Chengdu Ebyte Electronic Technology Co.,Ltd

# Wireless Modem

## User Manual




# M31-U-PN Series Profinet Distributed IO Host

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# 1 Product Overview

## 1.1 Product Introduction



The M31-U-PN series distributed I/O master is a slave module supporting the Profinet protocol . It maps I/O data to Profinet. Integration is achieved using GSD files, allowing PLCs to read and write I/O ports without requiring code. It supports various Siemens PLC models, including S7-200smart, S7-300, S7-1200, S7-1500, and S7-1500. It features two network ports, supports switch functionality, and integrates a Profinet-to-Modbus RTU gateway.

The device features a modular design, allowing users to flexibly expand it according to their actual needs. It supports multiple I/O types , and when the existing configuration is insufficient to meet specific application requirements, users can easily add matching I/O expansion modules without replacing the entire system, effectively saving costs and simplifying the on-site deployment process.

This product allows connection to up to 16 IO expansion modules (including the host itself) and is built in accordance with EMC Level 3 protection standards. IO input/output and power supply are fully isolated, providing excellent electromagnetic compatibility, outstanding performance and high reliability, and meets CE certification standards.

## 1.2 Features

- It uses the standard Profinet protocol for communication and can be networked with PLCs, configuration files, and host computers.
- Dual industrial Ethernet ports 10/100M auto-sensing, with built-in switch functionality
- Supports Profinet to Modbus RTU gateway function
- Modular splicing structure, small size, compact structure
- Supports differential analog input, 16-bit resolution, and accuracy within 1‰.
- Millisecond response time, with internal bus speeds up to 1ms.
- It can connect up to 16 I/O expansion modules ( including the host itself ) .
- The maximum number of I/O operations can be supported up to 256 bits.
- Arbitrary combinations of digital input/output, analog input/output, etc.
- Supports multiple I/O types including DI (NPN/PNP), AI (single-ended current), AI (differential current), AI (differential voltage), DO (PNP), DO (relay), AO (current), AO (voltage) , and PT100 RTD .
- It adopts industrial-grade hardware design and has multiple protections including electrostatic discharge, lightning surge, fast pulse group , and reverse power connection protection.

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- Features I/O input/output, RS485 isolation, and power isolation.
- Supports mounting via positioning holes and guide rails.
- Meets CE certification standards

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## 1.3 Product Model List

| Product Model | Product Specifications | digital input DI | Analog input AI | Switch output DO | Analog output AO |
|---|---|---|---|---|---|
| M31-AFAX4440G-U-PN | 4DI+4DO+4AI | 4 (NPN, PNP) | 4 (Differential Current) | 4 (Relay) | — |
| M31-AXAX8080G-U-PN | 8DI+8DO | 8 (NPN, PNP) | — | 8 (Relay) | — |
| M31-AXXX8000G-U-PN | 8DI | 8 (NPN, PNP) | — | — | — |
| M31-AXXXA000G-U-PN | 16 DI | 16 (NPN, PNP) | — | — | — |
| M31-AXEX8080G-U-PN | 8DI+8DO | 8 (NPN, PNP) | — | 8 (Transistors) | — |
| M31-XXAX00A0G-U-PN | 16 DO | — | — | 16 (Relay) | — |
| M31-XXEX00A0G-U-PN | 16 DO | — | — | 16 (Transistors) | — |
| M31-AXAX4040G-U-PN | 4 DI+ 4 DO | 4 (NPN, PNP) | — | 4 (Relay) | — |
| M31-XFXX0800G-U-PN | 8AI | — | 8 (Differential Current) | — | — |
| M31-XAXX0A00G-U-PN | 16AI | — | 16 (Single-ended current) | — | — |
| M31-XBXX0A00G-U-PN | 16AI | — | 16 (Single-ended voltage) | — | — |
| M31-XXXA0008G-U-PN | 8AO | — | — | — | 8 (Current) |
| M31-XXXB0008G-U-PN | 8AO | — | — | — | 8 (Voltage) |
| M31-XDXX0600G-U-PN | 6PT100 | — | PT100 RTD | — | — |

Please consult the official website for details on expansion module models.

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# 2 Technical indicators

## 2.1 Specifications

| Profinet Distributed I/O Host | | |
|---|---|---|
| **category** | **name** | **parameter** |
| power supply | Operating voltage | DC 9 ～ 36V ; with reverse polarity protection |
| | Power indicator | RUN red LED indicator |
| | Power consumption | 2-4W |
| communication | Communication interface | RJ45 *2 (dual network ports) , RS485 |
| | Communication Protocol | Standard Profinet (RT) protocol |
| | Internal bus | Up to 1ms |
| DI Input | Input type | NPN, PNP |
| | Input range | DC 10 ~ 28V |
| | Isolation methods | Each channel is individually opto-isolated. |
| | Input impedance | 7.2kΩ |
| | sampling frequency | 1000 Hz |
| | Counting frequency | <500Hz |
| | Filtering time | Default time 6ms |
| | Input Instructions | DI green LED indicator |
| AI input | Acquisition characteristics | Single-ended input/differential input (model optional) |
| | Input type | Single-ended current: 0-20mA, 4-20mA ; Differential current: 0-20mA, 4-20mA, ±20mA; Differential voltage: 0-5V, ±5V, 0-10V, ±10V; Single-ended voltage: 0-5V, 0-10V |
| | AI resolution | 16-bit (differential) |
| | AI accuracy | 1‰ (differential) / 3‰ (single-ended) |
| | refresh rate | Maximum 70Hz |
| | Input Instructions | AI Green LED Indicator |
| DO ( relay ) output | DO output type | Type A relay (normally open) |
| | DO output mode | Level output , pulse output |
| | Relay contact capacity | 5A 30VDC, 5A 250VAC (maximum total current supported at the same COM common |

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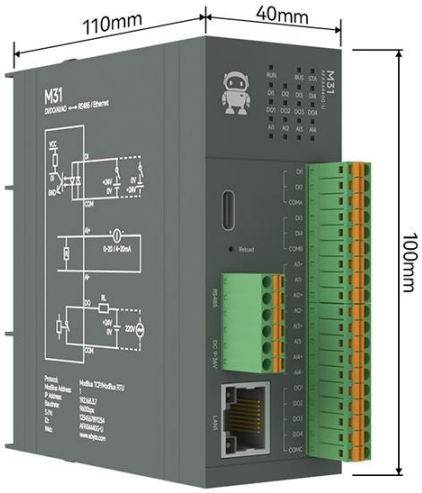

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| | | |
|---|---|---|
| | | terminal is 8A) |
| | Output Indicator | DO green LED indicator |
| DO ( PNP ) output | DO output type | PNP type |
| | DO output mode | Level output , pulse output |
| | Output capability | Supports output up to 0.5A per channel and 4A per COM port at voltages from 10 to 30V. |
| | Output Indicator | DO green LED indicator |
| AO output | Output type | 0-20mA, 4-20mA / 0-5V , 0-10V ( Voltage and current models are optional ) |
| | Output accuracy | 1‰ |
| | Output impedance | AOV: 40R AOI: 656kΩ |
| | Output Indicator | AO green LED indicator |
| PT100 input | Input type | 2/3 wire PT100 RTD |
| | Temperature measurement range | -200～850℃ |
| | Temperature resolution | 0.1℃ |
| | accuracy | ±0.1%±1℃ |
| | refresh rate | Maximum 70Hz |
| | Input Instructions | RTD Green LED Indicator |
| other | Product Dimensions | 110mm * 40mm * 100mm (Length * Width * Height) |
| | Operating temperature and humidity | -40 to +85℃, 5% to 95%RH (non-condensing) |
| | Storage temperature and humidity | -40 to +105℃, 5% to 95%RH (non-condensing) |
| | Installation method | Positioning holes and guide rail installation |

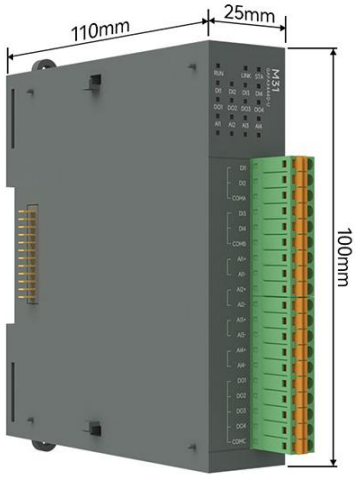
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## 2.2 Dimensions




主机




扩展模块

## 2.3 Port, button and LED indicator description

### 2.3.1 M31-AFAX4440G-U-PN

| M31-AFAX4440G-U-PN Port and Button Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| DI1 | DI1 digital input | DI1 digital input interface, used in conjunction with COM A |
| DI2 | DI2 digital input | DI2 digital input interface, used in conjunction with COM A |
| COM A | DI digital input common terminal | DI1-DI2 share COM A common terminal |
| DI3 | DI3 digital input | DI3 digital input interface, used in conjunction with COM B |
| DI4 | DI4 digital input | DI4 digital input interface, used in conjunction with COM B |
| COM B | DI digital input common terminal | DI3-DI4 share a common COM B terminal |
| DO1 | DO1 digital output | DO1 is a digital output interface used in conjunction with COMC. |
| DO2 | DO2 digital output | DO2 digital output interface, used in conjunction with COMC |
| DO3 | DO3 digital output | DO3 digital output interface, used in conjunction with COMC |
| DO4 | DO4 digital output | DO4 digital output interface, used in conjunction with COMC |
| COM C | DO's COM side | DO1-DO4 share a common COMC for use. |
| AI1+ | AI1 Analog Input + | AI1 analog input + interface, used in conjunction with AI1- |
| AI1- | AI1 Analog Input - | AI1 Analog Input Interface, for use with AI1+ |

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| | | |
|---|---|---|
| AI2+ | AI2 analog input + | AI2 analog input + interface, used in conjunction with AI2- |
| AI2- | AI2 Analog Input - | AI2 Analog Input Interface, for use with AI2+ |
| AI3+ | AI3 Analog Input + | AI3 analog input + interface, used in conjunction with AI3- |
| AI3- | AI3 Analog Input - | AI3 Analog Input Interface, for use with AI3+ |
| AI4+ | AI4 Analog Input + | AI4 analog input + interface, used in conjunction with AI4- |
| AI4- | AI4 Analog Input - | AI4 Analog Input Interface, for use with AI4+ |
| Reload | Factory reset/auto-negotiation | Press and hold for 5-10 seconds to restore factory settings; |
| A(RS485) | RS485 A interface | RS485 A interface |
| B(RS485) | RS485 B interface | RS485 B interface |
| G(RS485) | RS485 G interface | RS485 G interface |
| PE | Grounding | Grounding |
| V- (DC9-36V) | negative terminal of power supply | DC (9-36V) power supply negative terminal interface |
| V+ (DC9-36V) | Positive power supply | DC (9-36V) power supply positive terminal interface |
| LAN1 | network port | Standard RJ45 network cable interface |
| LAN 2 | network port | Standard RJ45 network cable interface |

| M31-AFAX4440G-U-PN Indicator Light Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| RUN | Equipment operating status indicator lights | Red LED light; On: Connection to master station initialization completed; Off: Device malfunction; 1Hz flashing: Not connected to master station, initialization incomplete; 4Hz flashing: Configuration software actively searches for and requests device flashing; 20Hz flashing: Gateway serial port data transmission and reception; |
| BUS | Device bus status indicator | Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flickering: There may be an abnormality in the operation of the device's internal bus. |
| STA | Bus communication indicator | Blue LED light; flashing: indicates data exchange between the host and the expansion module; off: indicates no data exchange between the host and the expansion module. |
| DI1 | DI1 Input Indicator | Green LED light; On: DI1 valid input; Off: DI1 invalid input. |
| DI2 | DI2 Input Indicator | Green LED light; On: DI2 input is valid; Off: DI2 input is invalid. |
| DI3 | DI3 Input Indicator | Green LED light; On: DI3 input is valid; Off: DI3 input is invalid. |
| DI4 | DI4 Input Indicator | Green LED light; On: DI4 input is valid; Off: DI4 input is invalid. |
| DO1 | DO1 output indicator light | Green LED light; On: DO1 relay closed; Off: DO1 relay open. |
| DO2 | DO2 output indicator light | Green LED light; On: DO2 relay closed; Off: DO2 relay open. |
| DO3 | DO3 output indicator light | Green LED light; On: DO3 relay closed; Off: DO3 relay open. |

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| | | |
|---|---|---|
| DO4 | DO4 output indicator light | Green LED light; On: DO4 relay closed; Off: DO4 relay open. |
| AI1 | AI1 Input Indicator Light | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI2 | AI2 Input Indicator Light | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI3 | AI3 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI4 | AI4 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |

### 2.3.2 M31-AXAX8080G-U-PN

| M31-AXAX8080G-U-PN Port and Button Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| DO1 | DI1 digital input | DI1 digital input interface, used in conjunction with COMA |
| DI2 | DI2 digital input | DI2 digital input interface, used in conjunction with COMA |
| DI3 | DI3 digital input | DI3 digital input interface, used in conjunction with COMA |
| DI4 | DI4 digital input | DI4 digital input interface, used in conjunction with COMA |
| COMA | DI digital input common terminal | DI1-DI4 share the same COMA common terminal |
| DI5 | DI5 digital input | DI5 digital input interface, used in conjunction with COMB. |
| DI6 | DI6 digital input | The DI6 digital input interface is used in conjunction with the COMB module. |
| DI7 | DI7 digital input | The DI7 digital input interface is used in conjunction with the COMB module. |
| DI8 | DI8 digital input | The DI8 digital input interface is used in conjunction with the COMB module. |
| COMB | DI digital input common terminal | DI5-DI8 share a common COMP terminal |
| DO1 | DO1 digital output | DO1 is a digital output interface used in conjunction with COMC. |
| DO2 | DO2 digital output | DO2 digital output interface, used in conjunction with COMC |
| DO3 | DO3 digital output | DO3 digital output interface, used in conjunction with COMC |
| DO4 | DO4 digital output | DO4 is a digital output interface used in conjunction with COMC. |
| DO5 | DO5 digital output | DO5 digital output interface, used in conjunction with COMC |
| DO6 | DO6 digital output | DO6 digital output interface, used in conjunction with COMC |
| DO7 | DO7 digital output | DO7 digital output interface, used in conjunction with COMC |
| DO8 | DO8 digital output | DO8 digital output interface, used in conjunction with COMC |
| COMC | DO's COM side | DO1-DO8 share a common COMC for coordinated use |

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| | | |
|---|---|---|
| Reload | Factory reset/auto-negotiation | Press and hold for 5-10 seconds to restore factory settings; |
| A(RS485) | RS485 A interface | RS485 A interface |
| B(RS485) | RS485 B interface | RS485 B interface |
| G(RS485) | RS485 G interface | RS485 G interface |
| PE | Grounding | Grounding |
| V- (DC9-36V) | negative terminal of power supply | DC (9-36V) power supply negative terminal interface |
| V+ (DC9-36V) | Positive power supply | DC (9-36V) power supply positive terminal interface |
| LAN1 | network port | Standard RJ45 network cable interface |
| LAN 2 | network port | Standard RJ45 network cable interface |

| M31-AXAX8080G-U-PN Indicator Light Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| RUN | Equipment operating status indicator lights | Red LED light; On: Connection to master station initialization completed; Off: Device malfunction; 1Hz flashing: Not connected to master station, initialization incomplete; 4Hz flashing: Configuration software actively searches for and requests device flashing; 20Hz flashing: Gateway serial port data transmission and reception; |
| BUS | Device bus status indicator | Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flashing: There may be an abnormality in the operation of the device's internal bus. |
| STA | Bus communication indicator | Blue LED light; flashing: indicates data exchange between the host and the expansion module; off: indicates no data exchange between the host and the expansion module. |
| DI1 | DI1 Input Indicator | Green LED light; On: DI1 valid input; Off: DI1 invalid input. |
| DI2 | DI2 Input Indicator | Green LED light; On: DI2 input is valid; Off: DI2 input is invalid. |
| DI3 | DI3 Input Indicator | Green LED light; On: DI3 input is valid; Off: DI3 input is invalid. |
| DI4 | DI4 Input Indicator | Green LED light; On: DI4 input is valid; Off: DI4 input is invalid. |
| DI5 | DI5 Input Indicator | Green LED light; On: DI5 input is valid; Off: DI5 input is invalid. |
| DI6 | DI6 Input Indicator | Green LED light; On: DI6 input is valid; Off: DI6 input is invalid. |
| DI7 | DI7 Input Indicator | Green LED light; On: DI7 valid input; Off: DI7 invalid input. |
| DI8 | DI8 Input Indicator | Green LED light; On: DI8 input is valid; Off: DI8 input is invalid. |
| DO1 | DO1 output indicator light | Green LED light; On: DO1 relay closed; Off: DO1 relay open. |
| DO2 | DO2 output indicator light | Green LED light; On: DO2 relay closed; Off: DO2 relay open. |
| DO3 | DO3 output indicator light | Green LED light; On: DO3 relay closed; Off: DO3 relay open. |
| DO4 | DO4 output indicator | Green LED light; On: DO4 relay closed; Off: DO4 relay open. |

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| | | |
|---|---|---|
| | light | |
| DO5 | DO5 output indicator light | Green LED light; On: DO5 relay closed; Off: DO5 relay open. |
| DO6 | DO6 output indicator light | Green LED light; On: DO6 relay closed; Off: DO6 relay open. |
| DO7 | DO7 output indicator light | Green LED light; On: DO7 relay closed; Off: DO7 relay open. |
| DO8 | DO8 output indicator light | Green LED light; On: DO8 relay closed; Off: DO8 relay open. |

### 2.3.3 M31-AXXX8000G-U-PN

| M31-AXXX8000G-U-PN Port and Button Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| DI1 | DI1 digital input | DI1 is a digital input interface used in conjunction with COM 1. |
| COM1 | COM port of D I1 | DI1 common terminal of digital input interface |
| DI 2 | DI 2 digital input | DI 2 is a digital input interface used in conjunction with COM 2. |
| COM2 | DI2 's COM port | The common terminal of the DI2 digital input interface |
| DI 3 | DI 3 digital input | DI 3 is a digital input interface used in conjunction with COM 3 . |
| COM3 | DI3 's COM port | The common terminal of the DI3 digital input interface |
| DI 4 | DI 4 digital input | DI 4 is a digital input interface used in conjunction with COM 4 . |
| COM4 | DI4 's COM port | The common terminal of the DI4 digital input interface |
| DI 5 | DI 5 digital input | DI 5 is a digital input interface used in conjunction with COM 5 . |
| COM5 | DI5 COM terminal | The common terminal of the DI5 digital input interface |
| DI 6 | DI 6 digital input | DI 6 digital input interface, used in conjunction with COM 6 |
| COM6 | DI61 COM port | The common terminal of the DI6 digital input interface |
| DI 7 | DI 7 digital input | DI 7 is a digital input interface used in conjunction with COM 7 . |
| COM7 | DI7 's COM port | The common terminal of the DI7 digital input interface |
| DI 8 | DI 8 digital input | DI 8 digital input interface, used in conjunction with COM 8 |
| COM8 | DI8 's COM port | The common terminal of the DI8 digital input interface |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| Reload | Factory reset/auto-negotiation | Press and hold for 5-10 seconds to restore factory settings; |
| A(RS485) | RS485 A interface | RS485 A interface |
| B(RS485) | RS485 B interface | RS485 B interface |

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| | | |
|---|---|---|
| G(RS485) | RS485 G interface | RS485 G interface |
| PE | Grounding | Grounding |
| V- (DC9-36V) | negative terminal of power supply | DC (9-36V) power supply negative terminal interface |
| V+ (DC9-36V) | Positive power supply | DC (9-36V) power supply positive terminal interface |
| LAN1 | network port | Standard RJ45 network cable interface |
| LAN 2 | network port | Standard RJ45 network cable interface |

| M31-AXXX8000G-U-PN Indicator Light Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| RUN | Power indicator light | Red LED light; On: Connection to master station initialization completed; Off: Device malfunction; 1Hz flashing: Not connected to master station, initialization incomplete; 4Hz flashing: Configuration software actively searches for and requests device flashing; 20Hz flashing: Gateway serial port data transmission and reception; |
| BUS | Device bus status indicator | Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flickering: There may be an abnormality in the operation of the device's internal bus. |
| STA | Bus communication indicator | Blue LED light; flashing: indicates data exchange between the host and the expansion module; off: indicates no data exchange between the host and the expansion module. |
| DI 1 | DI1 Input Indicator | Green LED light; On: DI1 valid input; Off: DI1 invalid input. |
| DI 2 | DI 2 Input Indicator | Green LED light; On: DI 2 valid input; Off: DI 2 invalid input. |
| DI 3 | DI 3 Input Indicator | Green LED light; On: DI 3 valid input; Off: DI 3 invalid input. |
| DI 4 | DI 4 Input Indicator | Green LED light; On: DI 4 valid input; Off: DI 4 invalid input. |
| DI 5 | DI 5 Input Indicator | Green LED light; On: DI 5 valid input; Off: DI 5 invalid input. |
| DI 6 | DI 6 Input Indicator | Green LED light; On: DI 6 valid input; Off: DI 6 invalid input. |
| DI 7 | DI 7 Input Indicator | Green LED light; On: DI 7 valid input; Off: DI 7 invalid input. |
| DI 8 | DI 8 Input Indicator | Green LED light; On: DI 8 valid input; Off: DI 8 invalid input. |

### 2.3.4 M31-AXXXA000G-U-PN

| M31-AXXXA000G-U-PN Port and Button Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| DI 1 | DI 1 digital input | DI1 digital input interface, used in conjunction with COM A |
| DI 2 | DI 2 digital input | DI 2 is a digital input interface used in conjunction with COM A. |
| DI 3 | DI 3 digital input | DI 3 digital input interface, used in conjunction with COM A |
| DI 4 | DI 4 digital input | DI 4 digital input interface, used in conjunction with COM A |
| DI 5 | DI 5 digital input | DI 5 digital input interface, used in conjunction with COM A |

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| | | |
|---|---|---|
| DI 6 | DI 6 digital input | DI 6 digital input interface, used in conjunction with COM A |
| DI 7 | DI 7 digital input | DI 7 digital input interface, used in conjunction with COM A |
| DI 8 | DI 8 digital input | DI 8 digital input interface, used in conjunction with COM A |
| COMA | DI digital input common terminal | DI1-DI8 share the same COMA common terminal |
| DI 9 | DI 9 digital input | DI 9 digital input interface, used in conjunction with COM A |
| DI1 0 | DI1 0 digital input | DI 10 digital input interface, used in conjunction with COM A |
| DI1 1 | DI1 1- digit input | DI1 is a digital input interface used in conjunction with COM A. |
| DI1 2 | DI1 2 digital input | DI1 2 is a digital input interface used in conjunction with COM A. |
| DI1 3 | DI1 3 digital input | DI1 3 digital input interface, used in conjunction with COM A |
| DI1 4 | DI1 4- digit digital input | DI1 4 digital input interface, used in conjunction with COM A |
| DI1 5 | DI1 5 digital input | DI1 5 digital input interface, used in conjunction with COM A |
| DI1 6 | DI1 6- digit digital input | DI1 6 digital input interface, used in conjunction with COM A |
| COMB | DI digital input common terminal | DI 9 - DI 16 share a common COM B terminal |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| Reload | Factory reset/auto-negotiation | Press and hold for 5-10 seconds to restore factory settings; |
| A(RS485) | RS485 A interface | RS485 A interface |
| B(RS485) | RS485 B interface | RS485 B interface |
| G(RS485) | RS485 G interface | RS485 G interface |
| PE | Grounding | Grounding |
| V- (DC9-36V) | negative terminal of power supply | DC (9-36V) power supply negative terminal interface |
| V+ (DC9-36V) | Positive power supply | DC (9-36V) power supply positive terminal interface |
| LAN1 | network port | Standard RJ45 network cable interface |
| LAN 2 | network port | Standard RJ45 network cable interface |

| M31-AXXXA000G-U-PN Indicator Light Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| RUN | Power indicator light | Red LED light; On: Connection to master station initialization completed; Off: Device malfunction; 1Hz flashing: Not connected to master station, initialization incomplete; 4Hz flashing: Configuration software actively searches for and requests device flashing; 20Hz flashing: Gateway serial port data transmission and reception; |
| BUS | Device bus status indicator | Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flickering: There may be an abnormality in the operation of the device's internal bus. |
| STA | Bus communication | Blue LED light; flashing: indicates data exchange between the host and the |

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| | | |
|---|---|---|
| | indicator | expansion module; off: indicates no data exchange between the host and the expansion module. |
| DI1 | DI1 Input Indicator | Green LED light; On: DI1 valid input; Off: DI1 invalid input. |
| DI2 | DI2 Input Indicator | Green LED light; On: DI2 input is valid; Off: DI2 input is invalid. |
| DI3 | DI3 Input Indicator | Green LED light; On: DI3 input is valid; Off: DI3 input is invalid. |
| DI4 | DI4 Input Indicator | Green LED light; On: DI4 input is valid; Off: DI4 input is invalid. |
| DI5 | DI5 Input Indicator | Green LED light; On: DI5 input is valid; Off: DI5 input is invalid. |
| DI6 | DI6 Input Indicator | Green LED light; On: DI6 input is valid; Off: DI6 input is invalid. |
| DI7 | DI7 Input Indicator | Green LED light; On: DI7 valid input; Off: DI7 invalid input. |
| DI8 | DI8 Input Indicator | Green LED light; On: DI8 input is valid; Off: DI8 input is invalid. |
| DI 9 | DI 9 Input Indicator | Green LED light; On: DI 9 valid input; Off: DI 9 invalid input. |
| DI 10 | DI 10 Input Indicator | Green LED light; On: DI 10 valid input; Off: DI 10 invalid input. |
| DI 11 | DI 11 Input Indicator | Green LED light; On: DI 11 valid input; Off: DI 11 invalid input. |
| DI 12 | DI 12 Input Indicator | Green LED light; On: DI 12 valid input; Off: DI 12 invalid input. |
| DI 13 | DI 13 Input Indicator | Green LED light; On: DI 13 valid input; Off: DI 13 invalid input. |
| DI 14 | DI 14 Input Indicator | Green LED light; On: DI 14 valid input; Off: DI 14 invalid input. |
| DI 15 | DI 15 Input Indicator | Green LED light; On: DI 15 valid input; Off: DI 15 invalid input. |
| DI 16 | DI 16 Input Indicator | Green LED light; On: D16 valid input; Off: D16 invalid input. |

### 2.3.5 M31-AXEX8080G-U-PN

| M31-AXEX8080G-U-PN Port and Button Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| DI 1 | DI1 digital input | DI1 digital input interface, used in conjunction with COMA |
| DI2 | DI2 digital input | DI2 digital input interface, used in conjunction with COMA |
| DI3 | DI3 digital input | DI3 digital input interface, used in conjunction with COMA |
| DI4 | DI4 digital input | DI4 digital input interface, used in conjunction with COMA |
| COMA | DI digital input common terminal | DI1-DI4 share the same COMA common terminal |
| DI5 | DI5 digital input | DI5 digital input interface, used in conjunction with COMB. |
| DI6 | DI6 digital input | The DI6 digital input interface is used in conjunction with the COMB module. |
| DI7 | DI7 digital input | DI7 digital input interface, used in conjunction with COMB. |
| DI8 | DI8 digital input | The DI8 digital input interface is used in conjunction with the COMB module. |
| COMB | DI digital input common terminal | DI5-DI8 share a common COMB terminal |
| DO1 | DO1 digital output | DO1 is a digital output interface used in conjunction with COMC. |
| DO2 | DO2 digital output | DO2 digital output interface, used in conjunction with COMC |

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| | | |
|---|---|---|
| DO3 | DO3 digital output | DO3 digital output interface, used in conjunction with COMC |
| DO4 | DO4 digital output | DO4 digital output interface, used in conjunction with COMC |
| DO5 | DO5 digital output | DO5 digital output interface, used in conjunction with COMC |
| DO6 | DO6 digital output | DO6 digital output interface, used in conjunction with COMC |
| DO7 | DO7 digital output | DO7 digital output interface, used in conjunction with COMC |
| DO8 | DO8 digital output | DO8 digital output interface, used in conjunction with COMC |
| COMC | DO's COM port | DO1-DO8 share a common COMC for coordinated use |
| Reload | Factory reset/auto-negotiation | Press and hold for 5-10 seconds to restore factory settings; |
| A(RS485) | RS485 A interface | RS485 A interface |
| B(RS485) | RS485 B interface | RS485 B interface |
| G(RS485) | RS485 G interface | RS485 G interface |
| PE | Grounding | Grounding |
| V- (DC9-36V) | negative terminal of power supply | DC (9-36V) power supply negative terminal interface |
| V+ (DC9-36V) | Positive power supply | DC (9-36V) power supply positive terminal interface |
| LAN1 | network port | Standard RJ45 network cable interface |
| LAN 2 | network port | Standard RJ45 network cable interface |

| M31-AXEX8080G-U-PN Indicator Light Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| RUN | Power indicator light | Red LED light; On: Connection to master station initialization completed; Off: Device malfunction; 1Hz flashing: Not connected to master station, initialization incomplete; 4Hz flashing: Configuration software actively searches for and requests device flashing; 20Hz flashing: Gateway serial port data transmission and reception; |
| BUS | Device bus status indicator | Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flickering: There may be an abnormality in the operation of the device's internal bus. |
| STA | Bus communication indicator | Blue LED light; flashing: indicates data exchange between the host and the expansion module; off: indicates no data exchange between the host and the expansion module. |
| DI1 | DI1 Input Indicator | Green LED light; On: DI1 valid input; Off: DI1 invalid input. |
| DI2 | DI2 Input Indicator | Green LED light; On: DI2 input is valid; Off: DI2 input is invalid. |
| DI3 | DI3 Input Indicator | Green LED light; On: DI3 input is valid; Off: DI3 input is invalid. |
| DI4 | DI4 Input Indicator | Green LED light; On: DI4 input is valid; Off: DI4 input is invalid. |
| DI5 | DI5 Input Indicator | Green LED light; On: DI5 input is valid; Off: DI5 input is invalid. |
| DI6 | DI6 Input Indicator | Green LED light; On: DI6 input is valid; Off: DI6 input is invalid. |
| DI7 | DI7 Input Indicator | Green LED light; On: DI7 valid input; Off: DI7 invalid input. |
| DI8 | DI8 Input Indicator | Green LED light; On: DI8 input is valid; Off: DI8 input is invalid. |
| DO1 | DO1 output indicator | Green LED light; On: DO1 transistor is conducting; Off: DO1 transistor is |

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| | | |
|---|---|---|
| | light | cut off. |
| DO2 | DO2 output indicator light | Green LED light; On: DO 2 transistor is conducting; Off: DO 2 transistor is cut off. |
| DO3 | DO3 output indicator light | Green LED light; On: DO 3 transistor is conducting; Off: DO 3 transistor is cut off. |
| DO4 | DO4 output indicator light | Green LED light; On: DO 4 transistor is conducting; Off: DO 4 transistor is cut off. |
| DO5 | DO5 output indicator light | Green LED light; On: DO 5 transistor is conducting; Off: DO 5 transistor is cut off. |
| DO6 | DO6 output indicator light | Green LED light; On: DO 6 transistor is conducting; Off: DO 6 transistor is cut off. |
| DO7 | DO7 output indicator light | Green LED light; On: DO 7 transistor is conducting; Off: DO 7 transistor is cut off. |
| DO8 | DO8 output indicator light | Green LED light; On: DO 8 transistor is conducting; Off: DO 8 transistor is cut off. |

### 2.3.6 M31-XXAX00A0G-U-PN

| M31-XXAX00A0G-U-PN Port and Button Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| DO1 | DO1 digital output | DO1 digital output interface, used in conjunction with COMA |
| DO2 | DO 2 digital output | DO 2 is a digital output interface used in conjunction with COMA. |
| DO3 | DO 3 digital output | DO 3 digital output interface, used in conjunction with COMA |
| DO4 | DO 4 digital output | DO 4 digital output interface, used in conjunction with COMA |
| DO5 | DO 5 digital output | DO 5 digital output interface, used in conjunction with COMA |
| DO 6 | DO 6 digital output | DO 6 digital output interface, used in conjunction with COMA |
| DO7 | DO 7 digital output | DO 7 digital output interface, used in conjunction with COMA |
| DO8 | DO 8 digital output | DO 8 digital output interface, used in conjunction with COMA |
| COM A | DO's COM side | DO1 - DO8 share COM A common terminal |
| DO 9 | DO 9 digital output | DO 9 digital output interface, used in conjunction with COM 8 |
| DO 10 | DO 10 digital output | DO 10 digital output interface, used in conjunction with COM B |
| DO 11 | DO1 1- way digital output | DO1 is a digital output interface for use with COM B. |
| DO 12 | DO1 2 digital output | DO1 2 -bit digital output interface, used in conjunction with COM B |
| DO 13 | DO1 3- way digital output | DO1 3 digital output interface, used in conjunction with COM B |
| DO 14 | DO1 4- way digital output | DO1 4 -way digital output interface, used in conjunction with COM B |
| DO 15 | DO1 5- way digital output | DO1 5 digital output interface, used in conjunction with COM B |
| DO 16 | DO1 6- digit digital output | DO1 6 -bit digital output interface, used in conjunction with COM B |

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| | | |
|---|---|---|
| COM B | DO's COM side | DO 9 - DO 16 share a common COM B for use. |
| COM B | DO's COM side | DO 9 - DO 16 share a common COM B for use. |
| Reload | Factory reset/auto-negotiation | Press and hold for 5-10 seconds to restore factory settings; |
| A(RS485) | RS485 A interface | RS485 A interface |
| B(RS485) | RS485 B interface | RS485 B interface |
| G(RS485) | RS485 G interface | RS485 G interface |
| PE | Grounding | Grounding |
| V- (DC9-36V) | negative terminal of power supply | DC (9-36V) power supply negative terminal interface |
| V+ (DC9-36V) | Positive power supply | DC (9-36V) power supply positive terminal interface |
| LAN1 | network port | Standard RJ45 network cable interface |
| LAN 2 | network port | Standard RJ45 network cable interface |

| M31-XXAX00A0G-U-PN Indicator Light Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| RUN | Power indicator light | Red LED light; On: Connection to master station initialization completed; Off: Device malfunction; 1Hz flashing: Not connected to master station, initialization incomplete; 4Hz flashing: Configuration software actively searches for and requests device flashing; 20Hz flashing: Gateway serial port data transmission and reception; |
| BUS | Device bus status indicator | Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flickering: There may be an abnormality in the operation of the device's internal bus. |
| STA | Bus communication indicator | Blue LED light; flashing: indicates data exchange between the host and the expansion module; off: indicates no data exchange between the host and the expansion module. |
| DO1 | DO1 output indicator light | Green LED light; On: DO1 relay closed; Off: DO1 relay open. |
| DO2 | DO2 output indicator light | Green LED light; On: DO 2 relay closed; Off: DO 2 relay open. |
| DO3 | DO3 output indicator light | Green LED light; On: DO 3 relay closed; Off: DO 3 relay open. |
| DO4 | DO4 output indicator light | Green LED light; On: DO 4 relay closed; Off: DO 4 relay open. |
| DO5 | DO5 output indicator light | Green LED light; On: DO 5 relay closed; Off: DO 5 relay open. |
| DO6 | DO6 output indicator light | Green LED light; On: DO 6 relay closed; Off: DO 6 relay open. |
| DO7 | DO7 output indicator light | Green LED light; On: DO 7 relay closed; Off: DO 7 relay open. |

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| | | |
|---|---|---|
| DO8 | DO8 output indicator light | Green LED light; On: DO 8 relay closed; Off: DO 8 relay open. |
| DO 9 | DO 9 output indicator light | Green LED light; On: DO 9 relay closed; Off: DO 9 relay open. |
| DO 10 | DO 10 output indicator light | Green LED light; On: DO1 0 relay closed; Off: DO1 0 relay open. |
| DO 11 | DO 11 output indicator | Green LED light; On: DO 1 1 relay closed; Off: DO 1 1 relay open. |
| DO 12 | DO 12 output indicator | Green LED light; On: DO12 relay closed; Off: DO12 relay open. |
| DO 13 | DO 13 Output Indicator | Green LED light; On: DO1 3 relay closed; Off: DO1 3 relay open. |
| DO 14 | DO 14 Output Indicator | Green LED light; On: DO1 4 relay closed; Off: DO1 4 relay open. |
| DO 15 | DO 15 Output Indicator | Green LED light; On: DO15 relay closed; Off: DO15 relay open. |
| DO 16 | DO 16 Output Indicator | Green LED light; On: DO1 6 relay closed; Off: DO1 6 relay open. |

### 2.3.7 M31-XXEX00A0G-U-PN

| M31-XXEX00A0G-U-PN Port and Button Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| DO1 | DO1 digital output | DO1 digital output interface, used in conjunction with COMA |
| D O 2 | DO 2 digital output | DO 2 is a digital output interface used in conjunction with COMA. |
| DO3 | DO 3 digital output | DO 3 digital output interface, used in conjunction with COMA |
| DO4 | DO 4 digital output | DO 4 digital output interface, used in conjunction with COMA |
| DO5 | DO 5 digital output | DO 5 digital output interface, used in conjunction with COMA |
| DO 6 | DO 6 digital output | DO 6 digital output interface, used in conjunction with COMA |
| DO7 | DO 7 digital output | DO 7 digital output interface, used in conjunction with COMA |
| DO 8 | DO 8 digital output | DO 8 digital output interface, used in conjunction with COMA |
| COM A | DO's COM side | DO1 - DO8 share COM A common terminal |
| DO 9 | DO 9 digital output | DO 9 digital output interface, used in conjunction with COM 8 |
| DO 10 | DO 10 digital output | DO 10 digital output interface, used in conjunction with COM B |
| DO 11 | DO1 1- way digital output | DO1 is a digital output interface for use with COM B. |
| DO 12 | DO1 2 digital output | DO1 2 -bit digital output interface, used in conjunction with COM 8. |
| DO 13 | DO1 3- way digital output | DO1 3 digital output interface, used in conjunction with COM B |
| DO 14 | DO1 4- way digital output | DO1 4 -way digital output interface, used in conjunction with COM B |
| DO 15 | DO1 5- way digital output | DO1 5 digital output interface, used in conjunction with COM B |
| DO 16 | DO1 6- digit digital output | DO1 6 -bit digital output interface, used in conjunction with COM B |

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| | | |
|---|---|---|
| COM B | DO's COM side | DO 9 - DO 16 share a common COM B for use. |
| COM B | DO's COM side | DO 9 - DO 16 share a common COM B for use. |
| Reload | Factory reset/auto-negotiation | Press and hold for 5-10 seconds to restore factory settings; |
| A(RS485) | RS485 A interface | RS485 A interface |
| B(RS485) | RS485 B interface | RS485 B interface |
| G(RS485) | RS485 G interface | RS485 G interface |
| PE | Grounding | Grounding |
| V- (DC9-36V) | negative terminal of power supply | DC (9-36V) power supply negative terminal interface |
| V+ (DC9-36V) | Positive power supply | DC (9-36V) power supply positive terminal interface |
| LAN1 | network port | Standard RJ45 network cable interface |
| LAN 2 | network port | Standard RJ45 network cable interface |

| M31-XXEX00A0G-U-PN Indicator Light Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| RUN | Power indicator light | Red LED light; On: Connection to master station initialization completed; Off: Device malfunction; 1Hz flashing: Not connected to master station, initialization incomplete; 4Hz flashing: Configuration software actively searches for and requests device flashing; 20Hz flashing: Gateway serial port data transmission and reception; |
| BUS | Device bus status indicator | Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flashing: There may be an abnormality in the operation of the device's internal bus. |
| STA | Bus communication indicator | Blue LED light; flashing: indicates data exchange between the host and the expansion module; off: indicates no data exchange between the host and the expansion module. |
| DO1 | DO1 output indicator light | Green LED light; On: DO1 relay closed; Off: DO1 relay open. |
| DO2 | DO2 output indicator light | Green LED light; On: DO 2 relay closed; Off: DO 2 relay open. |
| DO3 | DO3 output indicator light | Green LED light; On: DO 3 relay closed; Off: DO 3 relay open. |
| DO4 | DO4 output indicator light | Green LED light; On: DO 4 relay closed; Off: DO 4 relay open. |
| DO5 | DO5 output indicator light | Green LED light; On: DO 5 relay closed; Off: DO 5 relay open. |
| DO6 | DO6 output indicator light | Green LED light; On: DO 6 relay closed; Off: DO 6 relay open. |
| DO7 | DO7 output indicator light | Green LED light; On: DO 7 relay closed; Off: DO 7 relay open. |

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| | | |
|---|---|---|
| DO8 | DO8 output indicator light | Green LED light; On: DO 8 relay closed; Off: DO 8 relay open. |
| DO 9 | DO 9 output indicator light | Green LED light; On: DO 9 relay closed; Off: DO 9 relay open. |
| DO 10 | DO 10 output indicator light | Green LED light; On: DO1 0 relay closed; Off: DO1 0 relay open. |
| DO 11 | DO 11 output indicator | Green LED light; On: DO 1 1 relay closed; Off: DO 1 1 relay open. |
| DO 12 | DO 12 output indicator | Green LED light; On: DO12 relay closed; Off: DO12 relay open. |
| DO 13 | DO 13 Output Indicator | Green LED light; On: DO1 3 relay closed; Off: DO1 3 relay open. |
| DO 14 | DO 14 Output Indicator | Green LED light; On: DO1 4 relay closed; Off: DO1 4 relay open. |
| DO 15 | DO 15 Output Indicator | Green LED light; On: DO15 relay closed; Off: DO15 relay open. |
| DO 16 | DO 16 Output Indicator | Green LED light; On: DO1 6 relay closed; Off: DO1 6 relay open. |

### 2.3.8 M31-AXAX4040G-U-PN

| M31-AXAX4040G-U-PN Port and Button Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| DI 1 | DI1 digital input | DI 1 is a digital input interface used in conjunction with COM 1 . |
| COM 1 | DI 1 Common terminal for digital input | the DI1 digital output interface |
| DI 2 | DI 2 digital input | DI 2 is a digital input interface used in conjunction with COM 2. |
| COM 2 | DI 2 Common Terminal for Digital Input | the DI2 digital output interface |
| DI 3 | DI 3 digital input | DI 3 is a digital input interface used in conjunction with COM 3 . |
| COM 3 | DI 3 digital input common terminal | the DI3 digital output interface |
| DI 4 | DI 4 digital input | DI 4 is a digital input interface used in conjunction with COM 4 . |
| COM 4 | DI 4 Common Terminal for Digital Inputs | the DI4 digital output interface |
| DO 1 | DO 1 digital output | DO 1 is a digital output interface used in conjunction with COM 1 . |
| COM 1 | COM port of DO 1 | DO 1 common terminal of digital output interface |
| DO 2 | DO 2 digital output | DO 2 is a digital output interface used in conjunction with COM 2. |
| COM 2 | COM port of DO 2 | DO 2 common terminal of digital output interface |
| DO 3 | DO 3 digital output | DO 3 is a digital output interface used in conjunction with COM 3 . |

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| | | |
|---|---|---|
| COM 3 | DO 3 COM port | DO 3 digital output interface common terminal |
| DO 4 | DO 4 digital output | DO 4 is a digital output interface used in conjunction with COM 4 . |
| COM 5 | COM port of DO 4 | DO 4 digital output interface common terminal |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| Reload | Factory reset/auto-negotiation | Press and hold for 5-10 seconds to restore factory settings; |
| A(RS485) | RS485 A interface | RS485 A interface |
| B(RS485) | RS485 B interface | RS485 B interface |
| G(RS485) | RS485 G interface | RS485 G interface |
| PE | Grounding | Grounding |
| V- (DC9-36V) | negative terminal of power supply | DC (9-36V) power supply negative terminal interface |
| V+ (DC9-36V) | Positive power supply | DC (9-36V) power supply positive terminal interface |
| LAN1 | network port | Standard RJ45 network cable interface |
| LAN 2 | network port | Standard RJ45 network cable interface |

| M31-AXAX4040G-U-PN Indicator Light Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| RUN | Power indicator light | Red LED light; On: Connection to master station initialization completed; Off: Device malfunction; 1Hz flashing: Not connected to master station, initialization incomplete; 4Hz flashing: Configuration software actively searches for and requests device flashing; 20Hz flashing: Gateway serial port data transmission and reception; |
| BUS | Device bus status indicator | Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flickering: There may be an abnormality in the operation of the device's internal bus. |
| STA | Bus communication indicator | Blue LED light; flashing: indicates data exchange between the host and the expansion module; off: indicates no data exchange between the host and the expansion module. |
| DI1 | DI1 Input Indicator | Green LED light; On: DI1 valid input; Off: DI1 invalid input. |
| DI2 | DI2 Input Indicator | Green LED light; On: DI2 input is valid; Off: DI2 input is invalid. |
| DI3 | DI3 Input Indicator | Green LED light; On: DI3 input is valid; Off: DI3 input is invalid. |
| DI4 | DI4 Input Indicator | Green LED light; On: DI4 input is valid; Off: DI4 input is invalid. |
| DO1 | DO1 output indicator light | Green LED light; On: DO1 relay closed; Off: DO1 relay open. |
| DO2 | DO2 output indicator light | Green LED light; On: DO2 relay closed; Off: DO2 relay open. |
| DO3 | DO3 output indicator | Green LED light; On: DO3 relay closed; Off: DO3 relay open. |

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| | | |
|---|---|---|
| | light | |
| DO4 | DO4 output indicator light | Green LED light; On: DO4 relay closed; Off: DO4 relay open. |

## 2.3.9 M31-XFXX0800G-U-PN

| M31-XFXX0800G-U-PN Port and Button Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| AI1+ | AI1 Analog Current Input + | AI1 analog input + interface, used in conjunction with AI1- |
| AI1- | AI1 Analog Current Input - | AI1 Analog Input Interface, for use with AI1+ |
| AI2+ | AI 2 Analog Current Input + | AI 2 analog input + interface, used in conjunction with AI 2 - |
| AI2- | AI 2 Analog Current Input - | AI 2 Analog Input Interface, used in conjunction with AI 2+ |
| AI3+ | AI 3 Analog Current Input + | AI 3 analog input + interface, used in conjunction with AI 3 . |
| AI3- | AI 3 Analog Current Input - | AI 3 Analog Input Interface, for use with AI 3+ |
| AI4+ | AI 4 Analog Current Input + | AI 4 analog input + interface, used in conjunction with AI 4 . |
| AI4- | AI 4 Analog Current Input - | AI 4 Analog Input Interface, for use with AI 4+ |
| AI5+ | AI 5 Analog Current Input + | AI 5 analog input + interface, used in conjunction with AI 5 . |
| AI5- | AI 5 Analog Current Input - | AI 5 Analog Input Interface, for use with AI 5+ |
| AI6+ | AI 6 Analog Current Input + | AI 6 analog input + interface, used in conjunction with AI 6 . |
| AI6- | AI 6 Analog Current Input - | AI 6 Analog Input Interface, for use with AI 6+ |
| AI7+ | AI 7 Analog Current Input + | AI 7 analog input + interface, used in conjunction with AI 7 . |
| AI7- | AI 7 Analog Current Input - | AI 7 Analog Input Interface, for use with AI 7+ |
| AI8+ | AI 8 Analog Current Input + | AI 8 analog input + interface, used in conjunction with AI 8 . |
| AI8- | AI 8 Analog Current Input - | AI 8 Analog Input Interface, for use with AI 8+ |
| NC | Empty terminal (Not Care) | No actual circuit connection function |

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| | | |
|---|---|---|
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| Reload | Factory reset/auto-negotiation | Press and hold for 5-10 seconds to restore factory settings; Double-clicking within 2 seconds will automatically negotiate the I/O expansion module ; |
| A(RS485) | RS485 A interface | RS485 A interface |
| B(RS485) | RS485 B interface | RS485 B interface |
| G(RS485) | RS485 G interface | RS485 G interface |
| PE | Grounding | Grounding |
| V- (DC9-36V) | negative terminal of power supply | DC (9-36V) power supply negative terminal interface |
| V+ (DC9-36V) | Positive power supply | DC (9-36V) power supply positive terminal interface |
| LAN1 | network port | Standard RJ45 network cable interface |
| LAN 2 | network port | Standard RJ45 network cable interface |

| M31-XFXX0800G-U-PN Indicator Light Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| RUN | Power indicator light | Red LED light; On: Connection to master station initialization completed; Off: Device malfunction; 1Hz flashing: Not connected to master station, initialization incomplete; 4Hz flashing: Configuration software actively searches for and requests device flashing; 20Hz flashing: Gateway serial port data transmission and reception; |
| BUS | Device bus status indicator | Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flickering: There may be an abnormality in the operation of the device's internal bus. |
| STA | Bus communication indicator | Blue LED light; flashing: indicates data exchange between the host and the expansion module; off: indicates no data exchange between the host and the expansion module. |
| AI 1 | AI 1 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI 2 | AI 2 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI 3 | AI 3 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI 4 | A I4 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI5 | AI5 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |

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| | | |
|---|---|---|
| AI6 | AI6 Input Indicator Light | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI7 | AI7 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI8 | AI8 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |

### 2.3.10 M31-XAXX0A00G-U-PN

| M31-XAXX0A00G-U-PN Port and Button Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| AI1 | AI1 Analog Current Input | AI1 analog input interface, used in conjunction with COM A |
| AI2 | AI2 analog current input | AI2 analog input interface, used in conjunction with COM A |
| AI3 | AI3 Analog Current Input | AI3 analog input interface, used in conjunction with COM A |
| AI4 | AI4 Analog Current Input | AI4 analog input interface, used in conjunction with COM A |
| AI5 | AI5 Analog Current Input | AI5 analog input interface, used in conjunction with COM A |
| AI6 | AI6 Analog Current Input | AI6 analog input interface, used in conjunction with COM A |
| AI7 | AI7 Analog Current Input | AI7 analog input interface, used in conjunction with COM A |
| AI8 | AI8 Analog Current Input | AI8 analog input interface, used in conjunction with COM A |
| COMA | AI analog input public terminal | AI1 - AI 8 Shared COM A Common Terminal |
| AI9 | AI9 Analog Current Input | AI9 analog input interface, used in conjunction with COM B |
| AI10 | AI10 Analog Current Input | AI10 analog input interface, used in conjunction with COM B |
| AI11 | AI11 Analog Current Input | AI11 analog input interface, used in conjunction with COM B |
| AI12 | AI12 Analog Current Input | AI12 analog input interface, used in conjunction with COM B |
| AI13 | AI13 Analog Current Input | AI13 analog input interface, used in conjunction with COM B |
| AI14 | AI14 Analog Current Input | AI14 analog input interface, used in conjunction with COM B |
| AI15 | AI15 Analog Current Input | AI15 analog input interface, used in conjunction with COM B |

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| | | |
|---|---|---|
| AI16 | AI16 Analog Current Input | AI16 analog input interface, used in conjunction with COM B |
| COMB | AI analog input public terminal | AI9 - AI16 Shared COM B Common Terminal |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| Reload | Factory reset/auto-negotiation | Press and hold for 5-10 seconds to restore factory settings; Double-clicking within 2 seconds will automatically negotiate the I/O expansion module ; |
| A(RS485) | RS485 A interface | RS485 A interface |
| B(RS485) | RS485 B interface | RS485 B interface |
| G(RS485) | RS485 G interface | RS485 G interface |
| PE | Grounding | Grounding |
| V- (DC9-36V) | negative terminal of power supply | DC (9-36V) power supply negative terminal interface |
| V+ (DC9-36V) | Positive power supply | DC (9-36V) power supply positive terminal interface |
| LAN1 | network port | Standard RJ45 network cable interface |
| LAN 2 | network port | Standard RJ45 network cable interface |

| M31-XAXX0A00G-U-PN Indicator Light Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| RUN | Power indicator light | Red LED light; On: Connection to master station initialization completed; Off: Device malfunction; 1Hz flashing: Not connected to master station, initialization incomplete; 4Hz flashing: Configuration software actively searches for and requests device flashing; 20Hz flashing: Gateway serial port data transmission and reception; |
| BUS | Device bus status indicator | Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flickering: There may be an abnormality in the operation of the device's internal bus. |
| STA | Bus communication indicator | Blue LED light; flashing: indicates data exchange between the host and the expansion module; off: indicates no data exchange between the host and the expansion module. |
| AI 1 | AI 1 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI 2 | AI 2 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI 3 | AI 3 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI 4 | A I4 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |

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| | | |
|---|---|---|
| AI5 | AI5 Input Indicator Light | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI6 | AI6 Input Indicator Light | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI7 | AI7 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI8 | AI8 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI9 | AI9 Input Indicator Light | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI10 | AI10 Input Indicator Light | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI11 | AI11 Input Indicator Light | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI12 | AI 12 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI13 | AI13 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI14 | AI14 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI15 | AI15 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI16 | AI16 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |

## 2.3.11M31-XBXX0A00G-U-PN

| M31-XBXX0A00G-U-PN Port and Button Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| AI1 | AI1 Analog Voltage Input | AI1 analog input interface, used in conjunction with COM A |
| AI2 | AI2 analog voltage input | AI2 analog input interface, used in conjunction with COM A |
| AI3 | AI3 Analog Voltage Input | AI3 analog input interface, used in conjunction with COM A |
| AI4 | AI4 Analog Voltage Input | AI4 analog input interface, used in conjunction with COM A |
| AI5 | AI5 Analog Voltage Input | AI5 analog input interface, used in conjunction with COM A |
| AI6 | AI6 Analog Voltage Input | AI6 analog input interface, used in conjunction with COM A |
| AI7 | AI7 Analog Voltage Input | AI7 analog input interface, used in conjunction with COM A |

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| | | |
|---|---|---|
| AI8 | AI8 Analog Voltage Input | AI8 analog input interface, used in conjunction with COM A |
| COMA | AI analog input public terminal | AI1 - AI 8 Shared COM A Common Terminal |
| AI9 | AI9 analog voltage input | AI9 analog input interface, used in conjunction with COM B |
| AI10 | AI10 analog voltage input | AI10 analog input interface, used in conjunction with COM B |
| AI11 | AI11 Analog Voltage Input | AI11 analog input interface, used in conjunction with COM B |
| AI12 | AI12 analog voltage input | AI12 analog input interface, used in conjunction with COM B |
| AI13 | AI13 Analog Voltage Input | AI13 analog input interface, used in conjunction with COM B |
| AI14 | AI14 Analog Voltage Input | AI14 analog input interface, used in conjunction with COM B |
| AI15 | AI15 Analog Voltage Input | AI15 analog input interface, used in conjunction with COM B |
| AI16 | AI16 Analog Voltage Input | AI16 analog input interface, used in conjunction with COM B |
| COMB | AI analog input public terminal | AI9 - AI16 Shared COM B Common Terminal |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| Reload | Factory reset/auto-negotiation | Press and hold for 5-10 seconds to restore factory settings; Double-clicking within 2 seconds will automatically negotiate the I/O expansion module ; |
| A(RS485) | RS485 A interface | RS485 A interface |
| B(RS485) | RS485 B interface | RS485 B interface |
| G(RS485) | RS485 G interface | RS485 G interface |
| PE | Grounding | Grounding |
| V- (DC9-36V) | negative terminal of power supply | DC (9-36V) power supply negative terminal interface |
| V+ (DC9-36V) | Positive power supply | DC (9-36V) power supply positive terminal interface |
| LAN1 | network port | Standard RJ45 network cable interface |
| LAN 2 | network port | Standard RJ45 network cable interface |

| M31-XBXX0A00G-U-PN Indicator Light Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| RUN | Power indicator light | Red LED light; On: Connection to master station initialization completed; Off: Device malfunction; 1Hz flashing: Not connected to master station, initialization incomplete; 4Hz flashing: Configuration software actively |

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| | | |
|---|---|---|
| | | searches for and requests device flashing; 20Hz flashing: Gateway serial port data transmission and reception; |
| BUS | Device bus status indicator | Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flashing: There may be an abnormality in the operation of the device's internal bus. |
| STA | Bus communication indicator | Blue LED light; flashing: indicates data exchange between the host and the expansion module; off: indicates no data exchange between the host and the expansion module. |
| AI 1 | AI 1 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI 2 | AI 2 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI 3 | AI 3 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI 4 | A I4 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI5 | AI5 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI6 | AI6 Input Indicator Light | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI7 | AI7 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI8 | AI8 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI9 | AI9 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI10 | AI10 Input Indicator Light | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI11 | AI11 Input Indicator Light | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI12 | AI 12 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI13 | AI13 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI14 | AI14 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI15 | AI15 Input Indicator Light | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |
| AI16 | AI16 Input Indicator | Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%. |

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## 2.3.12 M31-XXXA0008G-U-PN

| M31-XXXA0008G-U-PN Port and Button Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| AO1 | AO1 Analog Current Output (Positive) | AO1 analog output (positive) interface, used in conjunction with GND1. |
| GND1 | AO1 Analog Current Output (Negative Terminal) | AO1 analog output (negative terminal) interface |
| AO2 | AO 2 Analog Current Output (Positive) | AO 2 analog output (positive) interface, used in conjunction with GND 2. |
| GND2 | AO 2 Analog Current Output (Negative Terminal) | AO 2 analog output (negative) interface |
| AO3 | AO 3 Analog Current Output (Positive) | AO 3 analog output (positive) interface, used in conjunction with GND 3. |
| GND3 | AO 3 Analog Current Output (Negative Terminal) | AO 3 analog output (negative) interface |
| AO4 | AO 4 Analog Current Output (Positive) | AO 4 analog output (positive) interface, used in conjunction with GND 4. |
| GND4 | AO 4 Analog Current Output (Negative) | AO 4 Analog Output (Negative) Interface |
| AO5 | AO 5 Analog Current Output (Positive) | AO 5 analog output (positive) interface, used in conjunction with GND 5. |
| GND5 | AO 5 Analog Current Output (Negative Terminal) | AO 5 Analog Output (Negative) Interface |
| AO6 | AO 6 Analog Current Output (Positive) | AO 6 analog output (positive) interface, used in conjunction with GND 6. |
| GND6 | AO 6 Analog Current Output (Negative) | AO 6 Analog Output (Negative) Interface |
| AO7 | AO 7 Analog Current Output (Positive) | AO 7 analog output (positive) interface, used in conjunction with GND 7. |
| GND7 | AO 7 Analog Current Output (Negative) | AO 7 Analog Output (Negative) Interface |
| AO8 | AO 8 Analog Current Output (Positive) | AO 8 analog output (positive) interface, used in conjunction with GND 8. |
| GND8 | AO 8 Analog Current Output (Negative) | AO 8 Analog Output (Negative) Interface |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| Reload | Factory reset/auto-negotiation | Press and hold for 5-10 seconds to restore factory settings; Double-clicking within 2 seconds will automatically negotiate the I/O expansion module ; |

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| | | |
|---|---|---|
| A(RS485) | RS485 A interface | RS485 A interface |
| B(RS485) | RS485 B interface | RS485 B interface |
| G(RS485) | RS485 G interface | RS485 G interface |
| PE | Grounding | Grounding |
| V- (DC9-36V) | negative terminal of power supply | DC (9-36V) power supply negative terminal interface |
| V+ (DC9-36V) | Positive power supply | DC (9-36V) power supply positive terminal interface |
| LAN1 | network port | Standard RJ45 network cable interface |
| LAN 2 | network port | Standard RJ45 network cable interface |

| M31-XXXA0008G-U-PN indicator light description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| RUN | Power indicator light | Red LED light; On: Connection to master station initialization completed; Off: Device malfunction; 1Hz flashing: Not connected to master station, initialization incomplete; 4Hz flashing: Configuration software actively searches for and requests device flashing; 20Hz flashing: Gateway serial port data transmission and reception; |
| BUS | Device bus status indicator | Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flickering: There may be an abnormality in the operation of the device's internal bus. |
| STA | Bus communication indicator | Blue LED light; flashing: indicates data exchange between the host and the expansion module; off: indicates no data exchange between the host and the expansion module. |
| AO 1 | AO 1 output indicator light | Green LED light; On: Normal output reaches 1% or more of the range; Off: No effective output. |
| AO 2 | AO 2 output indicator light | Green LED light; On: Normal output reaches 1% or more of the range; Off: No effective output. |
| AO 3 | AO 3 output indicator light | Green LED light; On: Normal output reaches 1% or more of the range; Off: No effective output. |
| AO 4 | AO 4 output indicator light | Green LED light; On: Normal output reaches 1% or more of the range; Off: No effective output. |
| AO5 | AO5 output indicator light | Green LED light; On: Normal output reaches 1% or more of the range; Off: No effective output. |
| AO6 | AO6 output indicator light | Green LED light; On: Normal output reaches 1% or more of the range; Off: No effective output. |
| AO7 | AO7 output indicator light | Green LED light; On: Normal output reaches 1% or more of the range; Off: No effective output. |
| AO8 | AO8 output indicator light | Green LED light; On: Normal output reaches 1% or more of the range; Off: No effective output. |

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## 2.3.13M31-XXXB0008G-U-PN

| M31-XXXB0008G-U-PN Port and Button Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| AO1 | AO1 Analog Voltage Output (Positive) | AO1 analog output (positive) interface, used in conjunction with GND1. |
| GND1 | AO1 Analog Voltage Output (Negative Terminal) | AO1 analog output (negative terminal) interface |
| AO2 | AO2 analog voltage output (positive terminal) | AO2 analog output (positive) interface, used in conjunction with GND2. |
| GND2 | AO2 analog voltage output (negative terminal) | AO2 analog output (negative terminal) interface |
| AO3 | AO3 analog voltage output (positive terminal) | AO3 analog output (positive) interface, used in conjunction with GND3. |
| GND3 | AO3 analog voltage output (negative terminal) | AO3 analog output (negative terminal) interface |
| AO4 | AO4 Analog Voltage Output (Positive) | AO4 analog output (positive) interface, used in conjunction with GND4. |
| GND4 | AO4 analog voltage output (negative terminal) | AO4 analog output (negative terminal) interface |
| AO5 | AO5 analog voltage output (positive terminal) | AO5 analog output (positive) interface, used in conjunction with GND5. |
| GND5 | AO5 analog voltage output (negative terminal) | AO5 analog output (negative terminal) interface |
| AO6 | AO6 analog voltage output (positive terminal) | AO6 analog output (positive) interface, used in conjunction with GND6. |
| GND6 | AO6 Analog Voltage Output (Negative Terminal) | AO6 analog output (negative) interface |
| AO7 | AO7 Analog Voltage Output (Positive) | AO7 analog output (positive) interface, used in conjunction with GND7. |
| GND7 | AO7 Analog Voltage Output (Negative) | AO7 Analog Output (Negative) Interface |
| AO8 | AO8 analog voltage output (positive terminal) | AO8 analog output (positive) interface, used in conjunction with GND8. |
| GND8 | AO8 analog voltage output (negative terminal) | AO8 analog output (negative terminal) interface |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| Reload | Factory reset/auto-negotiation | Press and hold for 5-10 seconds to restore factory settings; Double-clicking within 2 seconds will automatically negotiate the I/O expansion module; |

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| | | |
|---|---|---|
| A(RS485) | RS485 A interface | RS485 A interface |
| B(RS485) | RS485 B interface | RS485 B interface |
| G(RS485) | RS485 G interface | RS485 G interface |
| PE | Grounding | Grounding |
| V- (DC9-36V) | negative terminal of power supply | DC (9-36V) power supply negative terminal interface |
| V+ (DC9-36V) | Positive power supply | DC (9-36V) power supply positive terminal interface |
| LAN1 | network port | Standard RJ45 network cable interface |
| LAN2 | network port | Standard RJ45 network cable interface |

| M31-XXXB0008G-U-PN indicator light description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| RUN | Power indicator light | Red LED light; On: Connection to master station initialization completed; Off: Device malfunction; 1Hz flashing: Not connected to master station, initialization incomplete; 4Hz flashing: Configuration software actively searches for and requests device flashing; 20Hz flashing: Gateway serial port data transmission and reception; |
| BUS | Device bus status indicator | Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flickering: There may be an abnormality in the operation of the device's internal bus. |
| STA | Bus communication indicator | Blue LED light; flashing: indicates data exchange between the host and the expansion module; off: indicates no data exchange between the host and the expansion module. |
| AO 1 | AO 1 output indicator light | Green LED light; On: Normal output reaches 1% or more of the range; Off: No effective output. |
| AO 2 | AO 2 output indicator light | Green LED light; On: Normal output reaches 1% or more of the range; Off: No effective output. |
| AO 3 | AO 3 output indicator light | Green LED light; On: Normal output reaches 1% or more of the range; Off: No effective output. |
| AO 4 | AO 4 output indicator light | Green LED light; On: Normal output reaches 1% or more of the range; Off: No effective output. |
| AO5 | AO5 output indicator light | Green LED light; On: Normal output reaches 1% or more of the range; Off: No effective output. |
| AO6 | AO6 output indicator light | Green LED light; On: Normal output reaches 1% or more of the range; Off: No effective output. |
| AO7 | AO7 output indicator light | Green LED light; On: Normal output reaches 1% or more of the range; Off: No effective output. |
| AO8 | AO8 output indicator light | Green LED light; On: Normal output reaches 1% or more of the range; Off: No effective output. |

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## 2.3.14M31 -X D XX0 6 00G-U -PN

| M31- X D XX0 6 00 GU -PN Port and Button Description: | | |
|---|---|---|
| silkscreen | name | illustrate |
| RTD1+ | 1-channel PT100 input | 1-channel PT100 input + interface |
| RTD1- | 1-channel PT100 input | - channel PT100 input interface |
| RTD1- | 1-channel PT100 input | - channel PT100 input interface |
| RTD2+ | 2-channel PT100 input | 2-channel PT100 input + interface |
| RTD2- | 2-channel PT100 input | - channel PT100 input interface |
| RTD2- | 2-channel PT100 input | - channel PT100 input interface |
| RTD3+ | 3-channel PT100 input | 3-channel PT100 input + interface |
| RTD3- | 3-channel PT100 input | - channel PT100 input interface |
| RTD3- | 3-channel PT100 input | - channel PT100 input interface |
| RTD4+ | 4-channel PT100 input | 4-channel PT100 input + interface |
| RTD4- | 4-channel PT100 input | - channel PT100 input interface |
| RTD4- | 4-channel PT100 input | - channel PT100 input interface |
| RTD5+ | 5-channel PT100 input | 5-channel PT100 input + interface |
| RTD5- | 5-channel PT100 input | - channel PT100 input interface |
| RTD5- | 5-channel PT100 input | - channel PT100 input interface |
| RTD6+ | 6-channel PT100 input | 6-channel PT100 input + interface |
| RTD6- | 6-channel PT100 input | - channel PT100 input interface |
| RTD6- | 6-channel PT100 input | - channel PT100 input interface |
| NC | Empty terminal (Not Care) | No actual circuit connection function |
| Reload | Factory reset/auto-negotiation | Press and hold for 5-10 seconds to restore factory settings; Double-clicking within 2 seconds will automatically negotiate the I/O expansion module ; |
| A(RS485) | RS485 A interface | RS485 A interface |
| B(RS485) | RS485 B interface | RS485 B interface |
| G(RS485) | RS485 G interface | RS485 G interface |
| PE | Grounding | Grounding |
| V- (DC9-36V) | negative terminal of power supply | DC (9-36V) power supply negative terminal interface |
| V+ (DC9-36V) | Positive power supply | DC (9-36V) power supply positive terminal interface |
| LAN1 | network port | Standard RJ45 network cable interface |
| LAN 2 | network port | Standard RJ45 network cable interface |

| M31-XDXX0600G-U -PN Indicator Light Description: | | |
|---|---|---|
| silkscreen | name | illustrate |

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| | | |
|---|---|---|
| RUN | Power indicator light | Red LED light; On: Connection to master station initialization completed; Off: Device malfunction; 1Hz flashing: Not connected to master station, initialization incomplete; 4Hz flashing: Configuration software actively searches for and requests device flashing; 20Hz flashing: Gateway serial port data transmission and reception; |
| BUS | Device bus status indicator | Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flickering: There may be an abnormality in the operation of the device's internal bus. |
| STA | Bus communication indicator | Blue LED light; flashing: indicates data exchange between the host and the expansion module; off: indicates no data exchange between the host and the expansion module. |
| RTD1 | RTD1 Input Indicator | Green LED light; On: Sensor is successfully connected; Off: Sensor is not successfully connected; |
| RTD2 | RTD2 Input Indicator Light | Green LED light; On: Sensor is successfully connected; Off: Sensor is not successfully connected; |
| RTD3 | RTD3 Input Indicator Light | Green LED light; On: Sensor is successfully connected; Off: Sensor is not successfully connected; |
| RTD4 | RTD4 Input Indicator | Green LED light; On: Sensor is successfully connected; Off: Sensor is not successfully connected; |
| RTD5 | RTD5 Input Indicator Light | Green LED light; On: Sensor is successfully connected; Off: Sensor is not successfully connected; |
| RTD6 | RTD6 Input Indicator Light | Green LED light; On: Sensor is successfully connected; Off: Sensor is not successfully connected; |

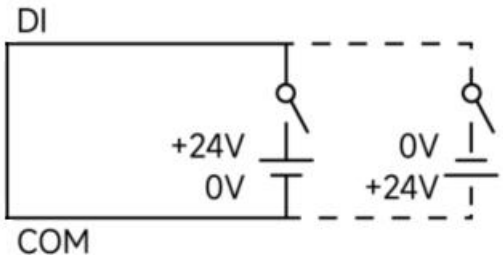
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# 3 Wiring Instructions

## 3.1Device connection

### 3.1.1 DI connection

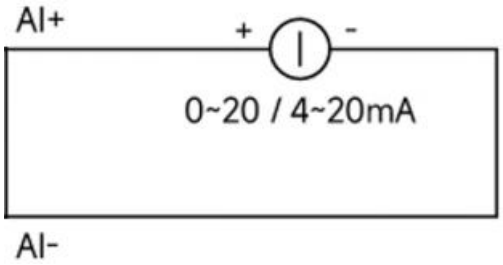



**PNP input** **NPN input**

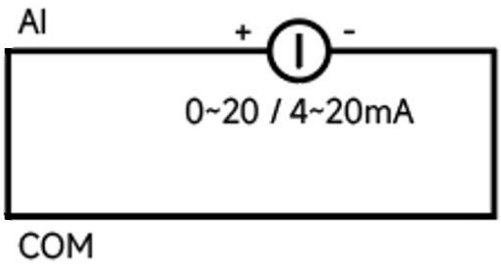
Note: DI is an NPN or PNP active input, and the voltage range supported is only 10 V to 28 V.

### 3.1.2 AI Connectivity

Differential analog current acquisition:



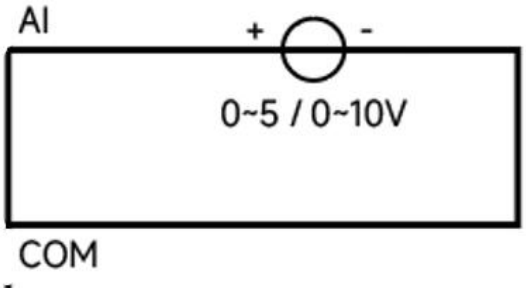

Single-ended analog current acquisition:




Single-ended analog voltage acquisition:

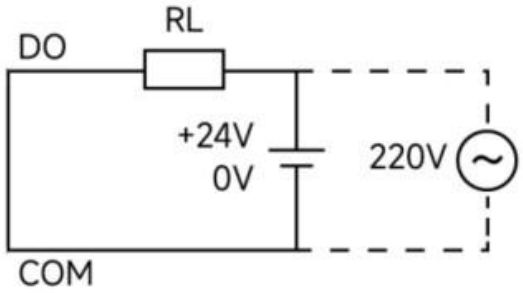
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## 3.1.3 DO connection

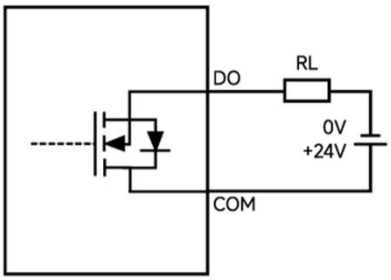
### 3.1.3.1 Relay type




Note: 1. A single relay can support a maximum of 5A.

2. The maximum total current supported for each group (same COM common terminal) is 8A.

### 3.1.3.2 transistor type




Note: 1. A single channel can support a maximum of 0.5A .

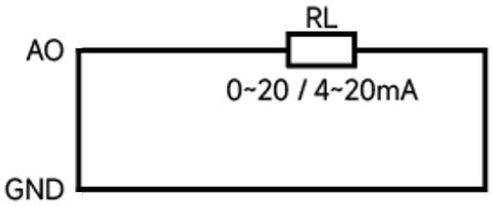
2. The maximum total current supported by each group (same COM common terminal) is 4 A , and the voltage range is 10-30V .

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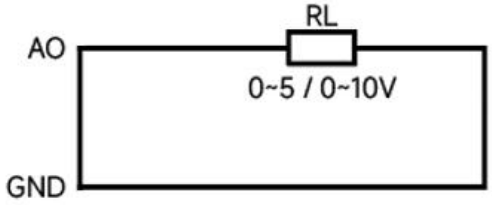

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## 3.1.4 AO connection

Current type AO :

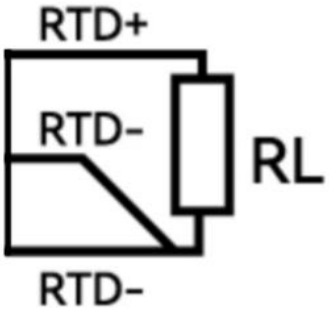



Voltage type AO :




## 3.1.5 PT100 connection

Three-wire PT100 RTD data acquisition:




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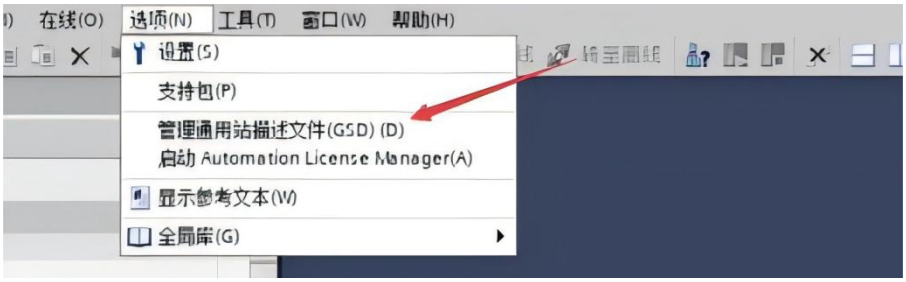
# 4 Tutorial on loading devices using TIA Portal

## 4.1 Preparation before connection

1. Prepare the necessary XML file as follows:
   GSDML-V2.3-EBYTE-P31-20251217xml

## 4.2 Add GSDML file to TIBRA

1. Open TIA Portal, click Options, and then Manage General Site Files (GSD).



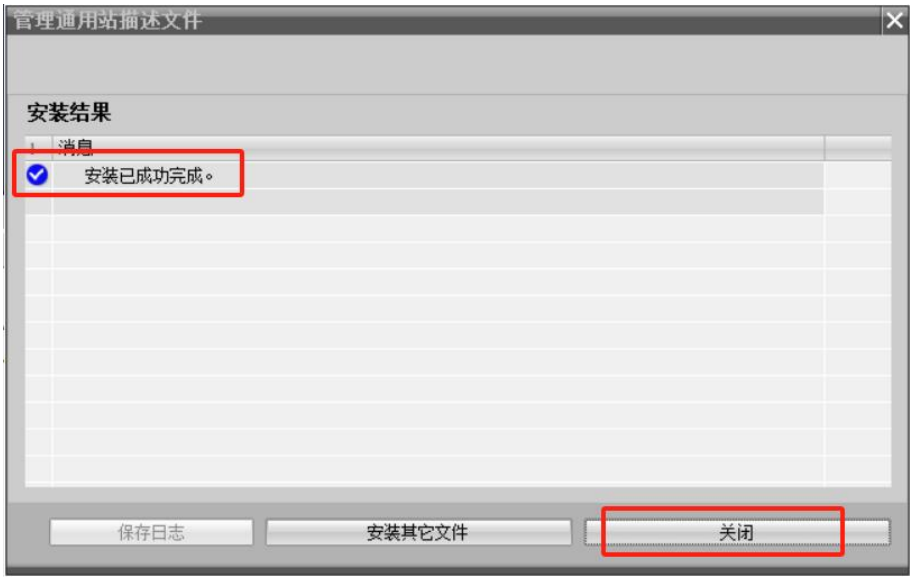

2. Add the GSDML file. Locate the folder where the GSD is stored, select the folder, and the software will automatically scan for the GSD file. Then, select the GSD file and click Install.




3. Once the installation is complete, simply click "Close," and then you can configure the device.

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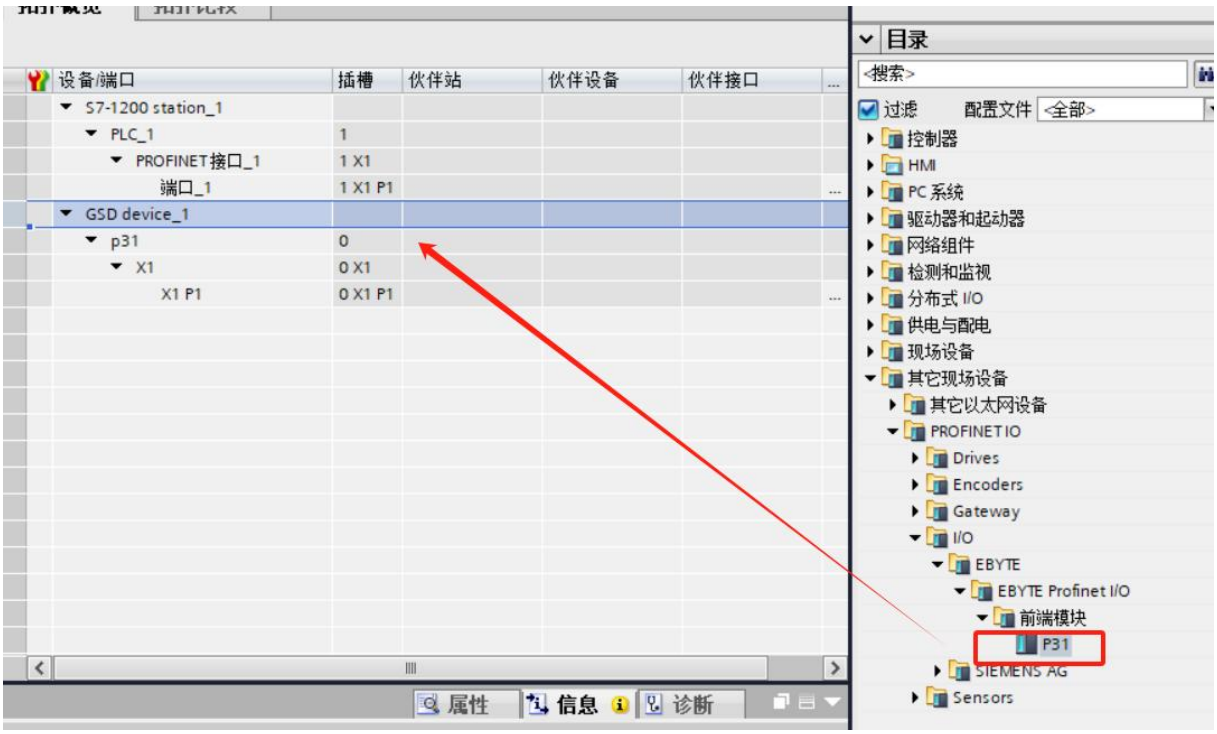

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## 4.3 Add Profinet IO device to project

The following example demonstrates adding an M31-AFAX4440G-U-PN main unit and a GAFAX4440-U expansion module.

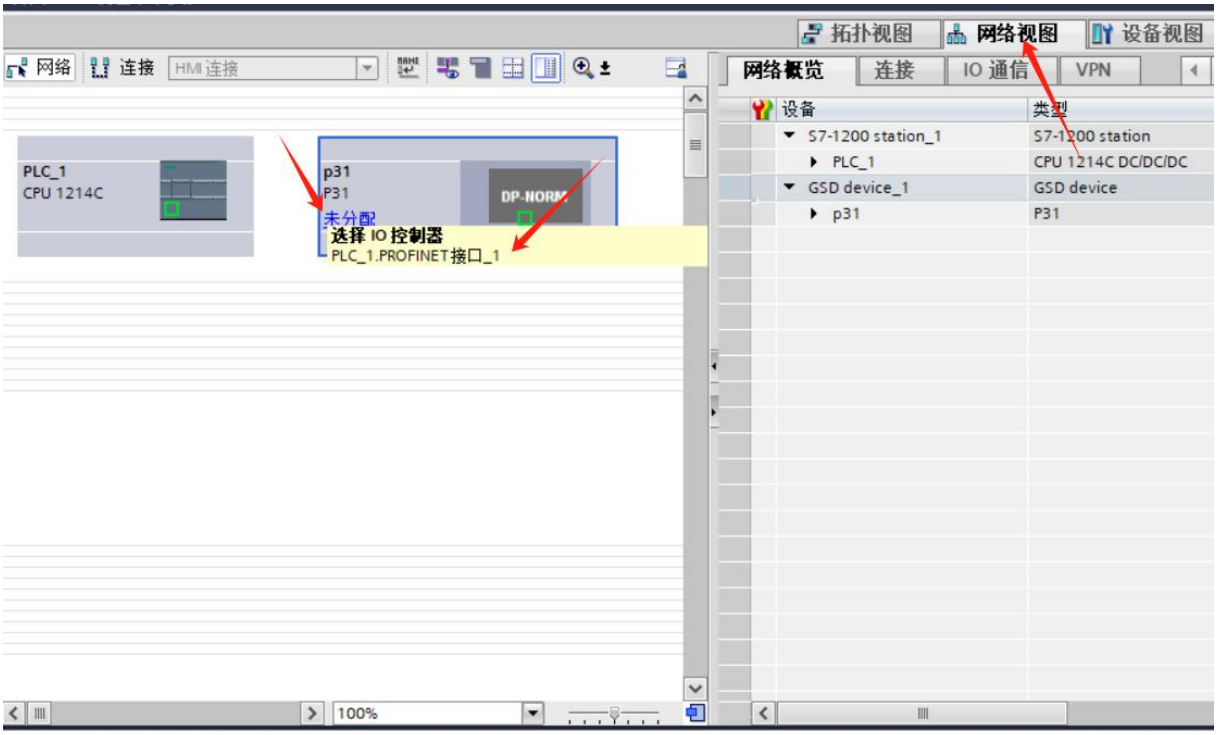
1. To create or open a new project, first add a controller device, then add the corresponding IO module in the device configuration interface. Double-click the module to add it successfully, as shown in the figure:



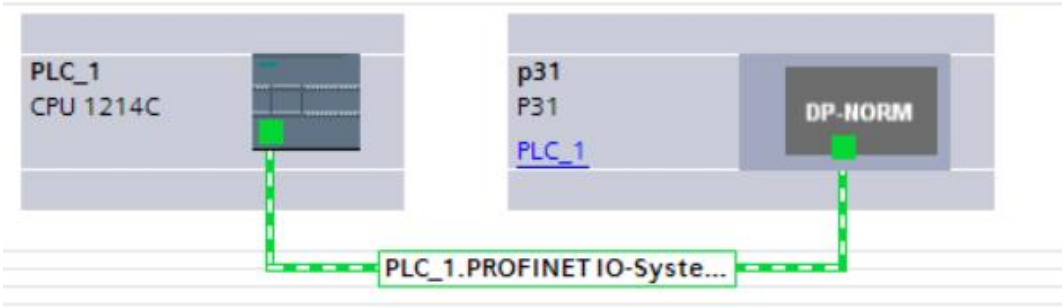

2. Configure devices in the network view.

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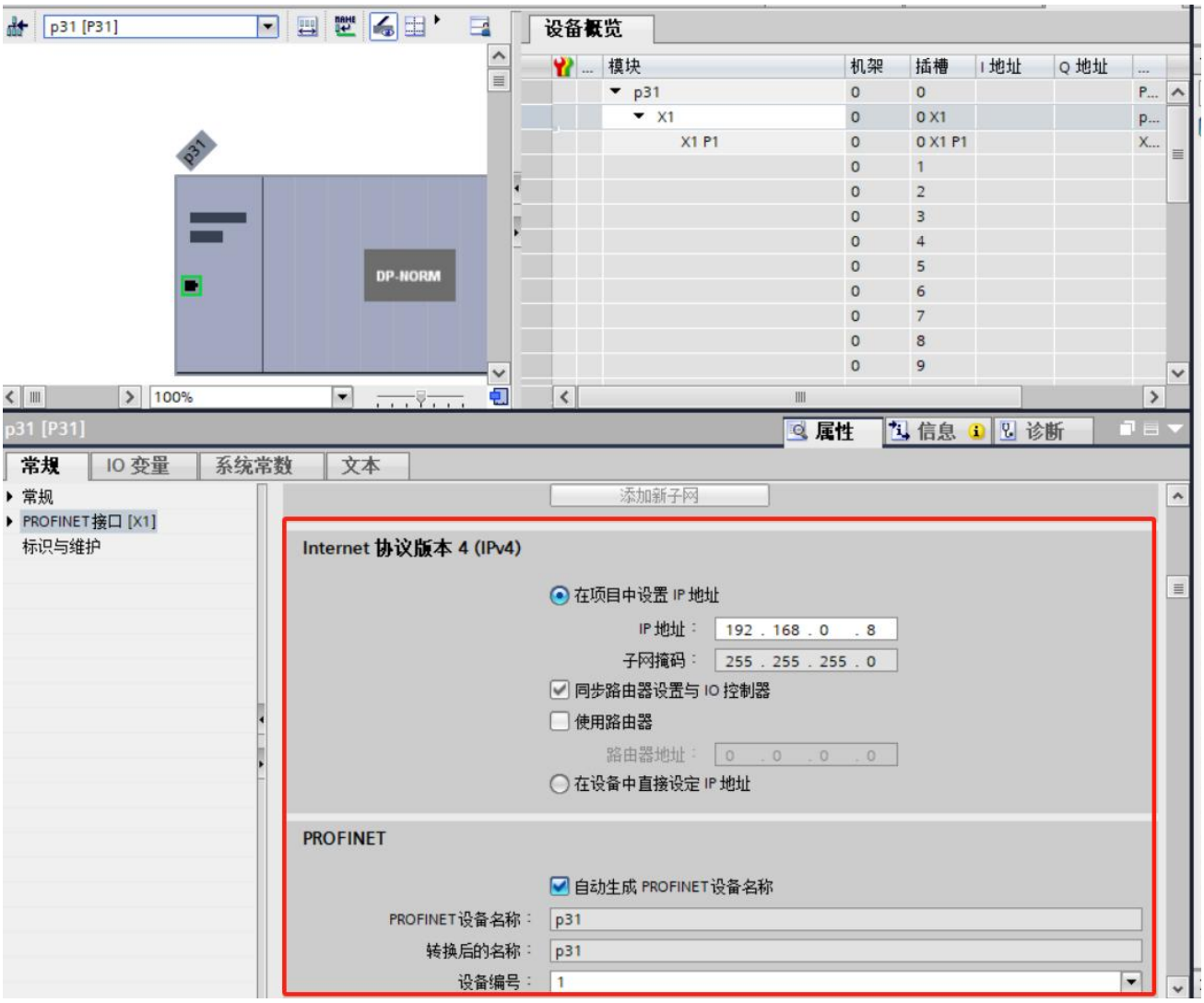

Once completed, it will look like this:



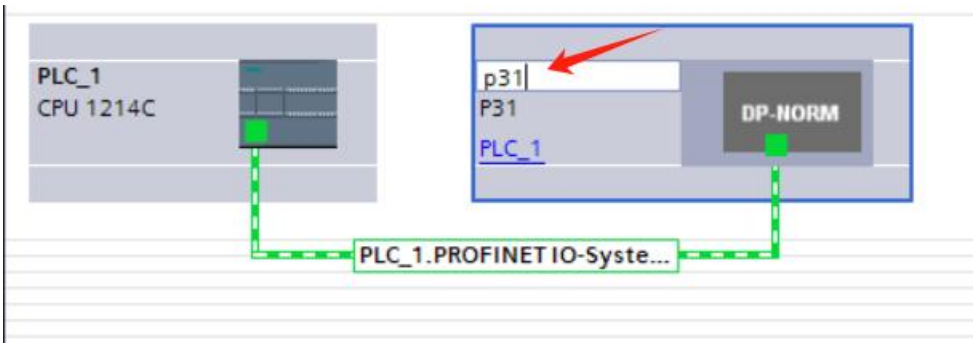

3. In the device view, first locate and select the newly added device, then double-click the module in the image. Next, in the general configuration interface, modify the IP address and device name, ensuring they match the module itself. Alternatively, you can choose to set the IP address directly on the device.

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You can also click here to directly modify the device name.




4. Select the p31 module, click Device View, and then add M31-AFAX4440G-U-PN and GAFAX4440-U according to the device splicing order.

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## 4.4 Check the starting addresses of points I and Q.

1. The device view on p31 shows the address and length allocated to each submodule:

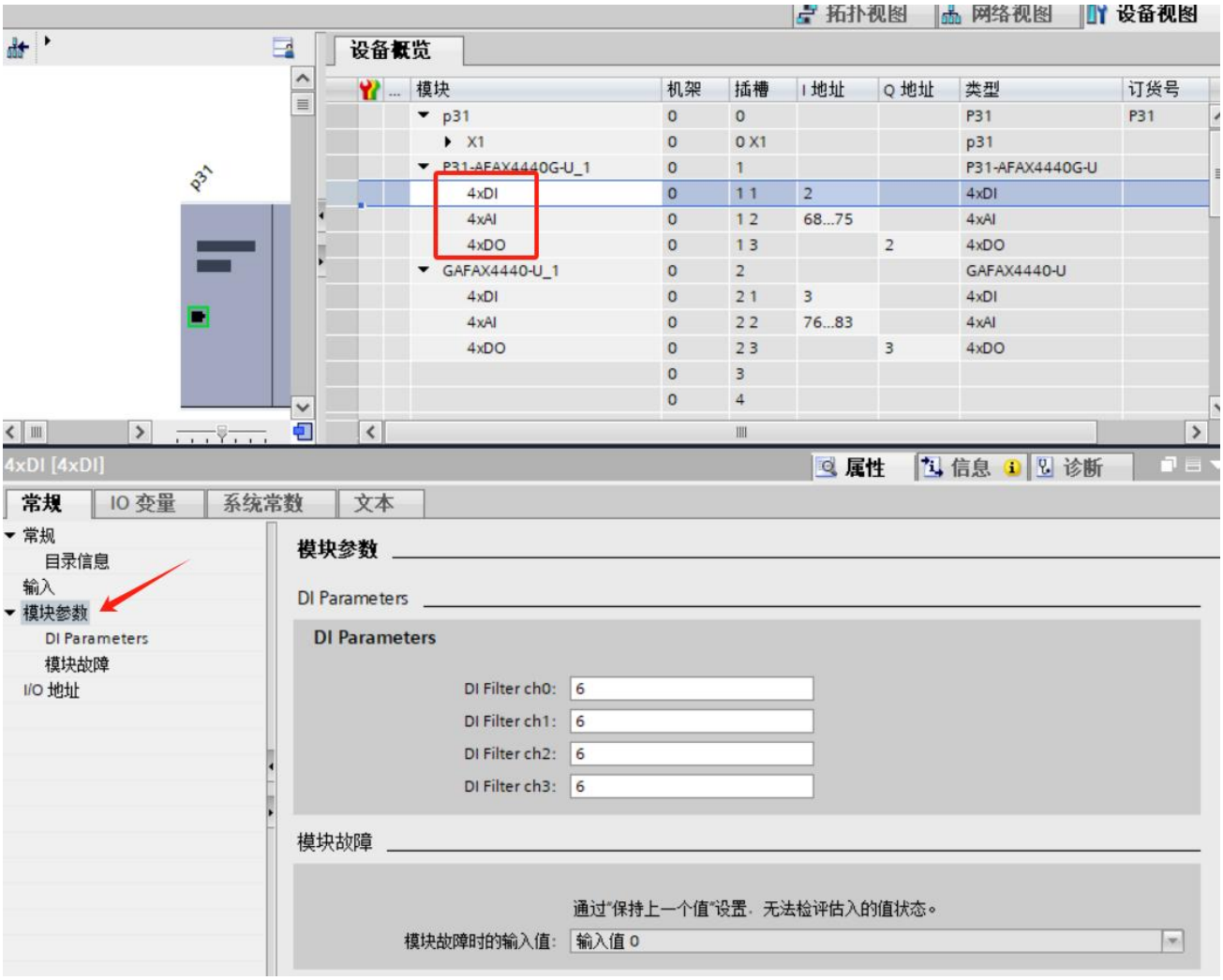



## 4.5 Instructions for using the IO function:

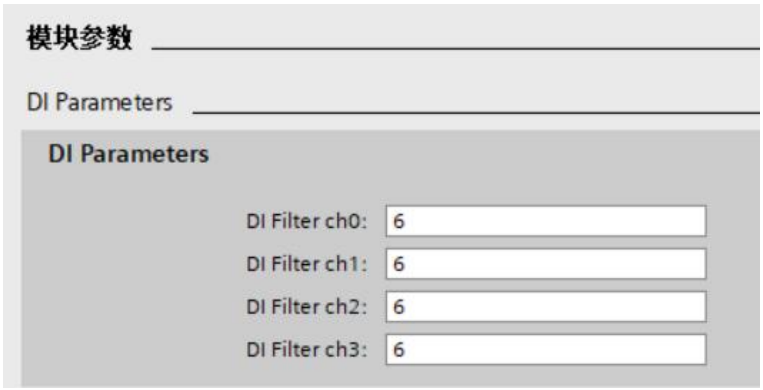
1. Click on the corresponding IO type, then click on module parameters to see the relevant settings options for the IO function:

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2. DI Parameters:

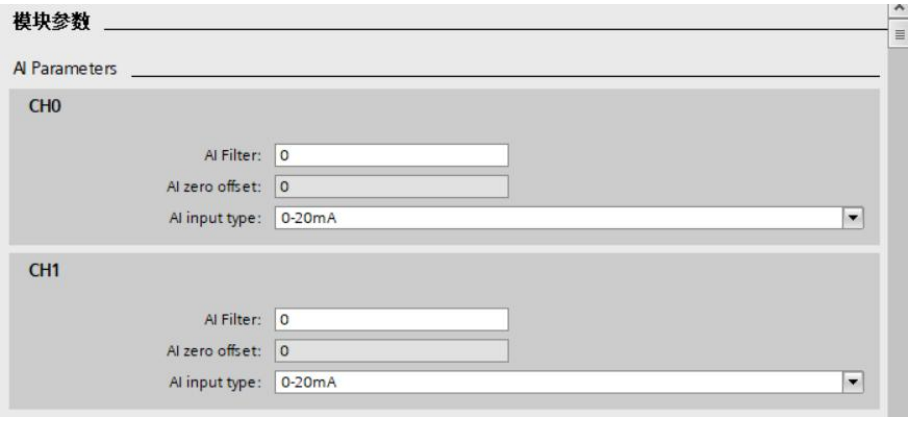



DI Filter: The DI filtering time for each channel can be set individually.

3. AI Parameters:

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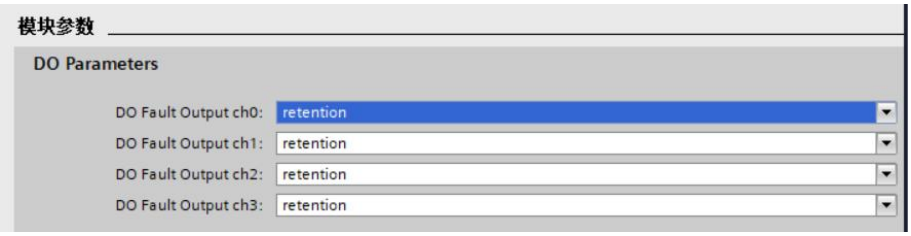



AI Filter: The AI filtering level for each channel can be set individually. The higher the level, the longer the filtering time.

AI zero offset: (Cannot be set)

AI input type (AI output type): Current type is available in ranges of 0~20mA, 4~20mA, and -20~20mA; Voltage type is available in ranges of 0~5V, 0~10V, -5~5V, and -10~10V.

4. DO Parameters:



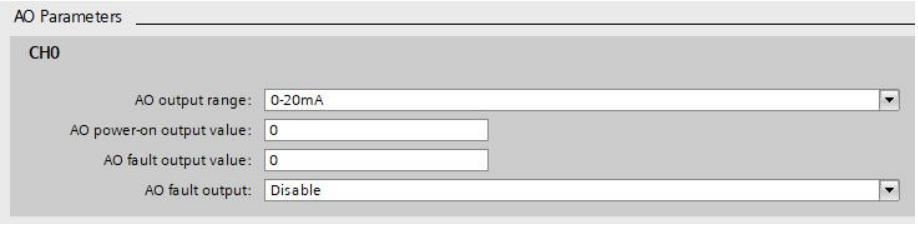

DO Fault Output: When the bus malfunctions, the output status of each channel's DO can be set individually.

Retention: In the event of a fault, retain the current state of the DO output.

Reset: In case of a fault, resets the DO output to its previous state.

Set (Set bit): In case of a fault, set the state before the DO output is set.

5. AO Parameters:




AO output range: Current type is available in 0~20mA and 4~20mA ranges; Voltage type is available in 0~5V and 0~10V ranges.

AO power-on output value: A preset fixed value that the AO channel automatically outputs after the device is powered on.

AO fault output value: The emergency output value that the AO channel automatically switches to when the device detects a communication interruption, bus abnormality, or module failure.

AO fault output: Controls the on/off state of the AO fault output function. When enabled, the AO channel will execute according to the preset "fault output value" when the device fails; when disabled, the AO channel will retain the last normal output value when a fault occurs.

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6. PT100 Parameters:

Read the temperature data collected by PT100 and directly convert it to the actual temperature.

In Profinet IO communication, the temperature data of PT100 is in 16-bit signed integer (INT) format and is used as input data, which is uploaded in real time by the slave station to the input process image area of the master station.

Temperature conversion: The read INT value ranges from -2000 to 8500, and has a linear correspondence with the actual temperature (-2000 corresponds to -200℃, 8500 corresponds to 850℃). The conversion formula is:

That is: Actual temperature = Collected value / 10 (°C)

[Status Diagnostic Value Explanation] When the INT value read from the Profinet data area is one of the following special values, it indicates a fault state for the corresponding channel, rather than the actual temperature value:

32766: Sensor not connected or wired out (wired out when temperature exceeds 870℃)

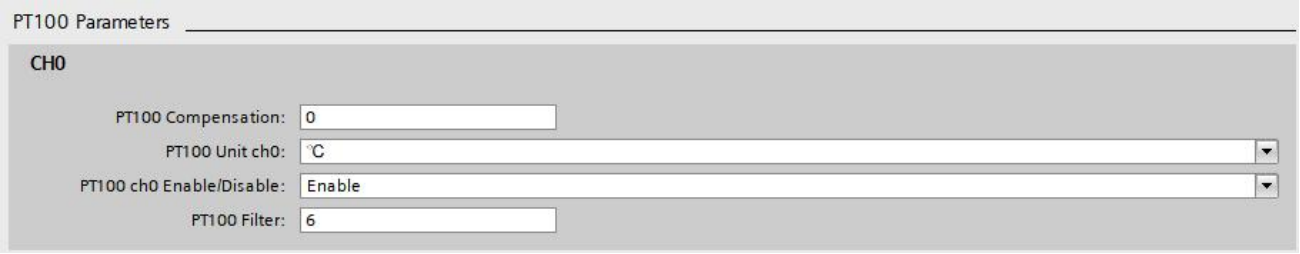
-32766: Short circuit condition (when the temperature is below -220℃, it is determined to be a short circuit condition)

32765: Chip fault (indicates that the ADC acquisition unit to which this channel belongs is malfunctioning and cannot complete the temperature signal conversion).

32767: Temperature overflow (triggered when the temperature exceeds 850°C but does not reach 870°C)

-32768: Temperature overflow (triggered when the temperature is below -200°C but not yet -220°C)

-32767: Channel is disabled




PT100 Compensation: Value range -200 to 200 (unit: 0.1℃, default value 0), used to compensate and calibrate the measured temperature of the channel. The compensation value is directly added to the final temperature result.

PT100 Unit ch0 (PT100 channel unit): Numerical range (°C; °F; K). After the setting takes effect, the integer and floating-point values of the project quantity will be automatically converted according to the selected unit.

PT100 ch0 Enable/Disable (PT100 channel disabled): When this channel is disabled , the engineering integer and floating-point registers for this channel will return the diagnostic value -32767.

PT100 Filter (PT100 filter parameters ): Data range 1-16, default parameter 6 .

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# 5 Tutorial on loading devices using STEP 7

## 5.1 Preparation before connection

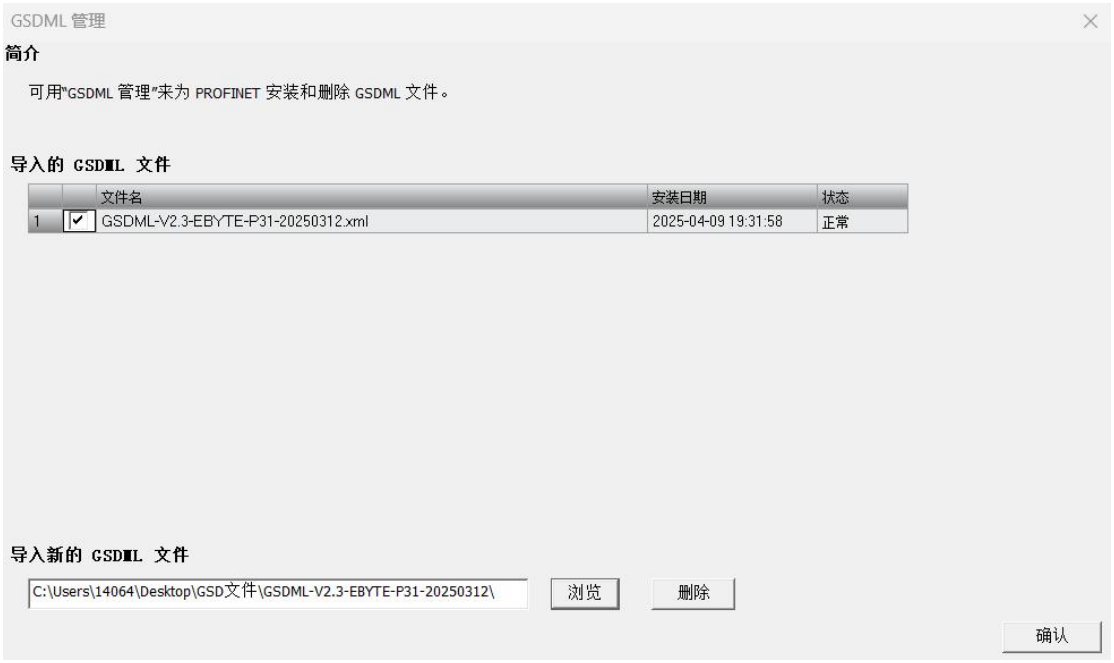
1. Prepare the necessary XML file as follows:
   GSDML-V2.3-EBYTE-P31-20251217xml

## 5.2 STEP 7 Add GSDML file

1. Under the File menu, access GSDML Management.




2. Add GSDML file




## 5.3 Add Profinet device to project

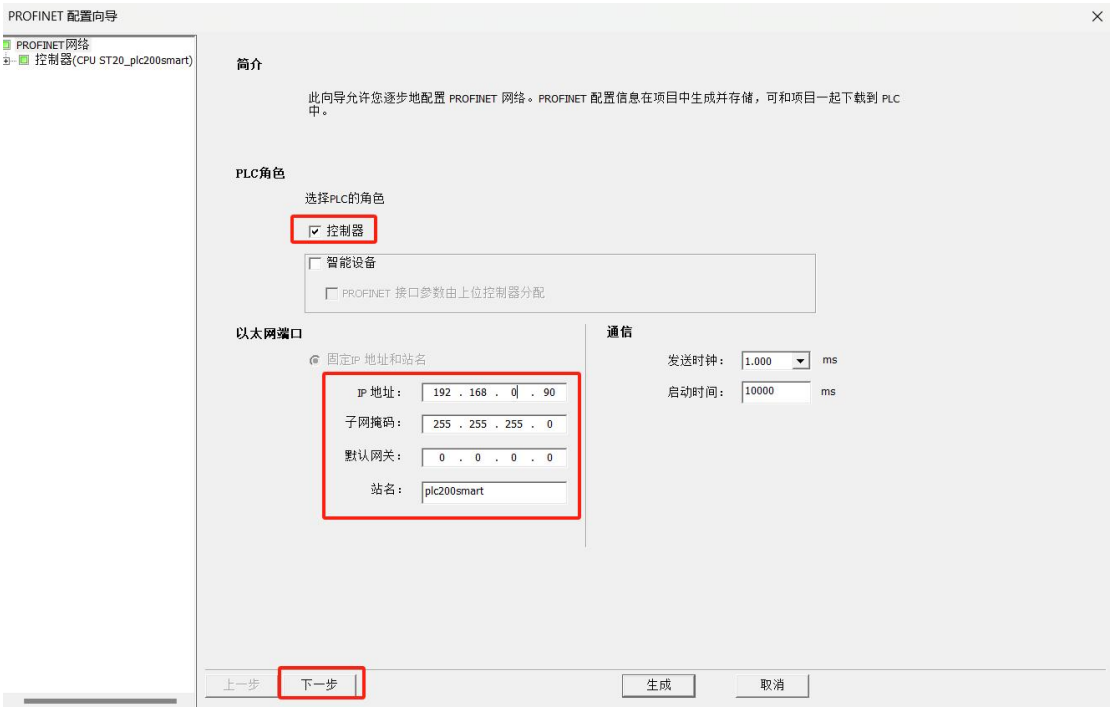
1. Select the PROFINET command under the Tools menu.

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2. Select the PLC role as PLC controller, and set the corresponding PLC controller IP and other relevant parameters. Click Next when finished.




3. In the right-hand column, select PROFINET-IO→I/O→EBYTE→TION→EBYTE Profinet I/O→P31V1.0.0, then hold down the left mouse button and drag it into the table on the left.




4. Double-click the device name field, enter the corresponding device name. There cannot be the same device

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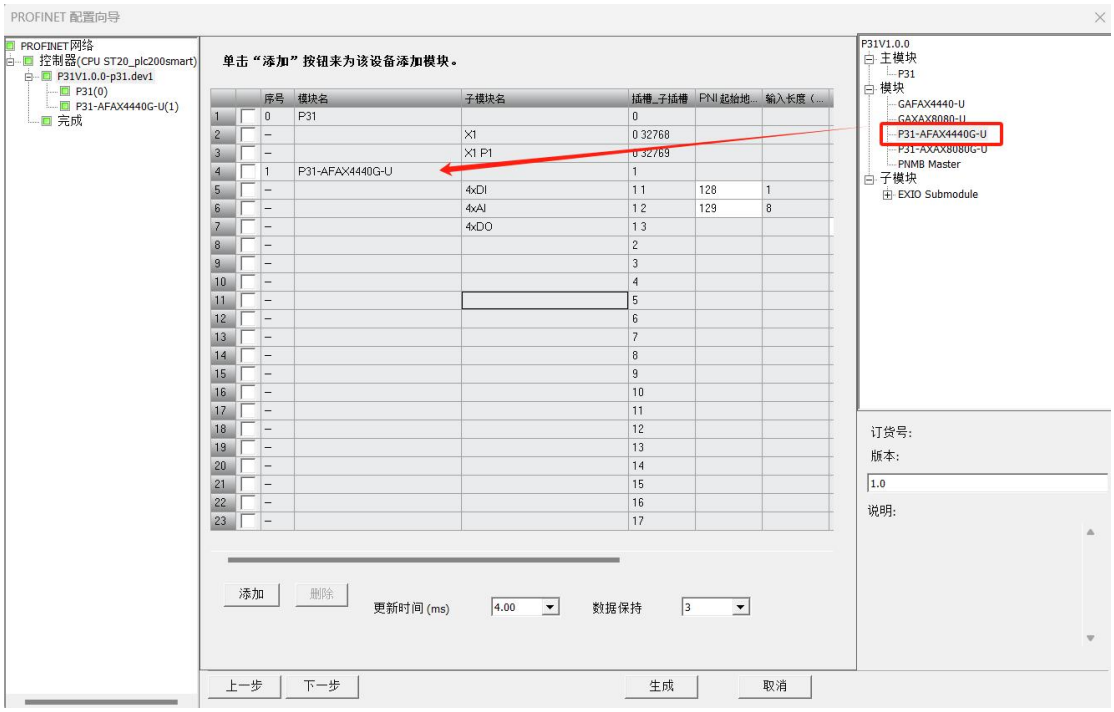

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name in the same project. Similarly, set the IP address, keeping it in the same network segment as the PLC controller. Finally, click Generate.

Note: The device name set here must be consistent with the device. If you are unsure of the device name, you can set it arbitrarily first and then change the device name to match the device name later. The IP address set here will be used to set the IP address of devices with the same device name during configuration.




5. After completing the relevant settings, click to enter the device view operation interface. In the device overview area, drag the corresponding device model name ( M31-AFAX4440G-U-PN ) into slot 1.




Note: If the P31 host has expansion I/O modules, the model names of the expansion modules must be dragged into the slots in sequence. Otherwise, the device will report a configuration error!

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## 5.4 Check the starting addresses of points I and Q.

1. By sliding the bottom bar, you can see the starting address of DI, AI, and DO, as well as their length (in bytes).




## 5.5 Instructions for using the IO function:

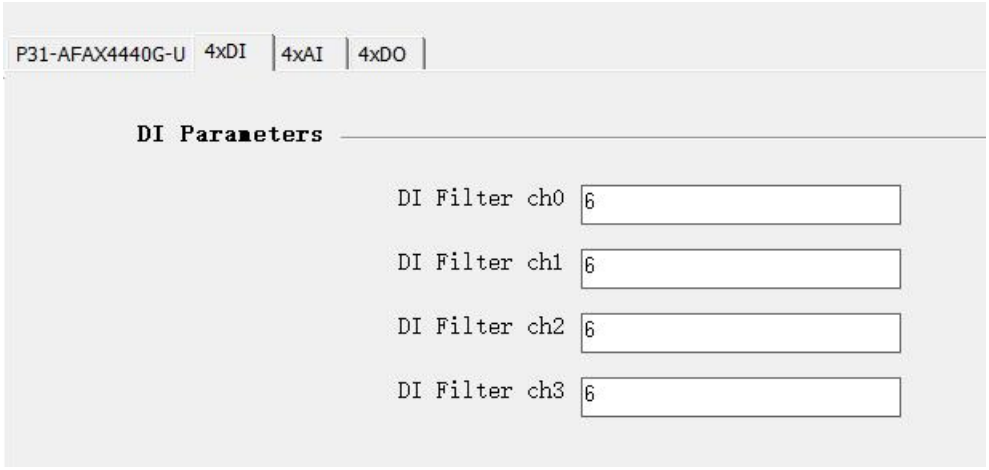
1. Select the device you just added ( M31-AFAX4440G-U-PN ). Here, you need to configure the corresponding DI, AI, and DO parameters according to the on-site usage requirements.

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2. DI Parameters:

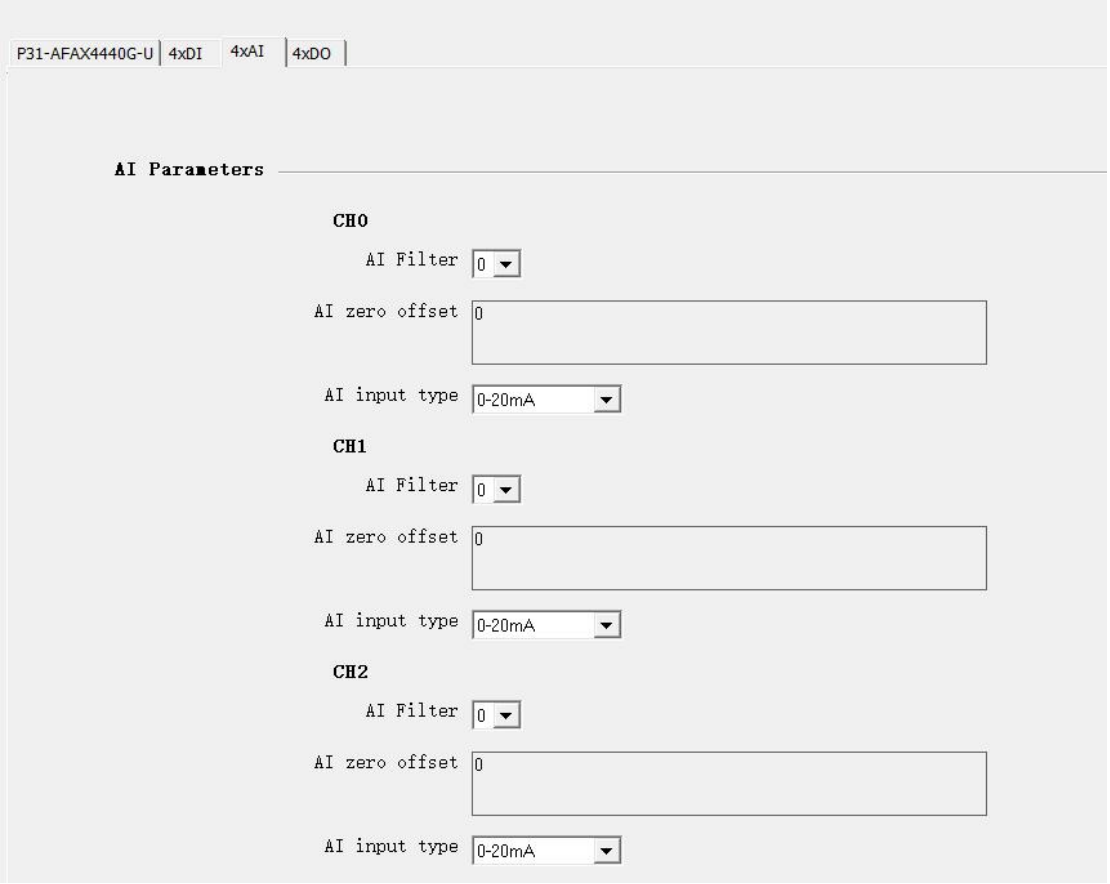



DI Filter: The DI filtering time for each channel can be set individually.

3. AI Parameters:

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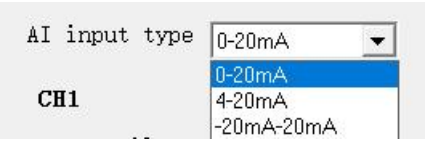

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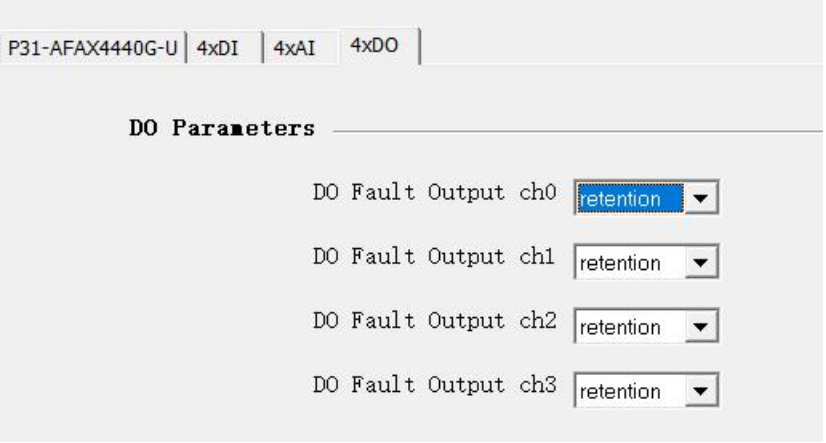

AI Filter: The AI filtering level for each channel can be set individually. The higher the level, the longer the filtering time.

AI zero offset: (Not configurable)

AI input type (AI output type): Selectable ranges are 0~20mA, 4~20mA, and -20~20mA.




4. DO Parameters:




DO Fault Output: When the bus malfunctions, the output status of each channel's DO can be set individually.

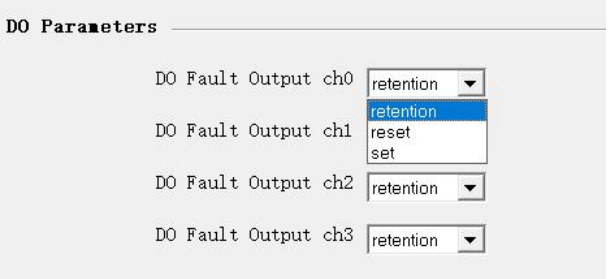
Retention: In the event of a fault, retain the current state of the DO output.

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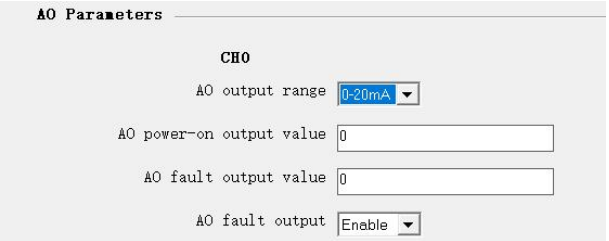

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Reset: In case of a fault, resets the DO output to its previous state.

Set (Set): In case of a fault, set the state before the DO output is set.




5. AO Parameters:



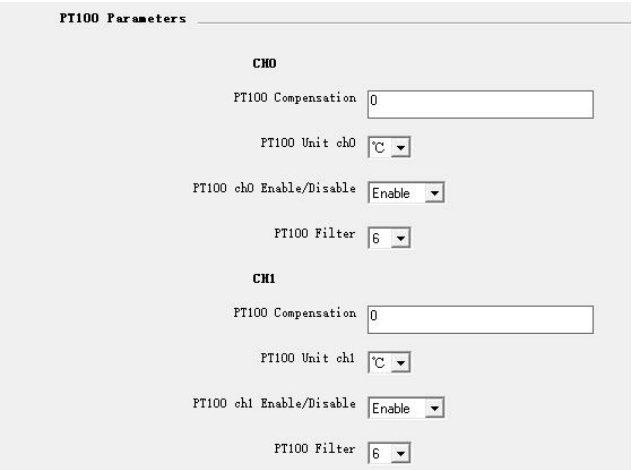

AO output range: Current type is available in 0~20mA and 4~20mA ranges; Voltage type is available in 0~5V and 0~10V ranges.

AO power-on output value: A preset fixed value that the AO channel automatically outputs after the device is powered on.

AO fault output value: The emergency output value that the AO channel automatically switches to when the device detects a communication interruption, bus abnormality, or module failure.

AO fault output: Controls the on/off state of the AO fault output function. When enabled, the AO channel will execute according to the preset "fault output value" when the device fails; when disabled, the AO channel will retain the last normal output value when a fault occurs.

6. PT100 Parameters:




PT100 Compensation: Value range -200 to 200 (unit: 0.1℃, default value 0), used to compensate and calibrate the measured temperature of the channel. The compensation value is directly added to the final temperature result.

PT100 Unit ch0 (PT100 channel unit): Numerical range (°C; °F; K). After the setting takes effect, the integer and floating-point values of the project quantity will be automatically converted according to the selected unit.

PT100 ch0 Enable/Disable (PT100 channel disabled): When this channel is disabled , the engineering integer and

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floating-point registers for this channel will return the diagnostic value -32767.
PT100 Filter (PT100 filter parameters ): Data range 1-16, default parameter 6 .

After configuring the relevant parameters, click "Generate".
At this moment, we have successfully completed the communication connection routine between Siemens PLC S7-200smart and Profinet distributed I/O ( M31-AFAX4440G-U-PN ).

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# 6 Product Function Introduction

## 6.1 IO point number expansion

Note: Do not operate the equipment while it is powered on during the assembly process, otherwise it may cause damage to the equipment!

This product supports the splicing of 15 expansion modules, and the host can synchronize all 15 IO expansion modules in as little as 1ms.

The M31-U-PN series distributed I/O host adopts an scalable architecture design, in which the I/O expansion module can be used to expand the M31-U-PN series host. Simply connect the I/O expansion module to the host slot and then slide down the latch to firmly connect the host and the I/O expansion module together.

The specific steps are as follows:

- First, ensure the host is not powered on and that the host's slider is in the UNLK position. Then, connect the IO expansion module to the host, as shown in the following figure:




- After connecting the IO expansion module, slide the host to the LOCK position and then power on the host .
- In TIA Portal/STEP 7, simply drag and drop the corresponding module model according to the module assembly order.

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## 6.2 Profinet to Modbus RTU gateway function

1. This product provides one RS485 interface and supports eight command nodes.
2. It can be used as a Modbus RTU master station .
3. The Profinet to Modbus RTU gateway needs to be dragged into slot 17 to be used.
4. For detailed usage instructions, please refer to the Profinet Gateway Manual : https://www.ebyte.com/product/2341.html .

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# 7 Precautions

(1) Do not connect the equipment while it is powered on, otherwise there is a risk of damage to the equipment.

(2) Firmware version compatibility requirements between host and expansion modules

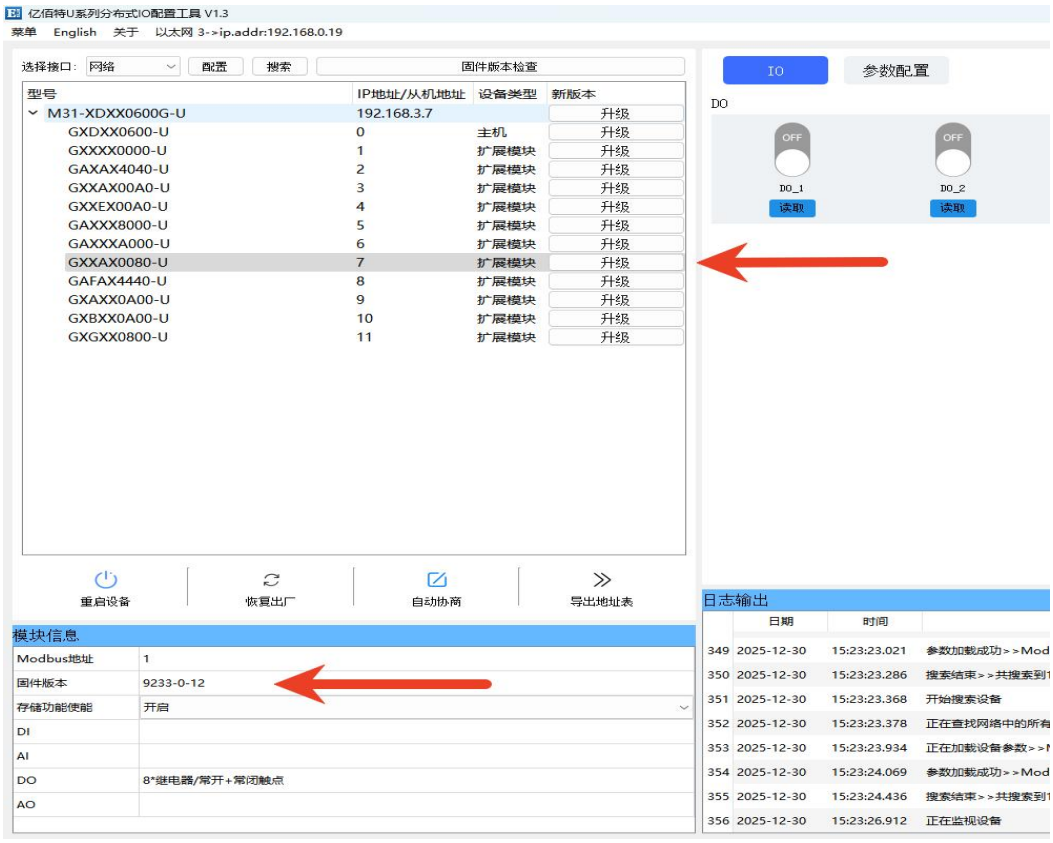
1. Compatibility principle: The firmware version number of the host device must be greater than or equal to the firmware version number of the expansion module it is paired with; otherwise, the device will not function properly.

2. Version compatibility example:

| Host firmware version | Compatible expansion module firmware version |
|---|---|
| 9232-0-10 | 9206-0-10, 9233-0-11 |
| 9232-0-11 | 9206-0-10, 9233-0-11, 9233-0-12 |
| 9232-0-12 | 9206-0-10, 9233-0-11, 9233-0-12, 9286-0-10 |
| 9232-0-13 | 9206-0-10, 9233-0-11, 9233-0-12, 9286-0-10, 9304-0-10 |

(3) Troubleshooting: If incompatible firmware versions are used in a combination, the entire device will fail to boot and operate. The host firmware must be upgraded to a version that meets compatibility requirements before normal use can proceed.

(4) Firmware version check: You can view their firmware version by selecting the host or expansion module in the host computer.




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# Revision History

| Version | Revision Date | Revision Notes | Maintainer |
|---|---|---|---|
| 1.0 | 2025-5-6 | Initial version | LT |
| 1.1 | 2025-10-11 | Add new models | LT |
| 1.2 | 2025-10-30 | Correct port identifier | LT |
| 1.3 | 2026-1-29 | Add new models , modify appearance | LT |

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