST gives customers access to leading integrated manufacturing and R&D facilities, as well as highly skilled engineering and industry specialists.

COTRUST invests 10% of revenues and 40% of employees in R&D, owned more than 30 trademark registration and 140 patents with certificates( including invention, utility models and appearance). Uses a uniquely rigorous engineering process that incorporates advanced design modelling, performance analysis and quality assurance techniques for improve production capacity continuously and promote sustainable development.

On the basis of owning industrial automation technologies with proprietary intellectual property rights, COTRUST perseveres in industry marketing and providing total solution to customers in segment market and achieves growth of both enterprise value and customer value.

## Focus on Industrial Control Driving the Intelligent Future



## Overview

System overview .....01

Software overview.....07

## Technical specification

Central processing unit .....09

CTH300-C CPU ..... 11

CTH300-H CPU.....17

Signal module.....24

Digital module ..... 25

Analog module.....26

Temperature module.....29

Function module.....32

High speed counting module.....32

High speed pulse output module .....33

CANopen communication module.....34

EtherCAT Slave station module.....35

PROFINET slave station module .....37

Power module .....39

Intermediate expansion module .....40

## Install

Dimensional drawing.....42

Wiring diagram .....43

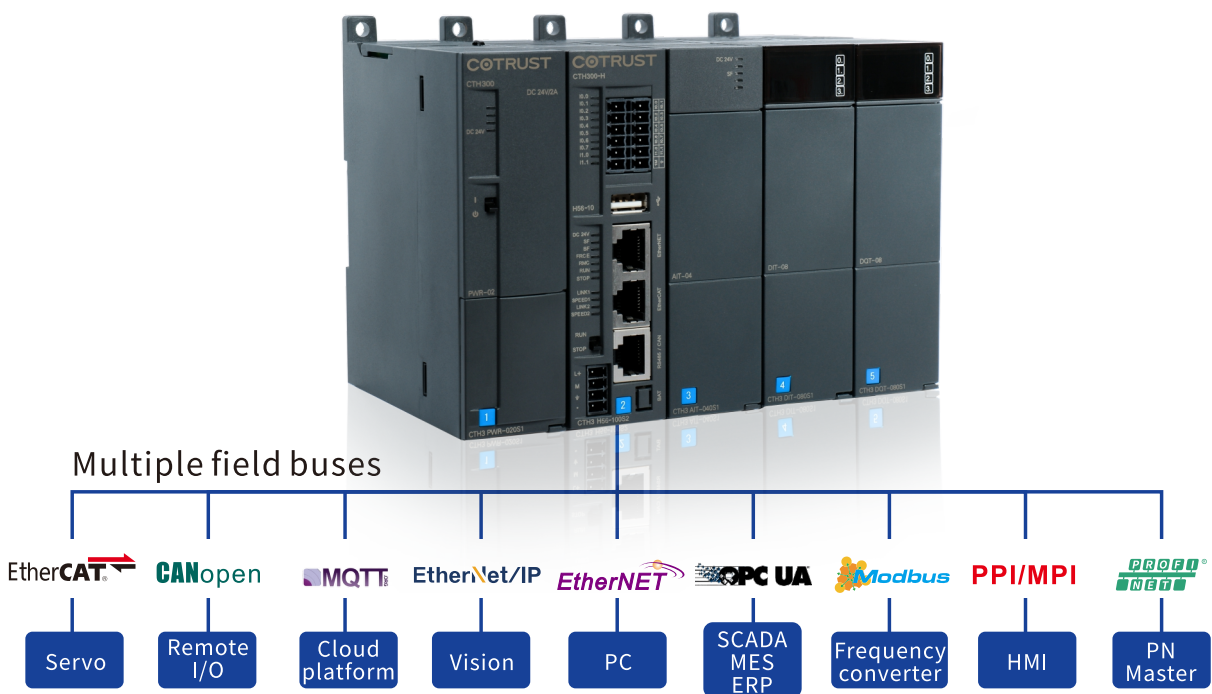
## Appendix

Power consumption .....46

Ordering Information .....47

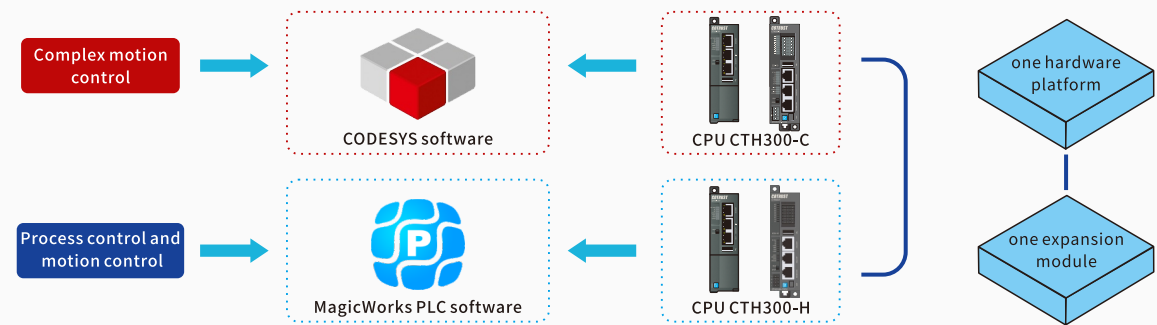


System features



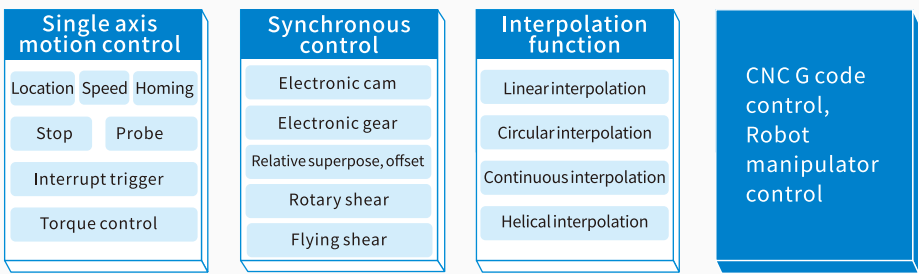
One platform, two architectures

CTH300-C CPU and CTH300-H CPU use the same hardware platform and share the same expansion module.  
CTH300-C is based on CODESYS software architecture, which is good at complex motion control.  
CTH300-H is based on the more easy-to-use MagicWorks software architecture that is good at process control and motion control.

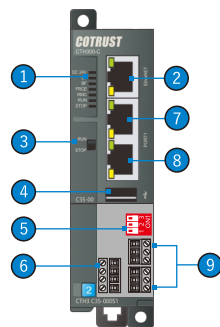


Powerful motion control

Based on PLCopen standard motion control library

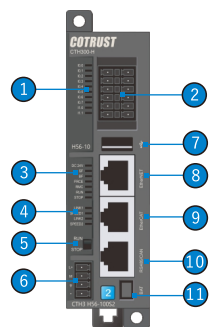


System composition



H3X: H31-01/H35-01/H32-01/H36-01/H36-02  
C3X: C35-02/C36-02/C37-02

- ① System status indicator
- ② Ethernet interface
- ③ System operation/stop dial switch
- ④ USB 2.0 interface
- ⑤ Terminal resistance dial switch and remote dial switch (C36-02:1/2: terminal resistance switch, 3. function switch.)
- ⑥ Power terminal
- ⑦ RS485 interface (H31-01/H35-01)  
EtherCAT interface (H32-01/H36-01/C35-02/C37-02)  
EtherCAT/EtherNET switchable interface (H36-02/C36-02)
- ⑧ RS485 interface (H31-01/H35-02)  
CANopen interface (H32-01/H36-01/H36-02/C35-02/C36-02/C37-02)
- ⑨ RS485 free port (CTH300-C) or PPI/free communication port (CTH300-H)

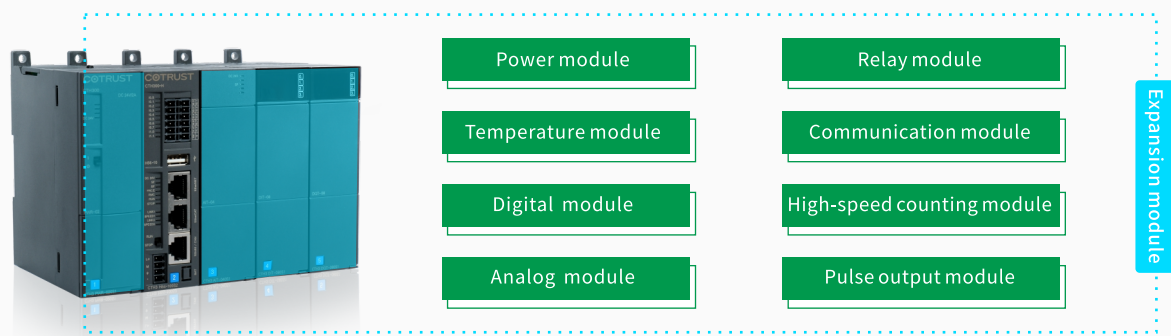


H5X: H52-10/H56-10  
C5X: C56-10/C57-10

- ① Digital input indicator
- ② Digital input interface
- ③ System status indicator
- ④ Network interface communication indicator
- ⑤ System operation switch
- ⑥ Power terminal
- ⑦ USB interface
- ⑧ EtherENT interface
- ⑨ EtherCAT interface
- ⑩ RS485/CAN interface
- ⑪ External battery interface

Superior performance

- CTH300 CPU uses Cortex-A8 processor, which has higher computing speed.
- The CTH300 system supports a variety of expansion modules, with the largest I/O scale of 4096DI/DQ and 1024AI/AQ.
- The 55 Mbps expansion bus ensures high-speed data transmission between CPU and expansion module.



Full isolation system

- All CTH300 CPU signal modules and function modules adopt isolation technology to isolate the power supply, bus and I input/output of the whole system.
- Digital input module with digital filter has strong anti-interference ability.
- Analog module signal is fully isolated, with strong anti-interference ability and accuracy up to 16 bits.

Environmental adaptability

- PCB three-proofing treatment, mildew-proof, moisture-proof and salt spray proof.
- Comply with IEC 61000 electromagnetic compatibility test.
- Comply with IEC 60018-2 environmental test.

## System expansion

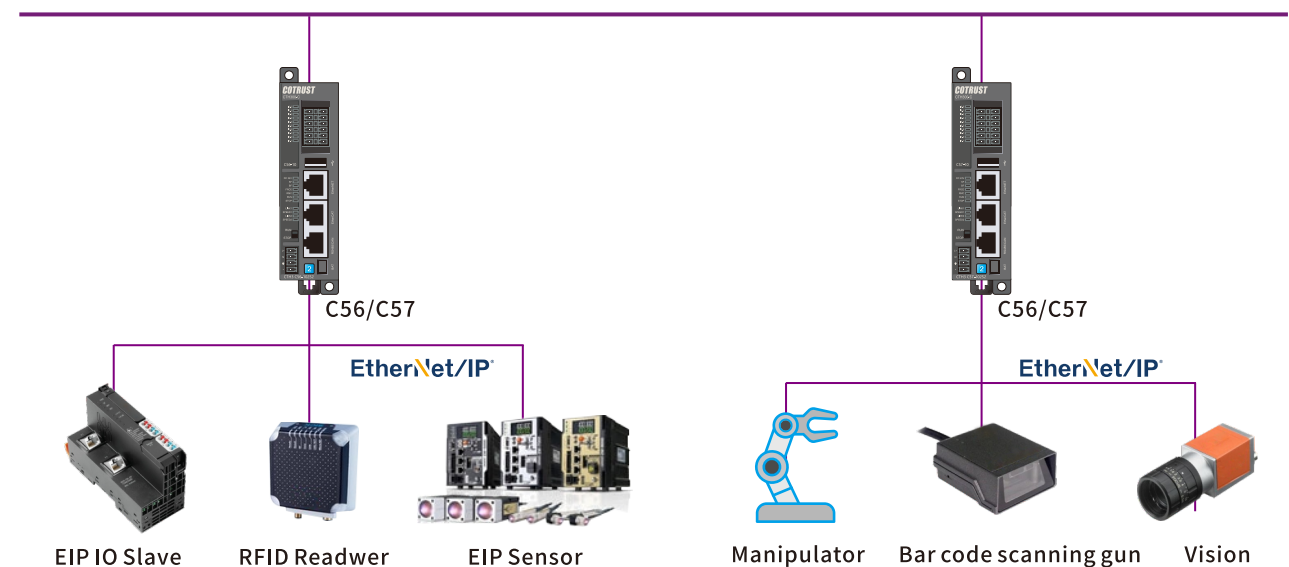
### Number of local extensions

- When the user control system requires more than 8 signal modules or function modules, the CTH300 rack can be expanded:
- Most 32 modules can be installed in 4 racks,
- Most 3 expansion racks can be connected to the local rack,
- Each rack can insert 8 modules,
- The maximum distance between two racks is 3 meters.

### RS485 serial communication

- It can communicate with third-party devices such as frequency converter and touch screen.
- CTH300-C only supports free port communication protocol (built-in Modbus-RTU protocol).
- CTH300-H can be used as program download port to support PPI/MPI and free port Communication protocol (built-in Modbus-RTU protocol).

### EtherNet/IP industrial Ethernet communication



### EtherNet/IP

EtherNet/IP, based on TCP/IP protocol, extends the standard TCP/IP Ethernet to industrial real-time control, and combines with the general industrial protocol (CIP) to help users obtain a more open and integrated overall solution for industrial automation and informatization. All standard Ethernet communication modules, such as PC interface cards, cables, connectors, hubs and switches, can be used together with EtherNet/IP, supporting the complete realization of all network functions such as equipment configuration, real-time control, information collection, etc. on the same link.

#### Industry application

EtherNet/IP is one of the leading Ethernet-based communication technologies, which can effectively interconnect industrial equipment. It is widely used in factory automation and process control applications: 3C industry, Photovoltaic industry, food and beverage processing, logistics car, robot (such as ABB manipulator), RFID industry, railway and mining industry.

#### Flexible network system construction

Supports star and linear network topologies, allowing for rapid expansion and management of production line compatible IT networks without the need for network cutting or maintenance by professional IT technicians.

#### Industry standard

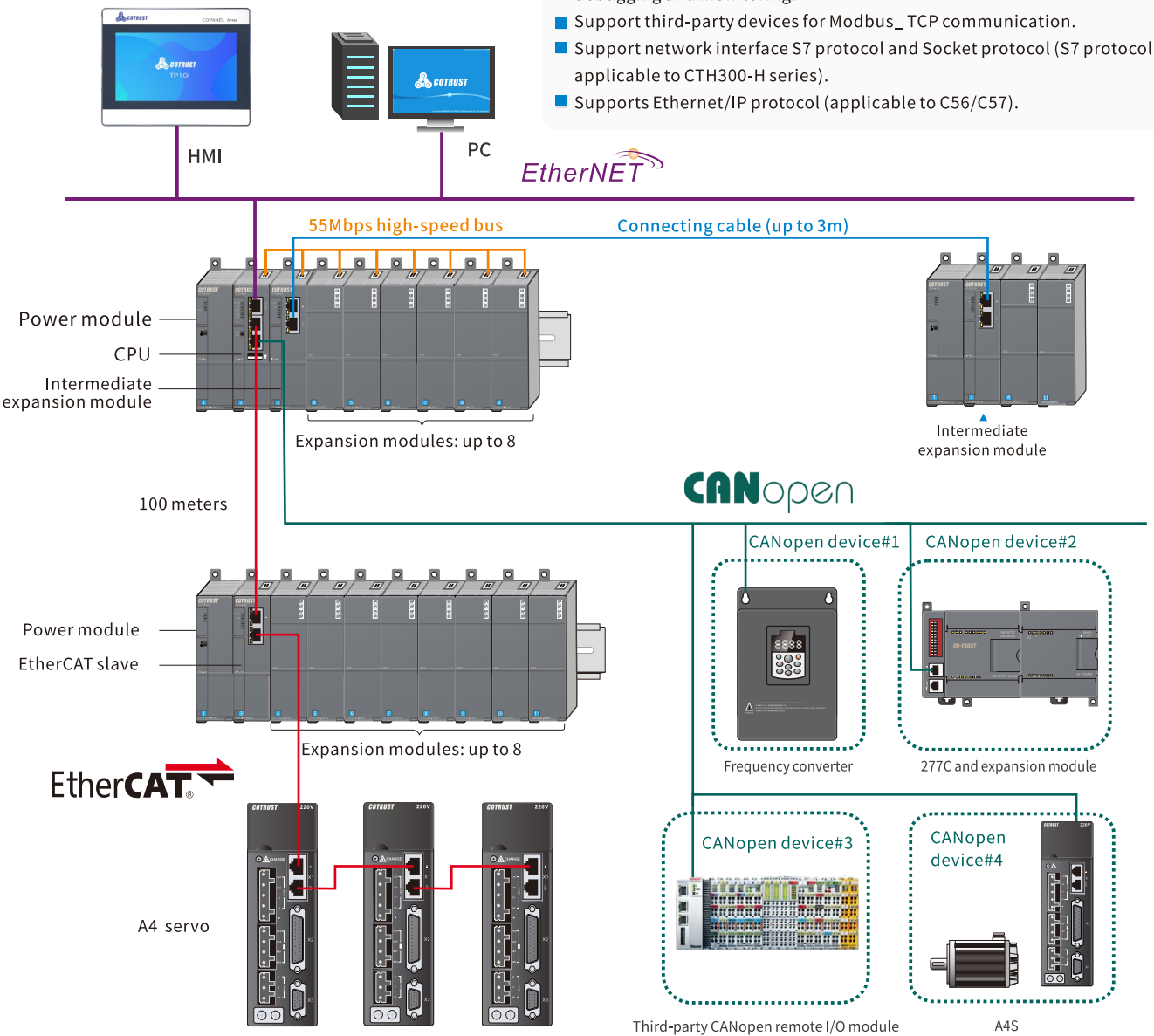
Real-time EtherNet system EtherNet/IP (or Ethernet Industry Protocol or EIP) is an open bus standard promoted and maintained by the ODVA organization. Built on the application layer of the "Common Industrial Protocol" (CIP), EtherNet/IP extends the standard protocols TCP or UDP so that standard and automated networks can run in parallel.

## System expansion

### EtherNET



- It can be used as a program download port, or it can be directly connected to the touch screen and the upper computer (using a common network cable).
- Communicate with multiple Ethernet devices through the switch to realize fast data interaction. CTH300-H series supports remote programming, debugging and monitoring.
- Support third-party devices for Modbus\_TCP communication.
- Support network interface S7 protocol and Socket protocol (S7 protocol is applicable to CTH300-H series).
- Supports Ethernet/IP protocol (applicable to C56/C57).



### EtherCAT



- CTH300 EtherCAT bus: connect remote IO module, COTRUST servo driver and third-party EtherCAT slave equipment.
- The CTH300-C master module can connect 128 slave stations at most. The CTH300-H master module can connect 64 slave stations at most.
- The bus communicates at a rate of 100Mbps, and the communication distance between slave stations is 100M at most.

### CANopen



- With CANopen DS301 standard protocol, the controller connect 277C remote IO block, COTRUST servo driver and third-party CANopen slave equipment.
- Supports up to 8 CAN masters, and each master can connect 32 slaves at most.
- The maximum communication speed is 1Mbps.

System expansion

PROFINET

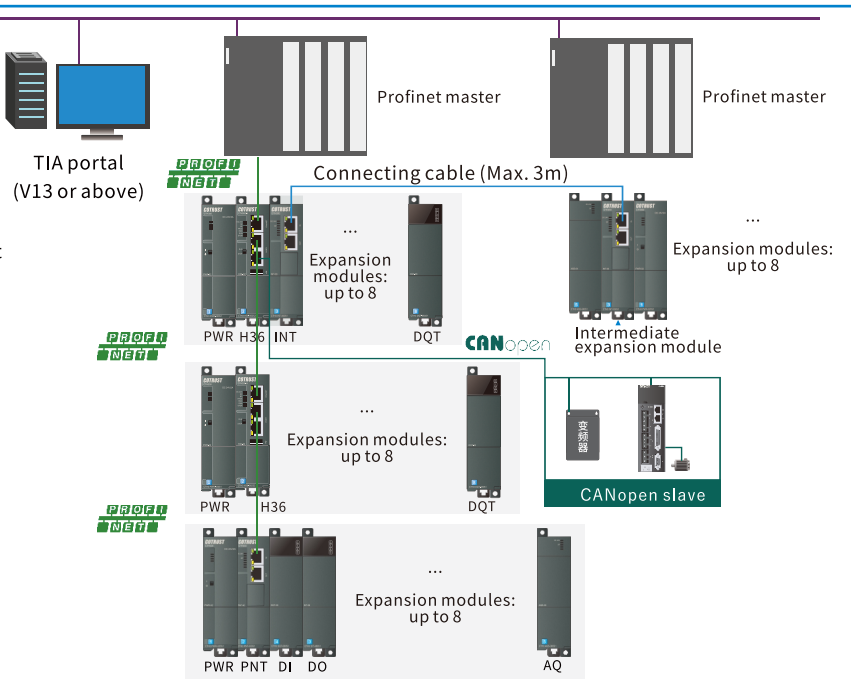


- Fast data transmission: synchronization period 1ms
- The configuration configuration is flexible: it does not need the wizard to import repeatedly, and the configuration can be freely configured by importing an XML file once.
- PN intelligent slave station is suitable for multiple models of Profinet master station: S7-200SMART, S7-300, S7-400, S7-1200, S7-1500
- Function support requires firmware V2.38 and above
- PLC programming platform: MagicWorks PLC V2.26 version

CPU switch mode

Supported models:

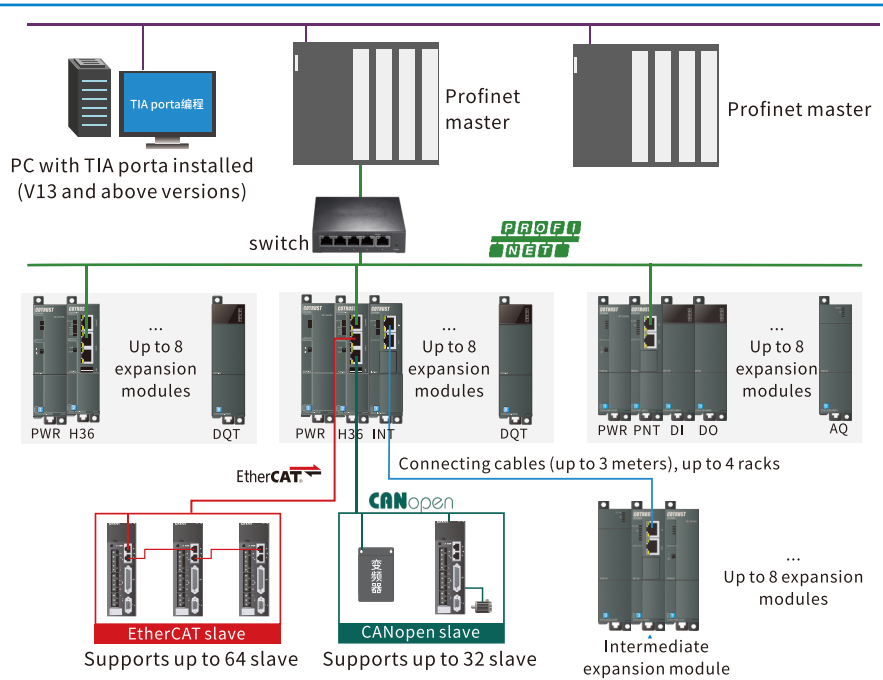
H36-02  
dual serial port , dual network port



CPU single network port mode

Supported models:

H31-01 H35-01 H32-01  
H36-01 H36-02 H52-10  
H56-10



System expansion

MQTT protocol



A communication protocol based on client/server publish/subscribe mode. The CTH300-H CPU of COTRUST PLC supports MQTT Internet of Things protocol.

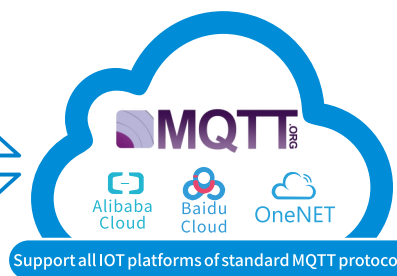
- MQTT is a simple, stable, open and easy to implement message protocol.
- Send and receive only when there are updates, and the efficiency burden is light.
- Save flow and do not need to cycle.
- Internal encryption mechanism to prevent eavesdropping.
- It has wide applicability in information collection, industrial control, intelligent building and other aspects under the application of the Internet of Things.

Device client



Device client: Publish and subscribe

- ① Publish information that other clients may subscribe to.
- ② Subscribe to messages published by other clients.
- ③ Unsubscribe or delete the message of the application.
- ④ Disconnect from the server.



MQTT server: message broker, transit station, distribution information

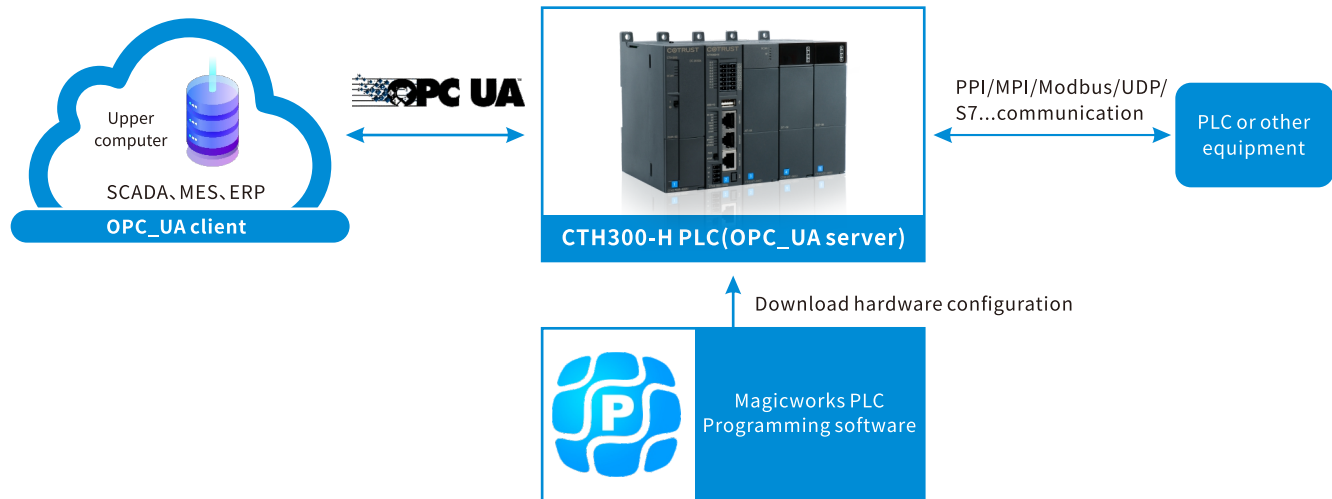
- ① Receive network connections from clients.
- ② Receive the application information published by the client.
- ③ Process subscription and unsubscribe requests from clients.
- ④ Forward application messages to subscribed clients.

OPC-UA protocol



It is independent of a specific operating system, supports such as Windows, Linux, Apple OS X, real-time operating system or mobile operating system (Android or iOS), and is suitable for cross-level data exchange. It uses a simple client/server mechanism for communication.

- Magicworks PLC (V2.23) supports OPC UA server, which is only applicable to CTH300-H series PLC.
- By adding OPC UA elements, the read and write permissions, variable types and node information of PLC variables and DB variables can be managed, so as to realize configuration access to PLC variables..

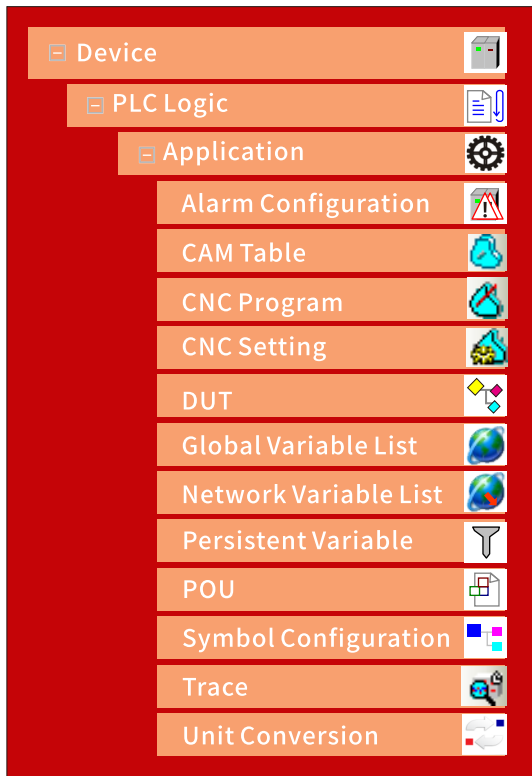






CODESYS: Programming software for CTH300-C CPU

CODESYS is a programming tool for machine developers. It is easy to learn, set adjustment control in one, can Complete the control function quickly and safely.



Programming

- Support standard data types such as BOOL/integer/real/time, and support Union/reference/pointer. IEC extended data types, supporting user-defined data types such as arrays/structures/enumerations.
- Complies with IEC61131-3 programming environment, supports CFC/FBD/LD/IL/ST/SFC language, and the program can be composed of POU in different languages.
- Multi task programming, the execution cycle and priority of each task can be set separately.
- Syntax error check, variable and symbol highlight processing. Online programming ensures that the device works properly during user debugging.

Motion control

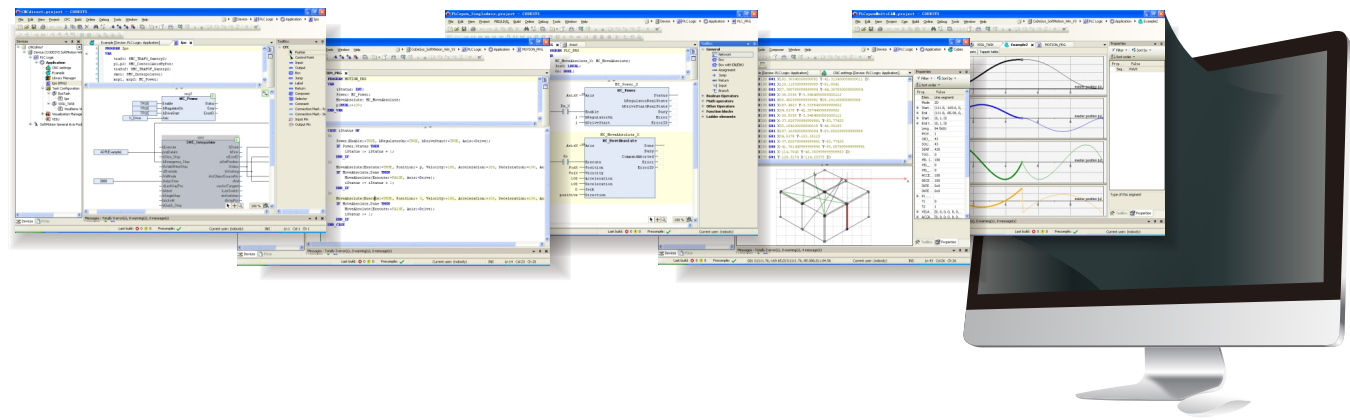
- PLCopen-compliant motion control function block
- The CAM cam editor quickly completes the electronic cam configuration and modifies the cam table in real time
- 5-axis linkage CNC function based on DIN66025

Graphical

- Path view shows the planned motion path of G code
- Trace function displays the change curve of multiple variables in real time
- The cam configuration can be completed by simply dragging the cam curve of the CAM Table

Safety and diagnosis

- Multi-level access rights to protect users' intellectual property
- Vendor ID check at startup
- Complete system diagnosis and exception handling mechanism



MagicWorks PLC: Programming software for CTH300-H CPU

Basic feature

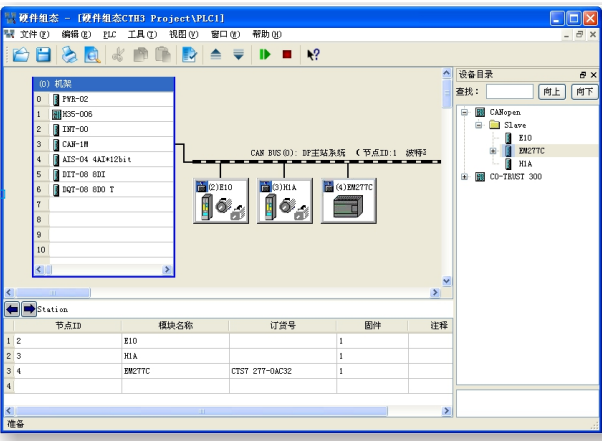
- Structured programming, through the program organization units POU: OB, FC, FB, CF and DB composed of user programs
- Programming language: LD, STL, C language
- Instruction types: bit instruction, integer instruction, floating point instruction, communication instruction, etc
- Data type: Boolean, byte, word, integer, double word, double integer, real number, string
- Data area: input image area (I/AIW), output image area (Q/AQW), variable memory area (V), special memory area (SM), bit memory area (M), local memory area (L), accumulator repository area (AC), Step storage area (S), timer (T), counter (C), data block (DB)

Run mode programming

Users can program online without stopping the machine

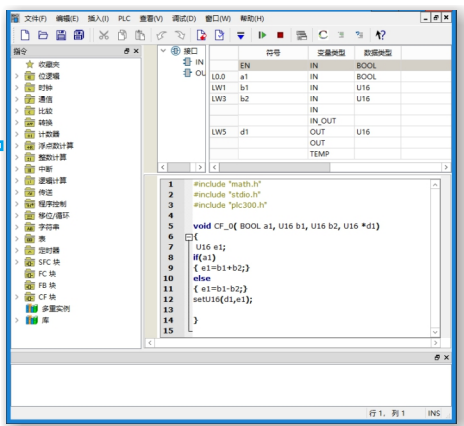
HW Config

- The rack hardware configuration can be realized by dragging
- The graphical form implements EtherCAT network and CANopen network configuration
- The address of the configuration module is automatically assigned



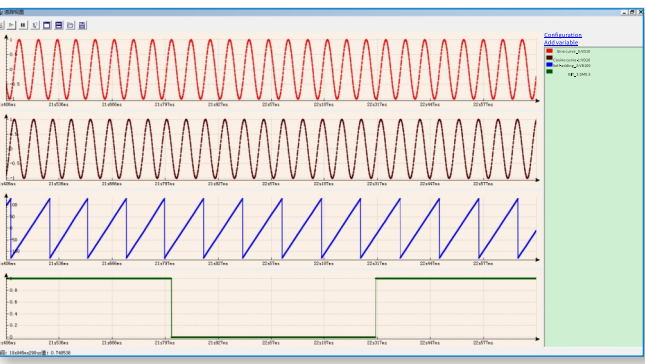
C language programming function

- Write a C function subroutine
- Used for complex mathematical operations, improve the efficiency of the program
- Code encryption, enhance the confidentiality of the program
- Support multiple calls, greatly improve programming efficiency



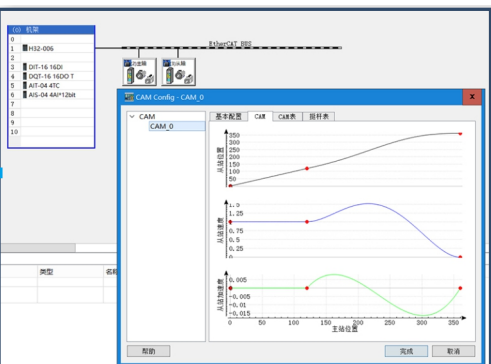
Trace Fuction

- A way to configure and display application-specific trace data in one or more charts.
- Used for BUG positioning and motion control analysis.
- Save data and import data for analysis.



Electronic cam

- Easy configuration using the axis configuration wizard
- Use the Electronic Cam Wizard to easily configure CAM data
- View the CAM curve and visually analyze the CAM motion path
- Support the compilation type of CAM table "polynomial (XYVA), one-dimensional array, two-dimensional array, composite curve"





Motion control CPU - CODESYS software

C57	C37	C56	C36	C35
EtherNET Modbus EtherCAT CANopen EtherNET/IP	EtherNET Modbus EtherCAT CANopen	EtherNET Modbus EtherCAT CANopen EtherNET/IP	EtherNET Modbus EtherCAT CANopen	EtherNET Modbus EtherCAT CANopen
32MB Program data space	32MB Program data space	32MB Program data space	32MB Program data space	32MB Program data space
4096DI/DQ 1024AI/AQ	4096DI/DQ 1024AI/AQ	4096DI/DQ 1024AI/AQ	4096DI/DQ 1024AI/AQ	4096DI/DQ 1024AI/AQ
Uniaxial motion control Electronic CAM, electronic gear Circular/line interpolation Continuous interpolation helical interpolation	Uniaxial motion control Electronic CAM, electronic gear Circular/line interpolation Continuous interpolation helical interpolation	Uniaxial motion control Electronic CAM, electronic gear Circular/line interpolation Continuous interpolation helical interpolation	Uniaxial motion control Electronic CAM, Electronic gear Circular/line interpolation Continuous interpolation helical interpolation	
CNC, gantry system Parallel manipulator 6-DOF joint robot Planar articulated robot	CNC, gantry system Parallel manipulator 6-DOF joint robot Planar articulated robot			
10 digital inputs 6 high-speed counters		10 digital inputs 6 high-speed counters		

CTH300 series modules comply with electrical specifications

Environmental conditions - transportation and storage	
Temperature	-40°C~+70°C(-40°F~158°F)
Atmospheric pressure	1080 hPa~660 hPa (The corresponding height is -1000m~+3500m)
Relative humidity	10%~95%, no condensation
Fall	1m, 10 times, shipping packing
Environmental conditions -- operating temperature	
Horizontal installation	0°C~60°C(32°F~140°F)
Vertical mounting	0°C~40°C(32°F~104°F)
Atmospheric pressure	1080 hPa~795 hPa (The corresponding height is -1000m~+2000m)
Relative humidity	10%~95%, no condensation
Harsh environment	Low salt fog, humidity, dust fog and other environments
Pollutant concentration	SO2<0.5ppm, relative humidity<60%, non-condensing, H2S<0.1ppm, relative humidity<60%, non-condensing
Electromagnetic compatibility - immunity	
Electrostatic discharge IEC61000-4-2	Contact discharge: ±4kV, air discharge: ±8kV
Electrical fast transient pulse group IEC61000-4-4	Power line: 2kV, 5kHz Signal line: 2kV, 5kHz (I/O coupling clip), 1kV, 5kHz (communication coupling clip)
Surge IEC61000-4-5	Power line: 2kV (asymmetric), 1kV (symmetrical)
Radio Frequency Electromagnetic Field Radiation IEC61000-4-3	80MHz~1GHz, 10V/m, 80%AM (1kHz)
Radio Frequency Field Induction Conduction Interference IEC61000-4-6	0.15MHz~80MHz, 10V/m, 80%AM (1kHz)
Short interruption and voltage change of DC power input port IEC61000-4-29	Short-time interruption: 10ms, voltage change: 80%~120%, 100ms
Environmental testing	
High and low temperature test	High and low temperature operation, starting machine, cycle operation, storage, hot and cold shock, high temperature and humidity, alternating humid heat IEC60068-2
Sinusoidal vibration (bare machine) IEC60068-2	5~150Hz, 0.05G2/Hz, 150Hz~ 500Hz-3dB/oct, 1 hour/axis, X, Y, Z total 3 axes
Impact (bare machine) IEC60068-2	15G, 11ms pulses, 3 times/direction
Flowing mixed gas corrosion test IEC60068-2-60	H2S: 0.1ppm, NO2: 0.2ppm, CL2: 0.02ppm, Temperature: 30°C(86°F), humidity: 75%, cycle: 4 days



High Performance CPU - MagicWorks PLC software

H56/H52	H36/H32	H35/H31
EtherNET Modbus CANopen Socket EtherCAT PPI/MPI S7	EtherNET Modbus CANopen Socket EtherCAT PPI/MPI S7	EtherNET Modbus PPI/MPI Socket S7
256KB of program space 2*64KB secret space 1M data space	256KB of program space 2*64KB secret space 1M data space	192KB of program space 2*64KB secret space 512MB data space
Single axis motion control Electronic cam, electronic gear Circular/linear interpolation Continuous interpolation, helical interpolation Probe function	Single axis motion control Electronic cam, electronic gear Circular/linear interpolation Continuous interpolation, helical interpolation Probe function	Single axis motion control
4096DI/DQ 1024AI/AQ	4096DI/DQ 1024AI/AQ	4096DI/DQ 1024AI/AQ
Special PID for temperature control	Special PID for temperature control	Special PID for temperature control
Trace C language programming	Trace C language programming	Trace C language programming
10 digital inputs 6 high speed counters		

CPU of CTH300-C Series



Basic characteristics

- EtherNet10M/100M communication
- EtherCAT 100Mbps high-speed motion control bus, "On the fly" data exchange
- Modbus communication based on RS485
- Bit command processing time: 8ns, floating-point command processing time: 0.05us
- Program/data space: 32MB, power-down data maintaining space: 64KB
- Programming environment: CODESYSV3.5
- Programming language compliant with IEC61131-3: CFC/FBD/LD/IL/ST/SFC
- Motion control command set compliant with PLCopen standard
- Electronic cam and electronic gear functions
- CNC function compliant with DIN66025
- Integrated gantry system, parallel manipulator, six freedom degree joint robot, planar joint robot and other algorithms
- Support the addition of CAN ports. Avoid the CAN master station from occupying high-speed bus resources and improve the overall performance of the system

SoftMotion motion control function I - "axis"

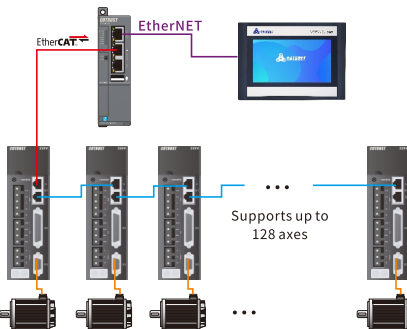
In the CTH300-C series motion control CPU, the "axis" is a bridge that connects powerful embedded motion control algorithms and actual drive systems. In the CODESYS system, the "axis" can be divided into several types: bus axis, pulse axis (virtual axis), encoder axis, position controlled speed axis (frequency converter axis), and so on.

The parameters of "axis" include unit conversion, given position, given speed, acceleration, deceleration, actual position, actual speed, axis status, axis error code, etc. In the open loop system, the reference coordinates of the "axis" come from the command position. In the closed loop system, the reference coordinates of the "axis" come from external position feedback.

Different "axes" use a unified single-axis or multi-axis motion control library in the control system.

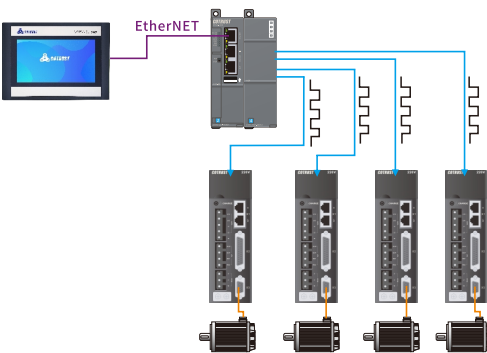
EtherCAT bus axes

- EtherCAT high-speed motion bus is adopted, with a communication speed of 100M, thus, it only takes 1ms to achieve synchronous control of 128 axes (typical case)
- Closed loop control system, where the controller obtains real-time feedback position, speed, load rate, and alarm light information of the driver
- Easy wiring. Controllers and drivers can be connected through inexpensive and universal network cables. Support 100BASE-TX, with a maximum connection distance of 100m between stations



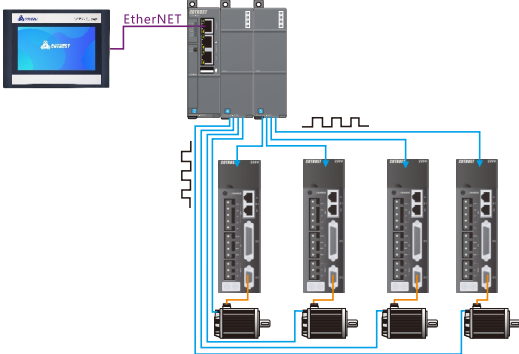
Virtual axis (pulse, open loop)

- Strong computing power ensures efficient and reliable controller handling of multi-axis pulse motion control
- The pulse output module HSP-04 has a pulse output frequency of up to 4MHz differential and 500k Hz single ended, ensuring smooth and accurate machine operation
- Rich operation and control commands, such as homing, positioning, speed control, etc.



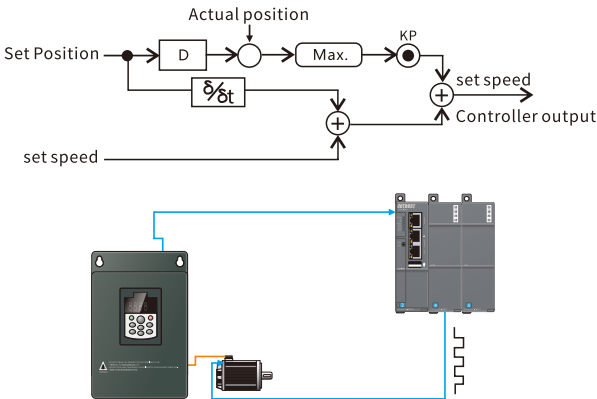
Encoder axis (pulse, closed loop)

- Strong computing power ensures efficient and reliable controller handling of multi-axis pulse motion control
- The pulse output module HSP-04 has a pulse output frequency of up to 4MHz differential and 500k Hz single ended, ensuring smooth and accurate machine operation
- Rich operation and control commands, such as homing, positioning, speed control, etc. make equipment movements flexible and variable
- Closed-loop control system can effectively reduce system errors caused by pulse loss due to environmental interference



Speed axis for position control (frequency converter axis)

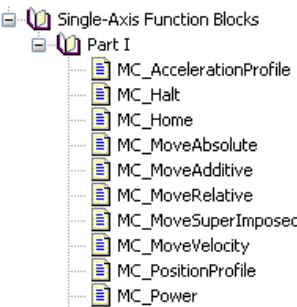
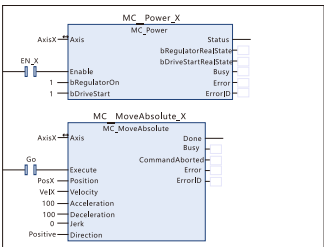
- CTH300-C PLC provides a set of algorithms for controlling position through variable frequency axis, which is planned by the controller.
- This control scheme has high cost-effectiveness in high-power drive systems.



CTH300-C Motion controller SoftMotion command

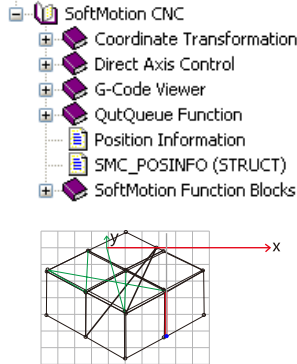
Single axis motion control function

- Motion commands compliant with PLCopen standard
- Bus axis and pulse axis are not distinguishable
- Native dimensional transformation
- Multiple homing modes
- Complete exception handling mechanism



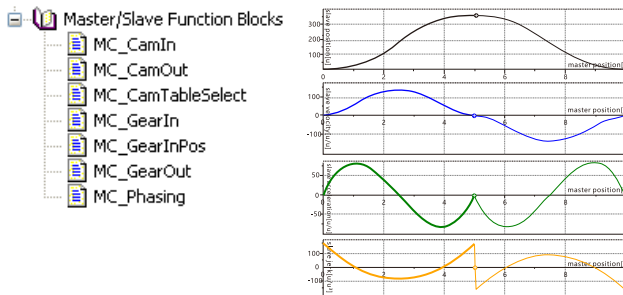
CNC function

- G code based on DIN66025 standard, supports DXF file import
- Coordinate transformation, path preprocessing, GCODE file reading and writing
- CNC path preview, all changes in the CNC editor will be automatically updated in the path view
- Support real-time modification of GCODE files in the controller through the HMI of Copanel series



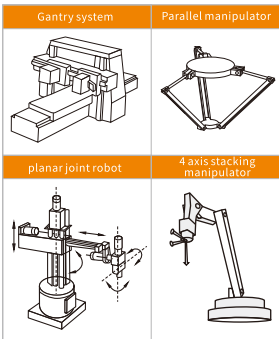
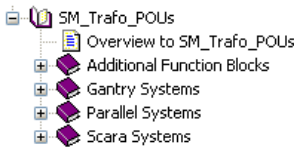
Electronic CAM, electronic gear

- Motion commands compliant with PLCopen standard
- Support virtual axis as electronic cam/electronic gear master
- Multiple axes can simultaneously call up an electronic cam table, and the cam curve can be translated, retracted, relative/absolute coordinate switched, and periodic/apperiodic switched according to demand.



Gantry system, robot

- H-type gantry system, T-type gantry system, gantry cutter
- Polar coordinate system
- A planar joint robot with 2~3 degrees of freedom
- Six freedom degree space joint robot
- Four axis stacking manipulator
- Parallel manipulator





CPU C56-10



Enhanced motor control  
32MB program data space,  
64KB power-off hold data space,  
55M expansion bus, 24V DC power supply,  
10-channel digital inputs,  
6\*500kHz high-speed counters,  
1 RS485 port (ModBus Free port protocol),  
1 Ethernet port, 1 USB port, 1 CAN port,  
1 EtherCAT port.

CTH3 C56-102S2

- Support single axis motion control, interpolation, electronic gear and electronic CAM and other SoftMotion instruction set functions.
- Maximum number of racks: 4 (including local racks).
- Support 128 EtherCAT slave stations at most.
- Support CODESYS SP11.

CPU C57-10



Enhanced motor control  
32MB program data space,  
64KB power-off hold data space,  
55M expansion bus, 24V DC power supply,  
10-channel digital inputs,  
6\*500kHz high-speed counters,  
1 RS485 port (ModBus Free port protocol),  
1 Ethernet port, 1 USB port, 1 CAN port,  
1 EtherCAT port,

CTH3 C57-102S2

- Support single axis motion control, interpolation, electronic gear and electronic CAM and other SoftMotion instruction set functions.
- Support CNC function, and supports 4 racks at most (including local racks).
- Support 128 EtherCAT slave stations at most.
- Support CODESYS SP11.



CPU C35-02

CTH3 C35-002S2

Basic model, 32MB program data space, 64KB power-off hold data, 55M extension bus, 24V DC power supply, 1 RS485 port (ModBus Free port Protocol), 1 Ethernet port, 1 USB port, 1 CAN port, 1 EtherCAT port, support single axis motion control, maximum number of 4 racks (including local racks), Supports 128 EtherCAT slave at most and supports CODESYS programming platform version SP11.

NEW



CPU C36-02

CTH3 C36-002S2

Standard motion control, 32MB program data space, 64KB power-off hold data, 55M extension bus, 24VDC power supply, 2 RS485 communication ports (ModBus Free port Protocol), 1 EtherNET interface, 1 EtherNET/EtherCAT switchable communication port, 1 CAN port, 1 USB port, support PLCopen single axis motion, interpolation, electronic CAM and electronic gear, support setting SoftMotion instruction, support a maximum of 4 racks (including local racks), support 128 EtherCAT slave stations at most, support CODESYS programming platform SP11 version.



CPU C37-02

CTH3 C37-002S2

Standard motion control, 32MB program data space, 64KB power-off holding data, 55M expansion bus, 24V DC power supply, 1 RS485 port (ModBus free port protocol), 1 Ethernet port, 1 USB port, 1 CAN port, 1 EtherCAT port, supporting single-axis motion control, interpolation, electronic gear, electronic cam and other SoftMotion command, supporting CNC function, and the maximum number of 4 racks (including local racks), It supports 128 EtherCAT slave stations at most and the CODESYS programming platform SP11 version.

Technical specifications of CTH300-C series CPU module

Product model		C35-02	C36-02	C37-02	C56-10	C57-10
Order number		CTH3 C35-002S2	CTH3 C36-002S2	CTH3 C37-002S2	CTH3 C56-102S2	CTH3 C57-102S2
Physical characteristics						
Size (W × H × D)		34×115×101.6mm				
Power loss		19.2W				
Power supply characteristics						
Rated input voltage		24V DC				
Input voltage range		20.4V~28.8V DC				
Input current		0.8A				
Polarity reverse connection protection		yes				
Bus supply voltage		+5V DC				
Bus supply current		1.6A				
LED indicator						
24V POWER(green)		ON: with 24 VDC. OFF: without 24V DC				
SF(red)		ON: system error. OFF: No error				
BF(red)		ON: BUS error. OFF: No error				
RUN (green)		ON: system running. OFF: The system stops running				
STOP (yellow)		ON: The system stops running. OFF: system running				
Ethernet port	green	Flashing:Connected.OFF:Not connected				
	yellow	ON:100Mbps.OFF:10Mbps				
EtherCAT	Link2 (green)	-			ON: Connected.OFF:Not connected	
	SPEED2 (yellow)	-			ON:100Mbps.OFF:10Mbps	
I/O	I0.0~I1.1 (green)	-			ON: signal input. OFF: no signal input	
Command performance						
Bit command execution speed		8ns/step				
Float command execution speed		0.05μs/step				
Memory						
User program space		32MB				
Power-off hold space		64KB				
Integrated communication function						
Bus interface		Support				
USB PORT		1				
EtherNET PORT		1	2 <sup>①</sup>	1	1	1
RS485 PORT		1	2	1	1	1
EtherCAT PORT		1				
CANopen PORT		1				
EtherCAT communication port						
Communication port		1 port				
Baud rate		Supports 100Mbps self-adaptation				
Protocol type		EtherCAT interface protocol				
Maximum cable length per section		100m				
Maximum number of stations		Each master station supports 128 EtherCAT slave stations at most				
Supported functions		Distributed clock Settings Redundancy Settings				
		Startup parameter configuration				
		Configure PDO parameters and mappings				
		Configure the bus cycle, configure the startup check vendor ID and product ID				
Isolate		YES				

Note①: One of them is an EtherNET/EtherCAT switchable communication interface

Technical specifications of CTH300-C series CPU module

Product model	C35-02		C36-02		C37-02		C56-10		C57-10	
Order number	CTH3 C35-002S2		CTH3 C36-002S2		CTH3 C37-002S2		CTH3 C56-102S2		CTH3 C57-102S2	
Integrated communication function										
RS485 communication port										
Number of interfaces	1, PORT0		2, PORT0,PORT1		1个, PORT0					
Protocol	Free port protocol (built-in Modbus RTU protocol)									
Free port baud rate	Baud rate 1.2Kbps~115.2Kbps, built-in MODBUS master/slave function									
Cable length per section	With isolation repeater: 1000m(115.2Kbps), 1200m(38.4Kbps). No isolation repeater : 50m									
Number of stations	32 stations per segment, 126 stations per network									
Isolation	Communication port isolation									
CANopen interfaces(C37/C36/C35/C56/C57 native integration CANopen)										
Interfaces	CANopen									
Number of stations	Up to32									
Communication protocol	CANopen Ds301 standard protocol									
Support function	CANopen Manager starts automatically									
	Optional slave polling									
	Support for starting slave stations									
	Support NMT									
	Support synchronous production									
	Support synchronous consumption									
	Support heartbeat generation									
	Support creation of activation time									
Transmission rate (kbit/s)	1000	800	500	250	125	50	20			
Maximum length (m)	25	50	100	250	500	1000	2500			
Isolate	Communication port isolation									
EtherNET interface										
Number of interfaces	1 EtherNET interfaces	2 EtherNET ports(one of them is EtherCAT/ EtherNET)		1 EtherNET interfaces						
Baud rate	10/100 MBPS adaptive									
Communication protocol	CODESYS custom protocol, based on UDP and TCP (support Ethernet programming and Ethernet communication between cpus)									
Maximum cable length per section	Direct connection within 100m									
Maximum number of stations	UDP supports up to 16 connections, Modbus_ TCP supports a maximum of 32 connections.									
Isolation	Communication port isolation									
Programming software										
Programming package	CODESYS V3.5 (SP11 version)									
Programming language	Programming language conforming to IEC61131-3: CFC/FBD/LD/IL/ST/SFC									
Protection function										
Power supply protection	The power supply terminal provides reverse connection protection function and surge absorption function									
Interface protection	Lightning protection of communication port									
Locally expanded I/O capability										
Maximum number of racks	4									
Maximum module number	Main rack: 11 (power module, CPU, relay module, 8 signal modules) Slave frame: 10 (power module, relay module, 8 signal modules)									
Remote I/O expansion										
Number of CAN expansion master	1									
Number of CAN slave	Each master station can connect up to 32 CAN slave stations (277C)									
Number of EtherCAT expansion slave	Up to 128 EtherCAT slave modules can be connected, and each EtherCAT slave module supports up to 8 signal modules									

Technical specifications of CTH300-C series CPU module

Product model	C35-02		C36-02		C37-02		C56-10		C57-10		
Order number	CTH3 C35-002S2		CTH3 C36-002S2		CTH3 C37-002S2		CTH3 C56-102S2		CTH3 C57-102S2		
Supported motion control functions											
Motion control	-		SoftMotion		SoftMotion, CNC		SoftMotion		SoftMotion, CNC		
Real time clock											
Power-off hold	Power-off holding time is about 112 hours (typical value)						The power-off holding time is about 112 hours (typical value). If connect external battery , the power-down retention time can be at least 1 year				
Accuracy	Monthly deviation < 60 seconds										
Digital input feature											
Native integrated IO count						-		10			
Input type						-		Source/drain			
Rated voltage						-		24V DC			
Input voltage range						-		20.4~28.8V DC			
Surge voltage						-		35V DC, lcontinue 0.5s			
Logic 1 signal (minimum)						-		15 VDC, 2.5mA			
Logic 0 signal (Max)						-		5 VDC, 1mA			
Connect 2-wire proximity switch sensor (BERO)						-		1mA (maximum allowable leakage current)			
Input filtering						-		Configurable, supporting 0.2us, 0.4us, 0.8us, 1.6us,3.2us, 6.4us, 12.8us, 0.2ms, 0.4ms, 0.8ms, 1.6ms, 3.2ms, 6.4ms, 12.8ms, The default value is 6.4ms			
Isolation (field and logic)						-		500V Ac for 1 minute			
Simultaneous accessible input						-		10			
Maximum cable length						-		500m (standard input)			
Shield						-		50m(High speed counter input)			
Unshielded						-		300 m (standard input)			
Pulse capture input						-		10			
High speed counter	total					-		6			
	single-phase					-		6×500kHz			
	two-phase							4×250kHz			

CPU of CTH300-H series



Basic characteristics

- EtherNet 10M/100M communication.
- EtherCAT 100Mbps high-speed motion control bus, "On the fly" data exchange.
- Modbus communication based on RS485.
- Widely used PPI/MPI communication protocol.
- CANopen distributed field bus, the maximum communication speed of 1Mbps, the maximum communication distance of 2500 meters.
- Bit instruction processing time: 80ns, float instruction processing time: 1.25μs.
- Basic program space: 192KB-256KB, secret program space: 2\*64KB,
- Data space: 512KB to 1 MB, power off data space: 16KB to 32KB.
- Programming software: Magicworks PLC.
- Programming language: STL, LAD, C language.
- Use POU for structured programming.
- 100μs/1ms timing interrupt, input interrupt, high speed counter interrupt
- Comes with USB interface, you can download the program through the U disk.
- Remote monitoring, remote firmware update, remote download program.
- Fuzzy PID algorithm for temperature, flow, pressure, liquid level, etc.
- Single-axis motion function, linear/circular interpolation, continuous interpolation, spiral interpolation, electronic CAM, electronic gear function
- Support C language programming, support Trace function,
- Support probe function, record the actual position when the trigger event occurs.

Program organization unit "POU"

The user program of CTH300-H CPU consists of program/interrupt OB, function block CF, function block FB, and function block FC.

■ Program/Interrupt OB:

OB1 represents the main program, which combines various logical commands, instantiated FB, and functional FC into a program body. It exchanges data with other POU through shared data blocks.

■ Function block FB:

A POU that can be assigned parameters and has static variables can be instantiated with a block of background data. Each instantiated FB has a separate memory space, and its variables are held between one execution of FB and the next.

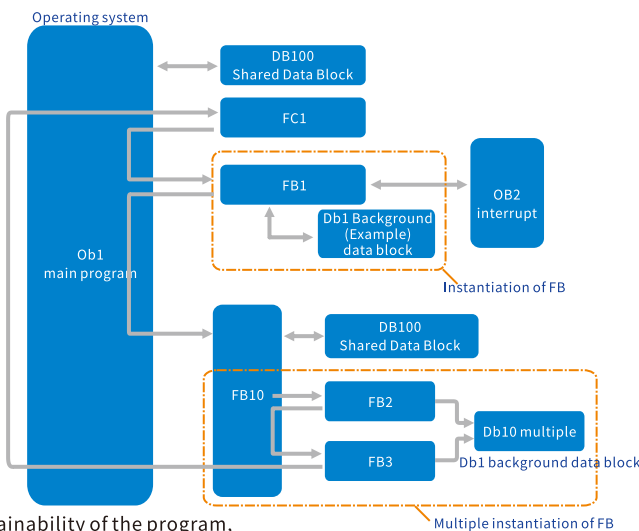
Multiple instantiation: When the instantiation of function block FB is implemented in another FB, the background data block of the latter can be used instead of the exclusive background data block of the former.

■ Function block FB:

A POU that can be assigned parameters but does not have static variables and always generates the same result as output when called with the same input parameters.

■ Function block CF

Using C language to write functional blocks to enhance the readability and maintainability of the program, while using C languageRich operation functions can achieve various calling functions, saving internal space and improvingprogramming efficiency.



Interrupt

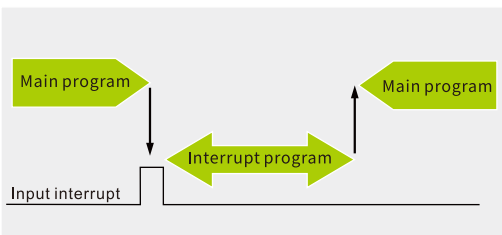
CTH300-H has interrupt function, interrupt is divided into external interrupt, timing interrupt, high-speed count interrupt, by calling interrupt can achieve some special operations, not affected by PLC scanning cycle.

■ External interrupt

Input DI signals can be used as inputs to external interrupts. Each input corresponds to an external interrupt, which is triggered by rising or falling edges.

■ Timing interrupt

In the case of a long execution cycle of the main program, to deal with a specific program, or in the cis scan. Timed interrupts are useful when specific programs need to be executed at regular intervals. Interrupts are not affected by the PLC scan cycle, and timed interrupt procedures are executed at regular intervals.



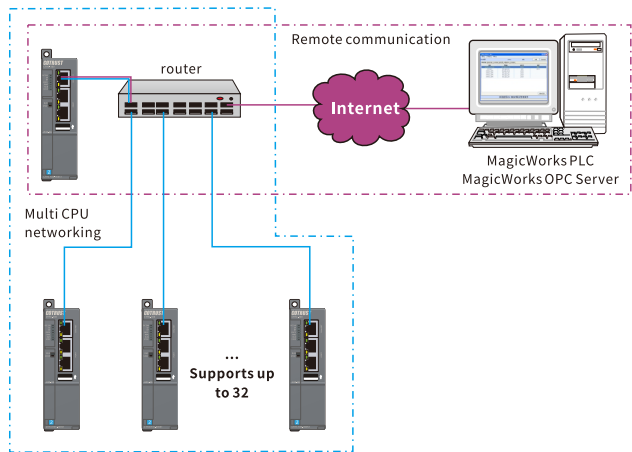
Industrial Ethernet communication based on ModbusTCP/IP

Remote communication programming maintenance:

**Network control function:** the CPU of CTH300-H series comes with an adaptive Ethernet port, which can connect to the Internet safely, quickly and conveniently through a router. Through the MiCo remote service platform, it achieves remote programming, remote monitoring, remote control and permission management functions.

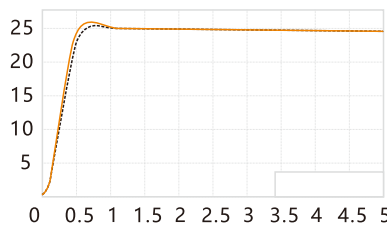
**Open interface:** it provides a standard OPC or MYSQL database interface to achieve MES system access, and fully records the production process data of all products on the production line through large capacity data, achieving digitalization and informatization of the production workshop.

**Multi CPU networking function:** Users can use ordinary routers/switches to connect multiple CTH300-H CPUs to the local network, and the CPUs communicate through the MODBUS TCP/IP protocol. The maximum number of sites per network segment for MODBUS TCP/IP communication is 32.



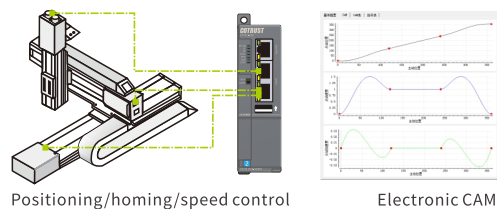
Temperature control

The CTH300-H CPU integrates a fuzzy logic temperature control PID algorithm, which can achieve up to 128 temperature control channels with simple library function calls. The temperature control PID parameters can achieve parameter self tuning, greatly reducing user debugging time.



Motion control

1. Motion commands that comply with PLCopen standards.
2. Supports motion control commands such as single axis positioning, speed control, and homing.
3. Supports multi axis linear interpolation, circular interpolation, continuous interpolation, helical interpolation and other commands.
4. Support virtual axis, EtherCAT bus axis, pulse axis, etc. as electronic cam/electronic gear master.
- 5.The same electronic cam table can be called up by multiple axes at the same time, and the cam curve can be translated, retracted, and switched between relative/absolute coordinates as well as in the periodic/non periodic ways, etc., as needed.



User program confidentiality

One-way download security

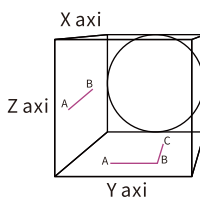
The CTH300-H CPU supports two one-way download secure programs, called "ct\_lib1" and "ct\_lib2". All code written in secure programs cannot be uploaded and cannot be monitored at run time. The two secret program Spaces are 24KB/24KB respectively.

Level 4 password protection for user programs from being compromised

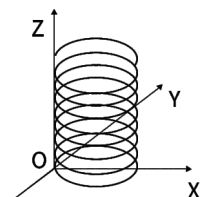
level	read, write	Controller start stop	Program Download	Program Upload	Condition monitoring	Project Compariso
1	✓	✓	✓	✓	✓	✓
2	✓	✓	●	✓	●	●
3	✓	✓	●	●	●	●
4	✓	✓	●	×	×	×

※ Functional limitations at different authorization levels (partial), where ● represents restricted permission.

Interpolation function



Supports XY axis, YZ axis, XZ axis, XYZ axis arc/line interpolation/continuous interpolation



Support 3D spatial helical interpolation



CPU H52-10



256KB+2\*64KB program memory,  
1MB data memory,  
32KB data storage power-down,  
24VDC power supply,  
10 channels digital input,  
6\*500KHz high-speed counter,  
1 RS485 port (PPI/ free port),  
1 Ethernet port,1 USB port,  
1 CAN port, and 1 EtherCAT port

CTH3 H52-100S2

- Support single-axis motion control functions (such as positioning, speed and backtracking, etc.),
- Support linear/circular interpolation, continuous interpolation and spiral interpolation,
- Support electronic CAM and electronic gear,
- Support probe function, up to 8 EtherCAT slave stations supported, the maximum number of racks is 1,
- Support Trace function,
- Support C language programming,
- Support Profinet intelligent slave function.

CPU H56-10



256KB+2\*64KB program memory,  
1MB data memory,  
32KB data storage power-down,  
24VDC power supply,  
10 channels digital input,  
6\*500KHz high-speed counter,  
1 RS485 port (PPI/ free port),  
1 Ethernet port,1 USB port,  
1 CAN port, and 1 EtherCAT port

CTH3 H56-100S2

- Support single-axis motion control functions (such as positioning, speed and backtracking, etc.),
- Support linear/circular interpolation,
- Support continuous interpolation and spiral interpolation,
- Support electronic CAM and electronic gear,
- Support probe function, up to 64 EtherCAT slave stations supported, the maximum number of racks is 4,
- Support Trace function,
- Support C language programming,
- Support Profinet intelligent slave function.



CPU H36-02/H32-02

• CTH3 H36-002S2/CTH3 H32-002S2

256KB+2\*64KB program memory,1MB data memory,32KB data storage power-down,24VDC power supply,  
2 RS485 port (PPI/ free port),1 Ethernet port,1 USB port,1 CAN port, and 1 Ethernet/EtherCAT port,  
support single axis motion control, interpolation, electronic gear and electronic CAM,  
support Trace function, support C language programming.

**H32-02: the maximum number of racks is 1, up to 8 EtherCAT slave stations supported,**  
**H36-02: the maximum number of racks is 4, up to 64 EtherCAT slave stations supported,**



CPU H36-01/H32-01

• CTH3 H36-001S2/CTH3 H32-001S2

256KB+2\*64KB program memory,1MB data memory,32KB data storage power-down,24VDC power supply,  
1 RS485 port (PPI/ free port),1 Ethernet port,1 USB port,1 CAN port, and 1 EtherCAT port,  
supports single-axis motion control functions (such as positioning, speed and backtracking, etc.),  
linear/circular interpolation, continuous interpolation and spiral interpolation, electronic CAM and  
electronic gear, support probe function, support Trace function, support C language programming.

**H32-01: up to 8 EtherCAT slave stations supported, the maximum number of racks is 1,**  
**H36-01: up to 64 EtherCAT slave stations supported,the maximum number of racks is 4,**



CPU H35-01/H31-01

• CTH3 H35-001S2/CTH3 H31-001S2

192KB+2\*64KB program memory,512KB data memory,16KB data storage power-down,  
24VDC power supply,2 RS485 port (PPI/ free port),1 Ethernet port,1 USB port,  
supports single-axis motion control functions (such as positioning, speed and backtracking, etc.),  
support Trace function, support C language programming.

**H31-01: the maximum number of racks is 1**  
**H35-01: the maximum number of racks is 4**

Technical specifications of CTH300-H series CPU module

Product model		H31-01	H35-01	H32-01	H36-01	H36-02	H52-10	H56-10
Order number		CTH3 H31-001S2	CTH3 H35-001S2	CTH3 H32-001S2	CTH3 H36-001S2	CTH3 H36-002S2	CTH3 H52-100S2	CTH3 H56-100S2
Physical characteristics								
Size (W×H×D)		34×115×101.6mm						
Power loss		19.2W						
Power supply characteristics								
Rated input voltage		24V DC						
Input voltage range		20.4V~28.8V DC						
Input current		0.8A						
Polarity reverse connection protection		YES						
Bus supply voltage		+5V DC						
Bus supply current		1.6A						
LED indicator								
24V power supply (green)		ON: with 24 VDC. OFF: without 24V DC						
Sf (red)		ON: system error. OFF: No error						
Bf (red)		ON: bus fault, Flashing (1Hz)=Profinet communication link disconnected, OFF=no error						
FRCE (yellow)		ON: Some items are forced, Off: No items are forced (Note: It can also be controlled by DLED command)						
RMC (green)		ON: The CPU communicates with the remote server successfully. (DIP switch 3 is set to ON and EtherNET port parameters are correctly configured.) Flashing (1Hz) : The Profinet communication link is successful Flashing (4Hz) : The CPU successfully communicates with the remote server and the Profinet communication link is successful OFF: The CPU fails to communicate with the remote server or disables communication with the remote server .						
RUN (green)		ON: system running. OFF: The system stops running						
STOP (yellow)		ON: The system stops running. OFF: system running						
EtherNET	green	ON: Connected.OFF:Not connected						
	yellow	ON:100Mbps.OFF:10Mbps						
EtherCAT	Link2 (green)	-				ON: Connected.OFF:Not connected		
	SPEED2 (yellow)	-				ON:100Mbps.OFF:10Mbps		
IO indicator	I0.0~I1.1 (green)	-				ON: signal input. OFF: no signal input		
Command performance								
Bit command execution speed		80ns/step						
Float instruction execution speed		1.25μs/step						
Memory								
User program space		192KB+2*64KB(Secret space)		256KB+2*64KB(Secret space)			256KB+2*64KB(Secret space)	
User data space		512KB		1M			1M	
Power -off hold space		16KB		32KB			32KB	
Integrated communication function								
Bus interface		1						
USB interface		1						
EtherNET interface		1	1	1	1	2 <sup>①</sup>	1	1
Rs485 interface		2	2	1	1	2	1	1
EtherCAT interface		0	0	0	0	1	1	1
CANopen interface		0	0	0	0	1	1	1
Topology View		The topology view is supported in CPU independent network port mode, but not in switch mode. (Only switches that support topology can be used, and switches need to be configured in the TIA Portal topology view.)						

Note: ① One of them is an Ethernet/EtherCAT switchable communication port

Technical specifications of CTH300-H series CPU module

Product model	H31-01	H35-01	H32-01	H36-01	H36-02	H52-10	H56-10
Order number	CTH3 H31-001S2	CTH3 H35-001S2	CTH3 H32-001S2	CTH3 H36-001S2	CTH3 H36-002S2	CTH3 H52-100S2	CTH3 H56-100S2
Integrated communication function							
PORT0: Rs485 interface							
Protocol		PPI/MPI, free port protocol (built-in MODBUS-RTU protocol)					
Baud rate	PPI/MPI	9.6Kbps, 19.2Kbps, 187.5Kbps					
	Free port	1.2kbps~115.2kbps, built-in ModBus master/slave function					
Maximum cable length per section		Using isolated relays: 1000m (187.5Kbps), 1200m (38.4Kbps), not using isolated relays: 50m					
Maximum number of sites		32 stations per segment, 126 stations per network					
Point to Point (PPI Master Mode)		Yes (NETR/NETW), each instruction can read/write up to 200 bytes, and 8 read/write instructions are allowed at the same time					
MPI connection		One MPI slave station can connect up to 8 MPI master stations					
Isolation		Communication port isolation					
EtherCAT communication port							
Interface	-		1				
Baud rate	-		100Mbps adaptive				
Protocol type	-		EtherCAT Interface Protocol				
Maximum cable length per section	-		Direct connection within 100m				
Number of slave supported by the master	-		1 master supports 8 EtherCAT slaves	1 master supports 64 EtherCAT slaves		1 master supports 8 EtherCAT slaves	1 master supports 64 EtherCAT slaves
Supported functions	-		Distributed clock setting redundancy				
	-		Startup parameter configuration				
	-		Configure PDO parameters and mappings				
	-		Configure the bus cycle, configure the startup check vendor ID and product ID				
Isolation	-		YES				
EtherNET communication port							
Interface	1 standard Ethernet port				2 EtherNET ports (one of which shares a network port with EtherCAT)	1 standard Ethernet port	
Baud rate	10/100Mbps adaptive						
Protocol type	UDP_PPI protocol, modBus_TCP/IP master/slave protocol, socket , S7 protocol, Ethernet programming and Ethernet communication between						
Cable length	Within 100m						
Number of PLC connections	UDP_PPI supports 8 connections at most Modbus_TCP supports 32 connections at most Socket supports 4 connections, 2 UDP, and 2 TCP The S7 protocol supports up to 8 connections, regardless of master and slave stations						
Size of user data sent at once	Up to 200 bytes for UDP_PPI transmission Up to 240 bytes for ModBus_TCP transmission Up to 512 bytes for socket transmission Up to 200 bytes for S7 transmission						
DHCP function	YES						
emote monitoring/ emote programming	YES						
Isolation	Communication port isolation						
CANopen communication port (H32/H36/H52/H56 integrates a CAN port locally, and H31/H35 needs to be connected to the CAN-1M )							
Interface	CANopen						
Slave station	1 master station can be connected to 32 slave stations at most						
Protocol type	CANopen Ds301 standard protocol						
Supported functions	Support for automatic startup of CANopen Manager, support for optional slave polling, support for starting slave stations, support for NMT, support for synchronous production, support for synchronous consumption, Supports heartbeat generation and activation time creation.						
Transmission rate (kbit/s)	1000	800	500	250	125	50	20
Maximum velocity (m)	25	50	100	250	500	1000	2500
Isolation	Communication port isolation						

Technical specifications of CTH300-H series CPU module

Product model	H31-01	H35-01	H32-01	H36-01	H36-02	H52-10	H56-10
Order number	CTH3 H31-001S2	CTH3 H35-001S2	CTH3 H32-001S2	CTH3 H36-001S2	CTH3 H36-002S2	CTH3 H52-100S2	CTH3 H56-100S2
CPU and USB interface specifications							
Interface form	USB A-type female port						
Programming card medium	USB flash drive (FAT32 format)						
Upload and download	YES						
Recipe function	YES						
Data record archiving function	YES						
Programming software							
Programming software	MagicWorks PLC software						
Programming language	LAD, STL, C language						
Program Organization Unit							
Block type	Maximum number		Maximum block capacity		Maximum space		
OB	Up to 1024 total		64KB		H32/H36/H52/H56:256KB+2*64KB		
FC			64KB				
FB			64KB		H31/H35:192KB+2*64KB		
CF			64KB				
DB	256		64KB		H32/H36/H52/H56:1M, H31/H35:512KB		
Protection function							
Power protection	The power supply terminal provides reverse protection function and surge absorption function						
Interface protection	Communication port lightning protection						
Local expansion I/O							
Number of racks	1 local rack	4	1 local rack	4	4	1 local rack	4
Maximum number of modules	Mainrack: 11 (power module, CPU, intermediate expansion module, 8 signal modules) Slave rack: 10 (power module, intermediate expansion module, 8 signal modules)						
Remote I/O Extension							
Number of CAN expansion master	8						
Number of CAN slaves	Each master can connect up to 32 CAN slaves (277C)						
EtherCAT maximum expansion slaves	-	-	8	64	64	8	64
Motion control function							
Operation control	Single axis operation control function (positioning, speed, and homing, etc.)		Single axis operation control functions (positioning, speed, and return to original position, etc.) that comply with PLCopen standards, linear/circular interpolation functions, continuous and helical interpolation functions, probe functions, electronic cam and electronic gear functions.				
Data area characteristics							
Data Area Type	Data size	Addressing range	Read/Write		Access	Whether to maintain	
Digital input image area (I)	8kbytes	IB0-IB8191	Read/Write		Immediate access/direct access/indirect access	Unable to maintain power down	
Digital output image area (Q))	8kbytes	QB0-QB8191	Read/Write		Immediate access/direct access/indirect access	Unable to maintain power down	
Analog input image area (AI)	1024bytes	AIW0-AIW1022	read		Immediate access/direct access/indirect access	Unable to maintain power down	
Analog output image area (AQ)	1024bytes	AQW0-AQW1022	write		Immediate access/direct access/indirect access	Unable to maintain power down	
Variable memory area (V)	65536bytes	VB0-VB65535	Read/Write		Direct access/indirect access	Configurable to maintain power down	
Special Memory Area (SM)	2048bytes	SMB0-SMB2047	Read :SMB0-SMB29 Read /Write:SMB30-SMB2047		Direct access/indirect access	Unable to maintain power down	
Bit memory area (M)	16kbytes	MB0-MB16383	Read/Write		Direct access/indirect access	Power-off hold	
Local variable area (L)	128bytes	LB0-LB127	Read/Write		Direct access	From startup to shutdown, the same call position of the subroutine is maintained, unable to maintain power down	

Technical specifications of CTH300-H series CPU module

Product model	H31-01	H35-01	H32-01	H36-01	H36-02	H52-10	H56-10
Order number	CTH3 H31-001S2	CTH3 H35-001S2	CTH3 H32-001S2	CTH3 H36-001S2	CTH3 H36-002S2	CTH3 H52-100S2	CTH3 H56-100S2
Data area and retention characteristics							
Data Area Type	size	addressing range	Read/write	Accessing properties		Preserve attributes	
Accumulator register(AC)	Four	AC0-AC3	Read/write	Direct access		Not supported Power-off hold	
Step Register Area (S)	32bytes	SB0-SB31	Read/write	Direct/indirect access		Power-off retention is not hold	
Timer(T)	1ms *36 10ms *752 100ms *1260	T0-T2047	-	The timing register can be accessed directly or indirectly. The status bit is only directly accessible.		The current time value can be maintained after power failure. The status bit cannot be held.	
Counter(C)	2048	C0-C2047	-	Count registers can be accessed directly or indirectly. The status bit is only directly accessible.		The current time value can be maintained after power failure. The status bit cannot be held.	
Data block(DB)	512KB	-	Read/write	Direct/indirect access		32KB power down hold	
Diagnostic function							
Number of diagnostic event buffers		500, covering the oldest after the buffer is full					
Diagnosis Event		500					
Number of power-off holds							
Accuracy of Event Recording		1ms					
Diagnostic interruption		Support					
Diagnostic LED indicator		Support					
Real Time Clock							
Factory Settings		Not set, fixed value Monday, January 1, 90, 00:00:00					
Power-off retention		Power-off retention time is about 112 hours (typical value)				The power failure holding time is about 112 hours (typical value). After the external battery is connected, the power failure holding time is at least one year.	
Accuracy		Monthly deviation <60 seconds					
PLC local interrupt function							
Timer interrupt		4					
Local input interrupt		-				10	
Local high-speed counter interrupt		-				6	
Digital input characteristics							
Number of local integrated Ios		-				10	
Input type		-				Drain/source	
Rated voltage		-				24V DC	
Input voltage		-				20.4~28.8V DC	
Surge voltage		-				35V DC, lasting 0.5s	
Logic 1 signal (minimum)		-				15 VDC, 2.5mA	
Logic 0 signal (maximum)		-				5 VDC, 1mA	
Connect 2-wire proximity switch sensor (BERO)		-				1mA (maximum allowable leakage current)	
Input filtering		-				Configurable, support 0.2us, 0.4us, 0.8us, 1.6us, 3.2us, 6.4us, 12.8us, 0.2ms, 0.4ms, 0.8ms, 1.6ms, 3.2ms, 6.4ms, 12.8ms, the default is 6.4ms	
Isolation (Field and logical)		-				500V AC for 1 minute	
The number of inputs connected simultaneously		-				10	
Maximum cable length		-				500m (standard input)	
Shield		-				50m (high speed counter input)	
Unshield		-				3300 m (standard input)	
Pulse capture input		-				10	
high-speed counter	total	-				6	
	single-phase	-				6×500kHz	
	two-phase	-				4×250kHz	



Signal module characteristics

- There are various types, including digital input, digital output, analog input, analog output, thermal resistance, thermocouple, and other module types.
- IO diversity, with digital module IO covering 8 to 32 and analog module IO covering 4 to 8.
- Strong anti-interference ability, all signal modules adopt photoelectric isolation technology, and signal acquisition is accurate and stable.
- The power supply has reverse protection and surge absorption function, making it suitable for harsh industrial environments.
- Digital output overcurrent and short circuit protection.

Technical specifications of digital input module

Product model		DIT-08	DIT-16	DIT-32
Order number		CTH3 DIT-080S1	CTH3 DIT-160S1	CTH3 DIT-320S1
Dimension(W × H × D)		34×115×100mm		
Number of inputs		8	16	32
Current consumption	24V DC	–	–	–
	+5V bus	60mA	80mA	130mA
Input Type		drain/source type(IEC Class 1 drain type)		
Rated input voltage		24V DC, 6mA		
Input Voltage		20.4~28.8V DC		
surge voltage		35V Dc, continue 0.5s		
Logic 1 (minimum)		15V DC, 2.5mA		
Logic 0 (maximum)		5V DC, 1mA		
Connect 2-wire proximity switch sensor (BERO)		1mA		
Input filtering		Configurable for 0.2ms, 0.4ms, 0.8ms, 1.6ms, 3.2ms, 6.4ms, 12.8ms, with a default of 6.4ms		
Input frequency		1kHz, duty cycle 50%		
Input impedance		6.6kΩ		
Isolate		500V Ac, continue 1min		
Number of isolations per group		8	8	8
Simultaneous ON points		8	16	32
Cable Length		Shielded: 500m, unshielded: 300m		



Technical specifications of digital output module

Product model		DQT-08	DQT-16	DQT-32	DQR-08	DQR-16
Order number		CTH3 DQT-080S1	CTH3 DQT-160S1	CTH3 DQT-320S1	CTH3 DQR-080S1	CTH3 DQR-160S1
Dimension (W × H × D)		34×115×100mm				
Output quantity		8	16	32	8	16
Power loss	24V DC	50mA	95mA	180mA	64mA	130mA
	+5V bus	70mA	120mA	210mA	45mA	60mA
Type of output		Solid state-MOSFET, source type			Relay-dry contact	
Rated input voltage		24V DC			DC:24V, AC:110V/220V	
Input voltage range		20.4~28.8V DC			DC:5~30V, AC:5~250V	
Logic 1 (minimum)		20V DC			-	
Logic 0 (maximum)		0.1V DC, 10K Ω load			-	
Maximum output current		0.5A			2A	
Current at each common terminal		Maximum 4A			Maximum 16A	
Maximum output leakage current		15uA			-	
Surge current		8A, 100ms			5A, 4s@10% duty cycle	
Lamp load		5W			DC:30W /AC:200W	
contact resistance		0.3 Ω, max 0.6 Ω			Max 0.2Ω	
Output delay		Off to On (maximum): 50us, On to Off (maximum): 200us			Max 10ms	
Maximum output frequency		1kHz			Resistive load: 10Hz, lamp load: 1Hz, inductive load: 0.5Hz	
Mechanical life (no load)		-			10,000,000	
Contact life (rated load)		-			100,000	
Isolation	Field to logic	500V Ac for 1min			500V AC for 1min	
	Coil to contact	-			1500V AC for 1 minute	
Number of isolated I/O per group		8	8	8	8	8
Number of I/O simultaneously ON		8	16	32	8	16
Output Protection		-				
Two outputs in parallel		Supports two outputs in the same group in parallel				
Cable Length	shield	500m				
	unshield	150m				

Technical specifications of analog input module

Product model		AIS-04	AIV-08	AIC-08
Order number		CTH3 AIS-040S1	CTH3 AIV-080S1	CTH3 AIC-080S1
Physical characteristics				
Dimension(W × H × D)		34×115×100mm		
Power supply characteristics				
Rated input voltage		24V DC		
Input voltage range		20.4V~28.8V DC		
Input current		65mA	50mA	
Reverse polarity protection		YES		
Bus power supply Voltage		+5V DC		
Bus power supply current		50mA	30mA	
LED indicator characteristics				
24V power indicator		ON: The 24VDC power supply is normal. OFF: No 24VDC power supply		
SF indicator		ON: Module fault, OFF: No error, Flashing: Channel disconnection or out of range (only for 4-20mA)		
Input characteristics				
Input type		Voltage or current (differential input)	voltage	Current
Number of inputs		4	8	
input range	Voltage	Unipolarity: 0-5V, 0-10V, bipolar: ± 2.5V, ± 5V		
	Current	0~20mA, 4~20mA		
Maximum input voltage		30V DC		
Maximum input current		40mA		
Input resistance	Voltage	≥2MΩ	≥2MΩ	
	Current	250Ω	250Ω	
Data Format		Voltage: 0~+32000 (unipolar), -32000~+32000 (bipolar), current: 0~+32000		
Input step response		4 channels 5ms (fastest)	8 channels 50ms (fastest)	
Module update frequency (all channels)		The 4 channels can be configured at 200Hz, 100Hz, 50Hz, 20Hz, 10Hz, and 50Hz by default	8-channel support for 50Hz, 20Hz, 10Hz, 5Hz, 2Hz configurations Default: 10Hz for all channels (50Hz only meets 4 channels)	
Common mode		>40dB		
Channel crosstalk		>60dB		
Common mode voltage		-12V≤ Signal voltage + common-mode voltage ≤+12V		
Resolution		Unipolar: 12bit, bipolar: 11bit+ sign bit	Unipolar: 16bit, bipolar: 15bit+ sign bit	
Principle of measurement		Successive approximation	Sigma-delta (Σ—Δ)	
Measurement error		0.5% (max)	0.1% (max)	
Wire breakage detection (only for 4-20mA)		Line breaking calibration: -32768, 32767 two values are optional		
Isolation	Field to logic	500V AC		
	24VDC to logic	500V AC		
Diagnosis	Over negative range	Unipolar: 0, bipolar: -32768	Unipolar: 0, bipolar: -32768	
	Over positive range	Unipolar: 32760, bipolar: 32752	Unipolar: 32767, bipolar: 32767	
	No power supply	32736	32766	

Technical specifications of Analog Output Module

Product model		AQS-04		AQS-08	
Order number		CTH3 AQS-040S1		CTH3 AQS-080S1	
Physical characteristics					
Dimension (W × H × D)		34×115×100mm			
Power supply characteristics					
Rated input voltage		24V DC			
Input voltage range		20.4V~28.8V DC			
Input current		110mA		200mA	
Polarity reversal protection		YES			
Bus power supply voltage		+5V DC			
Bus power supply current		40mA		40mA	
LED indicator characteristics					
24V indicator		ON: The 24VDC power supply is normal. OFF: No 24VDC power supply			
SF indicator		ON: The module is faulty. OFF: The module is correct.			
Output characteristic					
Output type		Voltage or current			
Number of output		4		8	
Output range	Voltage	±10V			
	Current	0~20mA, 4~20mA			
Protect	Output misconnection voltage	Max. 30V DC			
	Voltage short circuit protection	YES			
Data format	Voltage	At full scale, -32000~+32000			
	Current	0~+32000			
Establish time	Voltage output	100us			
	Current output	2ms			
Load impedance	Voltage output	5000Ω (minimum)			
	Current output	500Ω (Max)			
Resolution		Unipolar: 12bit, bipolar: 11bit+ sign bit			
Accuracy	Voltage	Typical values: ±0.5% of full scale, worst case: ±2% of full scale			
	Current	Typical values: ±0.6% of full scale, worst case: ±2% of full scale			
Isolation	Power isolation	500V AC			
	Field to logic	500V AC			

Analog input/output module technical specifications

Product model		AMS-06
Order number		CTH3 AMS-060S1
Physical characteristics		
Dimension (W × H × D)		34×115×100mm
Power supply characteristics		
Rated input voltage		24V DC
Input voltage range		20.4V~28.8V DC
Input current		110mA
Polarity reversal protection		YES
Bus supply voltage		+5V DC
Bus supply current		50mA
LED indicator characteristics		
24V indicator		ON: The 24VDC power supply is normal. OFF: No 24VDC power supply
SF indicator		ON: The module is faulty. OFF: no error. Flashing: The channel is disconnected or out of range (for 4-20mA only).
Input characteristic		
Input type		Voltage or current (differential input)
Number input		4
Input range	Voltage	Unipolar: 0~5V, 0~10V, bipolar: ±2.5V, ±5V
	Current	0~20mA, 4~20mA
Maximum input voltage		30V DC
Maximum input current		40mA
Input resistance	Voltage	≥2MΩ
	Current	250Ω
Data Format	Voltage	0~+32000 (unipolar), -32000~+32000 (bipolar)
	Current	0~+32000
Input step response		4 channels 5ms (fastest)
Module update frequency (all channels)		The four channels can be configured at 200Hz, 100Hz, 50Hz, 20Hz, 10Hz, and 50Hz by default
Common mode		>40dB
Channel crosstalk		>60dB
Common mode voltage		-12V≤ Signal voltage + common-mode voltage ≤+12V
Resolution		Unipolar: 12bit, bipolar: 11bit+ sign bit
Principle of measurement		Successive approximation
Measurement error		0.5% (Max))
Wire breakage detection (only for 4-20mA)		Broken wire calibration: -3276832767, two values optional
Isolation	Field to logic	500V AC
	24VDC to logic	500V AC
Diagnosis	Over negative range	Unipolar: 0, bipolar: -32768
	Over positive range	Unipolar: 32760, bipolar: 32752
	No power supply	32736

Technical specifications of thermal resistance module

Product model		AIR-04	AIR-08
Order number		CTH3 AIR-040S1	CTH3 AIR-080S1
Power characteristics			
Bus Power Voltage		+5V DC	
Bus Power Current		50mA	50mA
LED Indicator			
24V power indicator		ON: 24VDC power supply is normal, OFF: no 24VDC power supply	
SF Indicator		ON: The module is faulty. OFF: The module is correct. Flashing: A channel is disconnected or out of range	
Input characteristic			
Input type		Module Reference Grounding Thermal Resistance	
Number of inputs		4	8
Connection mode		Supports 2-wire, 3-wire (default), 4-wire	
Input range		Thermal resistance type (choose one): Pt-100Ω, 200Ω, 500Ω, 1000Ω (α=3850ppm, 3920ppm, 3850.55ppm, 3916ppm, 3902ppm) Pt-10000Ω (α=3850ppm) , Cu-9.035Ω (α=4720ppm) , Ni-100Ω, 120Ω, 1000Ω (α=6720ppm, 6178ppm) R-150Ω, 300Ω, 600ΩFS, default :Pt-100Ω (α=3850ppm)	
Isolate	Field to logic	500V AC	
	Field to24VDC	500V AC	
	24VDC to field	500V AC	
Common-mode rejection		> 100dB@120VAC	
Input resolution		TEMP : 0.1°C/0.1°F Voltage: - Resistance: 15 bits+symbol bits	
Measuring principle		Sigma-Delta	
Module update frequency (all channels)		4 channels support configurations of 8Hz, 4Hz, 2Hz, and 1Hz, with a default of 2Hz for all channels. 8 channels support configurations of 4Hz, 2Hz, 1Hz, and 0.5Hz, with a default of 1Hz for all channels.	
Length of wire to sensor		Up to 100m	
Wire loop resistance		20Ω, Cu type 2.7Ωv	
Noise suppression		85dB@50Hz/60Hz/400Hz	
Data word format		Resistance: -27648~+27648	
Input impedance		> 10MΩ	
Maximum input voltage		The input terminal can support misconnection with a maximum voltage of 30V DC	
resolution ratio		15 bits+sign bits	
Input filtering attenuation		-3dB@3.6kHz	
Basic error		0.1%Fs(resistance)	
repetitiveness		0.05%Fs	
Cold junction compensation/ cold junction error		-	
Temperature unit		°C/°F, Configurable, default °C	
Wire breakage detection		With wire breakage detection	
		Supports calibration in both positive and negative directions, with default forward calibration	
Diagnose	Breaking	32767 (positive calibration), -32768 (negative calibration)	
	No power module	32766	

High speed counting module



CTH3 HSC-020S1

- Support two 5V DC differential inputs or 24V DC single-ended encoder signal input
- Input frequency up to 2MHz, 32-bit counter
- Count clear and count capture

High speed counting module technical specification

Product model		HSC-02
Order number		CTH3 HSC-020S1
Physical characteristics		
Dimension (W × H × D)		34×115×100mm
Power loss		
Bus supply voltage		+5V DC
Bus supply current		100mA
LED indicator characteristics		
Signal indicator		ON: with input signal   OFF: without input signal
Sensor Connection		
Number of input channels		2
Signal type	Differential input	Signal voltage: 5VDC Maximum input frequency: 2MHz
	Single-ended input	Signal voltage: 24VDC Maximum input frequency: 500KHz Permissible range of signal duty cycle: 40%-60%
Maximum protection voltage for signal input		30V DC
Input filtering		Configurable, 125 kHz / 250 kHz / 500 kHz / 1 MHz / 2 MHz
Orthogonal frequency doubling		1, 2, 4 times frequency
Counter format		32-bit
Counter reset		YES, signal Z
Counter Capture		YES, signal Z
Multi-counter synchronous counting function		YES, signal INT
INT Signal Voltage		24V DC
INT signal input frequency		500kHz
INT signal input filter		Configurable, 125kHz/250kHz/500kHz
Photoelectric isolation		500V AC, 1min



Analog input/output module technical specifications

Product model		AMS-06
Order number		CTH3 AMS-060S1
Output characteristic		
Type of output		Voltage or current
Number of outputs		2
Output range	Voltage	±10V
	Current	0~20mA, 4~20mA
Protect	Output Misconnected Voltage	Maximum 30V DC
	Voltage short circuit protection	YES
Data format	Voltage	At full scale, -32000~+32000
	Current	0~+32000
Establishment time	Voltage output	100us
	Current output	2ms
Load impedance	Voltage output	5000Ω(minimum)
	Current output	500Ω (Max)
Resolution ratio		Unipolar: 12bits, bipolar: 11bits+ sign bits
Accuracy	Voltage	Typical value: ±0.5% of full scale, worst case: ±2% of full scale
	Current	Typical value: ±0.6% of full scale, worst case: ±2% of full scale
Isolation	Power isolation	500V AC
	Field to logic	500V AC

Technical specifications for thermocouple modules

Product model	AIT-04		AIT-08
Order number	CTH3 AIT-040S1		CTH3 AIT-080S1
Physical characteristics			
Dimension (W × H × D)	34×115×100 mm		
Power supply characteristics			
Rated input voltage	24V DC		
Input voltage range	20.4V~28.8V DC		
Input current	50mA		
Polarity reverse connection protection	YES		
Bus supply voltage	+5V DC		
Bus supply current	50mA		
LED indicator characteristics			
24V power indicator	ON: The 24VDC power supply is normal. OFF: No 24VDC power supply		
SF indicator	ON: The module is faulty. OFF: The module is correct. Flashking: A channel is disconnected or out of range		
Input characteristic			
Type of input	Suspension type thermocouple		
Number of inputs	4	8	
Connection mode	-		
Input range	Thermocouple type (choose one): S, T, R, E, N, K (default), J, voltage range: ± 80mV		

Technical specifications for thermocouple modules

Product model		AIT-04	AIT-08
Order number		CTH3 AIT-040S1	CTH3 AIT-080S1
Input characteristic			
Temperature unit		C / °F can be configured. The default is ° C	
Wire breakage detection		Configurable, with default wire breakage detection	
		Supports calibration in both positive and negative directions, with default forward calibration	
Diagnosis	Disconnection	32767 (forward calibration), -32768 (negative calibration)	
	No module power supply	32766	
Whether the PID control function is integrated		无	
Isolation	Field to logic	500VAC	
	Field to 24VDC	500VAC	
	24VDC to Field	500VAC	
Common-mode suppression		> 100dB@120VAC	
Input resolution	temperature	0.1°C/0.1°F	
	voltage	15bits+sign bit	
	resistance	-	
measuring principle		Sigma-Delta	
Module update frequency		4 channels support 8Hz, 4Hz, 2Hz, and 1Hz. Default: 2Hz for all channels	
(all channels)		8-channel support for 4Hz, 2Hz, 1Hz, 0.5Hz. Default: 1Hz for all channels	
Wire length to sensor		Maximum 100m	
Wire circuit resistance		100Ω	
Noise suppression		85dB@50Hz/60Hz/400Hz	
Data word format		Voltage: -27648~+27648	
Input impedance		>10MΩ	
Maximum input voltage		The input terminal can support misconnection with a maximum voltage of 30V DC	
resolution		15 bits+sign bits	
Input filter attenuation		-3dB@21KHz	
Basic error		0.1% Fs (voltage)	
Repeatability		0.05%Fs	
Cold Junction Compensation		Configurable, default with cold junction compensation	
Cold Junction error		±1.5°C	

Technical specifications of thermal resistance module

Product model	AIR-04	AIR-08
Order number	CTH3 AIR-040S1	CTH3 AIR-080S1
Physical characteristics		
Dimension (W × H × D)	34×115×100 mm	
Power supply characteristics		
Rated input voltage	24V DC	
Input voltage range	20.4V~28.8V DC	
Input current	60mA	80mA
Reverse polarity protection	YES	

Pulse output module



CTH3 HSP-040S1

- Pulse output module, supporting 4-channel 4MHz differential output or single ended 500kHz

Technical specifications of pulse output module

Product model	HSP-04	
Order number	CTH3 HSP-040S1	
Physical characteristics		
Dimension (W × H × D)	34×115×100mm	
Power supply characteristics		
Rated input voltage	24V DC	
Input voltage range	20.4-28.8VDC	
Input current	100mA	
Polarity reversal protection	YES	
Bus power supply voltage	+5V DC	
Bus power supply current	100mA	
LED indicator characteristics		
Signal indicator	ON: with output signal, OFF: without output signal	
Output characteristic		
Number of output channels	4	
Output type	Differential signal	Single ended (NPN) signal
Maximum output frequency	4MHz	500kHz
Output signal duty Ratio	–	50%
Rated output voltage	5VDC	5~24VDC
Output voltage range	0-5.5VDC	5-28.8VDC
Output signal logic "0"	3.8V(minimum)	0.5V (maximum)
Output signal logic "1"	0.3V (maximum)	Vcc-0.5V (minimum)
Surge current	8A, Lasting for 100ms	
Maximum current per point	20mA	20mA
Maximum current at each common end	无	160mA
Maximum leakage current	10μA	
Isolation	500V AC, 1min	

CAN communication module



Characteristics of CAN communication module

- CANopen DS301 standard protocol, connect 277C interface module, E10/H1A/H2A series servo drivers and third party CANopen slave equipment.
- Most of the 200 series extension modules can be connected through the 277C module to achieve distributed control.
- The maximum communication speed of CAN master module is 1Mbps, and the maximum communication distance is 2.5KM.
- CANopen configuration function can be completed by simple drag action, easy to use.

CTH3 CAN-1M0S1

- CAN master station communication module (suitable for CTH300-H series CPU)

CAN communication module technical specifications

Product model	CAN-1M						
Order number	CTH3 CAN-1M0S1						
Physical characteristics							
Dimension (W × H × D)	34×115×101.6mm						
Power supply characteristics							
Rated input voltage	24V DC						
Input voltage range	20.4V~28.8V DC						
Input current	100mA						
Polarity reverse connection protection	YES						
Bus supply voltage	+5V DC						
Bus supply current	100mA						
LED indicator characteristics							
24V power indicator	On: with 24VDC power supply Off: without 24VDC power supply						
SF indicator	On: The module is faulty. Off: The module is correct						
BF	On: There is a diagnosis from the slave Off: there is no diagnosis						
DX	On: The configuration data is incorrect. Off: the configuration data is correct						
Applicability							
Applicable controller	CAN-1M applies to CTH300-H series CPUs						
CANopen communication							
Communication interface	CANopen						
Number of master	8						
Number of slave	32						
Transmission rate (kbit/s)	1000	800	500	250	125	50	20
Maximum length (m)	25	50	100	250	500	1000	2500
Support function	Supports automatic CANopen Manager startup, optional slave polling, slave startup, NMT, synchronous production, synchronous consumption, heartbeat generation, and activation time creation.						
Isolation	Communication port isolation						

EtherCAT Slave Module



CTH3 ECT-000S1

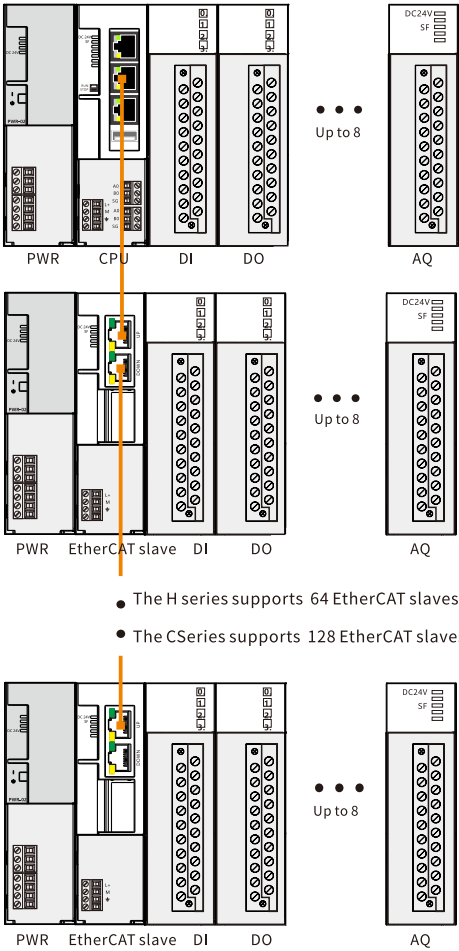
- The H32/H52 can connect to 8 EtherCAT slave modules.
- The H36/H56 can connect to 64 EtherCAT slave modules.
- The CTH300-C series CPU can connect to 128 EtherCAT slave modules.
- The bus communicates at a rate of 100Mbps and the distance between the slave stations is up to 100M.
- Supported third-party EtherCAT master.
- EtherCAT slave module, extensible up to 8 IO modules.

EtherCAT Slave Module

Product model	ECT-00
Order number	CTH3 ECT-000S1
Physical characteristics	
Dimension (W × H × D)	34×115×100mm
Power characteristics	
Rated input voltage	24V DC
Input voltage range	20.4~28.8VDC
Input Current	0.8A
Reverse polarity protection	YES
Bus power supply voltage	+5V DC
Bus power current	1.6A
LED indicator	
24V (green)	ON: with 24V DC
	OFF: without 24 VDC
SF (red)	ON: The extended IO bus is faulty or the EtherCAT module is faulty, the hardware configuration is inconsistent
	OFF: No error
BF (red)	ON : The EtherCAT bus communication is faulty
	OFF: No error
LINK (green) (Slave status indicator)	Off = Not connected, initialized
	Flashing = Pre-operation, safe operation
	ON = Operation state
Rj45 (green)	ON: Connect with other EtherCAT interface
	OFF: No connection with other EtherCAT interfaces
	Flashing: communicating with other EtherCAT interfaces

Product model	ECT-00
Extended I/O	
The maximum number of modules supported by a slave	Allows to expand 8 I/O modules, supports expanded digital quantity module, analog quantity module, temperature module, HSC module, HSP module, does not support expanded CAN module.
Protocol type	CTH300 PLC Custom 55MHz Bus Protocol
EtherCAT interface	
Communication interface	1 double RJ45 port
Baud rate	100Mbps
Protocol type	CANopen over EtherCAT (CoE)
	Supports the PDO service
	Support for SDO services
	Supports the EtherCAT state machine command
Longest communication distance between slave stations	Support for third-party EtherCAT master
	100m
Isolation	Communication port isolation
Applicability	
Type of the file to be imported	EtherCAT's XML file
MagicWorks PLC configuration	Suitable for CTH300-H series H32/H52/H36/H56, automatic allocation mapping address, digital quantity I/Q addressing, analog quantity AI/AQ addressing, users can modify them
Codesys or other third party configuration	Suitable for CTH300-C series CPU or third-party EtherCAT master station

EtherCAT Slave System Architecture





PROFINET slave module



CTH3 PNT-000S1

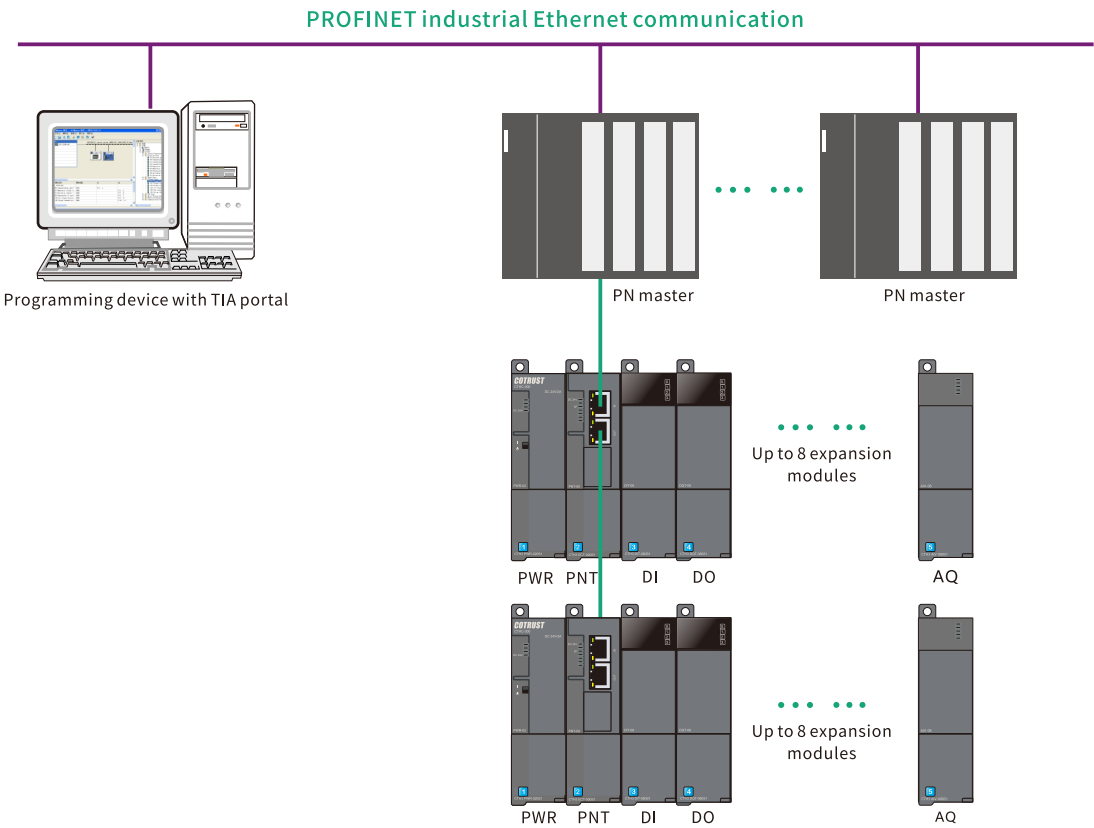
- PROFINET bus 100 M b p s rate communication, communication distance from station to station up to 100 meters (100 Base-TX).
- The topology supports star, tree, linear, and ring structures.
- Each slave station allows expansion of 8 I/O modules (digital module, analog module, Temperature module, HSC module, HSP module .
- Support Siemens PROFINET master , including Siemens S7-200 SMART, Siemens S7-300, Siemens S7-400, Siemens S7-1200, Siemens S7-1500.
- Configuration software TIA Portal V13 and later.
- PROFINET slave station module, CAN be extended up to 8 IO modules (excluding CAN module, EtherCAT slave station module).

Technical specifications of PROFINET slave station module

Product model	PNT-00
Order number	CTH3 PNT-000S1
Physical characteristics	
Dimension (W × H × D)	34×115×100mm
Power	
Rated input voltage	24V DC
Input voltage range	20.4-28.8VDC
Input current	0.8A
Bus supply voltage	+5V DC
Bus supply current	1.6A
Isolation	External power supplies are isolated from system power supplies
Power supply protection	The power supply provides reverse connection protection and surge absorption functions
LED Indicator	
24V power (green)	ON : 24VDC power supply is normal.
	OFF: no 24VDC power supply
SF (red)	ON: Expansion I/O bus fault or PROFINET module fault
	OFF: No error
BF (red)	ON: PROFINET bus communication failure (switch not connected, network not detected)
	Flashing: Inconsistent hardware configuration
	OFF: No error
MT indicator (yellow) (maintenance indicator)	Reserve
RJ45 port (green)	ON: There is a connection to the switch/PN master station
	OFF: No connection to the switch/PN master
RJ45 port (yellow)	ON: there is data transmission to the switch/PN master station
	OFF: No data transmission to the switch/PN master station

Product model		PNT-00
Expand I/O capabilities		
The number of modules connected to a slave station		Supports up to 8 modules (digital, analog and temperature modules can be added, HSC, HSP modules, not including other types of modules)
Protocol type		CTH300 PLC Custom 55MHZ bus protocol
Topological structure		Support star, tree, linear, ring
PROFINET communication port		
Communication port		2 RJ45 port
Data transfer rate		Ethernet transmission rate is 10Mbps
		PROFINET transmission rate is 100Mbps, full duplex
Ethernet service		ping, arp, Network Diagnostics (SNMP)/MIB-2, LLDP
Send cycle - real-time	RT	The minimum period is 1ms
	IRT	The minimum period is 250μs
Third party PROFINET master		YES
Maximum distance between slave stations		100m(100BASE-TX)
Topological structure		Supports star, tree, linear, ring topology
Isolation		Communication port isolation
Hardware configuration function		
Import file type		PROFINET GDS file XML format
Third party PN master		After the CTH3 PTN-000S1 module is added, eight slots can be expanded.
		Expansion module includes digital, analog and temperature module, HSC, HSP module.

Industrial Ethernet communication



Power module



CTH3 PWR-020S1

- The PWR module provides 24V power supply for units such as CPU, signal module, functional module, and communication module.
- The power input 110/220VAC is adaptive and suitable for power supply networks in different countries around the world.
- Excellent startup and buffering capabilities enhance system stability.
- Excellent overvoltage resistance and output overvoltage protection performance.
- Power module, 220VAC to 24VDC, 2A.

Technical specifications of the power module

Product model	PWR-02
Order number	CTH3 PWR-020S1
Physical characteristics	
Dimension (W × H × D)	34×115×101.6mm
Power loss	10W
LED indicator	
24V Power(green)	ON: with 24V DC output. OFF: without 24V DC output
Switching	
24V DC power control switch	ON: with 24V DC output. OFF: without 24V DC output
Input voltage	
Voltage range	85 ~ 264VAC, wide voltage input
Rated frequency	50Hz/60Hz
Frequency Range	47Hz~63Hz
Alternating current	0.9A/110V、0.5A/220V
Surge current (25°C max)	≤20A/110V、≤35A/220V
leakage current	≤5mA/220VAC
Output voltage	
DC voltage / rated current	24VDC/2A
Rated power	48W
Ripple and noise (maximum)	150mVp-p
Voltage output range	±5%
Start / rise / hold time	≤2.5s/≤50ms/≥20ms
Isolation (power input and output)	Isolation between 110V / 220V AC and 24V DC
Protection function	
Overload protection	105%~130% of the rated output power, cut off the output, and automatically recover after troubleshooting.
Overvoltage protection	115%~135%Ue. Protection mode: hiccup mode, automatic recovery after troubleshooting.
Surge protection, overcurrent protection	The power supply terminal provides surge absorption and the power output terminal provides overcurrent protection

Technical specifications of the Intermediate expansion module

Product model	PWR-02
Safety electromagnetic compatibility	
Withstand voltage	Input - output: 1.5kVdc, input - PE: 1.5kV DC, output-PE: 500V DC
Isolation resistance	Input - output, input-PE, output-PE: 100MΩ / 500V DC
Standard basis	Refer to UL60950 and UL1950 for safety and EN55022 for electromagnetic compatibility.

Intermediate expansion module



CTH3 INT-000S1

- High-speed backplane bus, effectively ensure the communication between master and slave rack.
- Advanced hardware design, simple selection

Technical specifications of the power module

Product model	INT-00
Order number	CTH3 INT-000S1
Physical characteristics	
Dimension (W × H × D)	34×115×101.6 mm
Power characteristics	
Rated input voltage	24V DC
Input voltage range	20.4V~28.8V DC
Input Current	0.8A
Reverse polarity protection	YES
Bus power supply voltage	+5V DC
Bus power current	1.6A
LED indicator	
24V Power	ON: with 24VDC. OFF: without 24VDC
SF	ON: The module is faulty. OFF: No error
Extended characteristic	
Number of expansion slots	4
Number of modules per slot	8
Communication bus	High speed bus
The length of the bus cable	Max 3m

# Install

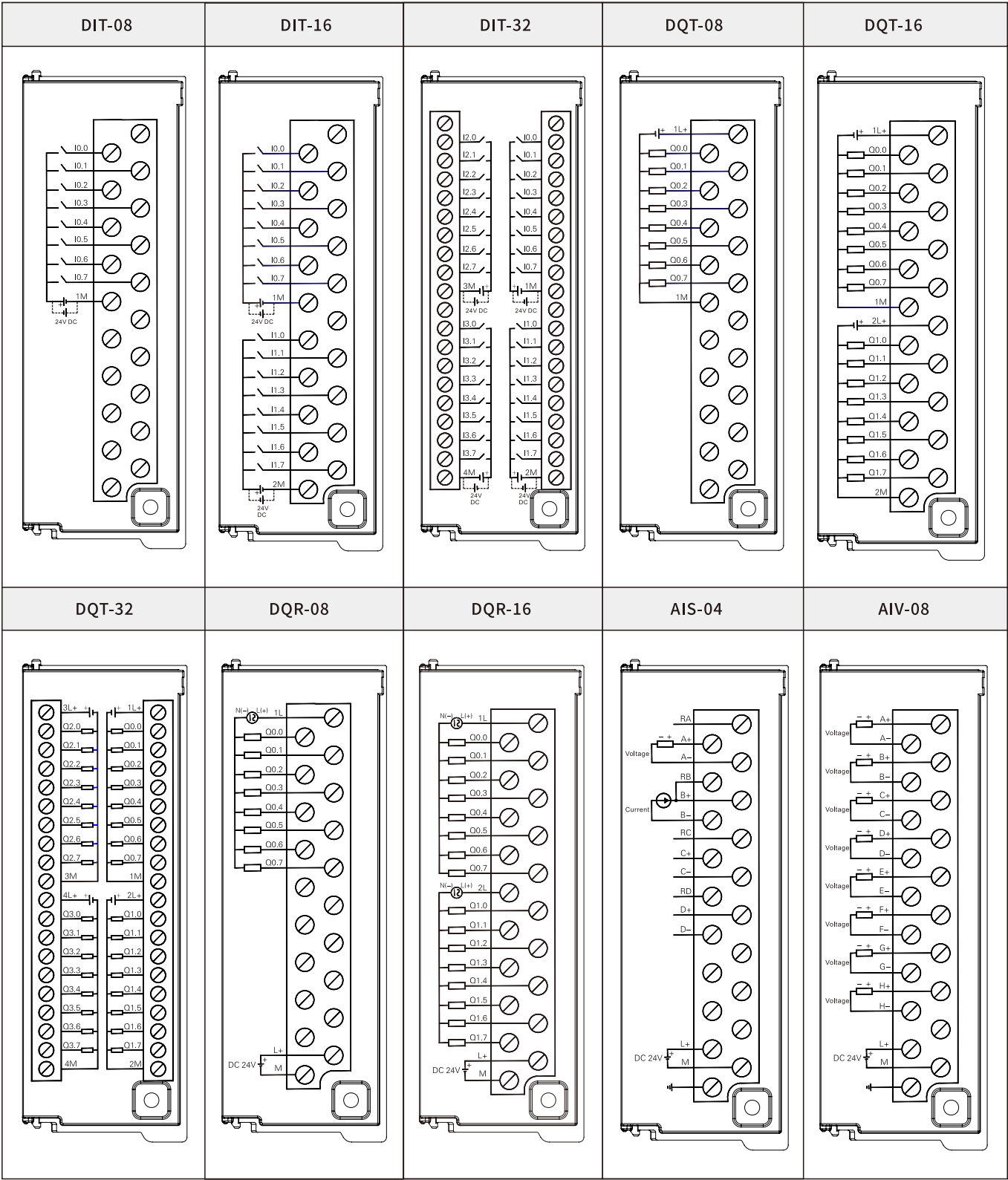
Dimension

Model	Dimensional drawing (unit: mm)
H31-01 CAN-1M H32-01 H35-01 ECT-00 H36-01 H36-02 PWR-02 H52-10 H56-10 INT-00 PNT-00  C35-02 C36-02 C37-02 C56-10 C57-10	<p>Front view</p> <p>Side view</p>

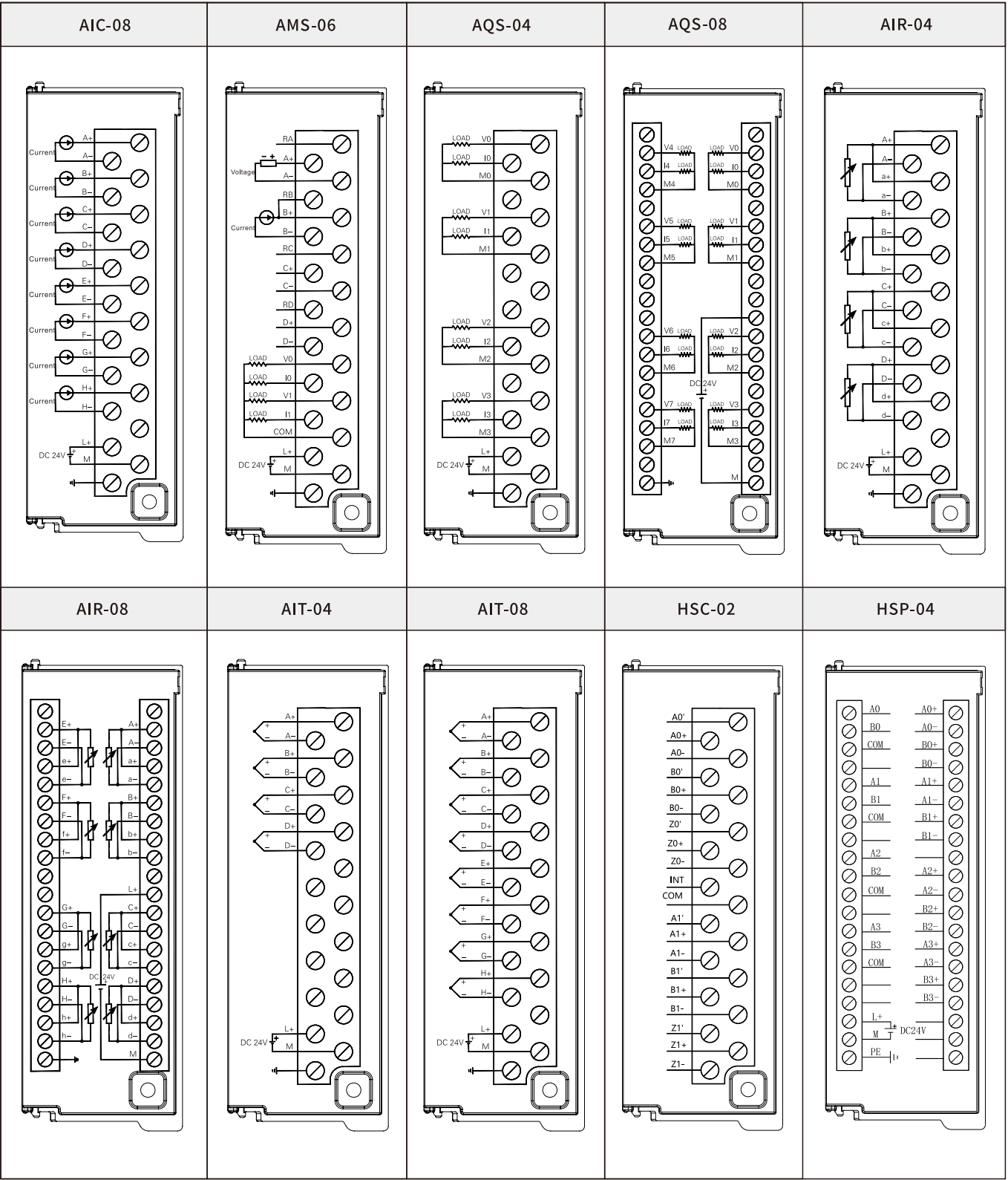
Model	Dimensional drawing (unit: mm)
DIT-08 AIS-04 DIT-16 AIC-08 DIT-32 AIV-08 DQT-08 AQS-04 DQT-16 AQS-08 DQT-32 AMS-06 DQR-08 DQR-16 AIT-04 AIT-08 HSC-02 AIR-04 HSP-04 AIR-08	<p>Front view</p> <p>Side view</p>



Wiring diagram



Wiring diagram



# Appendix

## Power & bus consumption calculation

Confirmation method of current consumption  
After selecting the CPU, power supply module, INT-00 module, and expansion module for each rack, it is also necessary to confirm whether the current consumption and power consumption of the system bus meet the following conditions:

Condition 1: Bus current consumption confirmation  
The internal bus voltage is 5V DC, and the current is provided by the CPU (when there is no relay module) or the relay module. The sum of bus current consumption of expansion modules in each rack cannot exceed the CPU or relay moduleMaximum allowable bus current.

Condition 2: Power consumption confirmation  
When using a power module, the sum of the power consumption of other modules in each rack cannot exceed the maximum power consumption allowed by the power module.When using an external power supply, select the model with the appropriate power size based on the sum of the connected powers.

5V DC bus current supply and consumption		
Model	Supply current	Consumption current
PNT-00	1600mA	–
ECT-00	1600mA	–
H31-01/H32-01/H35-01/ H36-01/H36-02/H52-10/ H56-10	1600mA	–
C35-02/C36-02/C37-02/ C56-10/C57-10	1600mA	–
INT-00	1600mA	–
DIT-08	–	60mA
DIT-16	–	80mA
DIT-32	–	130mA
DQT-08	–	70mA
DQT-16	–	120mA
DQT-32	–	210mA
DQR-08	–	45mA
DQR-16	–	60mA
AIS-04	–	50mA
AIC-08	–	30mA
AIV-08	–	30mA
AQS-04	–	40mA
AQS-08	–	40mA
AMS-06	–	50mA
AIT-04	–	50mA
AIT-08	–	50mA
AIR-04	–	50mA
AIR-08	–	50mA
HSC-02	–	100mA
HSP-04	–	100mA
CAN-1M	–	100mA

24V DC bus current supply and consumption		
Model	Supply current	Consumption current
PNT-00	–	110~800mA ❶
ECT-00	–	110~800mA ❶
PWR-02	2000mA	–
H31-01/H32-01/H35-01/ H36-01/H36-02/H52-10/ H56-10	–	110~800mA ❶
C35-02/C36-02/C37-02/ C56-10/C57-10	–	110~800mA ❷
INT-00	–	60~750mA ❸
DIT-08	–	–
DIT-16	–	–
DIT-32	–	–
DQT-08	–	50mA
DQT-16	–	95mA
DQT-32	–	180mA
DQR-08	–	64mA
DQR-16	–	130mA
AIS-04	–	65mA
AIC-08	–	50mA
AIV-08	–	50mA
AQS-04	–	110mA
AQS-08	–	200mA
AMS-06	–	110mA
AIT-04	–	50mA
AIT-08	–	50mA
AIR-04	–	60mA
AIR-08	–	80mA
HSC-02	–	–
HSP-04	–	100mA
CAN-1M	–	100mA

Remark➡

- ❶ The local 24V DC power consumption of H31-01/H32-01/H35-01/H36-01/H36-02/H52-10/H56-10/PNT-00/ECT-00 is approximately 110mA, and the 24V DC power consumption does not exceed 800mA when the 5VDC bus current is 1600mA.
- ❷ The local 24VDC power consumption of C35-02/C36-02/C37-02/C56-10/C57-10 is approximately 110mA, and the 24VDC power consumption does not exceed 800mA when the 5VDC bus current is 1600mA.
- ❸ The 24VDC power consumption of INT-00 module is about 60mA. When the 5VDC bus current is 1600mA, the 24VDC power consumption of Int-00 module is not more than 750mA. If the CPU and INT modules coexist on the host and the 5VDC bus current does not exceed 1600mA, the 24VDC power consumption of the CPU is calculated as the local power consumption.

Ordering Information

Name	Specification parameter	Order number
CTH300-H CPU		
H31-01	Basic, 192KB+2*64KB program space, 512KB data space, 16KB power-off hold data block space, 24V DC power supply, 2 Rs485 ports (PPI/free port switchable), 1 Ethernet port, 1 USB port, support single axis motion control (such as positioning, speed and homing), 1 rack, non-expandable rack, support trace function, support C language programming.	CTH3 H31-001S2
H35-01	Basic, 192KB+2*64KB program space, 512KB data space, 16KB power-off hold data block space, 24V DC power supply, 2 RS485 ports (PPI/free port switchable), 1 Ethernet port, 1 USB port, support single axis motion control functions (such as positioning, speed and homing), maximum number of racks 4 (including native), support Trace function, support C language programming.	CTH3 H35-001S2
H32-01	Standard motion control, 256KB+2*64KB program space, 1MB data space, 32KB power-off hold data block space, 24V DC power supply, 1 RS485 port (PPI/free port switchable), 1 Ethernet port, 1 USB port, 1 CAN port, 1 EtherCAT port, support single axis motion control functions (such as positioning, speed and homing), support linear interpolation and circular interpolation function, support continuous interpolation and helical interpolation function, supports functions such as electronic cam and electronic gear, supports probe, supports 8 EtherCAT slaves at most, 1 rack, non-expandable rack, supports Trace, supports C language programming.	CTH3 H32-001S2
H36-01	Standard motion control, 256KB+2*64KB program space, 1MB data space, 32KB power-off hold data block space, 24V DC power supply, 1 RS485 port (PPI/ free port switchable), 1 Ethernet port, 1 USB port, 1 CAN port, 1 EtherCAT port, support single-axis motion control functions (such as positioning, speed and homing, etc.), support linear interpolation and circular interpolation function, support continuous interpolation and helical interpolation function, support electronic CAM and electronic gear and other functions, support probe, support 64 EtherCAT slave stations at most, maximum number of racks 4 (including the machine), support trace function, support C language programming.	CTH3 H36-001S2
H36-02	Standard motion control, 256KB+2*64KB program space, 1MB data space, 32KB power-off hold data space, 24VDC power supply,2 RS485 ports (PPI/ Free port Protocol), 1 EtherNET port, 1 EtherNET/EtherCAT switchable port, 1 CAN port, 1 USB port, support PLCopen single-axis motion control/interpolation/electronic CAM and electronic gear, the maximum number of racks is 4 (including local racks), support 64 EtherCAT slave stations at most, support trace function, support C language programming.	CTH3 H36-002S2
H52-10	Enhanced motion control, 256KB+2*64KB program space, 1MB data space, 32KB power-off hold data block space, 24V DC power supply, 10 channels digital inputs, 6*500kHz high-speed counters, 1 RS485 port (PPI/ free port switchable), 1 Ethernet port, 1 USB port, 1 CAN port, 1 EtherCAT port, supporting single-axis motion control functions (such as positioning, speed and homing, etc.), supporting linear/circular interpolation functions, supporting continuous and helical interpolation functions, supporting electronic CAM and electronic gear functions, supporting probe, supporting 8 EtherCAT slave stations at most, 1 rack, non-expandable rack, etc. Support trace function, support C language programming.	CTH3 H52-100S2
H56-10	Enhanced motion control, 256KB+2*64KB program space, 1MB data space, 32KB power-off hold data block space, 24V DC power supply, 10 channels digital input, 6*500kHz high-speed counters, 1 RS485 port(PPI/ free port switchable), 1 Ethernet port, 1 USB port, 1 CAN port and 1 EtherCAT port, supporting single-axi motion control functions (such as positioning, speed and homing, etc.), supporting linear/circular interpolation functions, supporting continuous interpolation and helical interpolation functions, supporting electronic CAM and electronic gear and other functions, supporting probe, supporting 64 EtherCAT slave stations at most, and maximum number of 4 racks (including local racks). Support trace function, support C language programming.	CTH3 H56-100S2
CTH300-C CPU		
C35-02	Basic model, 32MB program data space, 64KB power-off hold data, 55M extension bus, 24V DC power supply, 1 RS485 port (ModBus Free port Protocol), 1 Ethernet port, 1 USB port, 1 CAN port, 1 EtherCAT port, support single axis motion control, maximum number of 4 racks (including local racks), Supports 128 EtherCAT slave at most and supports CODESYS programming platform version SP11.	CTH3 C35-002S2
C36-02	Standard motion control, 32MB program data space, 64KB power-off hold data, 55M extension bus,24VDC power supply,2 RS485 communication ports (ModBus Free port Protocol), 1 EtherNET interface, 1 EtherNET/EtherCAT switchable communication port, 1 CAN port, 1 USB port, support PLCopen single axis motion , interpolation, electronic CAM and electronic gear, support setting SoftMotion instruction , support a maximum of 4 racks (including local racks), support 128 EtherCAT slave stations at most, support CODESYS programming platform SP11 version.	CTH3 C36-002S2
C37-02	Standard motion control, 32MB program data space, 64KB power-off holding data, 55M expansion bus, 24V DC power supply, 1 RS485 port (ModBus free port protocol), 1 Ethernet port, 1 USB port, 1 CAN port, 1 EtherCAT port, supporting single-axis motion control, interpolation, electronic gear, electronic cam and other SoftMotion command , supporting CNC function, and the maximum number of 4 racks (including local racks),It supports 128 EtherCAT slave stations at most and the CODESYS programming platform SP11 version.	CTH3 C37-002S2
C56-10	Enhanced motor control, 32MB program data space, 64KB power-off hold data space,55M expansion bus, 24V DC power supply, 10-channel digital inputs, 6*500kHz high-speed counters, 1 RS485 port (ModBus Free port protocol), 1 Ethernet port, 1 USB port, 1 CAN port, 1 EtherCAT port. Support single axis motion control, interpolation, electronic gear and electronic CAM and other SoftMotion instruction set functions. Maximum number of racks: 4 (including local racks). Supports 128 EtherCAT slave stations at most. Support for CODESYS SP11 .	CTH3 C56-102S2
C57-10	Enhanced motor control, 32MB program data space, 64KB power-off hold data space,55M expansion bus, 24V DC power supply, 10-channel digital inputs, 6*500kHz high-speed counters, 1 RS485 port (ModBus Free port protocol), 1 Ethernet port, 1 USB port, 1 CAN port, 1 EtherCAT port.Support single axis motion control, interpolation, electronic gear and electronic CAM and other , SoftMotion instruction functions, CNC function. And supports 4 racks at most(including local racks).Supports 128 EtherCAT slave stations at most. Support for CODESYS SP11 .	CTH3 C57-102S2

Order information

Name	Specification parameter	Order number
Signal module		
DIT-08	Digital input module, 8DI, 24VDC, source/Drain type	CTH3 DIT-080S1
DIT-16	Digital input module, 16DI, 24VDC, source/Drain type	CTH3 DIT-160S1
DIT-32	Digital input module, 32DI, 24VDC, source/Drain type	CTH3 DIT-320S1
DQT-08	Digital output module, 8DQ, transistor source type, 24VDC/0.5A	CTH3 DQT-080S1
DQT-16	Digital output module, 16DQ, transistor source type, 24VDC/0.5A	CTH3 DQT-160S1
DQT-32	Digital output module, 32DQ, transistor source type, 24VDC/0.5A	CTH3 DQT-320S1
DQR-08	Digital output module, 8DQ, Relay, 2A	CTH3 DQR-080S1
DQR-16	Digital output module, 16DQ, Relay, 2A	CTH3 DQR-160S1
AIS-04	Analog input module, 4AI, voltage/current, isolated type 12 bits accuracy	CTH3 AIS-040S1
AIC-08	Analog input module, 8-channel current, isolated type 16 bits accuracy	CTH3 AIC-080S1
AIV-08	Analog input module, 8- channel voltage, isolation type 16 bits accuracy	CTH3 AIV-080S1
AQS-04	Analog output module, 4AQ, voltage/current, isolated type 12 bits accuracy	CTH3 AQS-040S1
AQS-08	Analog output module, 8AQ, voltage/current, isolated type 12 bits accuracy	CTH3 AQS-080S1
AMS-06	Analog input/output module, 4AI/2AQ, voltage and current, isolated type 12 bits accuracy	CTH3 AMS-060S1
AIT-04	Thermocouple acquisition module, 4TC, isolation type 16 bits accuracy	CTH3 AIT-040S1
AIT-08	Thermocouple acquisition module, 8TC, isolation type 16 bits accuracy	CTH3 AIT-080S1
AIR-04	Thermal resistance acquisition module, 4RTD, isolation type 16 bits accuracy	CTH3 AIR-040S1
AIR-08	Thermal resistance acquisition module, 8RTD, isolation type 16 bits accuracy	CTH3 AIR-080S1
Function module		
HSC-02	High speed counting module, 2 channel 2MHz differential /500kHz single terminal signal input	CTH3 HSC-020S1
HSP-04	Pulse output module, 4 channel 4MHz differential /500kHz single-ended signal output	CTH3 HSP-040S1
CAN-1M	CAN master station communication module (Suitable for CTH300-H series CPU)	CTH3 CAN-1M0S1
ECT-00	EtherCAT slave station module, CAN expand up to 8 IO modules (digital module, analog module, temperature module, CAN module is not supported, after V1.12 version support HSC, HSP module)	CTH3 ECT-000S1
PNT-00	PROFINET slave module, expandable up to 8 IO modules (excluding CAN module , EtherCAT slave module)	CTH3 PNT-000S1
PWR-02	Power module, 220V AC converted to 24VDC, 2A	CTH3 PWR-020S1
INT-00	The maximum length between modules is 3 meters	CTH3 INT-000S1