

**innOCTRL**



# INN-A3-CPUL-T4 controller

User Manual

2026-05-06 | V1.0.3

## Contents

|                                                       |    |
|-------------------------------------------------------|----|
| 1. Document Description 1 .....                       | 1  |
| 1.1 Compliance with standards 1 .....                 | 1  |
| 1.2 Version Revision History 1 .....                  | 2  |
| 1.3 Warranty Description 2 .....                      | 2  |
| 1.4 Safety Precautions 2 .....                        | 3  |
| 1.4.1 Safety Instructions 2 .....                     | 3  |
| 1.4.2 Security Level 3 .....                          | 4  |
| 2. Product Information 8 .....                        | 10 |
| 2.1 Naming rules and nameplate description 8 .....    | 10 |
| 2.2 Technical Specifications 9 .....                  | 11 |
| 2.2.1 Basic specifications 9 .....                    | 11 |
| 2.2.2 Communication specifications 10 .....           | 12 |
| 2.2.3 Power supply specifications 11 .....            | 13 |
| 2.3 Interface Definition and terminal wiring 12 ..... | 14 |
| 2.3.1 Interface Definition 12 .....                   | 14 |
| 2.3.2 Terminal Wiring 14 .....                        | 16 |
| 2.4 Indicator light description 15 .....              | 17 |
| 2.5 Environmental regulations 17 .....                | 19 |
| 3. Dimensions and installation 18 .....               | 20 |
| 3.1 Module Dimensions 18 .....                        | 20 |
| 3.2 Equipment installation 19 .....                   | 21 |

---

|                                                      |    |
|------------------------------------------------------|----|
| 3.2.1 Installation 19.....                           | 21 |
| 3.2.2 Disassembly 22 .....                           | 24 |
| 3.3 Electrical Installation 23 .....                 | 26 |
| 3.4 Communication connection 23 .....                | 26 |
| 4. Inspection and power-on 25 .....                  | 28 |
| 4.1 Check before powering on 25 .....                | 28 |
| 4.2 Power on for the first time 26 .....             | 30 |
| 5. Bluetooth and APP configuration 28 .....          | 32 |
| 5.1 Register and log in to APP 28 .....              | 32 |
| 5.2 Connecting devices via Bluetooth 28 .....        | 33 |
| 5.3 Configure device IP address 31 .....             | 36 |
| 6. Programming Example 35 .....                      | 41 |
| 6.1 Install CODESYS development environment 35 ..... | 41 |
| 6.2 Installing equipment 35.....                     | 42 |
| 6.2.1 Install using package 35.....                  | 42 |
| 6.2.2 Installation using XML files 37 .....          | 43 |
| 6.3 Adding equipment and programming 38 .....        | 45 |
| 6.4 Program download and device operation 44.....    | 50 |
| 7. Operation and maintenance 47 .....                | 54 |
| 7.1 Running and shutdown operations 47.....          | 54 |
| 7.2 Routine inspection and maintenance 47 .....      | 54 |
| 8. Extension module 48 .....                         | 56 |

---

## 1 Document Description

The INN-A3-CPUL-T4 controller (hereinafter referred to as the controller) is an industrial-grade programmable logic controller independently developed by Zhejiang Visual Intelligent Technology Co., Ltd. Its core features are its high-performance processing capabilities and flexible industrial communication scalability. The hardware supports dual Gigabit network ports (can be configured as EtherCAT or standard Ethernet), and can expand digital, analog and other I/O modules through high-speed backplane. In terms of network, it integrates EtherCAT real-time bus, Ethernet network and multi-protocol communication interfaces to support the construction of a multi-layer network architecture from the equipment layer to the information layer. In terms of equipment maintenance, a Bluetooth module is innovatively added and equipped with a dedicated maintenance APP. The controller also supports 4G and Wi-Fi communications, wireless debugging and operating status cloud monitoring functions.

### 1.1 Applicable Standards

Table 1 Certification standards1

| Certification name | Command name    |            | Applicable Standards         |
|--------------------|-----------------|------------|------------------------------|
| CE certification   | EMC directive   | 2014/30/EU | EN 61131-2                   |
|                    | LVD instruction | 2014/35/EU | EN 61010-1<br>EN 61010-2-201 |

---

|  |                   |                                        |              |
|--|-------------------|----------------------------------------|--------------|
|  | RoHS<br>Directive | 2011/65/EU amended by<br>(EU) 2015/863 | EN IEC 63000 |
|--|-------------------|----------------------------------------|--------------|

## 1.2 Version Revision History

Table 2 Version Revision History2

| Revision date | release version | Change history                                                                                  |
|---------------|-----------------|-------------------------------------------------------------------------------------------------|
| 2026/01/09    | V1.0.0          | initial version                                                                                 |
| 2026/02/26    | V1.0.1          | Added DIP switch and power-off retention area                                                   |
| 2026/03/19    | V1.0.2          | Added power-on precautions, Bluetooth configuration, development environment installation, etc. |
| 2026/05/06    | V1.0.3          | Added support for firmware upgrade, Wi-Fi, etc.                                                 |

## 1.3 Warranty Description

Under normal use, if the product fails or is damaged, Zhejiang Visual Intelligent Technology Co., Ltd. provides warranty services within the warranty period (please refer to the order form for details of the product warranty period). After the warranty period, repair fees will be charged.

During the warranty period, if the product is damaged due to the following conditions, repair fees will be charged.

- 1) Failure to operate this product according to the regulations in this manual may result in damage to the product.

- 2) Product damage caused by fire, flood, voltage abnormality.
- 3) Product damage caused by using this product for abnormal functions.
- 4) Product damage caused by exceeding the specified use range of the product.
- 5) Secondary damage to the product caused by force majeure (natural disasters, earthquakes, lightning strikes).

The relevant service fees are calculated according to the manufacturer's unified standards. If there is a contract, the contract priority will be used. Please refer to the "Product Warranty Card" for detailed warranty instructions.

## **1.4 Safety Precautions**

### **1.4.1 Safety Instructions**

When installing, operating, and maintaining the product, please read and comply with the following safety precautions:

- To ensure personal and equipment safety, please follow all safety precautions marked on the product and described in this manual when installing, operating, and maintaining the product.
- The "Caution", "Warning" and "Danger" items in this manual do not represent all the safety precautions that should be observed, but are only supplementary to all safety precautions.
- This product should be used in an environment that meets the design specifications, otherwise it may cause malfunctions. Functional abnormalities or component damage caused by failure to comply with relevant regulations are not covered by the product

quality guarantee.

- Our company will not bear any legal responsibility for personal safety accidents, property losses, etc. caused by illegal operation of products.

### 1.4.2 Security level

This manual will indicate the user's safety level into three categories: danger, warning, and caution. Please be sure to give this manual to the end user and keep it in a safe place in case you need to read it.

#### **DANGER**

Indicates that death or serious bodily injury may result if instructions are not followed.

#### **WARNING**

Indicates that death or serious bodily injury may result if instructions are not followed.

#### **CAUTION**

Indicates that minor bodily injury or equipment damage may result if operations are not carried out as specified.

#### 1.4.2.1 When designing the control system

When designing a control system, please read and follow the following safety precautions:

---

 **DANGER**

- Please be sure to design a safety circuit to ensure that the control system can still work safely when the external power supply fails or the product fails;
- When the rated load current is exceeded or the load is short-circuited, causing overcurrent for a long time, the module may smoke or catch fire. Safety devices such as fuses or circuit breakers should be installed externally.

 **WARNING**

- Please be sure to set up emergency braking circuits, protection circuits, interlock circuits for forward and reverse operations, and position upper and lower limit interlock switches to prevent machine damage in the external circuit of the product;
- In order to ensure the safe operation of the equipment, please design external protection circuits and safety mechanisms for output signals related to major accidents; the CPU may shut down all outputs after detecting an abnormality in its own system; when part of the circuit of the product fails, its output may be uncontrolled. To ensure normal operation, it is necessary to design an appropriate external control circuit;
- When the product's output units such as relays and transistors are damaged, the output cannot be controlled to ON or OFF state;

- The product is designed to be used in indoor, overvoltage level II electrical environments. The power supply system level should have lightning protection devices to ensure that lightning overvoltage is not applied to the power input end, signal input end, control output end and other ports of the product to avoid damage to the equipment.

### 1.4.2.2 When installing

When installing the device, please read and follow the following safety precautions:



#### WARNING

- Only professional maintenance personnel who have received relevant training on electrical equipment and have sufficient electrical knowledge can install this product;
- When disassembling or installing a module, all external power supplies used by the system must be disconnected before proceeding. If the power is not completely disconnected, it may cause electric shock or module failure or malfunction;
- Do not use the product in the following places: places with dust, oil fumes, conductive dust, corrosive gases, and flammable gases; places exposed to high temperatures, condensation, wind and rain; places with vibrations and shocks. Electric shock, fire, and misoperation can also cause product damage and deterioration;
- The product is an Open type device. Please install it in a control

cabinet with a door lock (control cabinet shell protection > IP20). Only operators who have received relevant training on electrical equipment and have sufficient electrical knowledge can open the control cabinet.

 **CAUTION**

- During installation, avoid metal shavings and wire ends from falling into the ventilation holes of the product, which may cause fire, malfunction, or misoperation;
- After installation, make sure there are no foreign objects on the ventilation surface, otherwise it may cause poor heat dissipation, causing fire, malfunction, and misoperation;
- When installing, they should be tightly connected to their respective connectors and the module connection hooks should be locked firmly. If the module is installed improperly, it may cause malfunction, malfunction, and falling off.

### 1.4.2.3 When wiring

When wiring, please read and follow the following safety precautions:

 **DANGER**

- Only professional maintenance personnel who have received relevant training on electrical equipment and have sufficient electrical knowledge can perform wiring on this product;

- During wiring work, all external power supplies used by the system must be disconnected before proceeding. If all are not disconnected, it may cause electric shock or equipment failure or malfunction;
- Cable terminals should be well insulated to ensure that the insulation distance between cables will not be reduced after the cables are installed on the terminal block. Otherwise it may cause electric shock or equipment damage.

 **CAUTION**

- To avoid electric shock, please cut off the power supply before connecting this product;
- Please refer to the data in the technical specifications for the input power supply specifications of this product. Please provide the power supply strictly in accordance with the data in the technical specifications. If the power supplied is not within the required range, the product will be seriously damaged. Therefore, please regularly check whether the DC power provided by the switching power supply is stable.

#### **1.4.2.4 During operation and maintenance**

When operating and maintaining the equipment, please read and comply with the following safety precautions:

 **CAUTION**

- Only professional maintenance personnel who have received relevant training on electrical equipment and have sufficient electrical knowledge can operate and maintain the product;
- Do not touch the terminals when the power is on, otherwise it may cause electric shock or malfunction;
- When disassembling modules or connecting or removing communication cables, all external power supplies used by the system must be disconnected first. Failure to disconnect them all may result in electric shock or malfunction.

#### **1.4.2.5 When scrapped**

When scrapping your equipment, please read and follow the following safety precautions:

 **CAUTION**

- Please treat it as industrial waste; when discarding batteries, they should be disposed of separately in accordance with the laws and regulations established by each region;
- Scrapped equipment should be processed and recycled according to industrial waste treatment standards to avoid environmental pollution.

## 2 product information

### 2.1 Naming rules and nameplate instructions

INN-A 3-CPUL-T4

①    ② ③    ④    ⑤

Table 3 Naming rules table3

| No. | Description                                                                                                                                                                                                                                                                              |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ①   | Product range INNOCTRL                                                                                                                                                                                                                                                                   |
| ②   | Module classification level: A-series                                                                                                                                                                                                                                                    |
| ③   | Product generation: 3, third generation product                                                                                                                                                                                                                                          |
| ④   | Module classification: <ul style="list-style-type: none"> <li>● CPUL, controller;</li> <li>● CPL, Coupler;</li> <li>● MODD, digital module;</li> <li>● MODA, analog module;</li> <li>● MODS, serial port module;</li> <li>● POWER, power module;</li> <li>● ASSY, attachment.</li> </ul> |
| ⑤   | <ul style="list-style-type: none"> <li>● R4: high performance version</li> <li>● T4: Basic version</li> </ul>                                                                                                                                                                            |

---

## 2.2 Technical Specifications

### 2.2.1 Basic specifications

Table 4 Basic specifications table4

| Item                                 | Specification                                        |
|--------------------------------------|------------------------------------------------------|
| Program capacity                     | 10MB                                                 |
| Data capacity                        | 20MB                                                 |
| Power-off retention area             | 32KB (supports backup verification)                  |
| real time clock                      | Supported                                            |
| Motion Control Real Axis Type        | EtherCAT servo axis                                  |
| local extension                      | Up to 32 Class A I/O modules                         |
| Programming software                 | CODESYS V3. 5. 20. 40                                |
| programming language                 | IEC 61131-3 programming language (LD/ST/SFC/FBD/CFC) |
| Download user program                | Ethernet                                             |
| Firmware burning                     | Type-C                                               |
| Firmware upgrade                     | Ethernet                                             |
| Installation method                  | 35mm guide rail installation                         |
| weight                               | 350g                                                 |
| Product certification                | CE certification (certification pending)             |
| Power terminal block wiring diameter | AWG24~16                                             |

## 2.2.2 Communication specifications

Table 5 Communication specifications table5

| Item      | Specification                                                                                                                                                                                                                                                                                                                                                              |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EtherCAT  | <ul style="list-style-type: none"> <li>• Dual Gigabit independent network ports, configurable as EtherCAT interface</li> <li>• The network port only supports one mode at the same time, namely Ethernet or EtherCAT mode.</li> </ul>                                                                                                                                      |
| Ethernet  | <ul style="list-style-type: none"> <li>• Dual Gigabit independent network ports</li> <li>• The network port only supports one mode at the same time, namely Ethernet or EtherCAT mode.</li> <li>• TCP/UDP free protocol</li> </ul>                                                                                                                                         |
| Bluetooth | Support operation and maintenance management, equipment status monitoring, equipment maintenance, and interface configuration                                                                                                                                                                                                                                              |
| Wi-Fi     | <ul style="list-style-type: none"> <li>• Support 802.11bgn 2.4GHz frequency band</li> <li>• Support AP mode or STA mode</li> <li>• Support wireless debugging</li> <li>• Supports access to the operation and maintenance monitoring system to remotely report status data, production data, etc.</li> <li>• Supports WPA, WPA2 and other encrypted connections</li> </ul> |
| 4G        | <ul style="list-style-type: none"> <li>• Support three network access</li> <li>• Support B1/3/5/8/34/38/39/40/41 frequency band</li> <li>• Supports connecting to cloud servers (subject to subsequent support)</li> <li>• Support virtual networking and remote debugging (subsequent support)</li> </ul>                                                                 |
| USB X2    | <ul style="list-style-type: none"> <li>• 1×USB 2.0 Type-C</li> <li>• Support OTG mode</li> </ul>                                                                                                                                                                                                                                                                           |

|        |                                                                                                   |
|--------|---------------------------------------------------------------------------------------------------|
|        | <ul style="list-style-type: none"> <li>• Support firmware upgrade</li> </ul>                      |
| USB X3 | <ul style="list-style-type: none"> <li>• 1×USB 2.0 Type-C</li> <li>• Support HOST mode</li> </ul> |

### 2.2.3 Power specifications

Table 6 Power supply specification table6

| Item                                  | Specification                                                                                   |
|---------------------------------------|-------------------------------------------------------------------------------------------------|
| Input power rated voltage             | 24V DC $\pm 10\%$ (21.6V DC~26.4V DC)                                                           |
| Input power supply rated current      | <ul style="list-style-type: none"> <li>• Without module: 1A</li> <li>• Full load: 6A</li> </ul> |
| Bus output power supply rated voltage | 5V                                                                                              |
| Bus output power supply rated current | 3A                                                                                              |
| 24V input power protection            | Support short circuit protection                                                                |

2.3 Interface Definition and terminal wiring

2.3.1 Interface Definition

The following is the interface diagram of the controller:

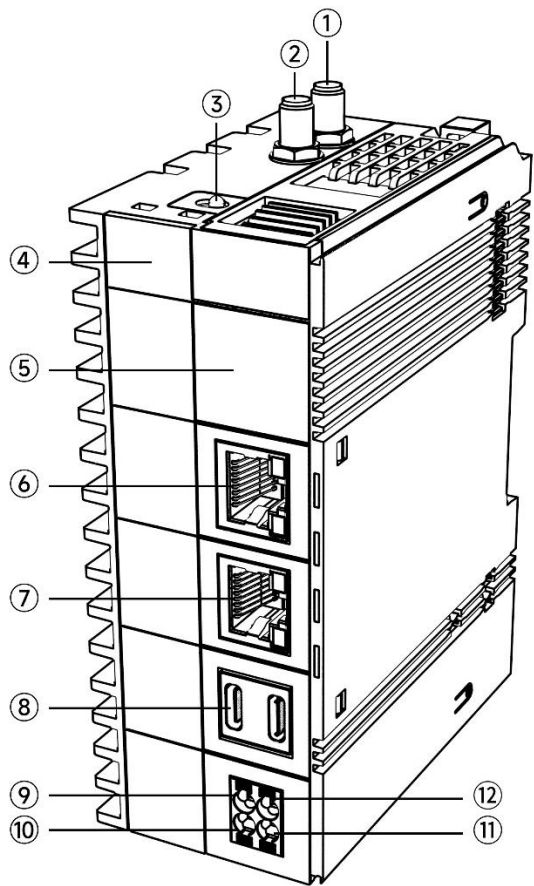


Figure 1 Interface diagram1

The interface slot definition is shown in the following table:

Table 7 Interface Definition table7

| No. | Description                                                                         |
|-----|-------------------------------------------------------------------------------------|
| ①   | 4G antenna interface, the product comes standard with a 1-meter suction cup antenna |

|   |                                                                                                                                                                                              |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ② | Wi-Fi antenna interface, the product comes standard with a 1-meter suction cup antenna                                                                                                       |
| ③ | <p>DIP switch: RUN/STOP controls the host to run/stop</p> <div>⚠ CAUTION</div> <p>Before debugging the device via Bluetooth connection, you must ensure that the device is in STOP mode.</p> |
| ④ | Removable panel: for replacing the built-in RTC battery                                                                                                                                      |
| ⑤ | Bluetooth module                                                                                                                                                                             |
| ⑥ | X5: Ethernet communication, RJ45 interface                                                                                                                                                   |
| ⑦ | X4: Ethernet communication, RJ45 interface (default IP: 192.168.1.100)                                                                                                                       |
| ⑧ | X2/X3: USB 2.0 Type-C interface, communicates with PC                                                                                                                                        |
| ⑨ | RDY: System running status monitoring. When the CPU is working, the pin status is pulled low and the CPU is not working.<br>in a floating state                                              |
| ⑩ | CTL: System sleep control, no wiring by default, inputting 24V voltage will shut down the operating system                                                                                   |
| ⑪ | System power supply GND, power ground                                                                                                                                                        |
| ⑫ | PWR: System power supply 24V DC, positive power supply                                                                                                                                       |

### 2.3.2 Terminal Wiring

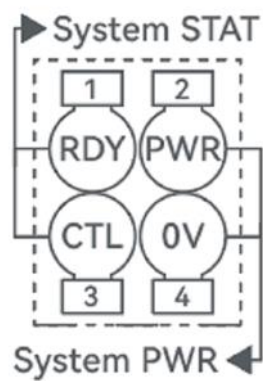


Figure 2 Terminal Wiring diagram2

## 2.4 Indicator light description

The following is a schematic diagram of the controller's indicator lights:

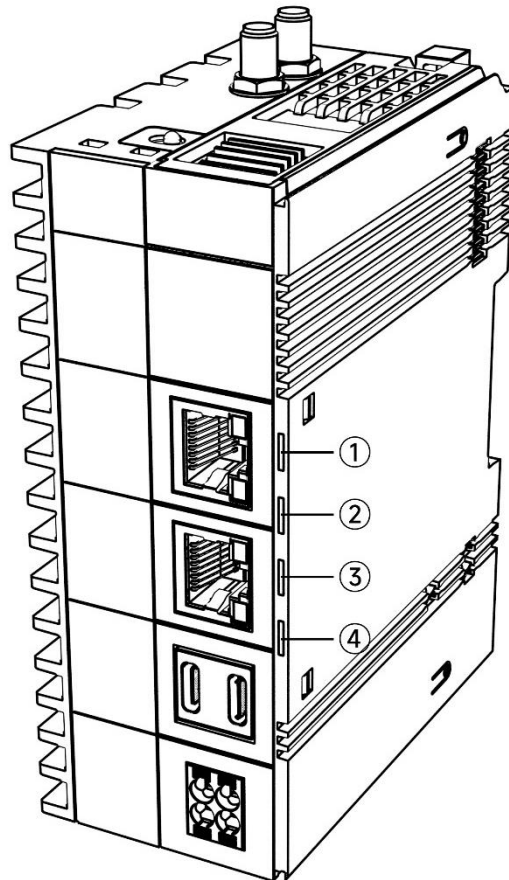


Figure 3 Schematic diagram of indicator lights3

See the table below for the indicator light function description:

Table 8 Indicator light description table8

| No. | Type                        | Color        | Description |
|-----|-----------------------------|--------------|-------------|
| ①   | Power indicator light (PWR) | Steady green | Power is on |

|   |                                      |                            |                                                                                  |
|---|--------------------------------------|----------------------------|----------------------------------------------------------------------------------|
| ② | Device Status Indicator (STS)        | Steady green               | Equipment is normal                                                              |
|   |                                      | Yellow always on           | No equipment or equipment failure                                                |
| ③ | Communication status indicator (COM) | Steady green               | Sending signal                                                                   |
|   |                                      | Yellow always on           | Receiving signal                                                                 |
|   |                                      | Alternate yellow and green | Signal is being received and sent at the same time                               |
| ④ | Function status indicator (SF)       | Steady green               | The APP is connected to the controller via Bluetooth                             |
|   |                                      | flashing blue              | The APP has connected to the controller and entered the device details interface |

## 2.5 environmental regulations

Table 9 Environmental requirements table9

| Item                         | Specification                                                |
|------------------------------|--------------------------------------------------------------|
| working temperature          | -20℃~55℃, horizontal installation                            |
|                              | -20℃~45℃, non-horizontal installation                        |
| Storage temperature          | -20℃~60℃                                                     |
| ambient humidity             | 5%~95%RH (no condensation)                                   |
| Installation altitude        | ≤2000m                                                       |
| pollution level              | II                                                           |
| Protection level             | IP20                                                         |
| Mechanical properties        | Comply with IEC61131-2, IEC60068-2-6, IEC6008-2-27 standards |
| Insulation withstand voltage | Comply with IEC61131-2 standard                              |
| EMC performance              | Comply with IEC61131-2, IEC61000-4-4 standards               |

## 3 Dimensions and installation

### 3.1 Module Dimensions

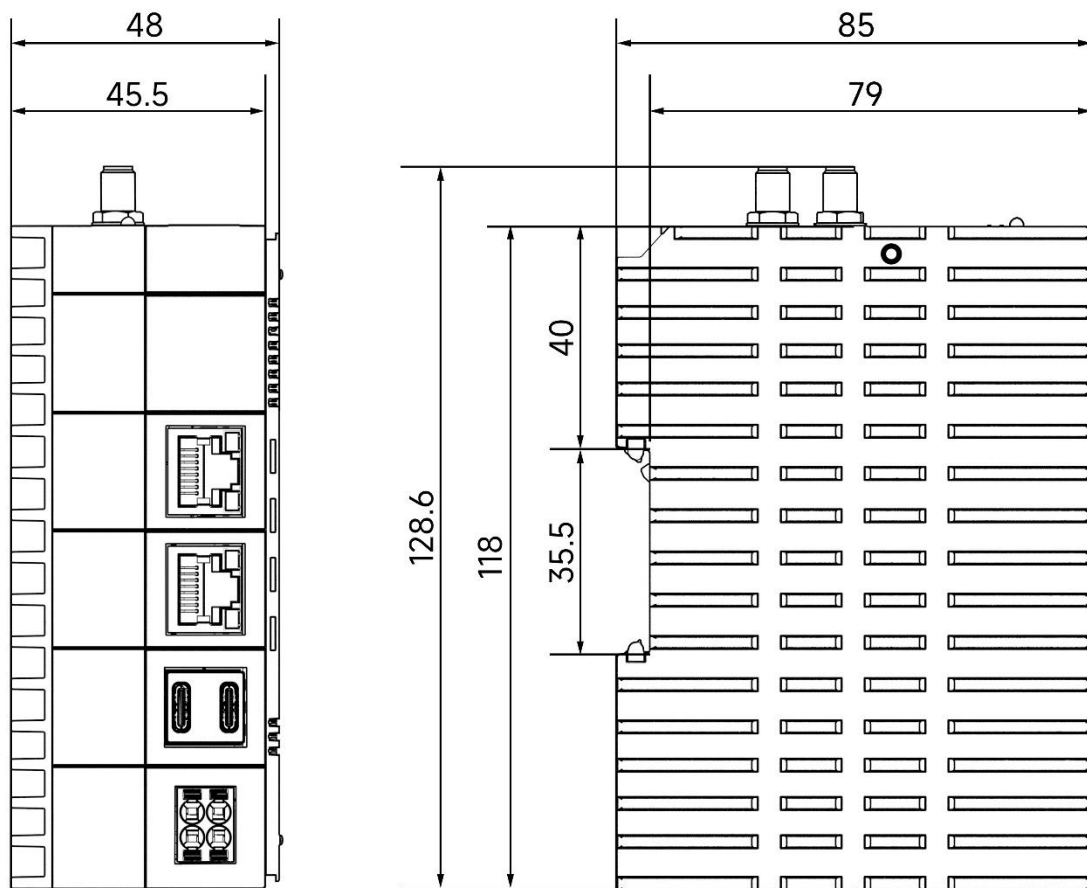


Figure 4 Module Dimensions diagram4

## 3.2 Equipment installation

### 3.2.1 Installation

The controller is installed using DIN rails. The DIN rails must comply with the IEC 60715 standard (35mm wide, 1mm thick). The size information is as shown in the figure below, in millimeters (mm):

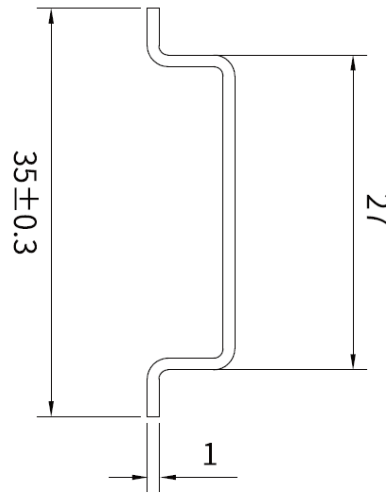


Figure 5 DIN rail diagram5

#### ⚠ CAUTION

If the controller is installed on a DIN rail other than those recommended above, the buckles may not lock properly.

The optimal installation position of the controller is in the horizontal direction. The heat dissipation is designed to be through natural convection. In order to ensure normal ventilation and heat dissipation and sufficient wiring space, a certain gap must be reserved around the controller. The minimum gap to be reserved is as shown in the figure below, in millimeters (mm).

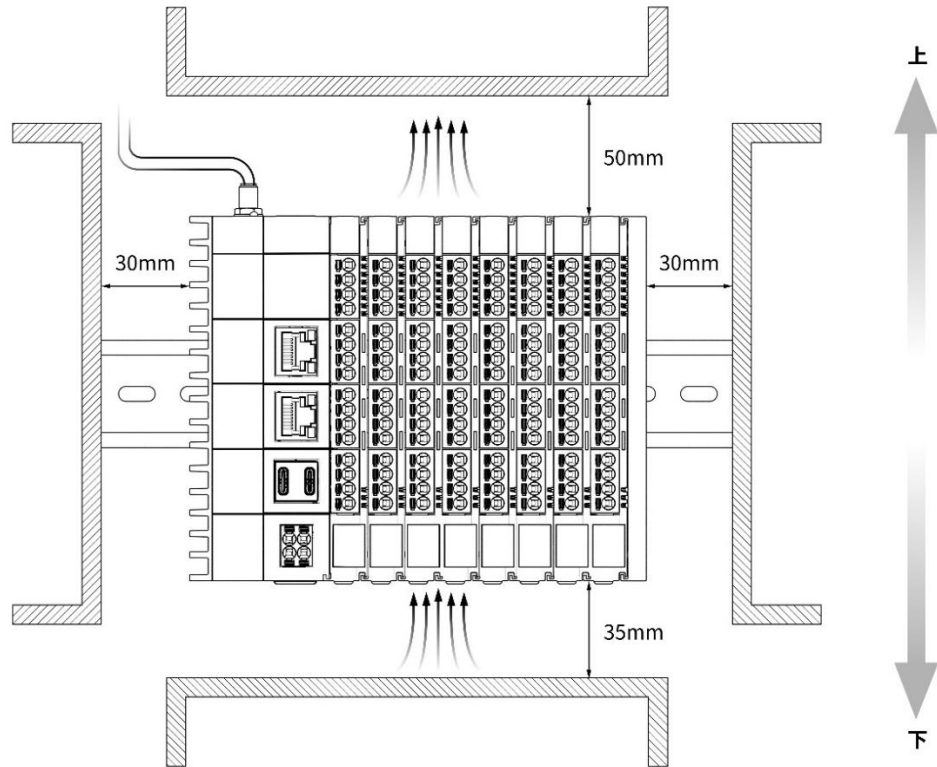


Figure 6 Minimum reserved clearance for installation6

The assembly between the controller and the I/O module is slidingly installed through the top and bottom guide rails, as shown in the figure below.

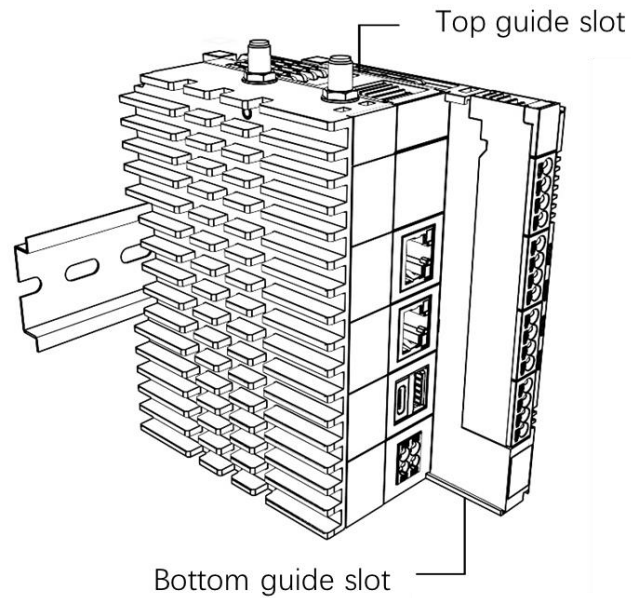


Figure 7 Schematic diagram of controller guide slot7

As shown in the figure below, when installing, align the controller with the DIN rail and press the module in the direction shown by arrow ① so that the module snaps onto the DIN rail. After the installation is in place, press the protruding guide rail part at the top in the direction shown by arrow ②. When you hear a snapping sound, the installation is complete.

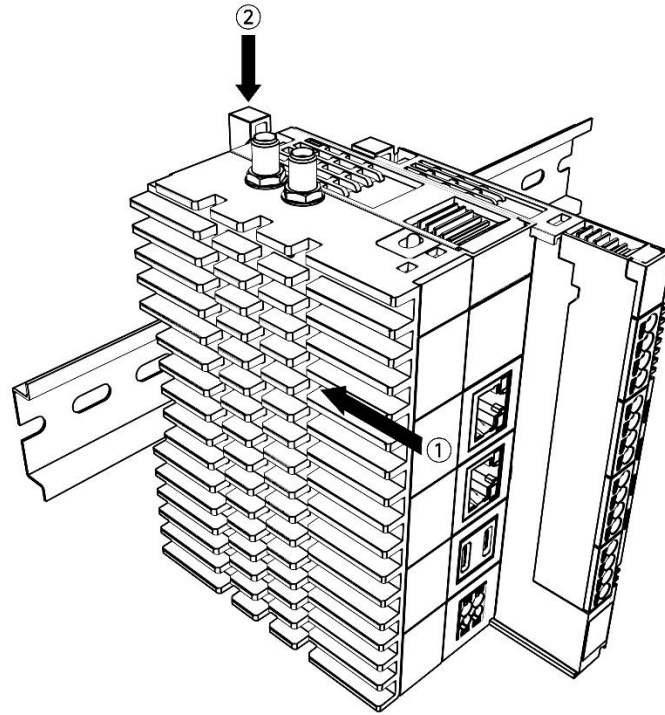


Figure 8 Controller installation diagram8

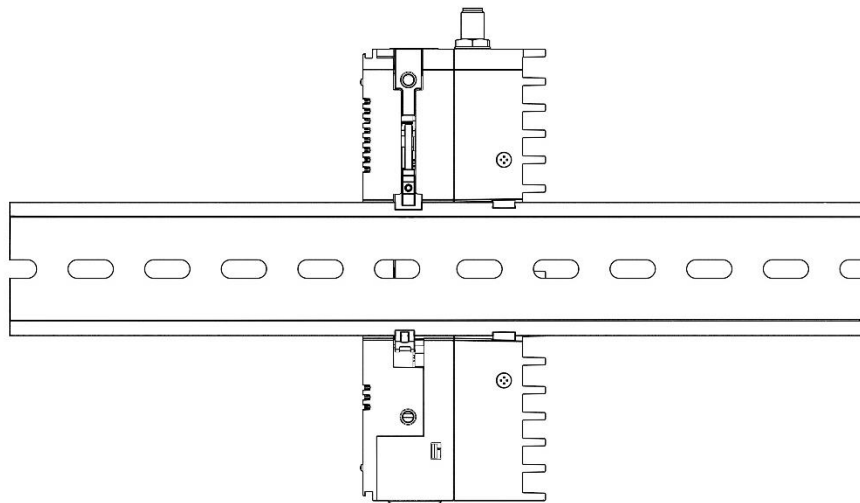


Figure 9 Schematic diagram of DIN rail buckle9

### 3.2.2 Disassembly

As shown in the figure below, use a flat-blade screwdriver or similar

tool to pry up the rail lock, and pull the module straight forward at the buckle position (the raised part). When completed, press down on the top of the lock.

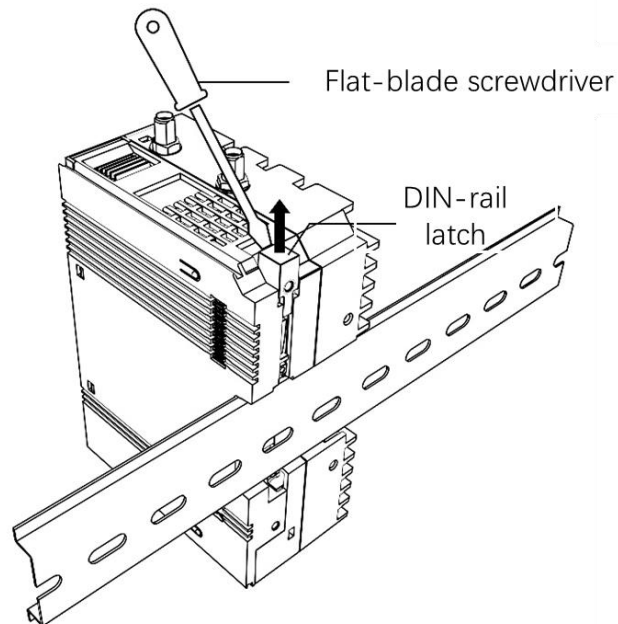


Figure 10 Schematic diagram of prying the guide rail lock10

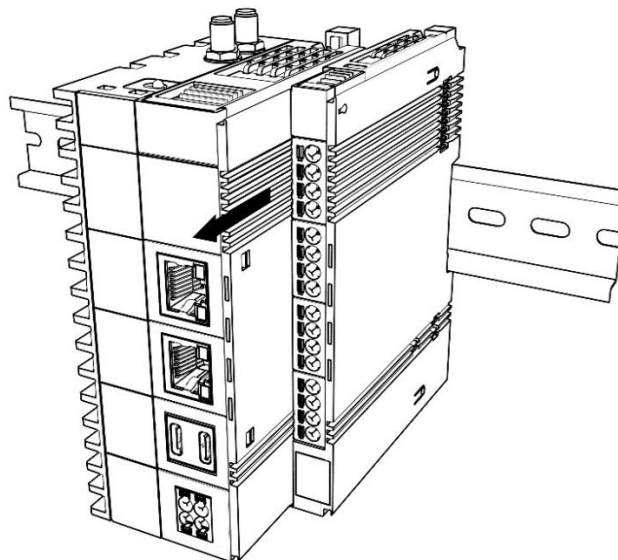


Figure 11 Diagram of pulling out the controller11

### 3.3 Electrical Installation

The following table shows the installation specifications of cables and tube terminals:

Table 10 Cable and tube terminal specifications

| Supporting material name | Adaptable wire diameter |     | Tube type terminal |
|--------------------------|-------------------------|-----|--------------------|
|                          | mm <sup>2</sup>         | AWG | Specification      |
| Tubular wire lug         | 0.25                    | 24  | E0208              |
|                          | 0.34                    | 22  | E0308              |
|                          | 0.5                     | 20  | E0508              |
|                          | 0.75                    | 18  | E7508              |
|                          | 1.0                     | 17  | E1008              |
|                          | 1.5                     | 16  | E1508              |

### 3.4 Communication connection

The controller provides a variety of communication connection methods and is suitable for complex industrial automation control systems. Mainly divided into the following categories:

- Remote connection: Supports remote access and debugging via Bluetooth connection to APP, Wi-Fi AP mode or STA mode, and Ethernet network.
- Ethernet connection: Production data reporting, cross-device linkage interaction and remote maintenance can be carried out through the Ethernet interface.

- EtherCAT connection: Supports expansion of device list via wired EtherCAT network.

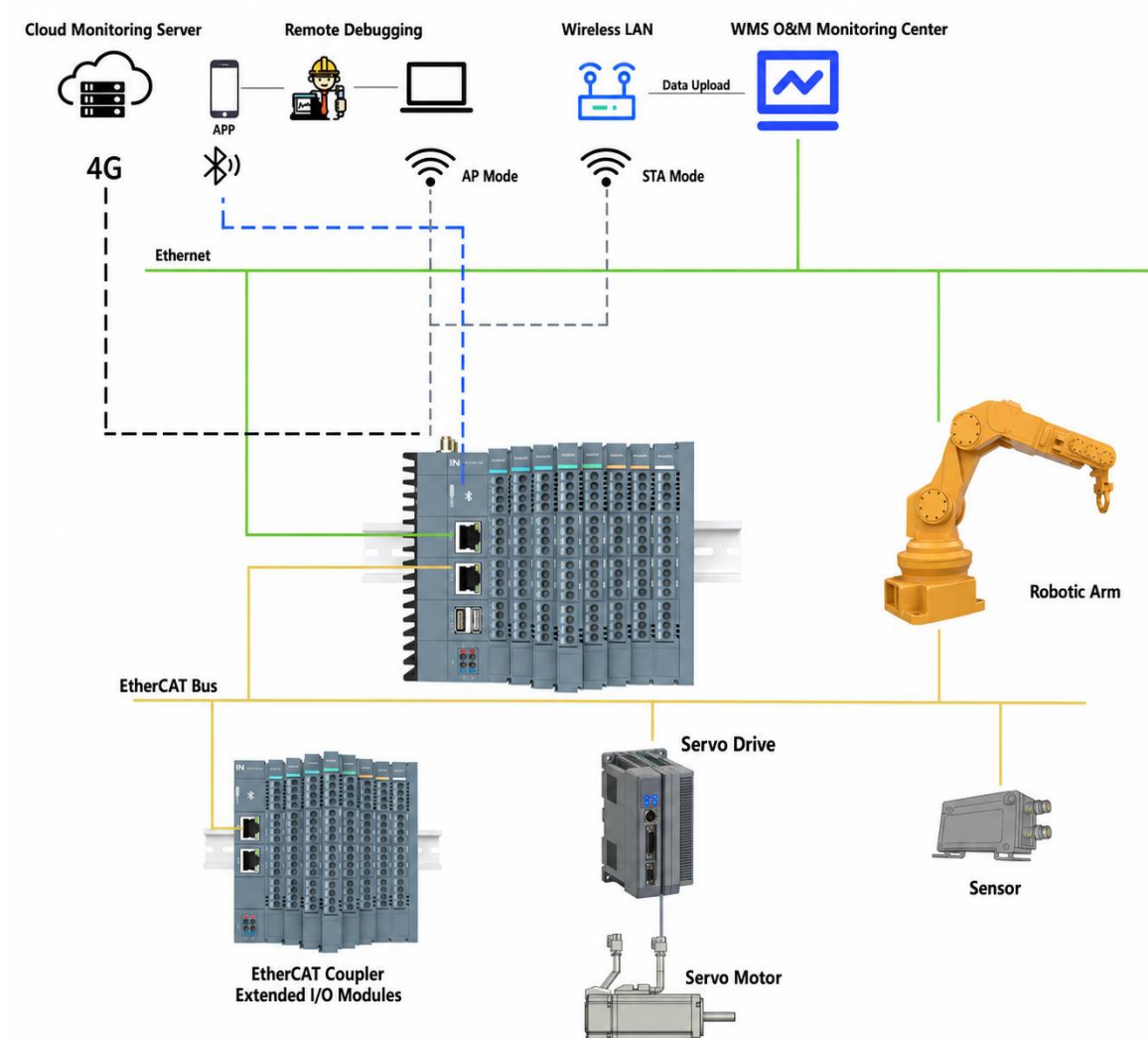


Figure 12 Communication topology architecture diagram12

## 4 Check and power on

This section guides users on how to safely perform first power-on and basic inspection after completing product installation.

### 4.1 Check before powering on

Before connecting power and applying power to the controller, be sure to complete the following checks:

- 1) Installation check: Confirm that the controller has been firmly installed on the 35mm DIN rail as required, and ensure that there is sufficient ventilation and heat dissipation clearance around it.
- 2) Appearance inspection: Confirm that the controller shell is not damaged, all interfaces are intact, and no obvious foreign objects fall into the ventilation holes.
- 3) Wiring check:
  - a) Confirm that all interfaces are connected according to the interface definition:
    - ① External 4G antenna;
    - ② External WIFI antenna;
    - ③ The DIP switch is in STOP state;
    - ⑥ Connect the external network cable to network port 0 to the Ethernet and automatically obtain the network IP;

 **CAUTION**

If you choose network port 0 to access the device, please ensure that network port 0 is connected to a network cable with normal communication, and you can connect to the device through Bluetooth APP, check the network IP obtained by DHCP, and access the device through the automatically obtained IP. For APP related operations, please refer to Bluetooth and APP configuration.

- ⑦ Connect an external network cable to network port 1 to connect to the PC terminal to access static IP or cascade Coupler devices (optional);

 **CAUTION**

If you choose network port 1 to access the device, please ensure that the PC terminal network cable is directly connected to network port 1, and the network IP of the PC needs to be set to the IP of the 192.168.1.x network segment before you can access the device through the static IP 192.168.1.100. For APP related operations, please refer to Bluetooth and APP configuration.

- ⑪ External power supply GND;
- ⑫ The external power supply is 24V positive.

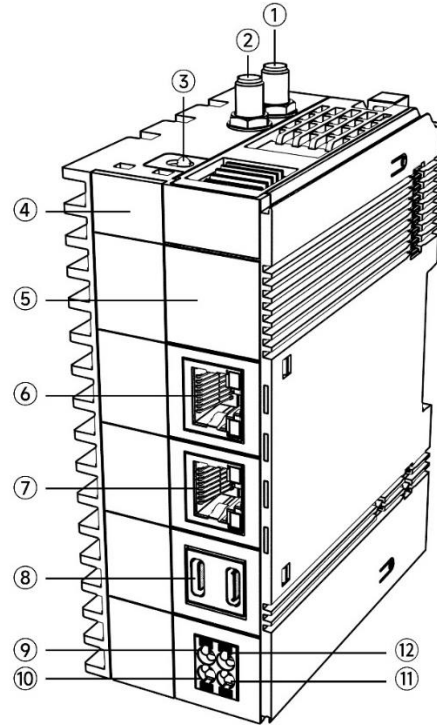


Figure 13 Interface diagram13

- b) Verify that the power cables are properly connected to the PWR (24V DC) and GND terminals in accordance with the terminal wiring diagram and electrical installation requirements.
- c) Confirm that all cable connections are secure, cable terminals are well insulated, and there is no risk of short circuit.

## 4.2 Powering on for the first time

After completing the pre-power-on checks, follow the steps below to power on for the first time:

- 1) Confirm power supply specifications: Confirm again that the output voltage of the external DC power supply is 24V DC and that the output power is sufficient.
- 2) Connect a small amount of external module loads: It is recommended

that when powering on for the first time, only a small number of necessary external load devices are connected to the output of the controller to prevent unexpected operations.

- 3) Turn on the power: turn on the external DC power switch to power the controller.
- 4) Observe the indicator lights:
  - a) Check whether the PWR indicator light on the controller and module is solid green and confirm that the power is connected normally.
  - b) Check whether the STS indicator lights on the controller and module are solid green and confirm that the device has passed the self-test and is in a normal state.
  - c) Check whether the COM indicator light on the controller and module is on to confirm that the device is receiving or sending signals.
- 5) Check for abnormalities: If the PWR indicator light does not light up, please cut off the power immediately and check the power wiring and the power supply itself; if the STS indicator light is yellow, it indicates that the device may be faulty, please conduct troubleshooting.

## 5 Bluetooth and APP configuration

The controller has a built-in Bluetooth module and supports wireless operation and maintenance through the APP, including device status monitoring, parameter configuration (such as IP address), etc.

### 5.1 Register and log in APP

After receiving the device, please contact us to obtain the APP installation package, and follow the steps below to register and log in to the APP:

- 1) On mobile devices such as mobile phones, download the APP installation package.
- 2) Click on the APP installation package and follow the interface prompts to complete the installation.
- 3) Open the APP and enter the login interface.
- 4) Click "New User Registration" to enter the registration interface.
- 5) Enter your name, email, and click to get the verification code.
- 6) Enter the verification code.
- 7) Check "I have read the User License Agreement".
- 8) Click "Next".
- 9) To create a new password, please enter the same password in both password boxes and click "Confirm".
- 10) New user registration successful.
- 11) Enter the account name (email) and password you just created, click "Login", and successfully log in to the APP.

## 5.2 Connect devices via Bluetooth

The APP supports connecting to the controller via Bluetooth. The steps are as follows:

 CAUTION

Before debugging the device via Bluetooth connection, you must ensure that the DIP switch on the controller is in STOP mode.

- 1) Turn on the Bluetooth function on your phone and move it close to the device to be connected.
- 2) The system will automatically try to connect to the device. After the connection is successful, the device status will be displayed as connected. If the device is in normal working condition, the system will prompt a pop-up window to disable Bluetooth connection. Please put the device in STOP mode.
- 3) Open the APP and enter the "Device Management" interface.
- 4) Click the plus sign in the upper right corner of the interface, select "Scan for nearby devices", and view attachments to add device information.

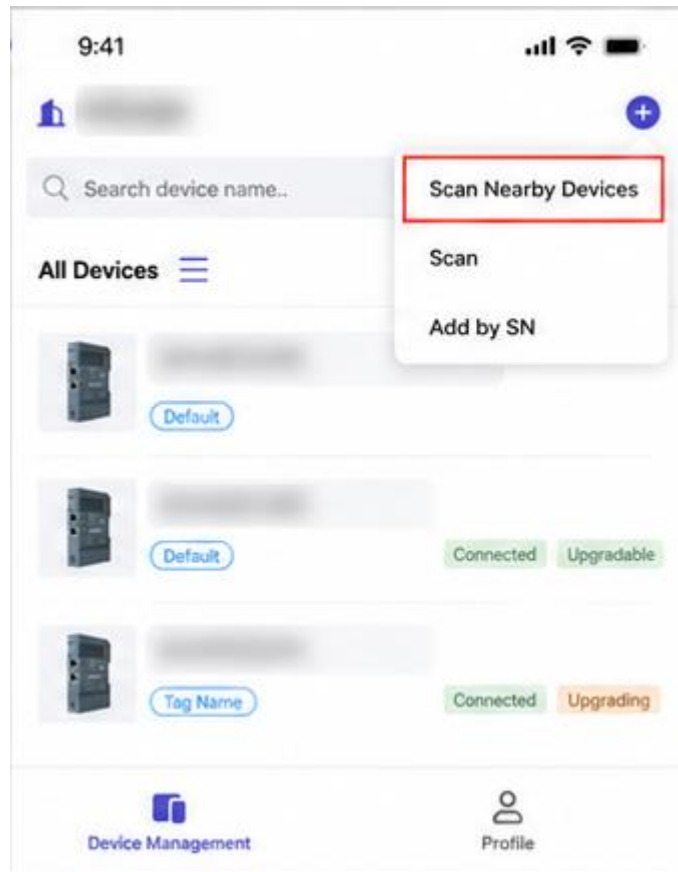


Figure 14 Scan for nearby devices14

- 5) Select the device to be added and click "Add".

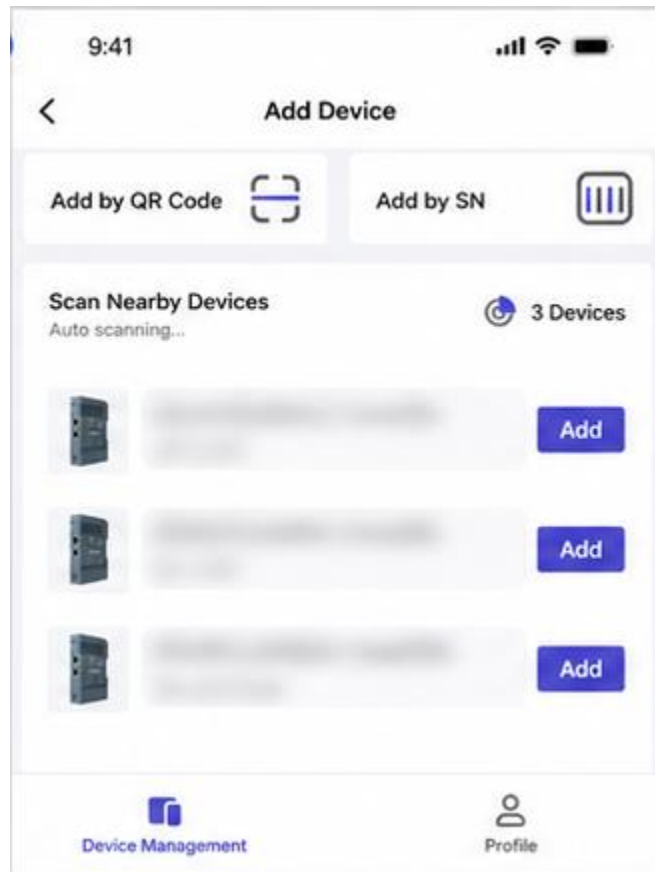


Figure 15 Add device15

- 6) After selecting a label for the device, click "Confirm" to complete the addition.

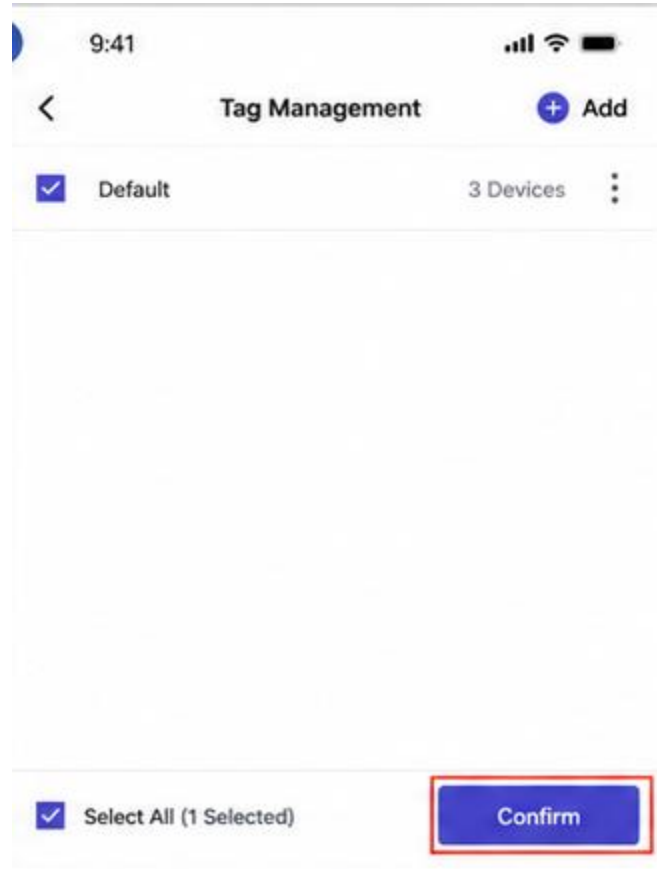


Figure 16 Confirm addition16

### 5.3 Configure device IP address

After the connection is successful via Bluetooth, use the APP to configure the IP address of the Ethernet port of the controller for subsequent program downloading and monitoring through the wired network.

The steps are as follows:

- 1) Open the APP, click the device in the device list, and enter the "Device Details" page.
- 2) In "Network Configuration", select "Network Port 1" or "Network Port 2" and click "Configure IPv4" to enter the IPv4 configuration page.

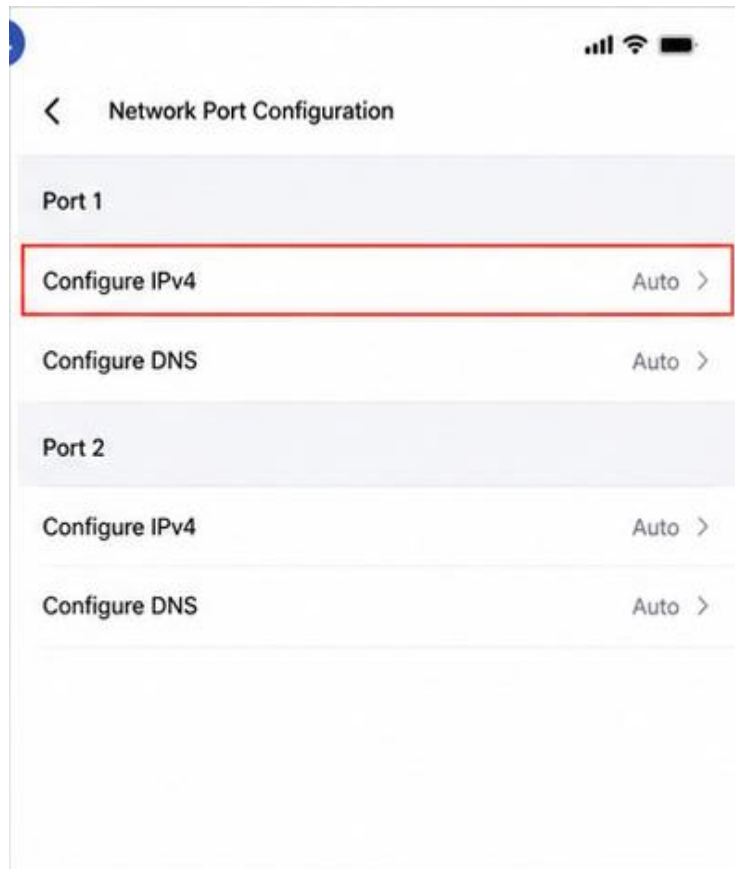


Figure 17 Network port configuration17

- 3) Select "Auto" or "Manual" to switch the configuration status.
  - a) Automatic: No specific configuration items are displayed, and the device automatically obtains parameters.

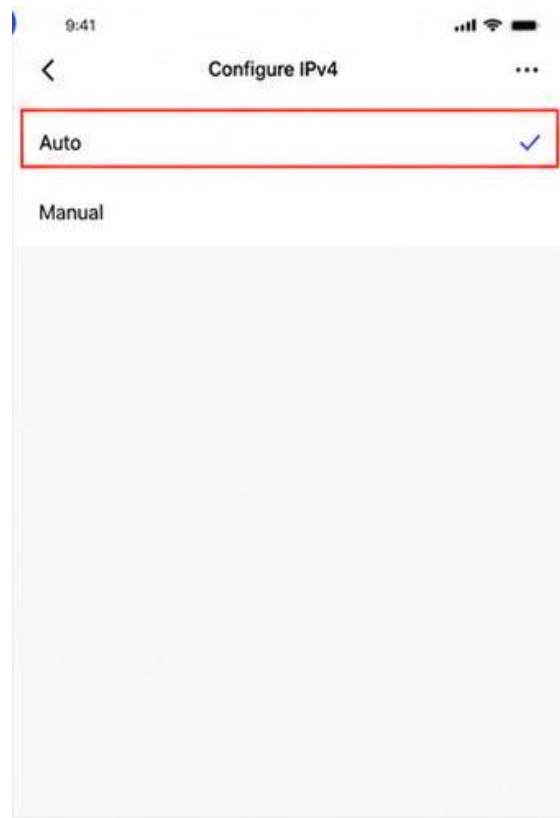


Figure 18 Automatic configuration18

- b) Manual: Displays three items: IP address, subnet mask, and gateway, which can be entered manually.

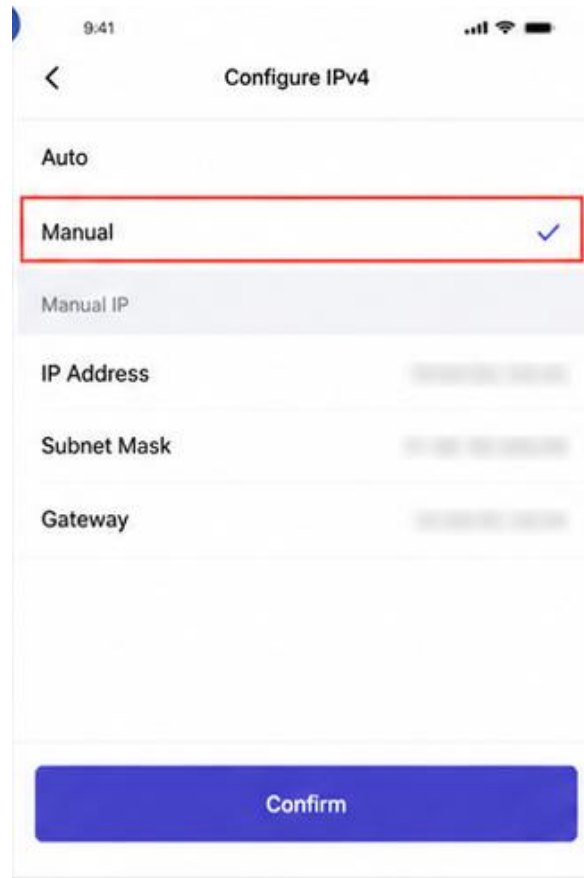


Figure 19 Manual configuration19

- 4) After completing the input, click "Confirm" to deliver the configuration. If the verification fails, the reason will be prompted.
- 5) After the configuration is successful, return to the "Device Details" page, click the icon in the upper right corner, and then click "View Device Information" to view the actual network port information of the device and confirm whether the configuration is effective. 

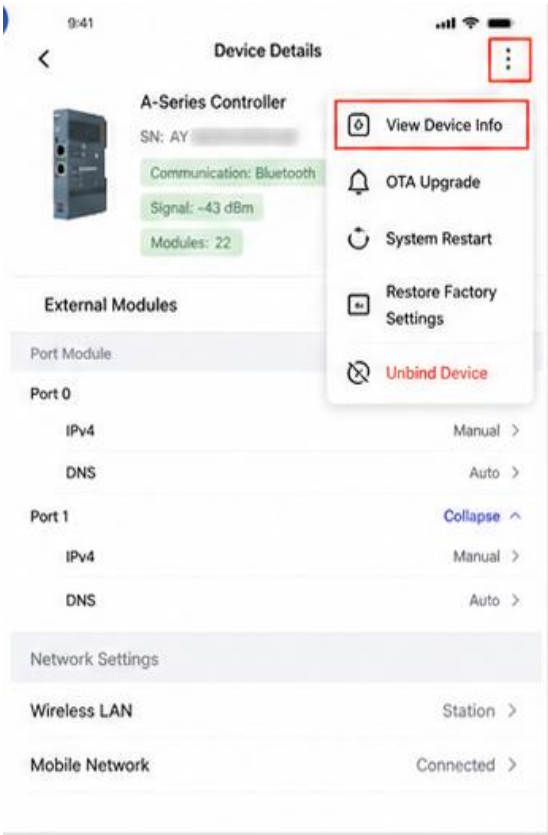


Figure 20 View device  
information20

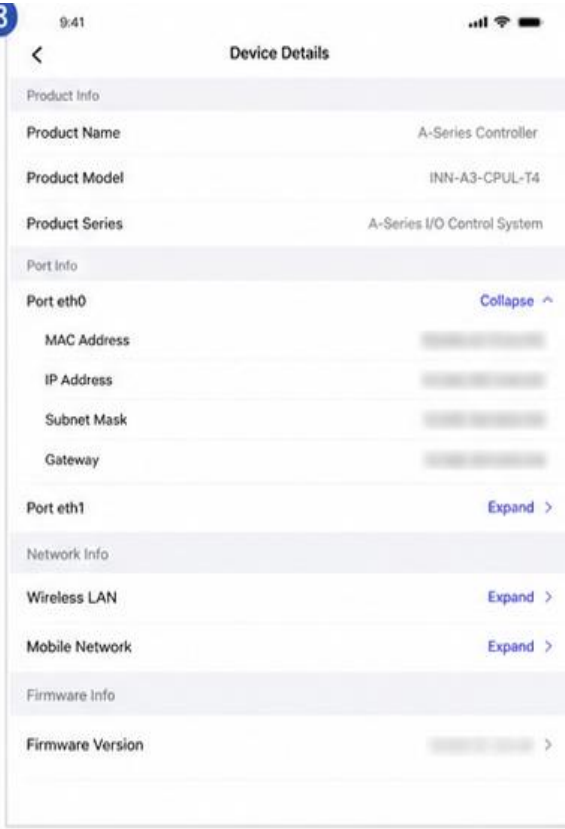


Figure 21 View network port  
information21

- 6) After successful configuration, set the DIP switch on the controller to RUN mode for subsequent operation.

## 6 Programming Examples

### 6.1 Install CODESYS development environment

The controller supports programming using the standard CODESYS development environment. Please follow the steps below to install the development environment:

- 1) Visit the CODESYS official website (<https://www.codesys.cn/list-DOWNLOAD.html>) to download the CODESYS Development System installation package.
- 2) Double-click the downloaded installation package to start the installation wizard. Click "Install" to install.
- 3) According to the interface prompts, click "Next" to proceed to the next step.
- 4) On the software license agreement page, read and check "I accept the terms in the license agreement" to accept the software license agreement, and click "Next" to proceed to the next step.
- 5) Select the installation location of the program. It is recommended to keep the default settings and click "Next" to proceed to the next step.
- 6) On the component selection page, you can choose between full installation or customization. Usually, the default selection is enough, click "Next" to proceed to the next step.
- 7) Click "Install" to install. The installation process may take 10~30 minutes, please be patient.
- 8) After the installation is complete, click "Finish" to end the

installation wizard.

## 6.2 Install equipment

Before starting programming, you also need to install the device in CODESYS. The device supports two installation methods: package and XML file. You can choose either method. If you only need to install one module separately, it is recommended to use XML file installation.

### 6.2.1 Install using package

The steps to install the device using the package are as follows:

- 1) Open CODESYS, click the "Tools" menu bar, and select "CODESYS Installer".

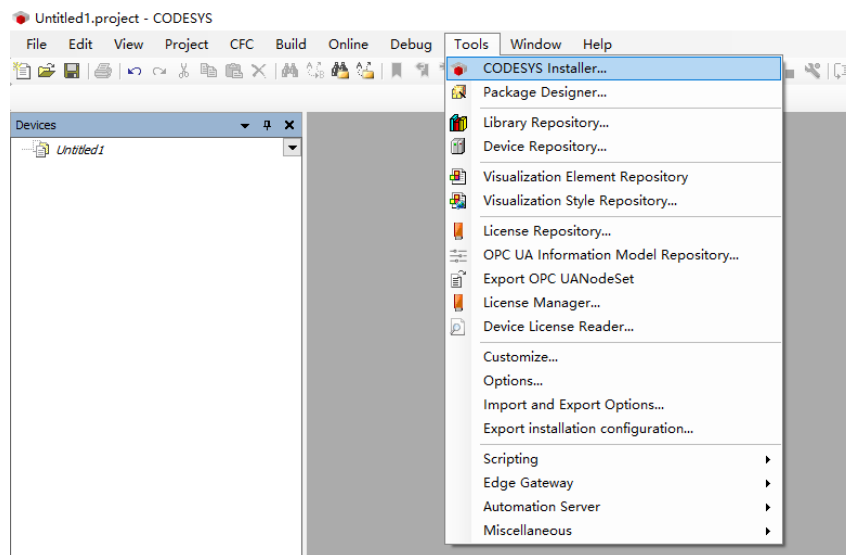


Figure 22 Select CODESYS installer22

- 2) In the CODESYS Installer, click Install File.

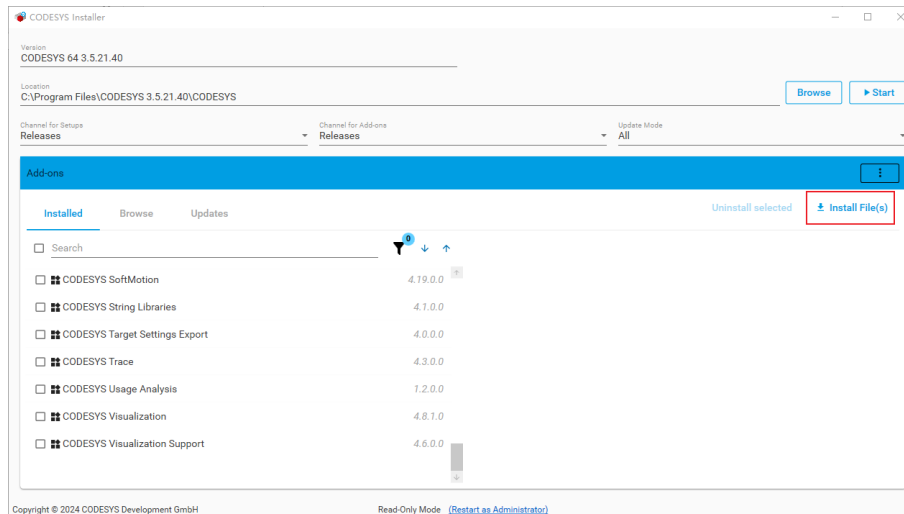


Figure 23 Click Install File23

- 3) Select INN-A3-CPUL-T4 and check "I want to continue despite of the missing signature(s)".

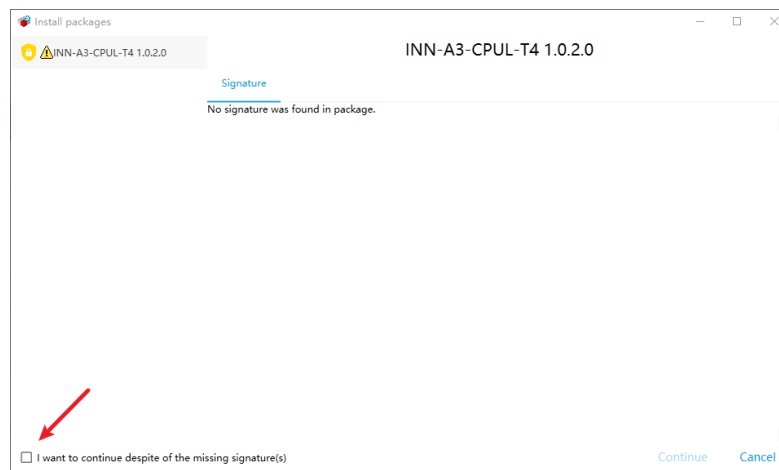


Figure 24 Select device24

- 4) Click "Continue" to complete the device installation.

## 6.2.2 Install using XML file

The steps to install a device using an XML file are as follows:

- 1) In the CODESYS menu bar, click "Tools" and select "Device Repository".

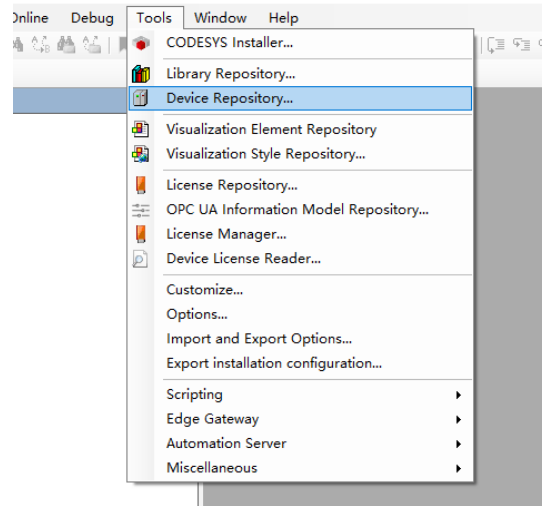


Figure 25 Tools menu drop-down box25

- 2) Store the device's .xml file and .bmp icon file in the same local directory. In the "Device Repository" window, click "Install", select the provided .xml format file and open it. After receiving the prompt "The relevant device has been installed in the device repository", click "Close" to complete the installation of the device.

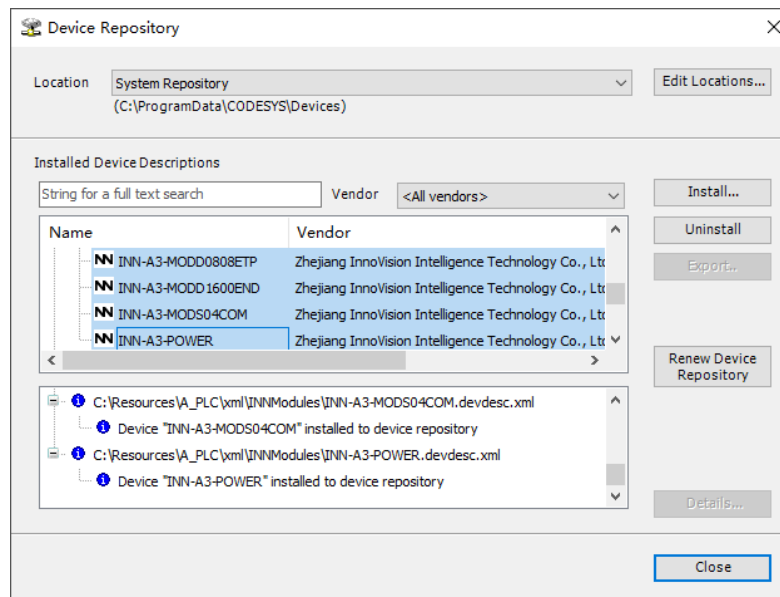


Figure 26 Installing the device into the device repository26

## 6.3 Adding devices and programming

This section uses CODESYS to demonstrate the module usage process. The steps are as follows:

- 1) When creating a new project, select "INN-A3-CPUL-T4" in the device drop-down menu.

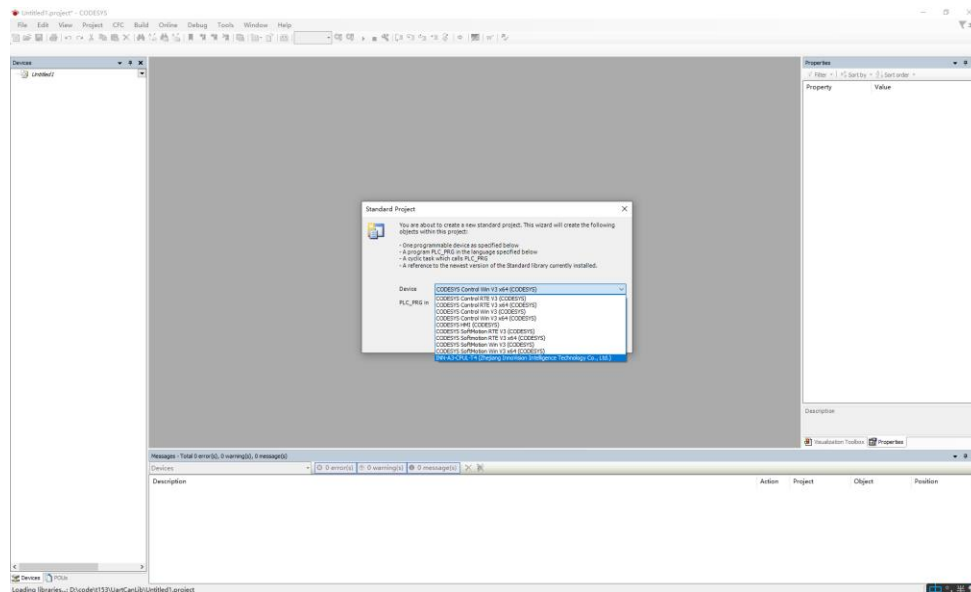


Figure 27 New construction27

- 2) Right-click "Add Device" in the blank space of the "Device" window on the left side of CODESYS, select the device you just installed, and click "Add Device". After adding it, click "Close" in the lower right corner.

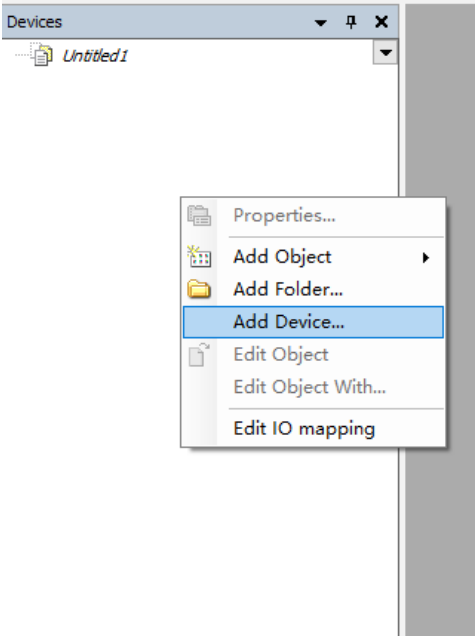


Figure 28 Device window28

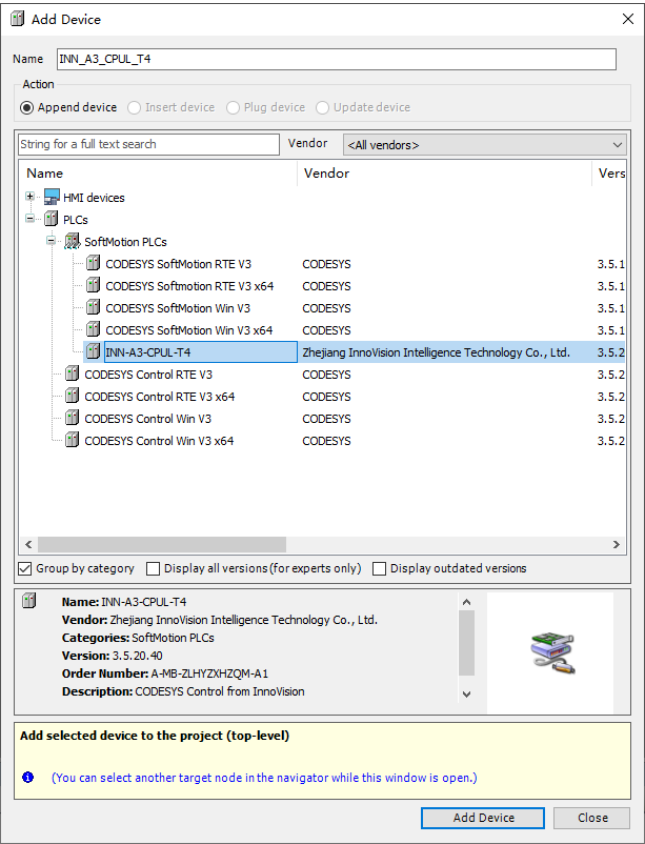


Figure 29 Add device29

3) Add corresponding I/O modules based on existing modules. Both manual adding and scanning adding methods are supported. It is recommended to use the scanning adding method.

a) Scan to add: After logging in to the device by referring to the program download and device operation chapters, in the CODESYS device window, right-click the controller and click "Scan Device". The system will automatically scan the I/O modules and display the scanned I/O modules in the window. Click "Copy all devices to project" to complete adding the I/O module.

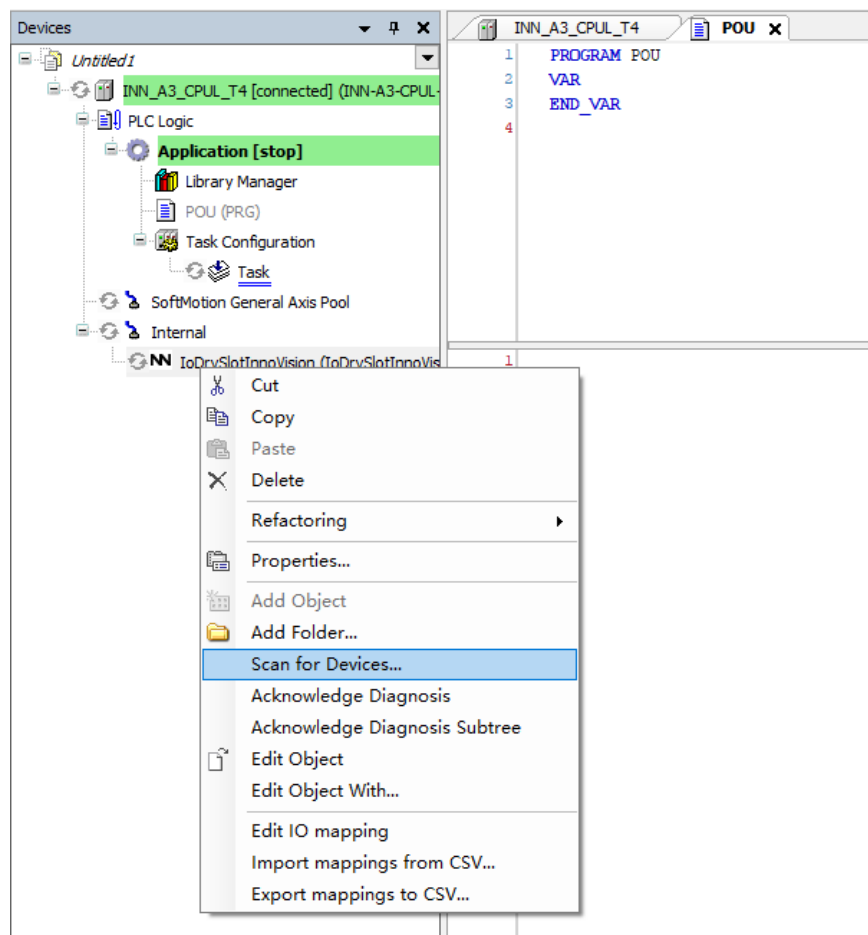


Figure 30 Scanning device30

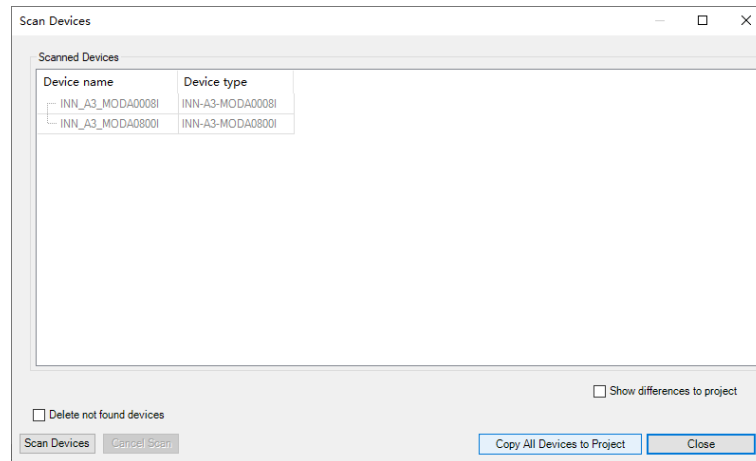


Figure 31 Copy all devices to the project

- b) Manual addition: In the CODESYS device window, right-click the controller, click "Add Device", and manually select the I/O module in the window to add.

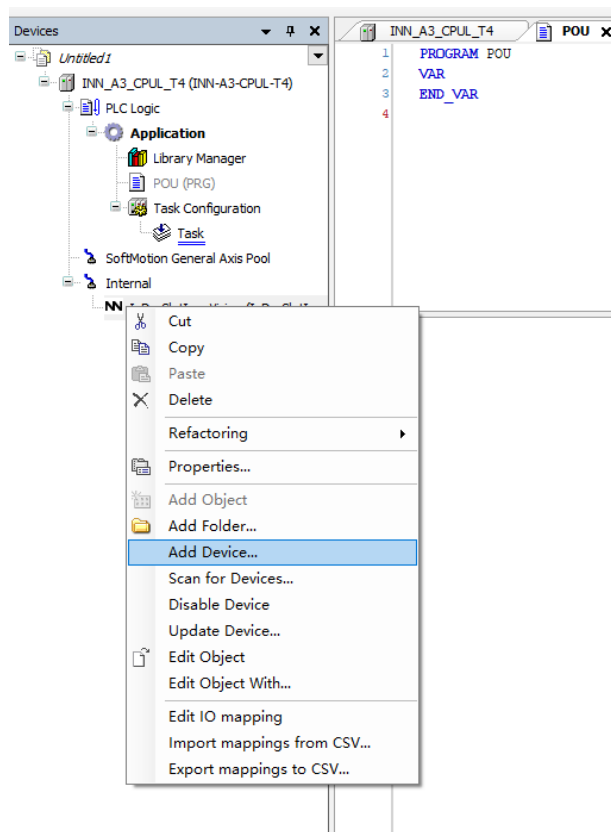


Figure 32 Add device

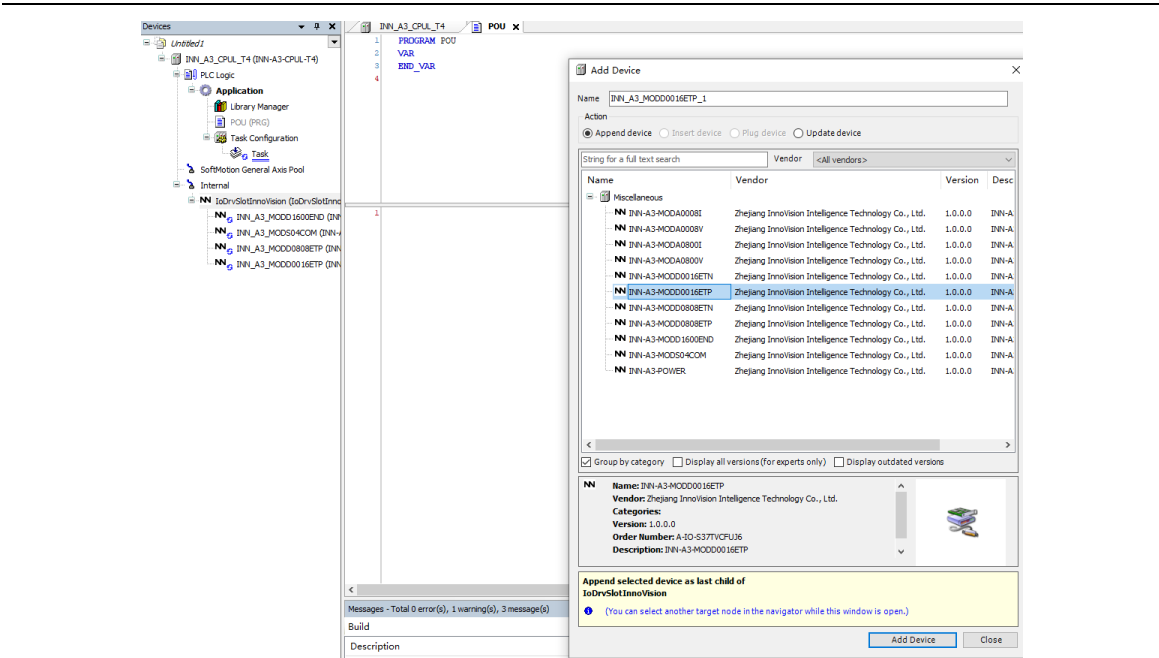


Figure 33 Add I/O module33

4) Write code and create variables.

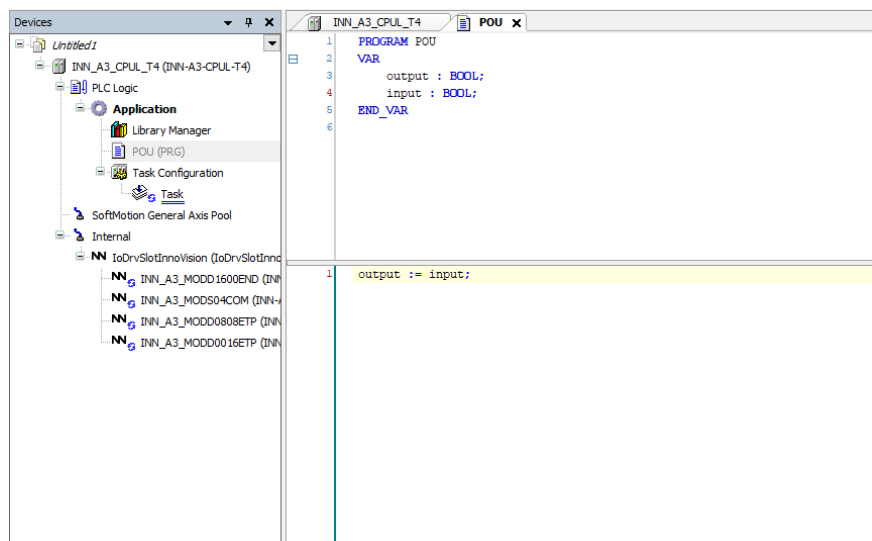


Figure 34 Code window34

- 5) Take the INN-A3-MODD1600END module as an example to associate variables with I/O modules.



When powered on for the first time or re-powered on, the INN-A3-MODD1600END module defaults to both PNP and NPN modes. The user needs to configure the NPN or PNP input mode through software:

- When mode\_pnp\_1\_npn\_2 is set to 1, it is PNP mode.
- When mode\_pnp\_1\_npn\_2 is set to 2, it is NPN mode.

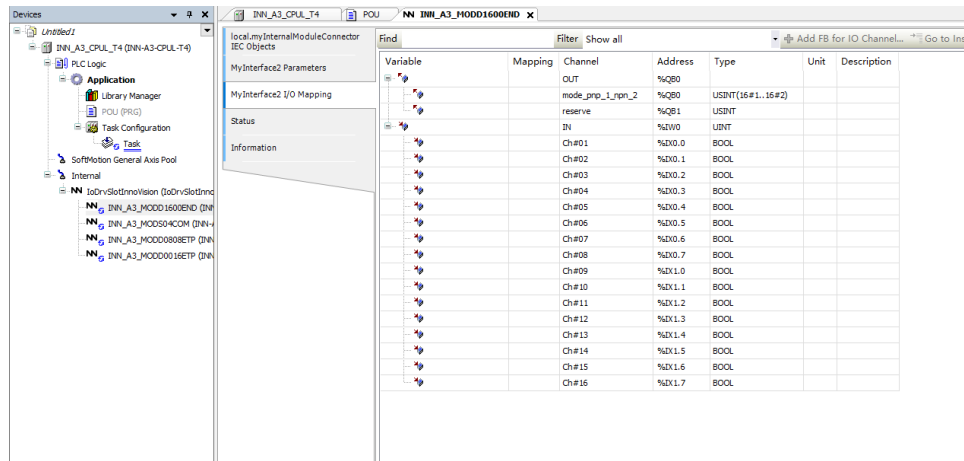


Figure 35 Setup mode35

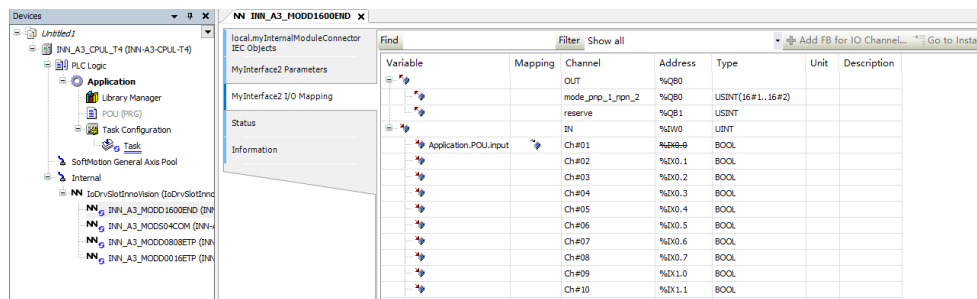


Figure 36 Setting mapping36

## 6.4 Program download and device operation

After completing the program writing and variable association, please

follow the steps below to download the program to the controller and run it:

- 1) Connect the hardware: Use a network cable to connect your computer to the X4 or X5 Ethernet port of the controller. Make sure the computer's IP address is in the same network segment as the controller.

## ⚠ CAUTION

The IP address of the controller can be configured and viewed through the APP in the Bluetooth and APP configuration chapter, or use the default IP address of the X4 network port (192.168.1.100). Do not occupy this IP when debugging the computer to avoid abnormal communication.

- 2) Set communication path:
  - a) In the "Device" tree on the left side of the CODESYS development environment, double-click the controller name to open the communication setting interface.

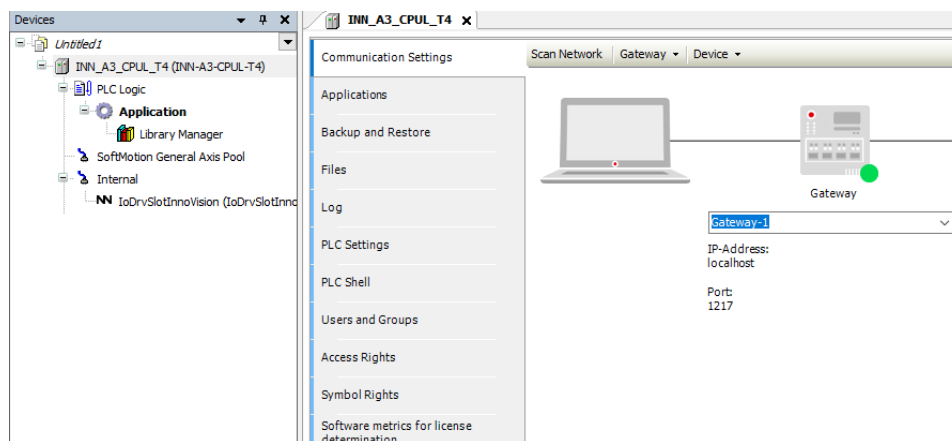


Figure 37 Communication settings37

- b) Click "Scan Network" and the software will automatically scan available devices in the same network segment. If the device is not scanned, you can manually enter the IP on the right and press Enter.

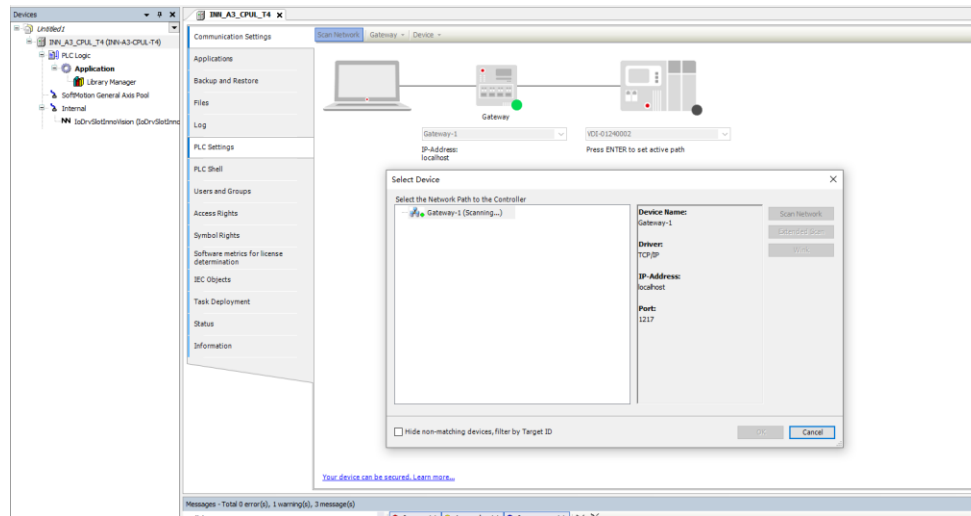


Figure 38 Scanning the network38

- c) In the scan results, select the target controller and click "OK" to establish the communication connection. After the connection is successful, the following window will be displayed.

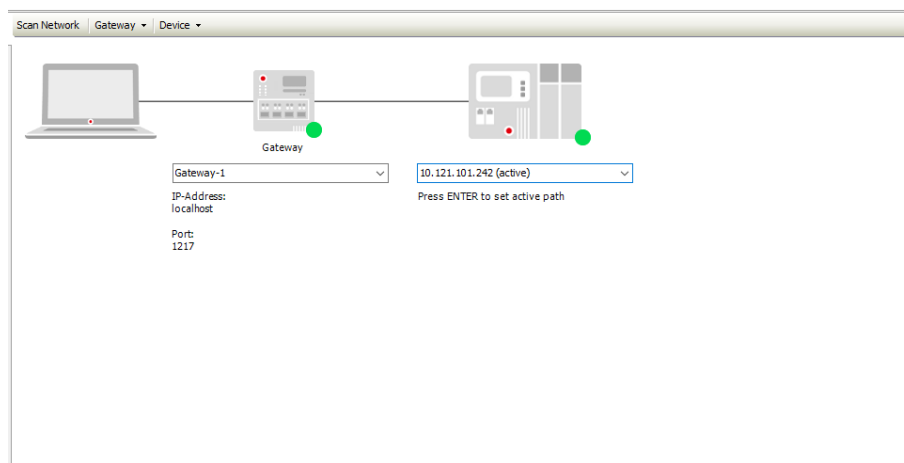


Figure 39 Network connection successful39

- 3) Login (download program):
  - a) In the menu bar, click "Online" -> "Login".
  - b) The system will prompt "There is no application on the device. Do you want to download the current application to the controller?", click "Yes".
  - c) CODESYS will start compiling and downloading the program to the controller. After the download is completed, the development environment will enter online monitoring mode, and the program is not yet running.
- 4) Run the program:
  - a) You can set the controller to running status in one of the following two ways: turn the DIP switch on the controller to the RUN position; click "Debug" -> "Start" in the CODESYS menu bar.
  - b) Verify that the STS indicator light on the controller turns solid green.
- 5) Stop the program: If you need to stop the program, you can operate it through the DIP switch (dial to STOP) or the CODESYS software (click "Debug" -> "Stop").

## **7 Operation and maintenance**

### **7.1 Running and shutdown operations**

When the controller is in STOP state, write the program to the controller. After completing the program writing, please follow the steps below to perform run and shutdown operations.

- 1) Start running:
  - a) Set the controller to RUN state through DIP switch or PLC development environment;
  - b) Confirm that the device status indicator light on the controller is solid green.
- 2) Stop running:
  - a) When it is necessary to stop running, just set the controller to STOP state through the DIP switch or PLC development environment.

### **7.2 Routine inspection and maintenance**

- 1) Status indicator light check: During daily operation, confirm that the equipment status indicator light (STS) is solid green. If it is solid yellow, it means the system is abnormal and the fault needs to be rectified.
- 2) Regular maintenance recommendations:
  - a) Check the ventilation and heat dissipation of the controller every month and remove dust accumulation.
  - b) Back up programs and parameters every quarter to prevent data loss.

- c) When shutting down for a long time, it is recommended to cut off the power and provide moisture protection.

## 8 Extension modules

The controller can be used with the following expansion modules:

Table 11 Expansion module model table11

| module           | Model              | Description                                       |
|------------------|--------------------|---------------------------------------------------|
| digital quantity | INN-A3-MODD0016ETP | 16-channel digital output module (PNP)            |
|                  | INN-A3-MODD0016ETN | 16-channel digital output module (NPN)            |
|                  | INN-A3-MODD1600END | 16-channel digital input module                   |
|                  | INN-A3-MODD0808ETP | 8-channel input and 8-channel output module (PNP) |
|                  | INN-A3-MODD0808ETN | 8-channel input and 8-channel output module (NPN) |
| Analog quantity  | INN-A3-MODA0800V   | 8-channel analog input module (voltage type)      |
|                  | INN-A3-MODA0008V   | 8-channel analog output module (voltage type)     |
|                  | INN-A3-MODA0800I   | 8-channel analog input module (current type)      |
|                  | INN-A3-MODA0008I   | 8-channel analog output module (current type)     |
| communication    | INN-A3-MODS04COM   | 4-way serial communication module                 |
| power supply     | INN-A3-POWER       | Power coupling module                             |



For more information, please visit INNOCTRL  
official website:

[www.innoctrl.com](http://www.innoctrl.com)

Kaihua County, Quzhou City, Zhejiang Province



---

Room 102, Comprehensive Building, No. 3 Taikang Road, Economic Development Zone  
sales@innoctrl.com  
www.innoctrl.com