

# SD Series IP67 Remote I/O Module

## User Manual

Decowell. Reliable partner for intelligent manufacturing



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## Foreword

### ■ Information profile

Thank you for purchasing Decowell SD SERIES IP67 I/O !

SD series products are Decowell's I/O with high protection grade, up to IP67 protection grade, which supports mainstream fieldbus protocols, such as PROFINET, EtherCAT, EtherNet/IP, CC-Link, CC-Link IE Field Basic, Modbus TCP, etc. And a single module supports a maximum of 16 signal points, signal types include digital input and output, analog input and output. It has fully sealed miniaturized design and compact structure which is easy to integrate and install. With the flexible connection of the extension cable, it is waterproof and dust-proof, suitable for long-term stable operation and in a variety of severe industrial environment in the application scenario. It has a strong anti-interference ability, which is widely used in automotive, lithium, logistics, metallurgy, printing and other industries.

This manual mainly describes the specifications, characteristics and usage of the module, please read it carefully before use, so that you can use the product more clearly and safely.

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## Safety precautions

### ■ Safety statement

01. When installing, operating, and maintaining the product, please read and follow these safety precautions.
02. To ensure the safety of the human body and the device, please follow the labels on the product and all the safety precautions described in this document when installing, operating, and maintaining the product.
03. The "Tips", "Attention", "Warning" and "Danger" in this manual do not represent all safety precautions to be followed, but only serve as a supplement to all safety precautions.
04. This product should be used in an environment that meets the requirements of the design specifications, otherwise it may cause failure, and the abnormal function or component damage caused by non-compliance with the relevant regulations are not within the scope of product quality assurance.
05. Decowell does not bear any legal responsibility for personal safety accidents and property damage caused by illegal operation of products.

### ■ Safety grade definition

|  |
|--|
|  <b>Tips</b>  |
| <b>The mark indicates "necessary additions or clarifications to the description of the operation."</b>   |
|  <b>Attention</b>   |
| <b>The label "Hazard caused by failure to perform as required, which could result in mild or moderate injury to human body and damage to equipment."</b> |
|  <b>Warning</b>   |
| <b>The mark indicates "risk of injury or personal injury due to failure to perform as required".</b>   |

## ■ Control system design Warning

01. Be sure to design a safety circuit to ensure that the control system can still work safely when the external power supply fails or the expansion module fails;
02. When the output circuit exceeds the rated load current or the load short circuit leads to long-term overcurrent, the module may smoke or catch fire, and safety devices such as fuses or circuit breakers should be set outside.

## ■ Control system design Attention

01. Be sure to set an emergency brake circuit, protection circuit, interlock circuit for forward and reverse operation and an upper and lower limit interlock switch to prevent machine damage in the external circuit of the expansion module;
02. To ensure the safe operation of the equipment, please design external protection circuits and safety mechanisms for output signals related to major accidents;
03. When the relay, transistor and other output units of the expansion module are damaged, its output can not be controlled to the ON or STEADY OFF state;
04. The expansion module is designed to be used in an indoor electrical environment with an overvoltage grade II. The power system level of the expansion module should have a lightning protection device to ensure that the lightning overvoltage is not applied to the power input, signal input, and control output ports of the expansion module to prevent device damage.
05. Be sure to set an emergency brake circuit, protection circuit, interlock circuit for forward and reverse operation and an upper and lower limit interlock switch to prevent machine damage in the external circuit of the expansion module;
06. To ensure the safe operation of the equipment, please design external protection circuits and safety mechanisms for output signals related to major accidents;
07. When the relay, transistor and other output units of the expansion module are damaged, its output can not be controlled to ON or STEADY OFF state;;
08. The expansion module is designed to be used in an indoor electrical environment with an overvoltage grade II. The power system level of the expansion module should have a lightning protection device to ensure that the lightning overvoltage is not applied to the power input, signal input, and control output ports of the expansion module to prevent device damage.

## 1. Product information

### 1.1 Product naming rules

Master module:

**SD EC - 8 IOL - M12 - 00**  
 ① ②                      ③ ④                      ⑤                      ⑥

| No. | Name                | Definition                  |
|-----|---------------------|-----------------------------|
| ①   | Product series name | SD series                   |
| ②   | Bus protocol        | PN:PROFINET<br>EC:EtherCAT  |
| ③   | Number of channels  | 8-channel                   |
| ④   | IOL identification  | IO-Link protocol            |
| ⑤   | Terminal type       | Standard M12 interface port |
| ⑥   | Reserve             | No definition               |

Slave station:

**SD IOL - 8 8 0 0 - M12**  
 ① ②                      ③ ④ ⑤ ⑥                      ⑦

| No. | Name                    | Note definition  |
|-----|-------------------------|--|
| ①   | Product series name     | SD series  |
| ②   | IOL identification      | IO-Link protocol   |
| ③   | Input channel quantity  | 0: no-input 4: 4-channel input<br>8: 8-channel input H: 16-channel input     |
| ④   | Output channel quantity | 0: no-output 4: 4-channel output<br>8: 8-channel output H: 16-channel output |

|   |                            |  |
|---|----------------------------|--|
| ⑤ | Input channel signal type  | 0:NPN input 1:PNP input N: no-input signal |
| ⑥ | Output channel signal type | 0:NPN input 1:PNP input N: no-input signal |
| ⑦ | Terminal type              | Standard M12 interface port                |

## 1.2 Component description

### 1.2.1 master module IOL Component description

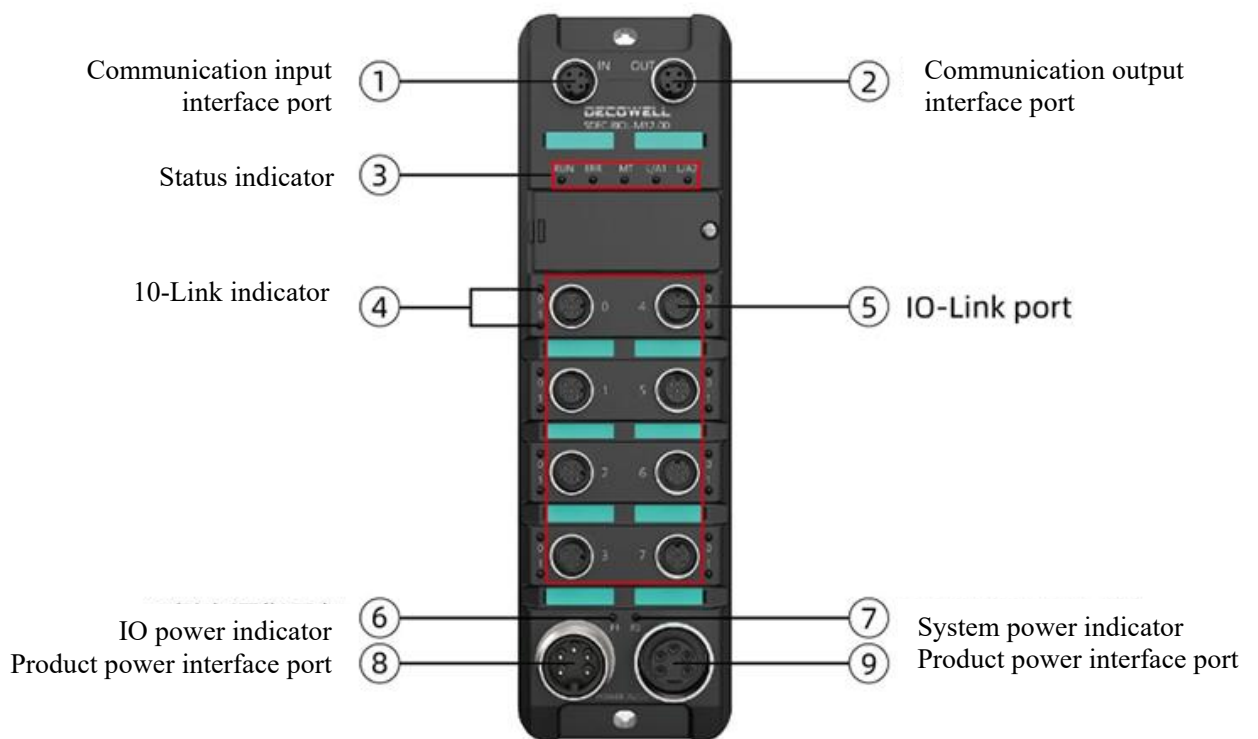


Figure 1-2-1-1 component specification diagram

Component specification list

| No. | Name                                | Function definition |   |
|-----|-------------------------------------|---------------------|---|
| 1   | Communication input interface port  | IN                  | Used for communication input and output for pin definition, refer to 3.2 <u>Terminal definition</u> |
| 2   | Communication output interface port | OUT                 |   |
| 3   | Status indicator light              | MT                  | Working normally (off)  |
|     |                                     |                     | Reset complete (on)   |
|     |                                     |                     | Press reset key flashing (1Hz flashing)   |

|   |                              |  |   |
|---|------------------------------|--|---|
|   |                              |  | Module upgrade flashing (5Hz flashing)  |
|   |                              | RUN  | The device is in INIT state (Off).<br>The device is in the PREOPERATIONAL state (flashing)                  |
| 3   | Status indicator light       | RUN  | Equipment in SAFEOPERATIONAL state (single flashing)  |
|   |                              |  | Equipment in OPERATIONAL state (on)   |
|   |                              | ERR  | The device is in a critical communication or application controller error (flashing)                        |
|   |                              |  | Application watchdog timeout (flashing twice)   |
|   |                              |  | The slave device application was automatically changed EtherCAT status due to a local error (flashing once) |
|   |                              |  | General configuration error(flashing)   |
|   |                              |  | EtherCAT communication on the device is working (off)   |
|   |                              | L/A1   | Network port disconnected (Off)   |
|   |                              |  | Network port connected (On)   |
|   |                              |  | Network port data communication (flashing)  |
|   |                              | L/A2   | Network port disconnected (Off)   |
|   |                              |  | Network port connected (On)   |
| Network port data communication (flashing)                |                              |  |   |
| 4   | IO-Link indicator            | 0  | Port configured as IO-Link, searching for IO-Link device (LED green flashing)                               |
|   |                              |  | IO-Link communication is normal (LED green on)  |
|   |                              |  | PIN4 and L- short circuit or overload (LED red on)  |
|   |                              |  | IO-Link communication error, hardware error, orz port conflict (LED red flashing)                           |
|   |                              |  | The port is configured as DI/DO. In this case, PIN4 is high (LED green + red/yellow steady on)              |
|   |                              | The port is configured as DI/DO or INACTIVE. At this time, PIN4 is low electrical level (LED green + red/yellow off) |   |
|   |                              | 1  | Digital input, PIN2 is high (LED green + red / steady yellow)   |
| Digital input, PIN2 is low (LED green + red / yellow out) |                              |  |   |
| 5   | IO-Link Port                 | Used for IO-Link data transmission for pin definition, refer to 3.3 terminal definition                              |   |
| 6   | IO Power indicator light     | Used to display whether there is a power supply input and output   |   |
| 7   | System Power indicator light |  |   |
| 8   | Product power supply         | POWER IN   | Used for power supply input and output, for pin definition,   |



|   |                |           |                                  |
|---|----------------|-----------|----------------------------------|
| 9 | interface port | POWER OUT | refer to 3.2 Terminal Definition |
|---|----------------|-----------|----------------------------------|

**1.2.2 IO-Link slave station component description**

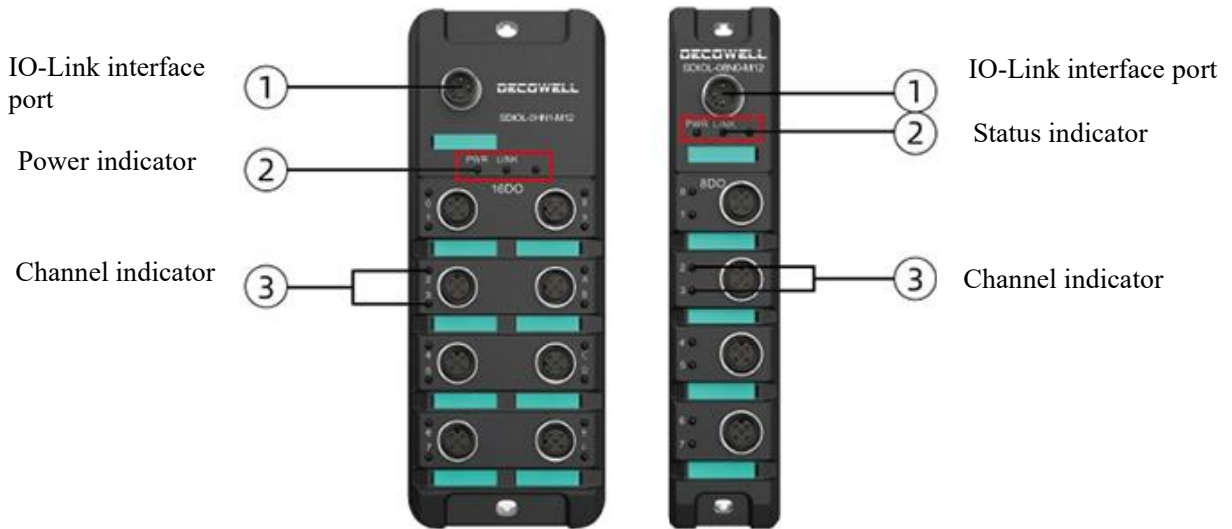


Figure 1-2-2-1 component description diagram

component description Table

| No. | Name                    | Function definition  |   |
|-----|-------------------------|--|---|
| 1   | IO-Link interface port  | Used for IO-Link data transmission. For details, see 3.2 terminal definition |   |
| 2   | Power indicator light   | PWR  | The device is powered on(steady green)                            |
|     |                         |  | The device is not powered on (steady off).                        |
|     | Status indicator light  | LINK   | Normal communication (green light flashes once every two seconds) |
|     |                         |  | Communication error (green flashing)                              |
| 3   | Channel indicator light | Input/output signal (green on)   |   |

**1.3 Technical specification**

**1.3.1 master module technical parameter**

SDEC-8IOL-M12-00

| Basic parameter     |                        |
|---------------------|------------------------|
| Protection grade    | IP67(Bolted condition) |
| Appearance material | PA6+gf30%              |

|  |   |
|--|---|
| Overall dimension  | 66×221×29mm   |
| Storing temperature                                      | -40°C...+85°C                                       |
| Working temperature                                      | -25°C...+70°C                                       |
| <b>Power supply parameter</b>                            |   |
| Power supply interface port type                         | 2×7/8" 5pin, Needle end+Hole end                    |
| US Standard voltage                                      | 24 VDC (18...30 VDC)                                |
| US Current summation                                     | 5A  |
| UA Standard voltage                                      | 24 VDC (18...30 VDC)                                |
| UA Current summation                                     | 8A  |
| Rated power consumption                                  | 45mA  |
| Electrical isolation                                     | US and UA: 24V isolation, 0V isolation              |
| <b>Technical parameter</b>                               |   |
| Communication protocol                                   | EtherCAT  |
| Bus communication interface port type                    | 2×M12 D-code 4pin, Hole end                         |
| Maximum transmission distance                            | 100 m   |
| Communication rate                                       | 10/100 Mbit/s                                       |
| Digital input  | 16×PNP, type 3                                      |
| Digital output end                                       | 8×PNP   |
| Input/output configurable                                | Yes   |
| IO-link version  | V1.1.3  |
| IO-link Transmission rate                                | COM1, COM2 , COM3 ( 4.8 kbps\38.4 kbps\230.4 kbps ) |
| IO-link port numbers/type                                | 8×CLASS A   |
| Signal connection interface type                         | 8×M12 D-code 5pin, Hole end                         |
| Maximum distance to communicate with slave station       | 20m   |
| External 24V power supply current of IO-link port (Pin1) | 2A  |
| Fault diagnosis  | Support   |

## SDPN-8IOL-M12-00

|                                  |                                  |
|----------------------------------|----------------------------------|
| <b>Basic parameter</b>           |                                  |
| Protection grade                 | IP67(Bolted condition)           |
| Appearance material              | PA6+gf30%                        |
| Overall dimension                | 66×221×29mm                      |
| Storing temperature              | -40°C...+85°C                    |
| Working temperature              | -25°C...+70°C                    |
| <b>Power supply parameter</b>    |                                  |
| Power supply interface port type | 2×7/8" 5pin, Needle end+Hole end |
| US Standard voltage              | 24 VDC (18...30 VDC)             |
| US Current summation             | 5A                               |
| UA Standard voltage              | 24 VDC (18...30 VDC)             |
| UA Current summation             | 8A                               |

|   |   |
|---|---|
| Rated power consumption                                   | 89mA  |
| Electrical isolation                                      | US AND UA: 24V isolation, 0V isolation              |
| Technical parameter                                       |   |
| Communication protocol                                    | PROFINET  |
| Bus communication interface port type                     | 2×M12 D-code 4pin, Hole end                         |
| Maximum transmission distance                             | 100 m   |
| Communication rate  | 10/100 Mbit/s                                       |
| Digital input   | 16×PNP, type 3                                      |
| Digital output end  | 8×PNP   |
| Input/output configurable                                 | Yes   |
| IO-link version   | V1.1.3  |
| IO-link Transmission rate                                 | COM1, COM2 , COM3 ( 4.8 kbps\38.4 kbps\230.4 kbps ) |
| IO-link port numbers/type                                 | 8 ×CLASS A  |
| Signal connection interface type                          | 8×M12 D-code 5pin, Hole end                         |
| Maximum distance to communicate with slave station        | 20m   |
| External 24V power supply current of IO- link port (Pin1) | 2A  |
| Fault diagnosis   | Support   |

### 1.3.2 Slave station technical parameter

SDIOL-801N-M12

|                         |                                |
|-------------------------|--------------------------------|
| Basic parameter         |                                |
| Protection grade        | IP67(Bolted condition)         |
| Appearance material     | PA6+gf30%                      |
| Overall dimension       | 65.0x35.9x220.0 mm             |
| Storing temperature     | -40°C...+85°C                  |
| Working temperature     | -25°C...+70°C                  |
| Technical parameter     |                                |
| Standard voltage        | 24 VDC (18...30 VDC)           |
| Rated power consumption | 16mA                           |
| Communication protocol  | IO-Link 1.1.3                  |
| Interface port slot     | 8×M12, socket , 5 pins, code A |
| Input channel quantity  | 8                              |
| Input signal type       | PNP, type 1                    |
| Communication rate      | COM2 (38.4Kbps)                |
| Minimum cycle time      | 5ms                            |

|                         |                                |
|-------------------------|--------------------------------|
| Input filtering time    | 0~10ms(Default 3ms)            |
| input impedance         | No                             |
| Isolation or not        | Yes                            |
| Product characteristics | Input filtering, anti-shorting |

## SDIOL-800N-M12

| Basic parameter         |                                |
|-------------------------|--------------------------------|
| Protection grade        | IP67(Bolted condition)         |
| Appearance material     | PA6+gf30%                      |
| Overall dimension       | 36x160x23mm                    |
| Storing temperature     | -40°C...+85°C                  |
| Working temperature     | -25°C...+70°C                  |
| Technical parameter     |                                |
| Standard voltage        | 24 VDC (18...30 VDC)           |
| Rated power consumption | 51mA                           |
| Communication protocol  | IO-Link 1.1.3                  |
| Interface port slot     | 8×M12, socket , 5 pins, code A |
| Input channel quantity  | 8                              |
| Input signal type       | NPN, type 1                    |
| Communication rate      | COM2 (38.4Kbps)                |
| Minimum cycle time      | 5ms                            |
| Input filtering time    | 0~10ms(Default 3ms)            |
| input impedance         | No                             |
| Isolation or not        | Yes                            |
| Product characteristics | Input filtering, anti-shorting |

## SDIOL-08N0-M12

| Basic parameter     |                        |
|---------------------|------------------------|
| Protection grade    | IP67(Bolted condition) |
| Appearance material | PA6+gf30%              |
| Overall dimension   | 36x160x23mm            |
| Storing temperature | -40°C...+85°C          |
| Working temperature | -25°C...+70°C          |
| Technical parameter |                        |

|                         |   |
|-------------------------|---|
| Standard voltage        | 24 VDC (18...30 VDC)  |
| Rated power consumption | 30mA  |
| Communication protocol  | IO-Link 1.1.3   |
| Interface port slot     | 8×M12, socket , 5 pins, code A                                      |
| Output channel quantity | 8   |
| Output signal type      | NPN   |
| Output current          | Max: 0.5A (Total Output Current of 8 Channels at the same time: 2A) |
| Communication rate      | COM2 (38.4Kbps)   |
| Minimum cycle time      | 5ms   |
| Load type               | Resistive load, inductive load, lamp load                           |
| Isolation or not        | Yes   |
| Fault diagnosis         | Low pressure, overheating diagnosis                                 |
| Product characteristics | Single channel short circuit protection                             |

## SDIOL-08N1-M12

| Basic parameter         |   |
|-------------------------|---|
| Protection grade        | IP67(Bolted condition)  |
| Appearance material     | PA6+gf30%   |
| Overall dimension       | 36x160x23mm   |
| Storing temperature     | -40°C...+85°C   |
| Working temperature     | -25°C...+70°C   |
| Technical parameter     |   |
| Standard voltage        | 24 VDC (18...30 VDC)  |
| Rated power consumption | 30mA  |
| Communication protocol  | IO-Link 1.1.3   |
| Interface port slot     | 8×M12, socket , 5 pins, code A                                      |
| Output channel quantity | 8   |
| Output signal type      | PNP   |
| Output current          | Max: 0.5A (Total Output Current of 8 Channels at the same time: 2A) |
| Communication rate      | COM2 (38.4Kbps)   |
| Minimum cycle time      | 5ms   |
| Load type               | Resistive load, inductive load, lamp load                           |

|                         |   |
|-------------------------|---|
| Isolation or not        | Yes                                     |
| Fault diagnosis         | Low pressure, overheating diagnosis     |
| Product characteristics | Single channel short circuit protection |

## SDIOL-8800-M12

| Basic parameter         |   |
|-------------------------|---|
| Protection grade        | IP67(Bolted condition)  |
| Appearance material     | PA6+gf30%   |
| Overall dimension       | 66x171x29mm   |
| Storing temperature     | -40°C...+85°C   |
| Working temperature     | -25°C...+70°C   |
| Technical parameter     |   |
| Standard voltage        | 24 VDC (18...30 VDC)  |
| Rated power consumption | 58mA  |
| Communication protocol  | IO-Link 1.1.3   |
| Interface port slot     | 8×M12Connector, socket, 5 pins, code A                              |
| Output channel quantity | 8   |
| Input channel quantity  | 8   |
| Input signal type       | NPN, type 1   |
| Output signal type      | NPN   |
| Output current          | Max: 0.5A (Total Output Current of 8 Channels at the same time: 2A) |
| Communication rate      | COM2 (38.4Kbps)   |
| Minimum cycle time      | 5ms   |
| Input filtering time    | 0~10ms(Default 3ms)   |
| Load type               | Resistive load, inductive load, lamp load                           |
| Isolation or not        | Yes   |
| Fault diagnosis         | Low pressure, overheating diagnosis                                 |
| Product characteristics | Single channel short circuit protection                             |

## SDIOL-8811-M12

| Basic parameter     |                         |
|---------------------|-------------------------|
| Protection grade    | IP679(Bolted condition) |
| Appearance material | PA6+gf30%               |

|                         |   |
|-------------------------|---|
| Overall dimension       | 66x171x29mm   |
| Storing temperature     | -40°C...+85°C   |
| Working temperature     | -25°C...+70°C   |
| Technical parameter     |   |
| Standard voltage        | 24 VDC (18...30 VDC)  |
| Rated power consumption | 72mA  |
| Communication protocol  | IO-Link 1.1.3   |
| Interface port slot     | 8×M12Connector, socket, 5 pins, code A                              |
| Output channel quantity | 8   |
| Input channel quantity  | 8   |
| Input signal type       | PNP, type 1   |
| Output signal type      | PNP   |
| Output current          | Max: 0.5A (Total Output Current of 8 Channels at the same time: 2A) |
| Communication rate      | COM2 (38.4Kbps)   |
| Minimum cycle time      | 5ms   |
| Input filtering time    | 0~10ms(Default 3ms)   |
| Load type               | Resistive load, inductive load, lamp load                           |
| Isolation or not        | Yes   |
| Fault diagnosis         | Low pressure, overheating diagnosis                                 |
| Product characteristics | Single channel short circuit protection                             |

## SDIOL-H00N-M12

|                         |                        |
|-------------------------|------------------------|
| Basic parameter         |                        |
| Protection grade        | IP67(Bolted condition) |
| Appearance material     | PA6+gf30%              |
| Overall dimension       | 66x171x29mm            |
| Storing temperature     | -40°C...+85°C          |
| Working temperature     | -25°C...+70°C          |
| Technical parameter     |                        |
| Standard voltage        | 24 VDC (18...30 VDC)   |
| Rated power consumption | 86mA                   |
| Communication           | IO-Link 1.1.3          |

|                         |  |
|-------------------------|--|
| protocol                |  |
| Interface port slot     | 8×M12Connector, socket, 5 pins, code A |
| Input channel quantity  | 16                                     |
| Input signal type       | NPN, type 1                            |
| Communication rate      | COM2 (38.4Kbps)                        |
| Minimum cycle time      | 5ms                                    |
| Input filtering time    | 0~10ms(Default 3ms)                    |
| input impedance         | No                                     |
| Isolation or not        | Yes                                    |
| Product characteristics | Input filtering, anti-shorting         |

## SDIOL-H01N-M12

| Basic parameter         |  |
|-------------------------|--|
| Protection grade        | IP67(Bolted condition)                 |
| Appearance material     | PA6+gf30%                              |
| Overall dimension       | 66x171x29mm                            |
| Storing temperature     | -40°C...+85°C                          |
| Working temperature     | -25°C...+70°C                          |
| Power supply parameter  |  |
| Standard voltage        | 24 VDC (18...30 VDC)                   |
| Rated power consumption | 19mA                                   |
| Communication protocol  | IO-Link 1.1.3                          |
| Interface port slot     | 8×M12Connector, socket, 5 pins, code A |
| Input channel quantity  | 16                                     |
| Input signal type       | PNP, type 1                            |
| Communication rate      | COM2 (38.4Kbps)                        |
| Minimum cycle time      | 5ms                                    |
| Input filtering time    | 0~10ms(Default 3ms)                    |
| input impedance         | No                                     |
| Isolation or not        | Yes                                    |
| Product characteristics | Input filtering, anti-shorting         |

## SDIOL-0HN0-M12



| Basic parameter         |   |
|-------------------------|---|
| Protection grade        | IP67(Bolted condition)  |
| Appearance material     | PA6+gf30%   |
| Overall dimension       | 66x171x29m  |
| Storing temperature     | -40°C...+85°C   |
| Working temperature     | -25°C...+70°C   |
| Technical parameter     |   |
| Standard voltage        | 24 VDC (18...30 VDC)  |
| Rated power consumption | 43mA  |
| Communication protocol  | IO-Link 1.1.3   |
| Interface port slot     | 8×M12Connector, socket, 5 pins, code A                              |
| Output channel quantity | 16  |
| Output signal type      | NPN   |
| Output current          | Max: 0.5A (Total Output Current of 8 Channels at the same time: 2A) |
| Communication rate      | COM2 (38.4Kbps)   |
| Minimum cycle time      | 5ms   |
| Load type               | Resistive load, inductive load, lamp load                           |
| Isolation or not        | Yes   |
| Fault diagnosis         | Low pressure, overheating diagnosis                                 |
| Product characteristics | Single channel short circuit protection                             |

## SDIOL-0HN1-M12

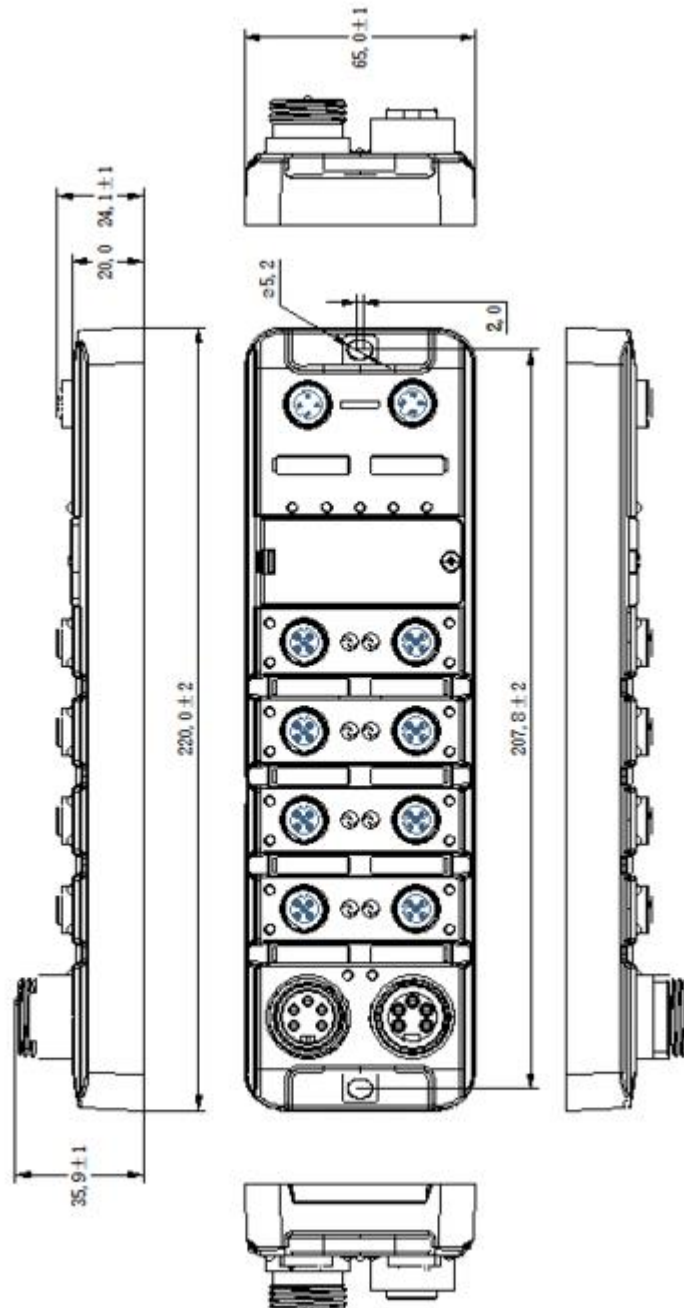
| Basic parameter         |                        |
|-------------------------|------------------------|
| Protection grade        | IP67(Bolted condition) |
| Appearance material     | PA6+gf30%              |
| Overall dimension       | 66x171x29mm            |
| Storing temperature     | -40°C...+85°C          |
| Working temperature     | -25°C...+70°C          |
| Power supply parameter  |                        |
| Standard voltage        | 24 VDC (18...30 VDC)   |
| Rated power consumption | 58mA                   |
| Communication protocol  | IO-Link 1.1.3          |

|                         |   |
|-------------------------|---|
| Interface port slot     | 8×M12Connector, socket, 5 pins, code A                              |
| Output channel quantity | 16  |
| Output signal type      | NPN   |
| Output current          | Max: 0.5A (Total Output Current of 8 Channels at the same time: 2A) |
| Communication rate      | COM2 (38.4Kbps)   |
| Minimum cycle time      | 5ms   |
| Load type               | Resistive load, inductive load, lamp load                           |
| Isolation or not        | Yes   |
| Fault diagnosis         | Low pressure, overheating diagnosis                                 |
| Product characteristics | Single channel short circuit protection                             |

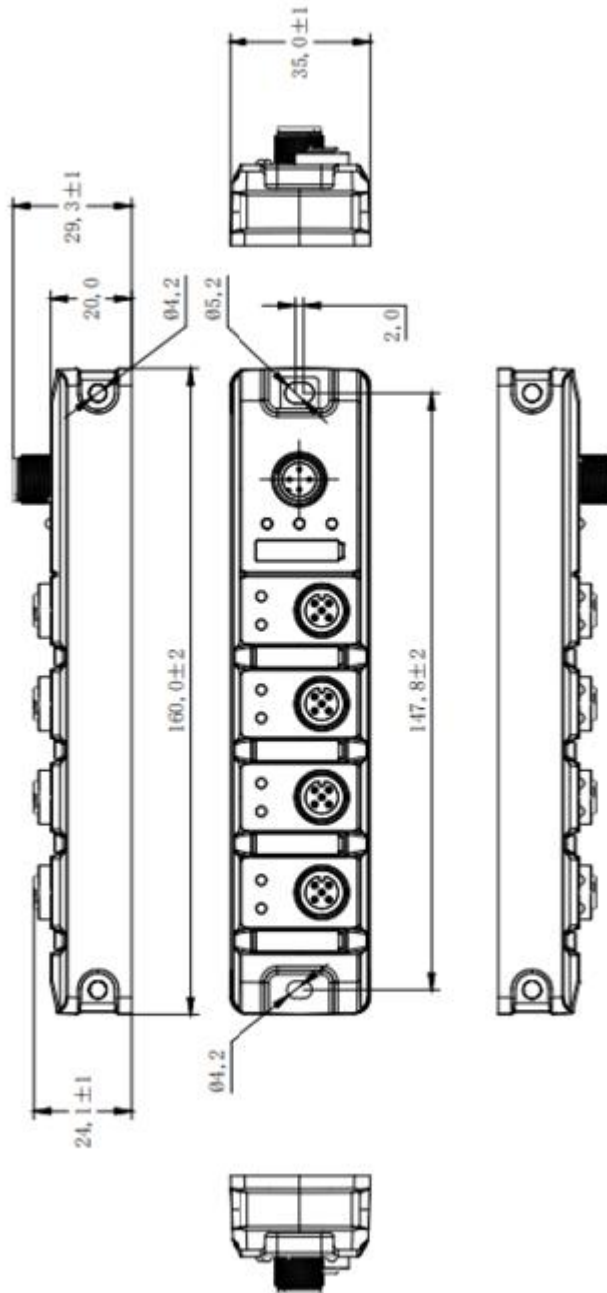
## 2. Mechanical installation

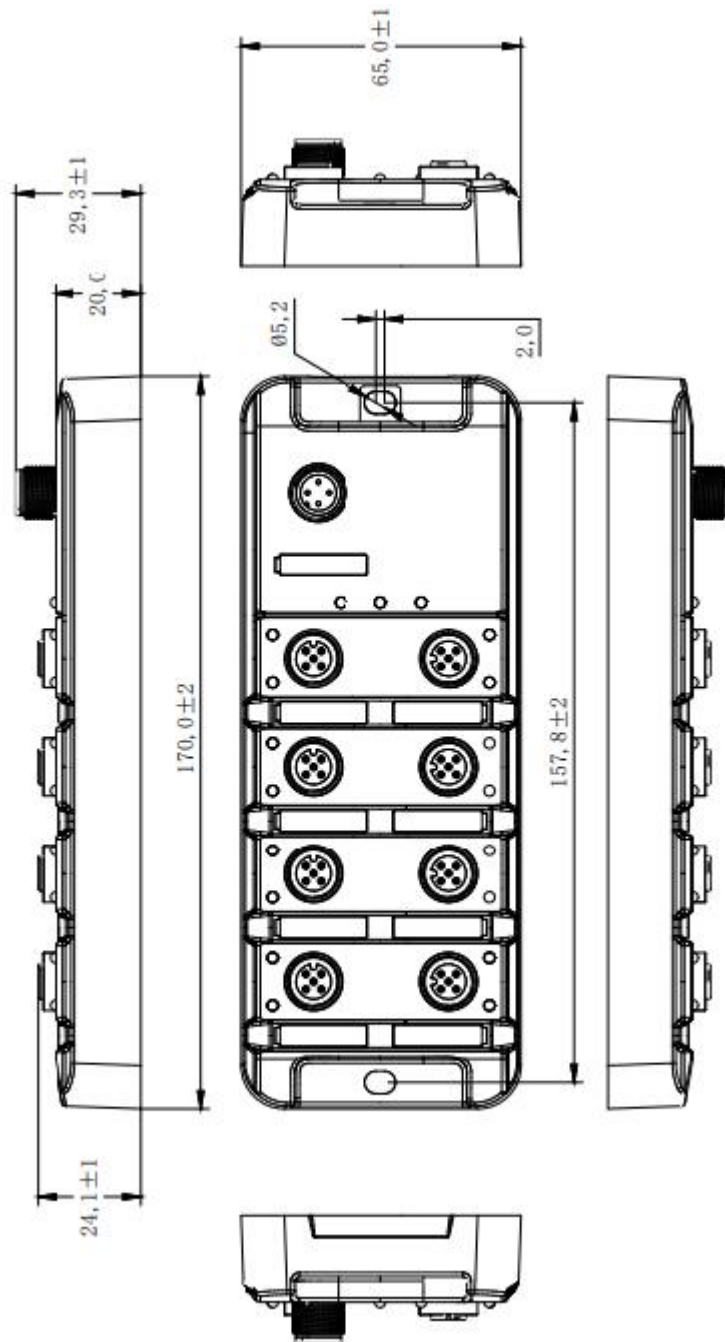
### 2.1 Installation dimension

#### 2.1.1 Master module installation dimension



2.1.1 Slave station installation dimension



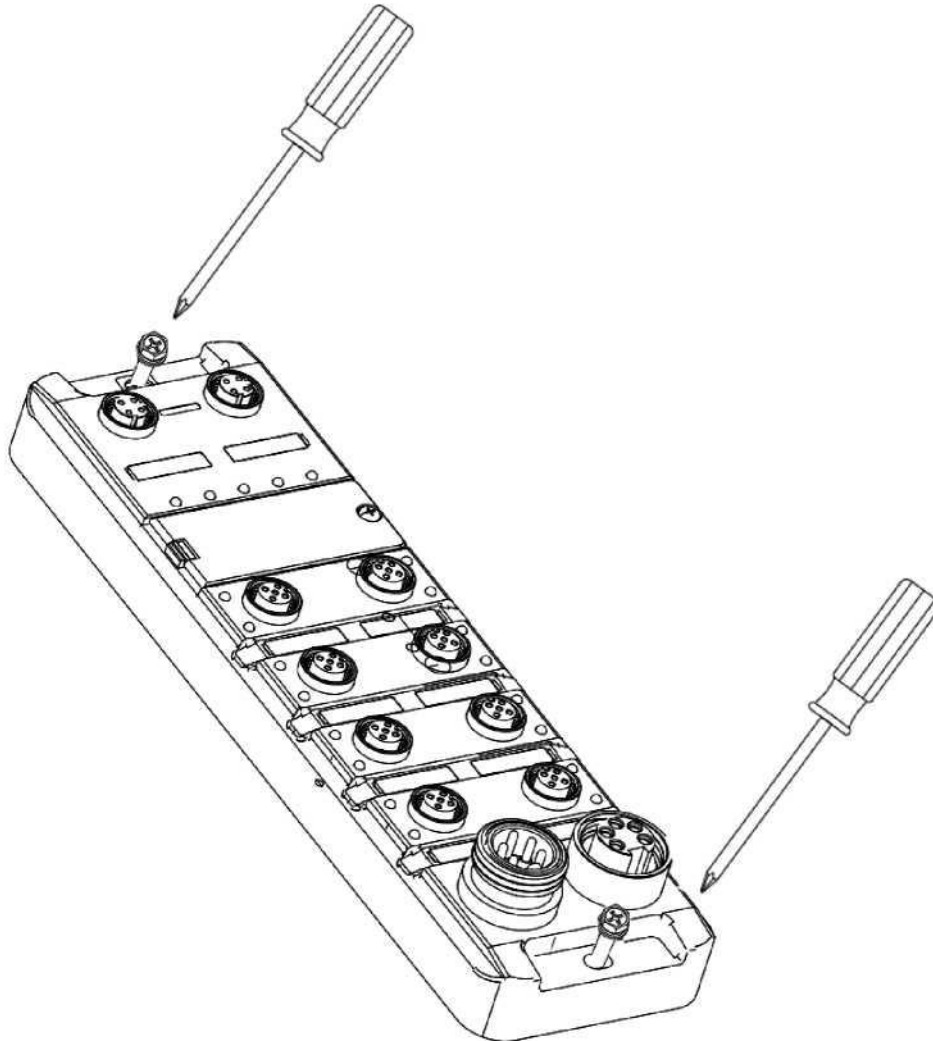


## 2.1 Installation method

### 2.1.1 Master module installation layout

#### Installation:

The screw is installed with cross slot and concave hexagon head combination (Screw M6\*25, screw gasket diameter is 11mm).



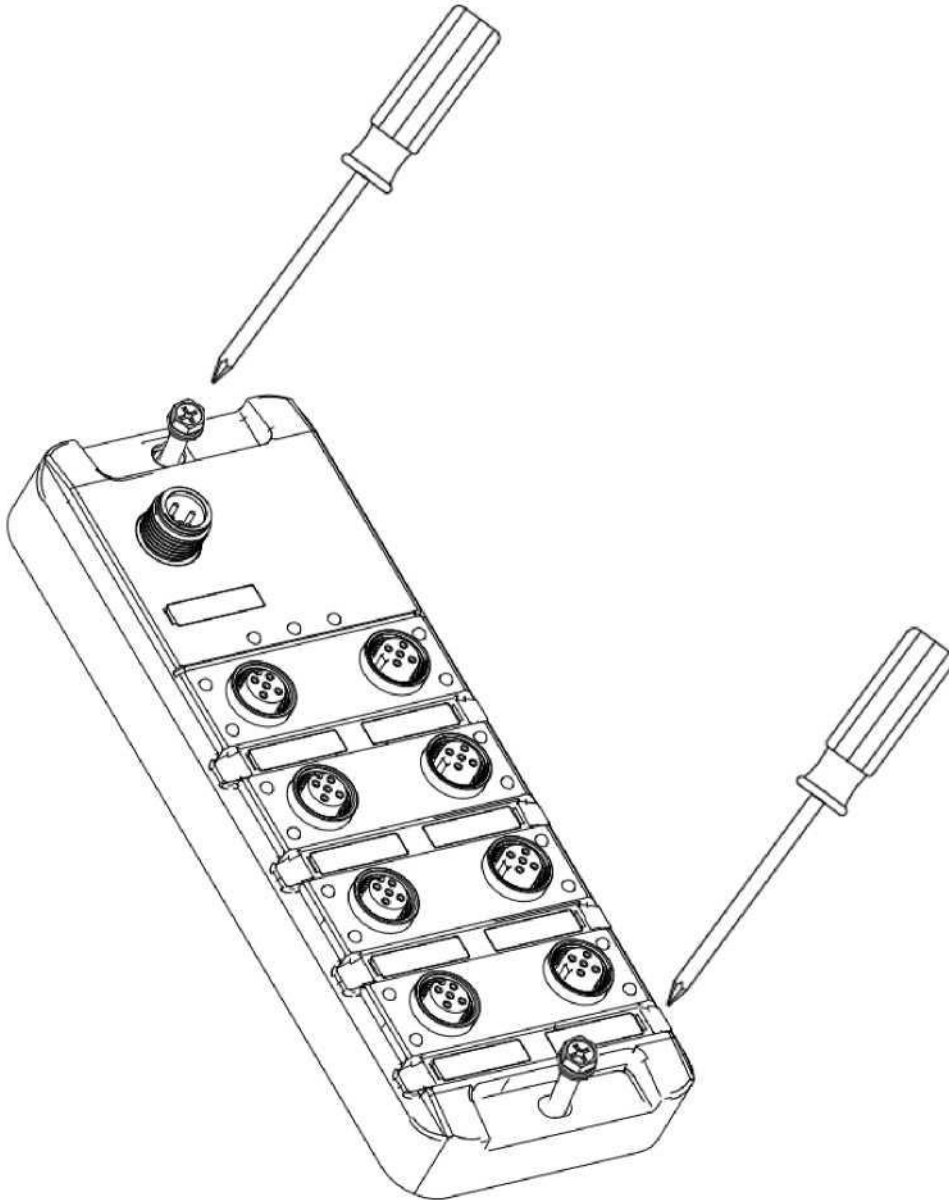
#### Disassemble:

Use a cross screwdriver to remove the M6 screws and remove the module.

### 2.1.2 Slave station installation layout

**Installation:**

The screw is installed with cross slot and concave hexagon head combination (Screw M6\*25, screw gasket diameter is 11mm).

**Disassemble:**

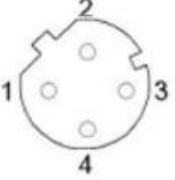
Use a cross screwdriver to remove the M6 screws and remove the module.

### 3. Electrical installation

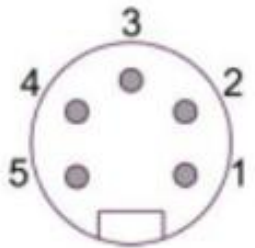
#### 3.1 Terminal definition

##### 3.1.1 master module terminal definition

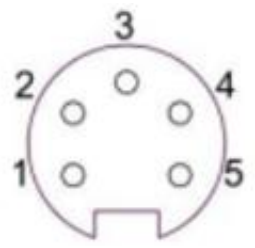
#### Communication port Pin definition

|  | Pin | Function                |
|---|-----|-------------------------|
|   | 1   | Tx+ Data transmission + |
|   | 2   | Rx+ Data receiving +    |
|   | 3   | Tx- Data transmission - |
|   | 4   | Rx- Data receiving -    |


#### Power supply input Pin definition

|  | Pin | Function                                      |
|--|-----|---|
|  | 1   | Auxiliary power supply UA- 0V                 |
|  | 2   | System and signal load power supply US- 0V    |
|  | 3   | Function earthing FE                          |
|  | 4   | System and signal load power supply US+ DC24V |
|  | 5   | Auxiliary power supply UA+ DC24V              |

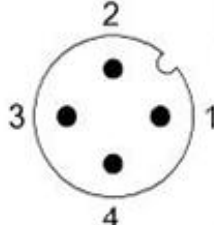
#### Power supply output Pin definition

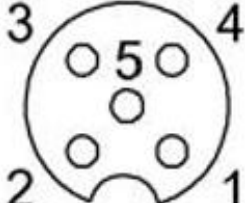
|  | Pin | Function                                      |
|---|-----|---|
|   | 1   | Auxiliary power supply UA- 0V                 |
|   | 2   | System and signal load power supply US- 0V    |
|   | 3   | Function earthing FE                          |
|   | 4   | System and signal load power supply US+ DC24V |
|   | 5   | Auxiliary power supply UA+ DC24V              |



| IO-Link Pin definition  |     |  |
|---|-----|--|
|   | Pin | Function                               |
|  | 1   | DC24V Power supply                     |
|   | 2   | DI signal                              |
|   | 3   | GND                                    |
|   | 4   | C\Q, IO-Link Data transmission channel |
|   | 5   | FE, Function earthing                  |

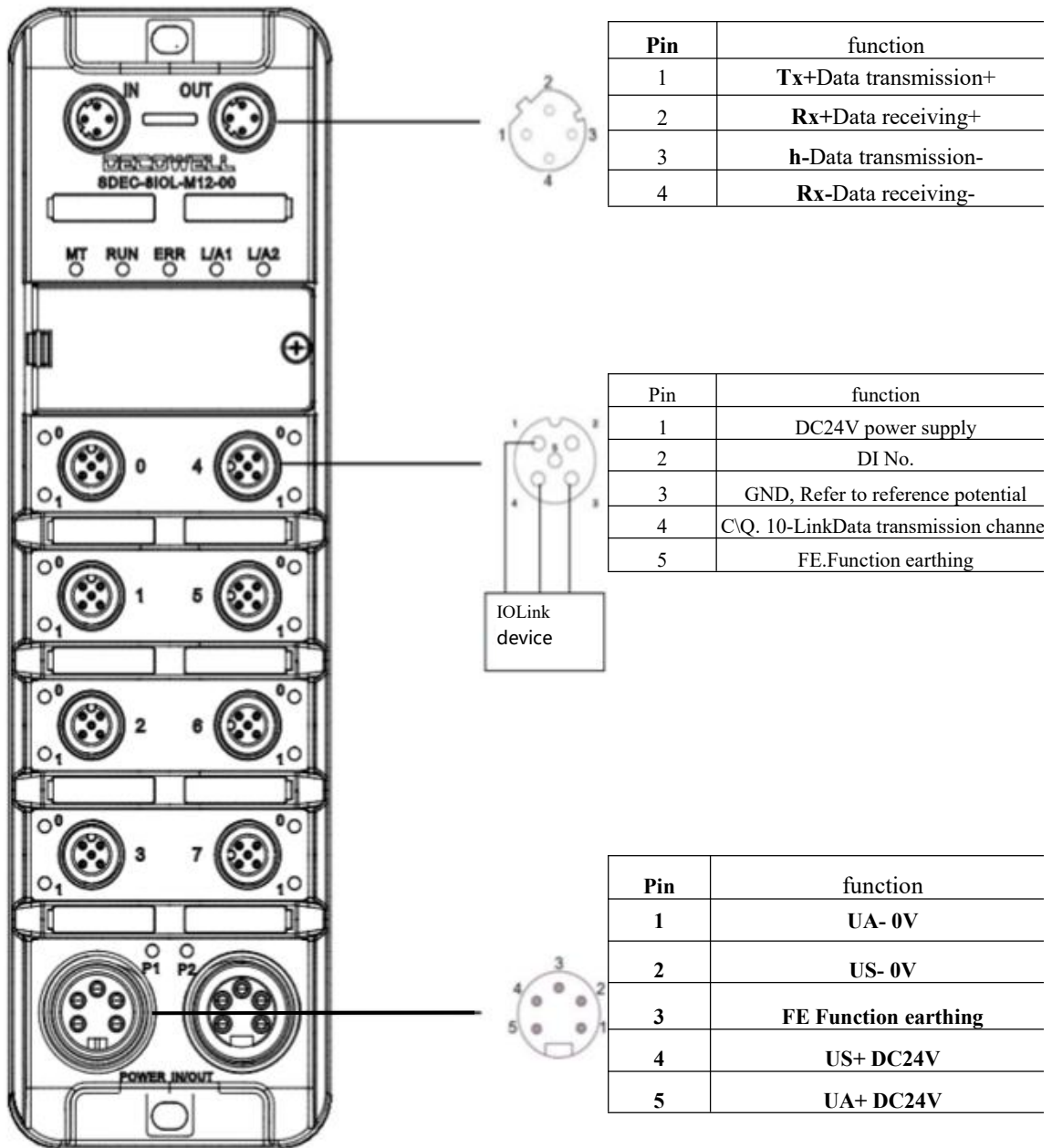
### 3.1.2 Slave station terminal definition

| IO-Link Pin definition  |     |  |
|---|-----|--|
|   | Pin | Function                               |
|  | 1   | DC24V Power supply                     |
|   | 2   | Not in use                             |
|   | 3   | GND                                    |
|   | 4   | C\Q, IO-Link Data transmission channel |

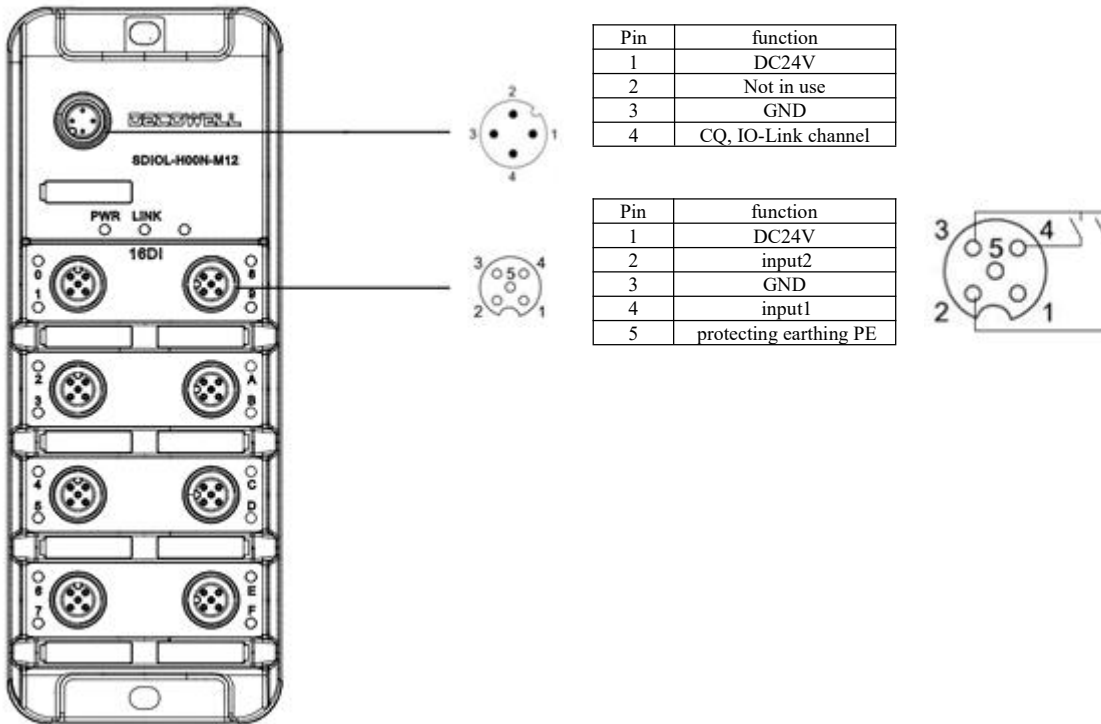
| IO Port Pin definition  |     |                        |
|---|-----|------------------------|
|   | Pin | Function               |
|  | 1   | DI:DC24V; DO:NC        |
|   | 2   | Input or output 2      |
|   | 3   | GND                    |
|   | 4   | Input or output 1      |
|   | 5   | protecting earthing PE |

### 3.2 Terminal connection

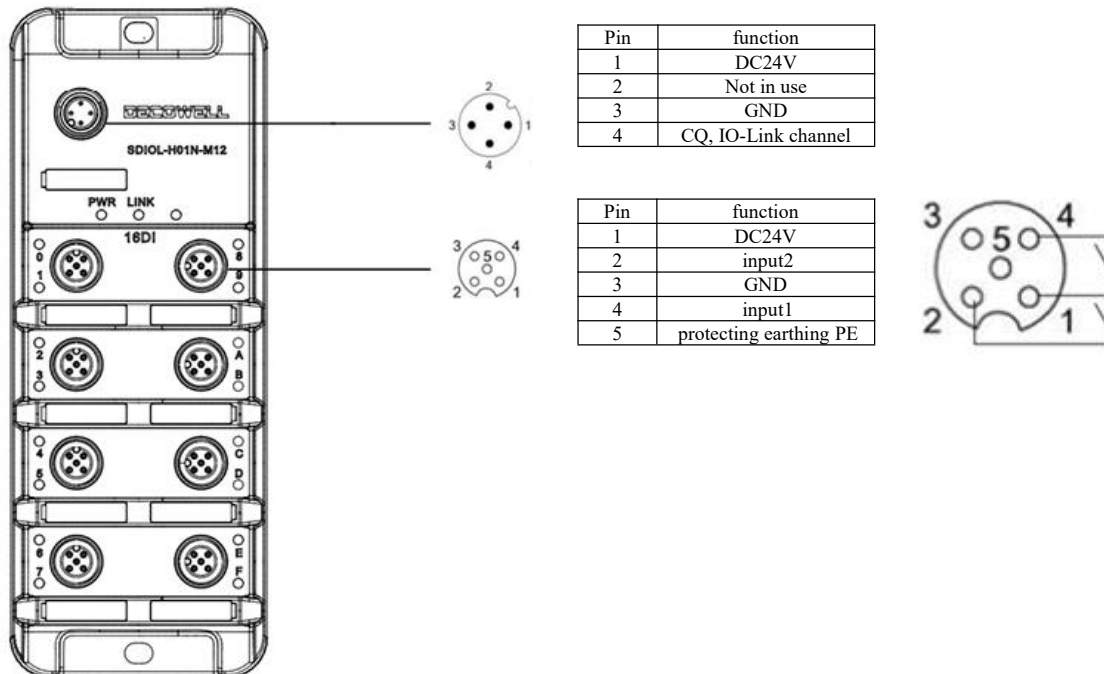
#### 3.2.1 master module IOL connection



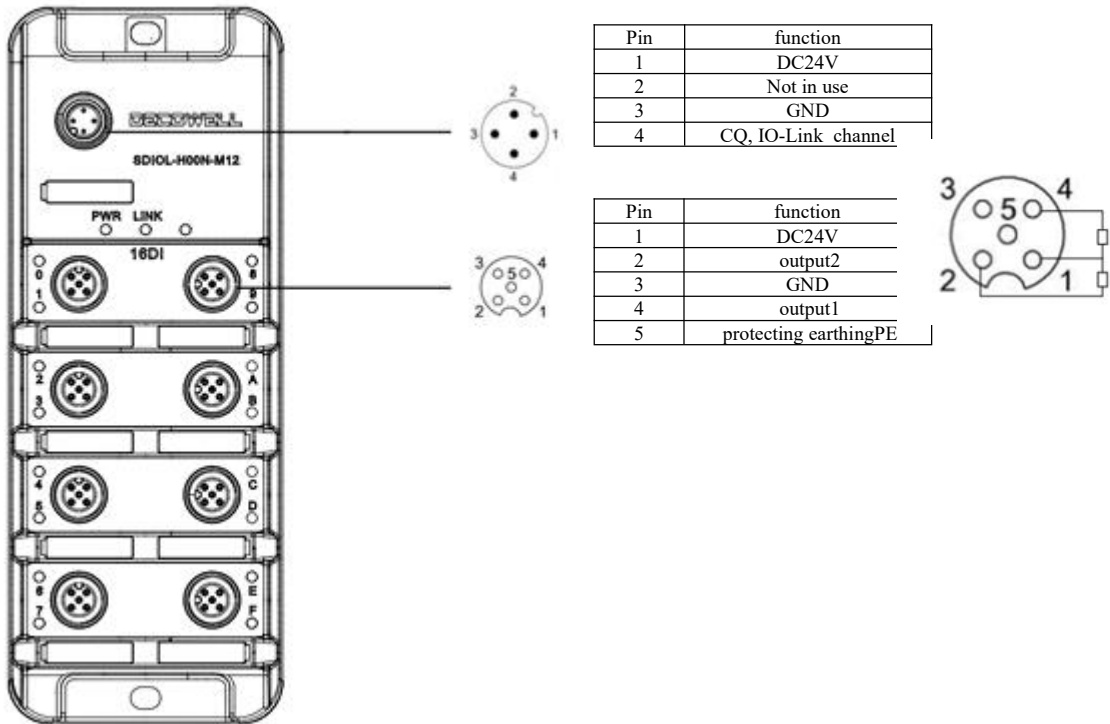
**3.2.2 Slave station input NPN connection**



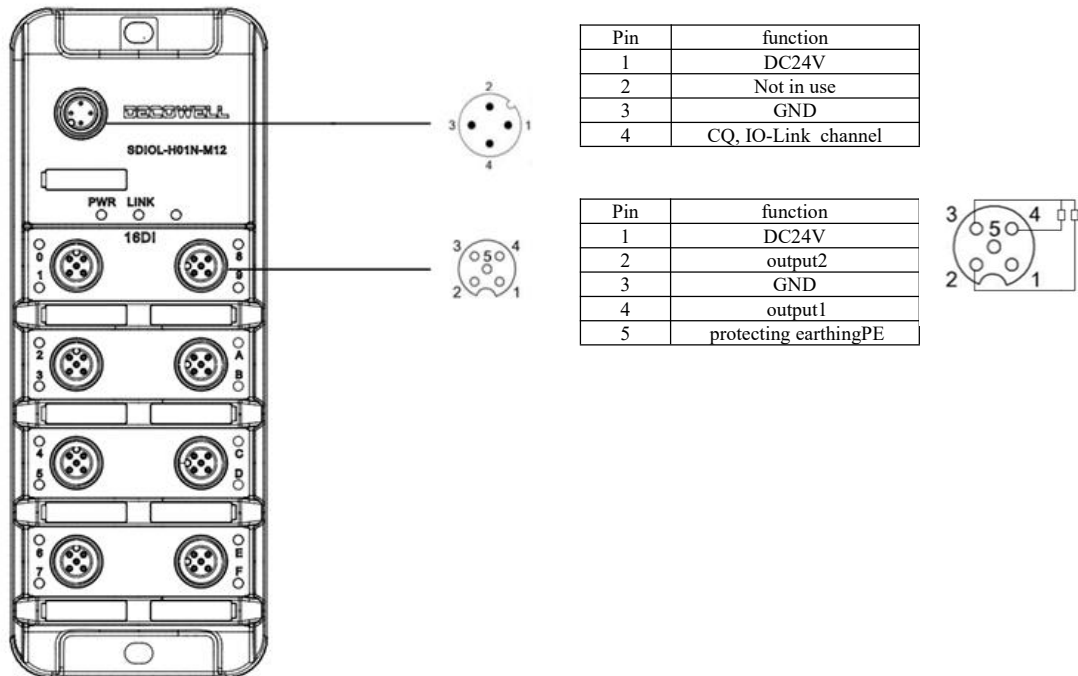
**3.2.3 Slave station input PNP connection**



**3.2.4 Slave station output NPN connection**



**3.2.5 Slave station output PNP connection**



## 4. Product use cases

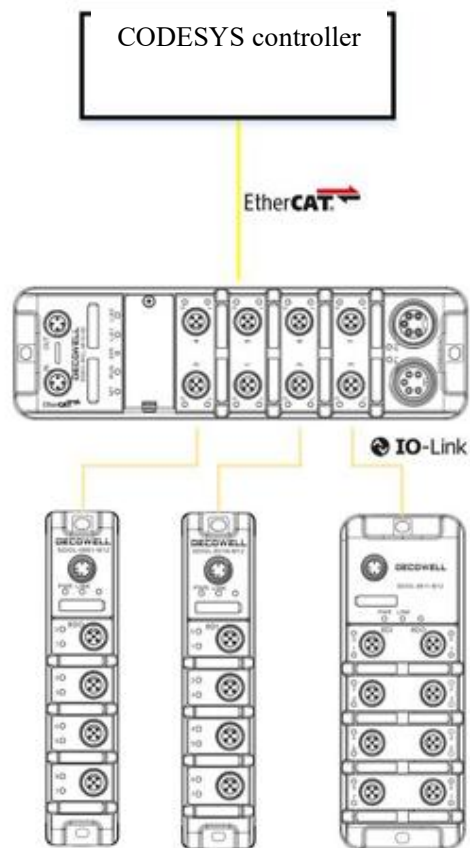
### 4.1 SDEC-8IOL-M12-00 use cases

#### 4.1.1 Connection and configuration of CODESYS and SDEC-8IOL-M12-00

##### 1. Hardware configuration

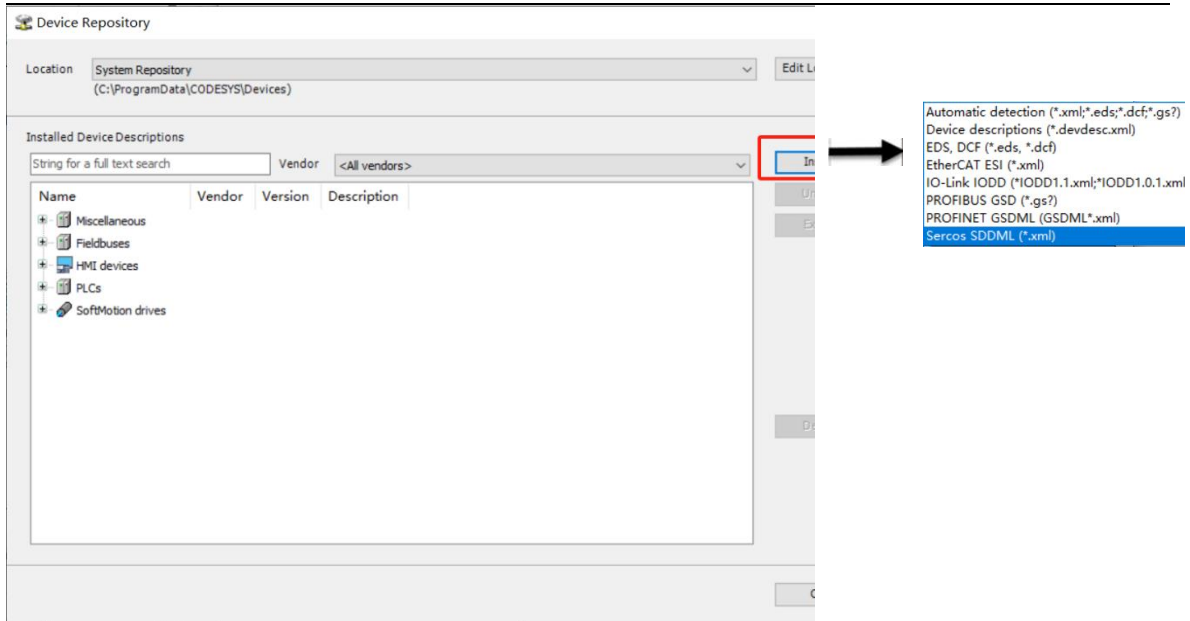
| Module type        | Quantity |
|--------------------|----------|
| CODESYS controller | 1        |
| SDEC-8IOL-M12-00   | 1        |
| SDIOL-8811-M12     | 1        |
| SDIOL-801N-M12     | 1        |
| SDIOL-08N1-M12     | 1        |

##### 2. Network topology

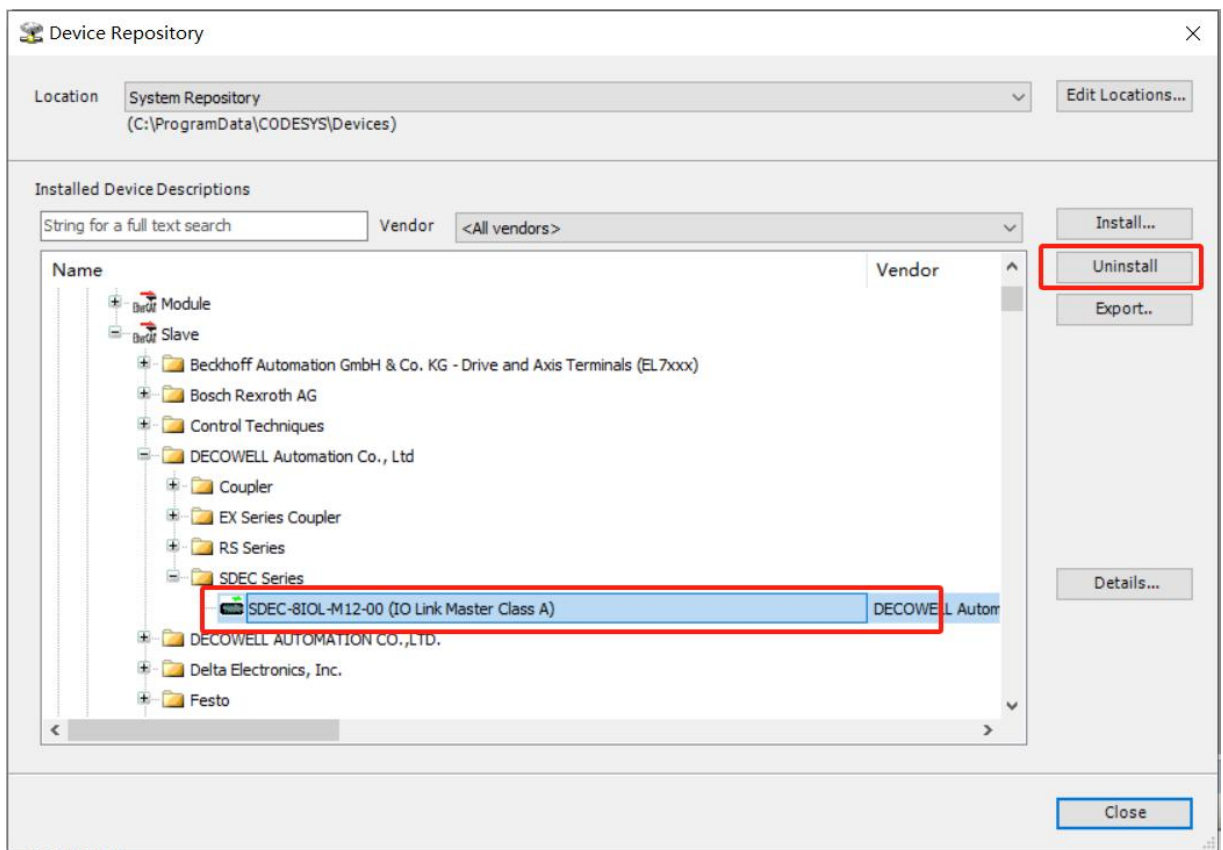


##### 3. Install and uninstall XML

- (1) Open the CODESYS programming software. In the device library window, select Install. In the device description file window, select EtherCAT XML Device Description Profile.

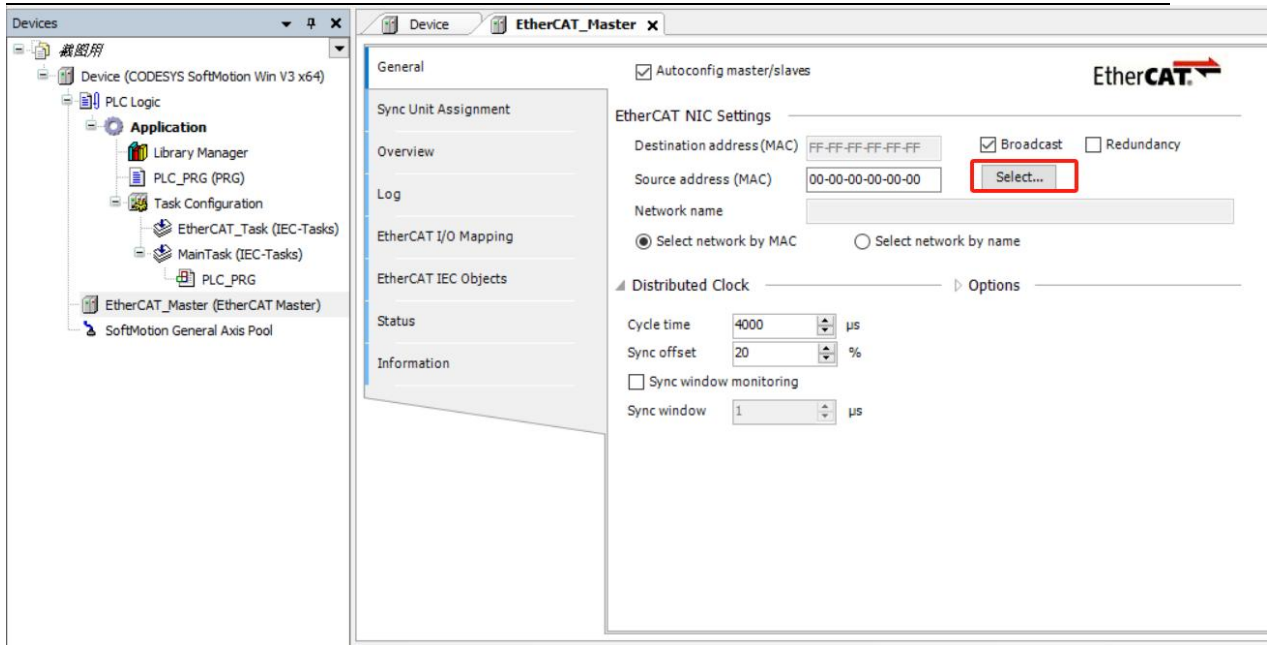


(2) In the device library, select the EtherCAT slave station XML file to be uninstalled.

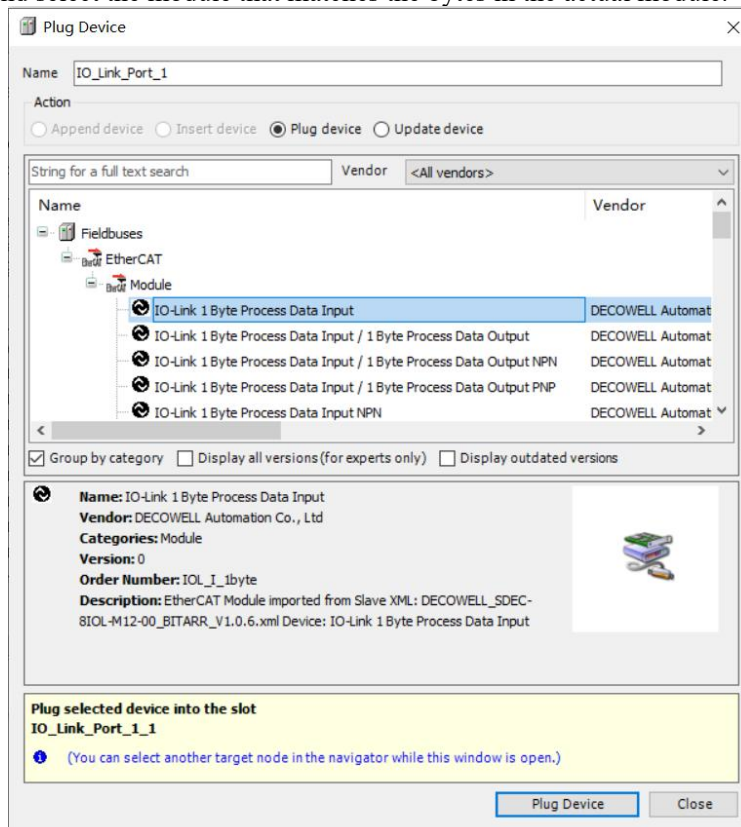


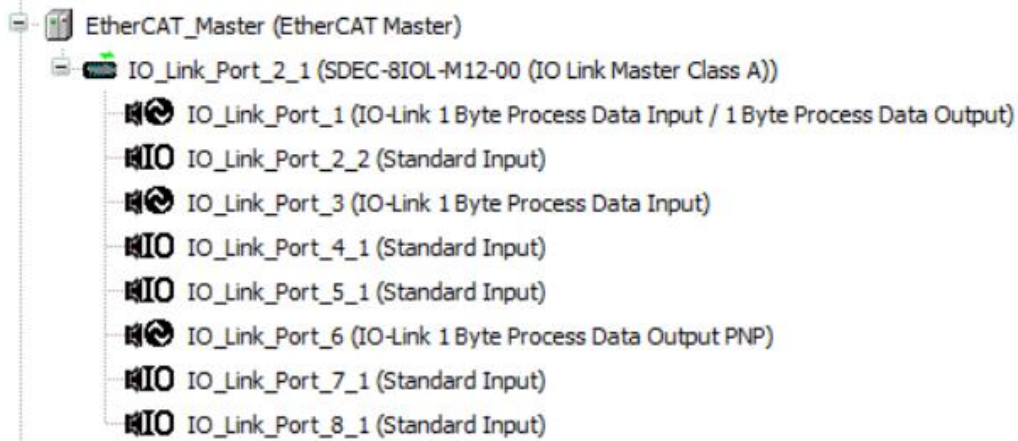
4. Create projects and configurations

Open the CODESYS programming software to create the project, right-click "Device" to add EtherCAT Master to the project tree, and configure its EtherCAT communication network port parameters.



Add I/O module manually: Right-click "EtherCAT\_Master" in the project tree and select "Add Device". Add SDEC-8IOL-M12-00 in the device library. Right-click SDEC\_8IOL\_M12\_00 in the project tree and select the module that matches the bytes in the actual module.





Tip: The IO-Link slave station configuration of the inserted device must be consistent with the actual port number.

5. IO-Link slave station port status viewing

| Variable                 | Mapping | Channel                  | Address | Type  | Unit | Description              |
|--------------------------|---------|--------------------------|---------|-------|------|--------------------------|
| Status of IO-Link Port 1 |         | Status of IO-Link Port 1 | %IB0    | USINT |      | Status of IO-Link Port 1 |
| Status of IO-Link Port 2 |         | Status of IO-Link Port 2 | %IB1    | USINT |      | Status of IO-Link Port 2 |
| Status of IO-Link Port 3 |         | Status of IO-Link Port 3 | %IB2    | USINT |      | Status of IO-Link Port 3 |
| Status of IO-Link Port 4 |         | Status of IO-Link Port 4 | %IB3    | USINT |      | Status of IO-Link Port 4 |
| Status of IO-Link Port 5 |         | Status of IO-Link Port 5 | %IB4    | USINT |      | Status of IO-Link Port 5 |
| Status of IO-Link Port 6 |         | Status of IO-Link Port 6 | %IB5    | USINT |      | Status of IO-Link Port 6 |
| Status of IO-Link Port 7 |         | Status of IO-Link Port 7 | %IB6    | USINT |      | Status of IO-Link Port 7 |
| Status of IO-Link Port 8 |         | Status of IO-Link Port 8 | %IB7    | USINT |      | Status of IO-Link Port 8 |
| Input Pin 2 of Ch 1      |         | Input Pin 2 of Ch 1      | %IB8    | USINT |      | Input Pin 2 of Ch 1      |
| Input Pin 2 of Ch 2      |         | Input Pin 2 of Ch 2      | %IB9    | USINT |      | Input Pin 2 of Ch 2      |
| Input Pin 2 of Ch 3      |         | Input Pin 2 of Ch 3      | %IB10   | USINT |      | Input Pin 2 of Ch 3      |
| Input Pin 2 of Ch 4      |         | Input Pin 2 of Ch 4      | %IB11   | USINT |      | Input Pin 2 of Ch 4      |
| Input Pin 2 of Ch 5      |         | Input Pin 2 of Ch 5      | %IB12   | USINT |      | Input Pin 2 of Ch 5      |
| Input Pin 2 of Ch 6      |         | Input Pin 2 of Ch 6      | %IB13   | USINT |      | Input Pin 2 of Ch 6      |
| Input Pin 2 of Ch 7      |         | Input Pin 2 of Ch 7      | %IB14   | USINT |      | Input Pin 2 of Ch 7      |
| Input Pin 2 of Ch 8      |         | Input Pin 2 of Ch 8      | %IB15   | USINT |      | Input Pin 2 of Ch 8      |

The complete status code and meaning are shown in the following table. The status is presented by the combination of high and low 4-bit status codes.

Low four digits meaning

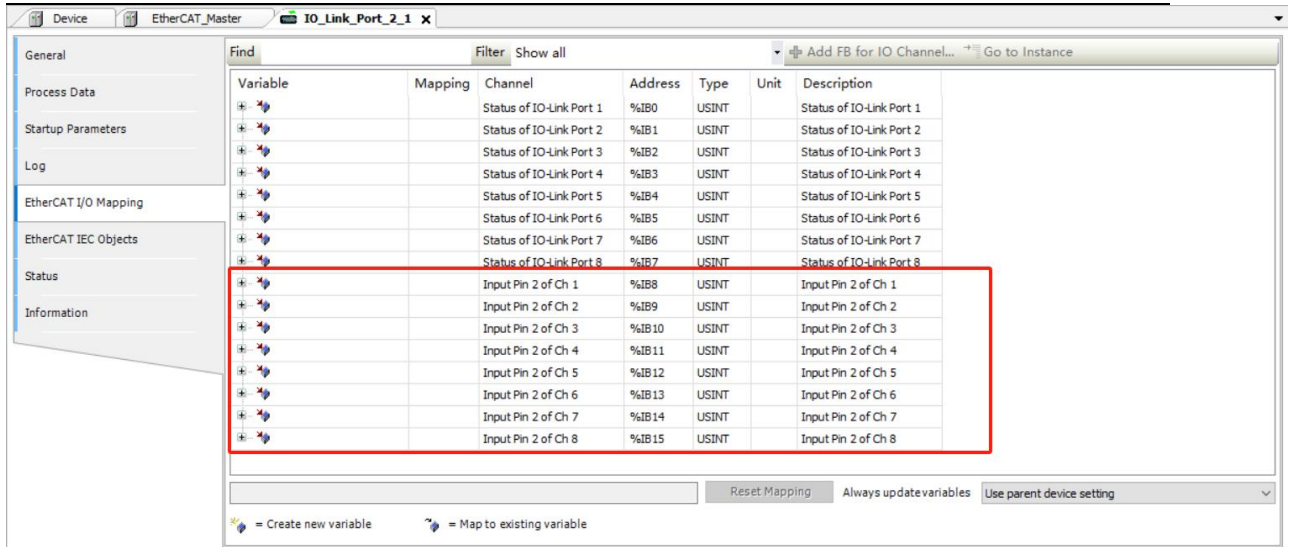
- 0x\_0 Port disabled
- 0x\_1 Port in std dig in
- 0x\_2 Port in std dig out
- 0x\_3 Port in communication OP
- 0x\_4 Port in communication COMSTOP

High four digits meaning

- 0x1\_ Watchdog detected
- 0x2\_ internal Error
- 0x3\_ invalid Device Id
- 0x4\_ invalid Vendor Id
- 0x5\_ invalid IO-Link Version
- 0x6\_ invalid Frame Capability
- 0x7\_ invalid Cycle Time
- 0x8\_ invalid PD in length
- 0x9\_ invalid PD out length
- 0xA\_ no Device detected

6. PIN2 input status





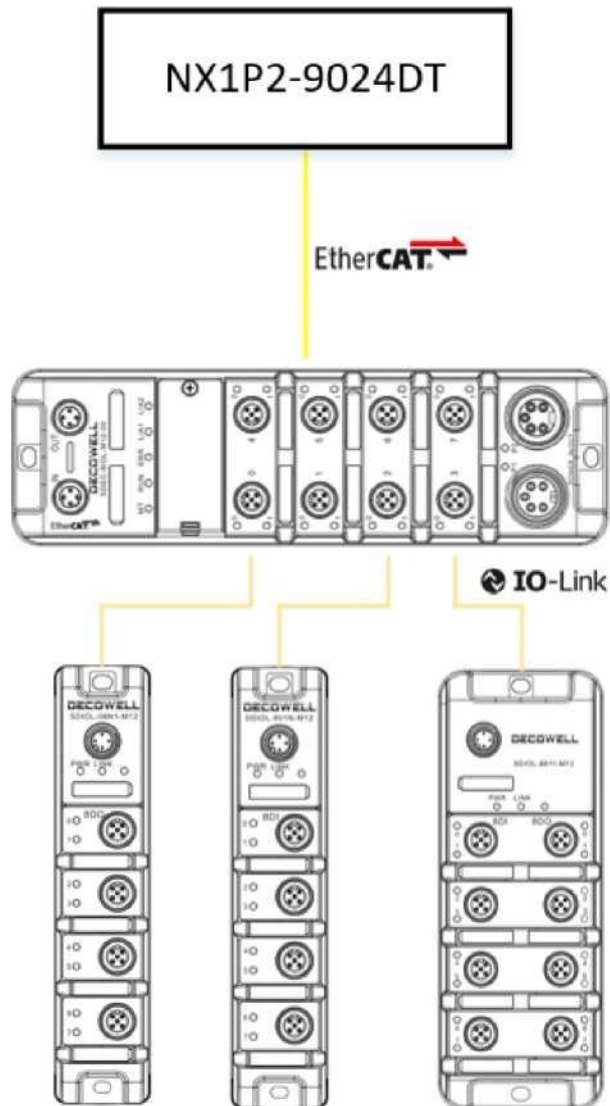
PIN2 in SDEC\_8IOL\_M12\_00 supports only digital input. If the input is not reversed, 1 indicates the high electrical level and 0 indicates the low electrical level.

### 4.1.2 Connection and configuration between Sysmac Studio and SDEC-8IOL-M12-00

#### 1. Hardware configuration

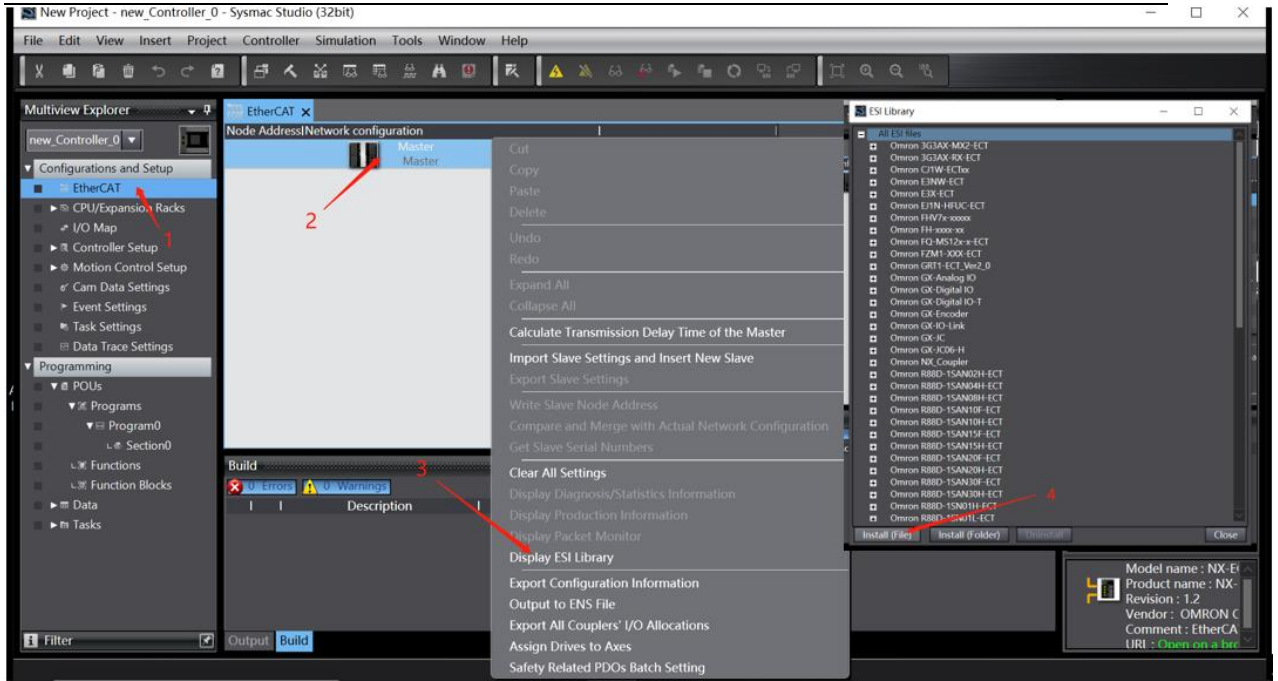
| Module type      | Quantity |
|------------------|----------|
| NX1P2-9024DT     | 1        |
| SDEC-8IOL-M12-00 | 1        |
| SDIOL-8811-M12   | 1        |
| SDIOL-801N-M12   | 1        |
| SDIOL-08N1-M12   | 1        |

#### 2. Network topology

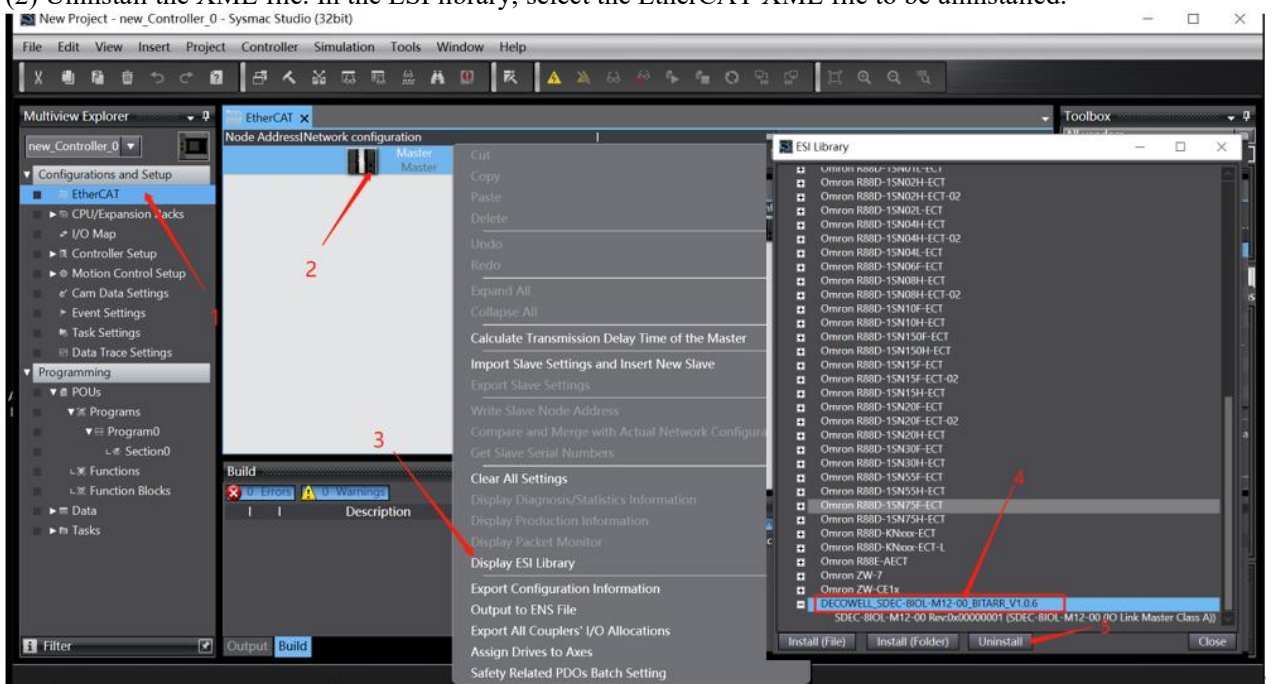


#### 3. Install and uninstall XML

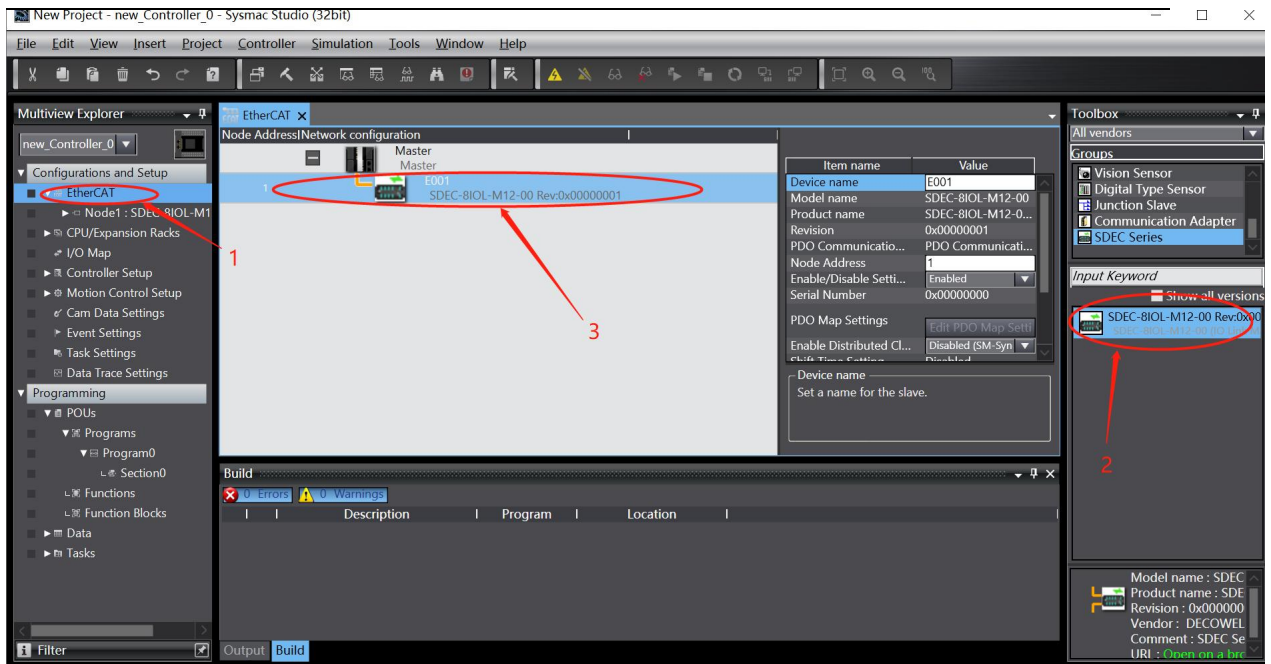
- (1) Install the XML file. In the ESI library, select the EtherCAT XML file to be installed.



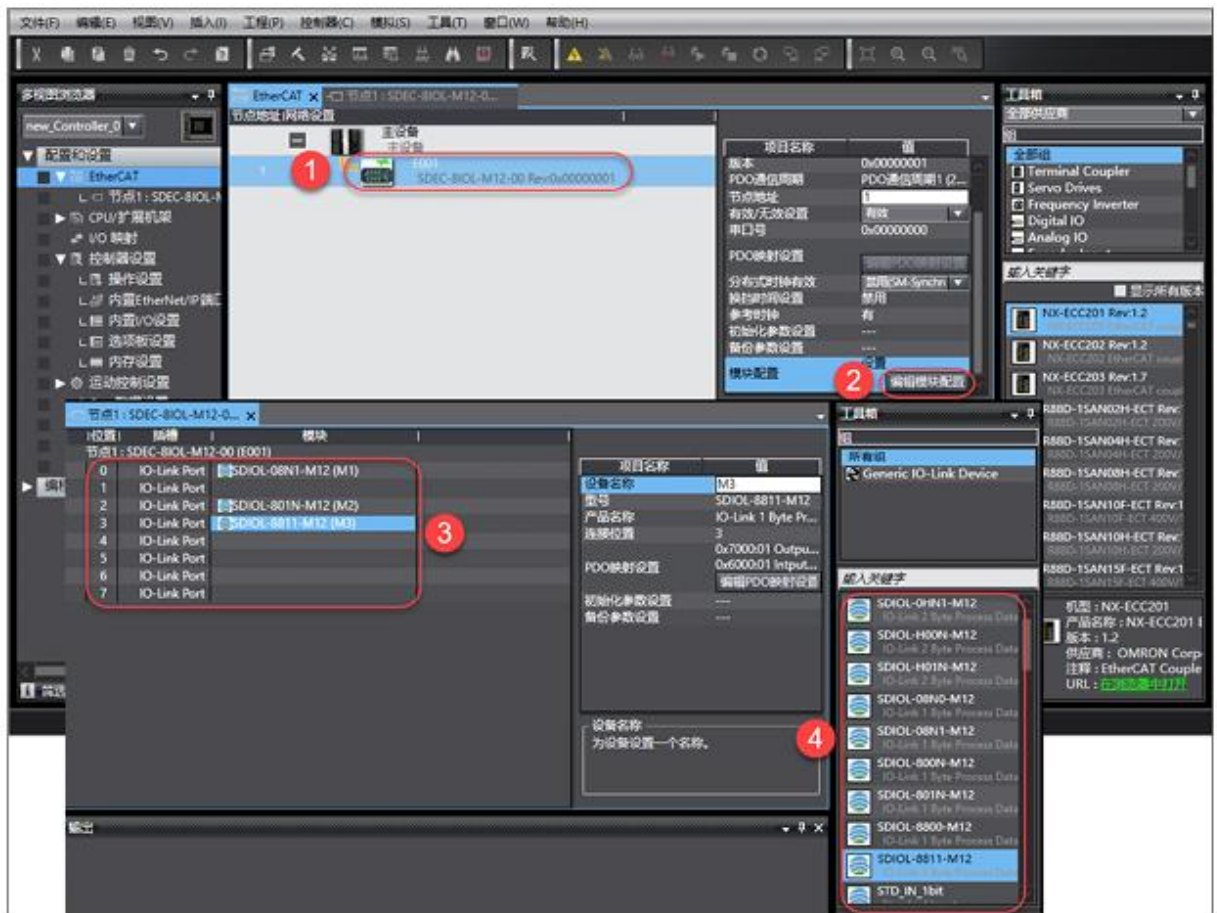
(2) Uninstall the XML file. In the ESI library, select the EtherCAT XML file to be uninstalled.



4. Create projects and configurations
- Add I/O module manually:
- Double-click "EtherCAT" and add the SDEC\_8IOL\_M12\_00 module in the EtherCAT window.

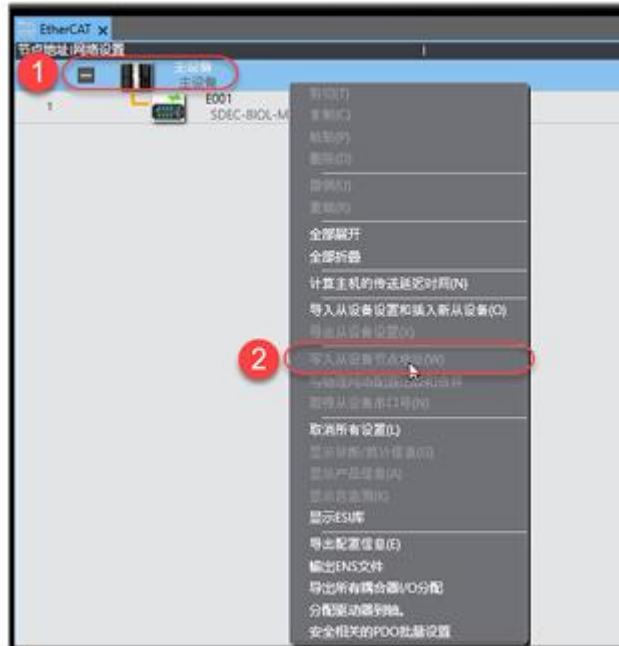


Add IO-Link slave station, in the EtherCAT window, select SDEC\_8IOL\_M12\_00 module in the node, click "Edit Module Configuration", and configure the module model in the slot (the slot model must be the same as the actual connection).



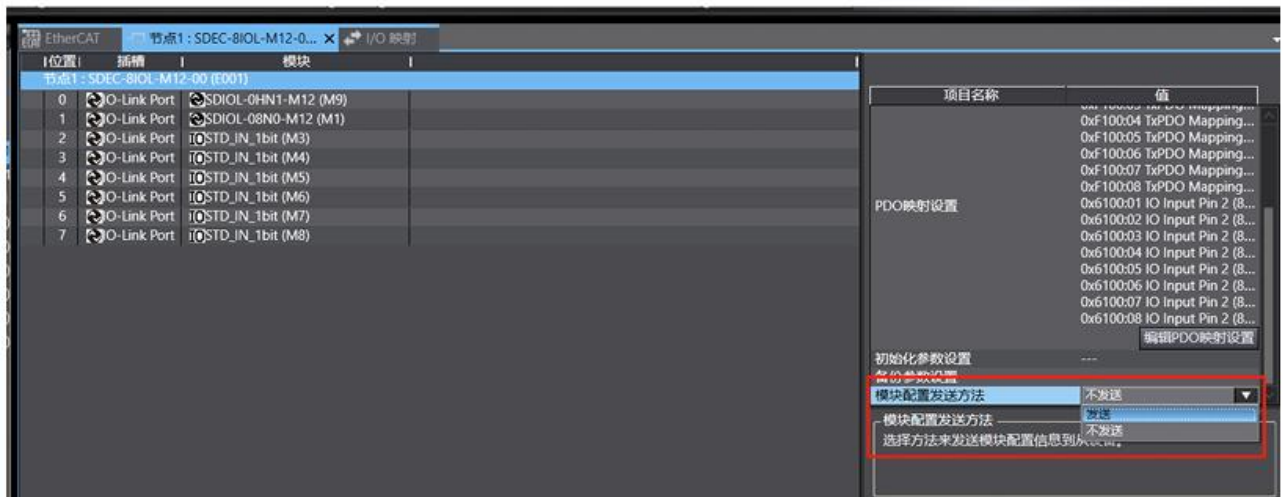
Node settings:

After switching to Online, right-click the primary device and choose Write Device Node Address.



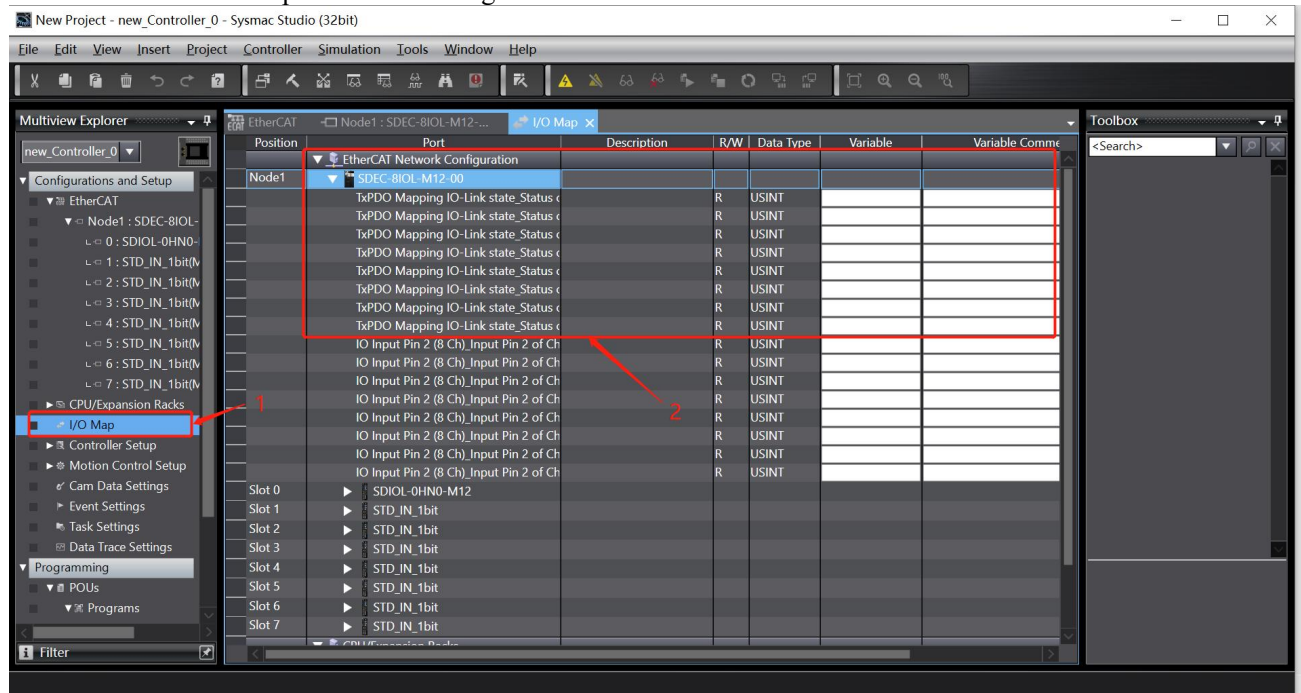
**Note:** After the node address is written, restart the device for the node address to take effect.

Note: Modify the module configuration sending mode: Send



Download the program to the PLC and go online to monitor its operating status.

### 5. IO-Link slave station port status viewing



The complete status code and meaning are shown in the following table. The status is presented by the combination of high and low 4-bit status codes.

Low four digits meaning

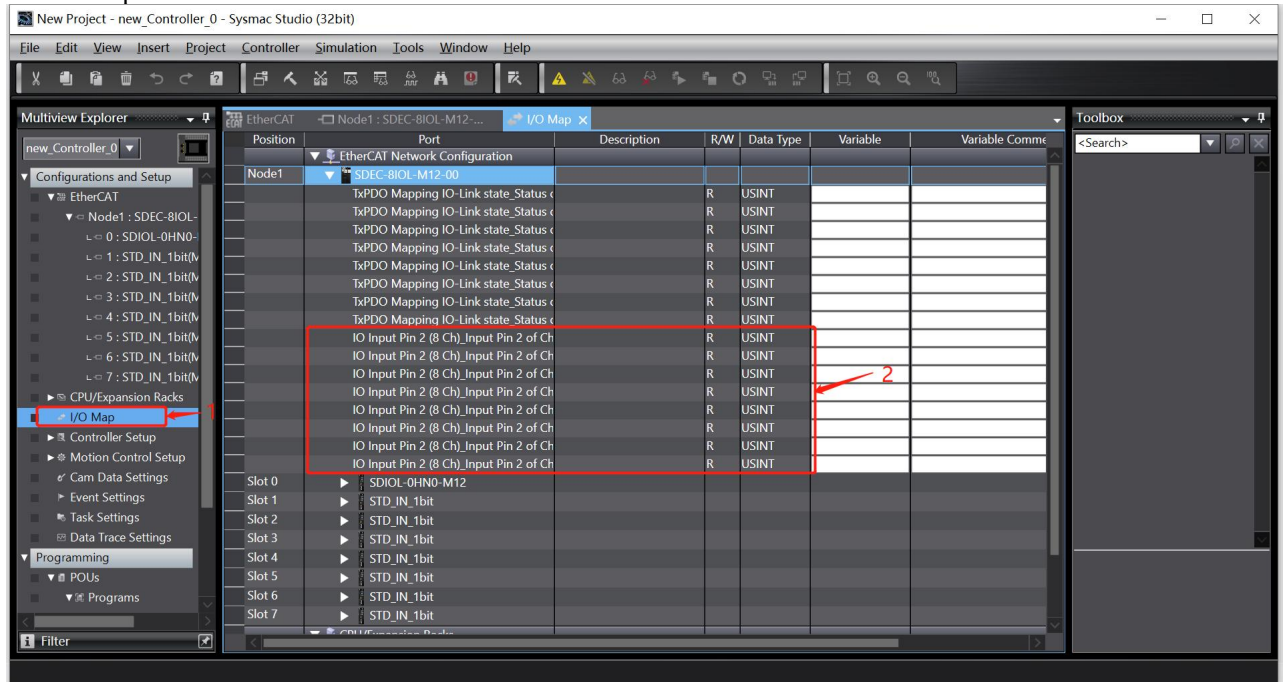
- 0x\_0 Port disabled
- 0x\_1 Port in std dig in
- 0x\_2 Port in std dig out
- 0x\_3 Port in communication OP
- 0x\_4 Port in communicationCOMSTOP

High four digits meaning

- 0x1\_ Watchdog detected
- 0x2\_ internal Error
- 0x3\_ invalid Device Id
- 0x4\_ invalid Vendor Id
- 0x5\_ invalid IO-Link Version
- 0x6\_ invalid Frame Capability
- 0x7\_ invalid Cycle Time
- 0x8\_ invalid PD in length

0x9\_ invalid PD out length  
 0xA no Device detected

6. PIN2 input status



PIN2 in SDEC\_8IOL\_sM12\_00 supports only digital input. If the input is not reversed, 1 indicates the high electrical level and 0 indicates the low electrical level.

## 4.2 SDPN-8IOL-M12-00 Use case

### 4.2.1 Connection and Configuration between TIA Portal and SDPN-8IOL-M12-00

1. The communication connection diagram is shown in Figure 4-2-1-1:

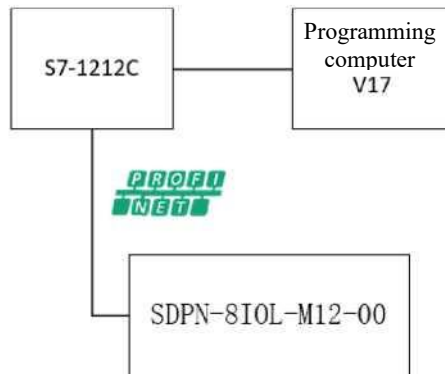


Figure 4-2-1-1 Communication connection diagram

2. The hardware configuration table is as follows:

| Hardware                    | Quantity | Note                            |
|-----------------------------|----------|---------------------------------|
| Programming computer        | 1        | Install TIA Portal V16          |
| Controller                  | 1        | S7-1211C                        |
| SDPN-8IOL-M12-00            | 1        | PROFINET protocol master module |
| IO-Link communication cable | Several  |                                 |

3, Install the GSD file, open TIA Portal V17, and select Options from the menu bar. Support Device Description File (GSD), as shown in Figure 4-1-1-2:

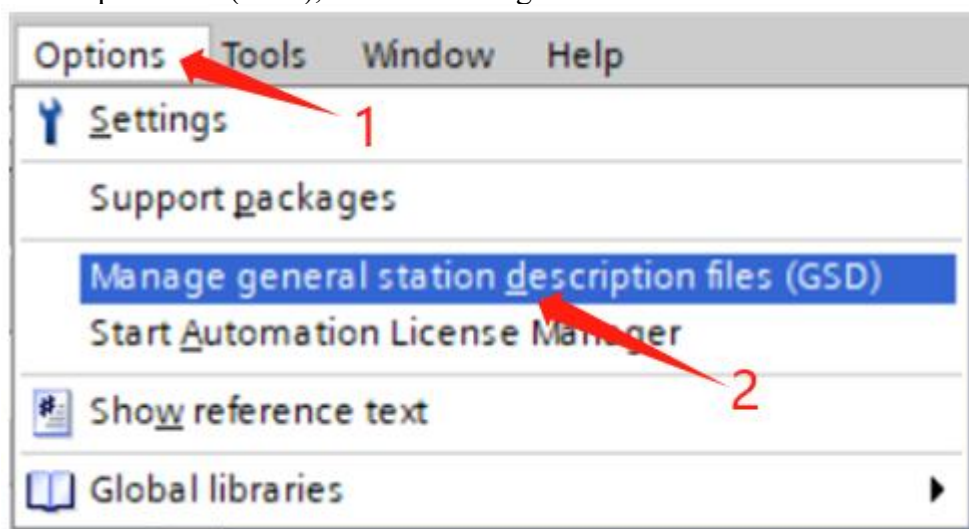




Figure 4-1-1-2 Installing the GSD file  
4, New engineering and equipment configuration

Open TIA Portal V17, select New project and configure it, as shown in Figure 4-1-1:

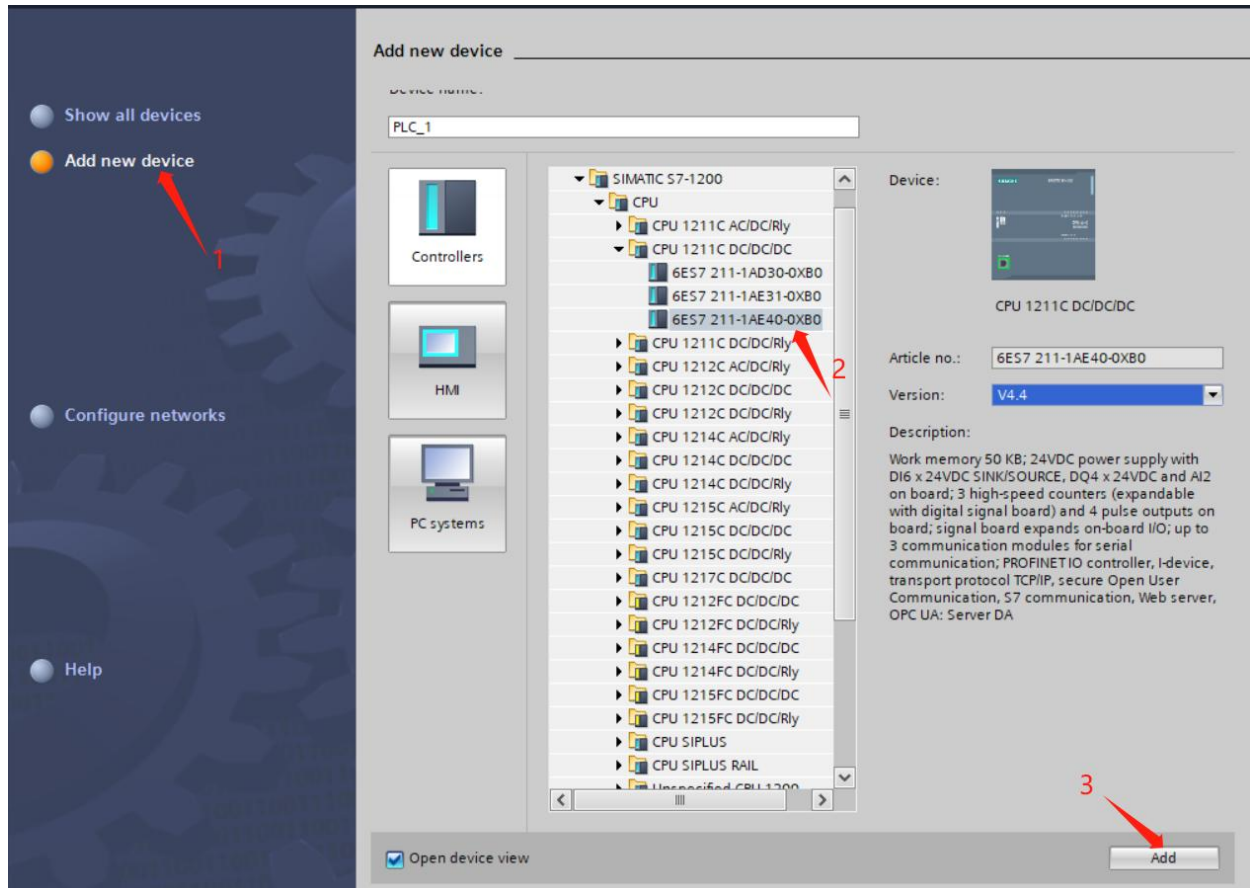


Figure 4-1-1-3 New construction, select PLC model

Switch to the network view window, expand the hardware directory on the right, select SDPN-8IOL-M12-00, and drag it to the network view, as shown in Figure 4-1-4:

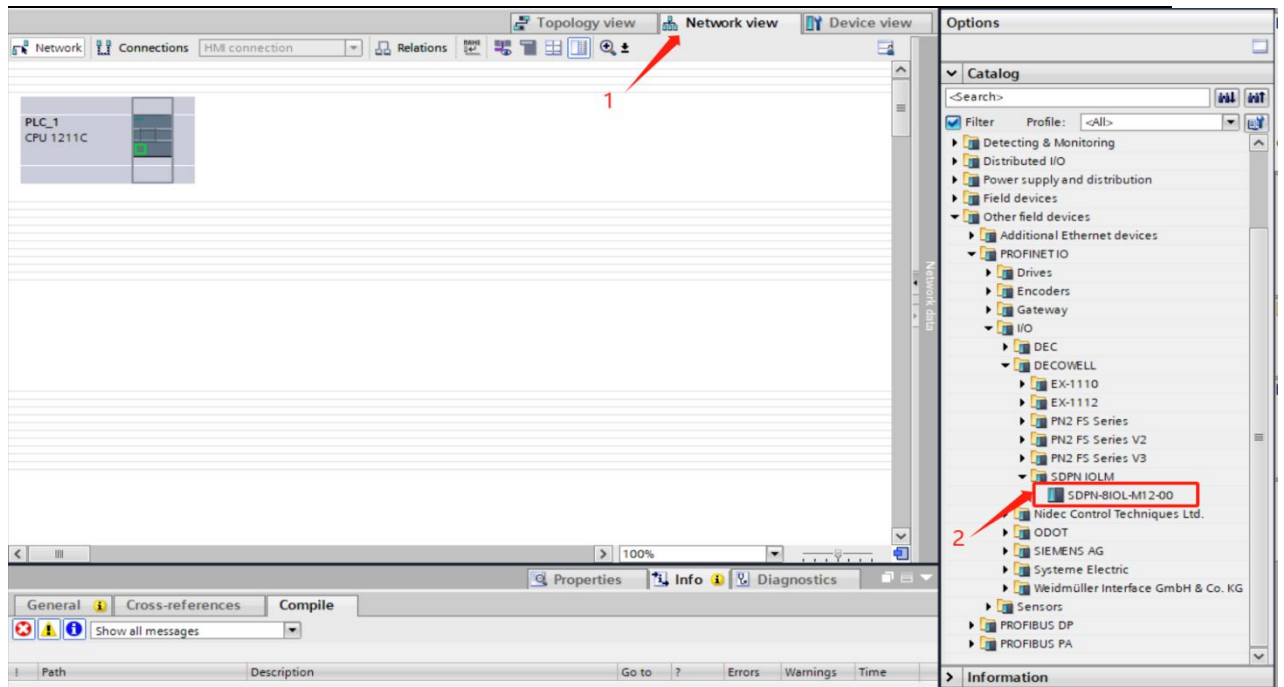


Figure 4-1-4 Adding an SD master module

In the network view, assign a controller to the remote I/O module. Click Unassigned in the I/O module and select PLC\_1.PROFINET interface \_1, as shown in Figure 4-1-1-5:

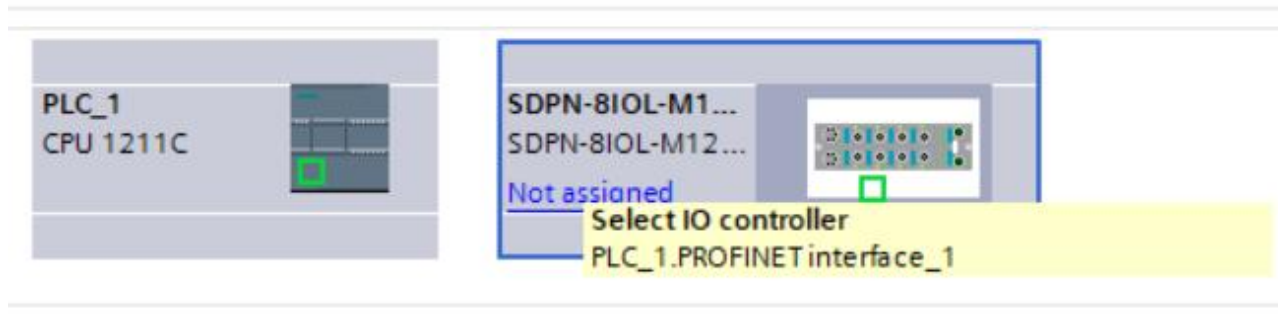


Figure 4-1-5 Assigning an I/O controller

Set the IP address of the I/O module. In the device view, double-click the module to enter the properties view, as shown in Figure 4-1-6:

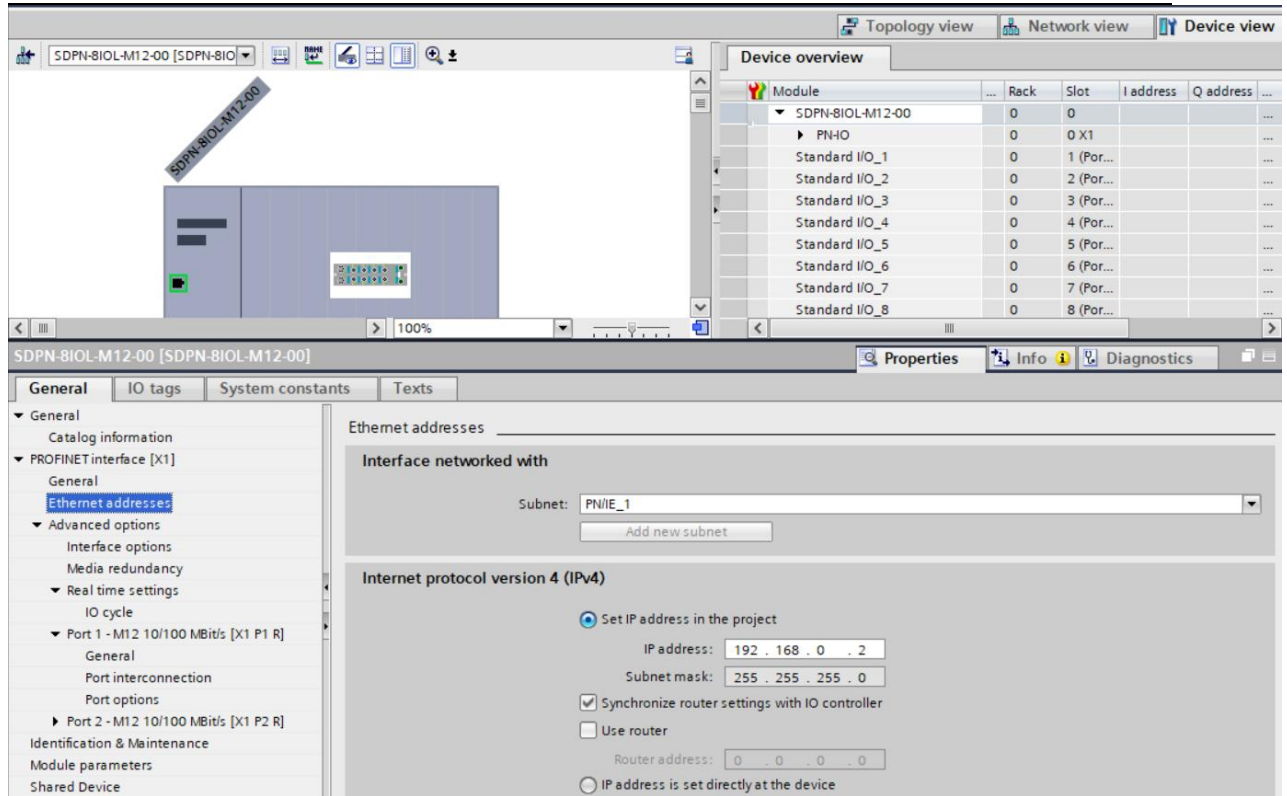


Figure 4-1-6 Assigning IP addresses

To add an SD slave station, click the device view, delete the port 1 object of the master module from the device view, and add an SD slave station to the hardware directory on the right, as shown in Figure 4-1-1-7 and Figure 4-1-1-8:

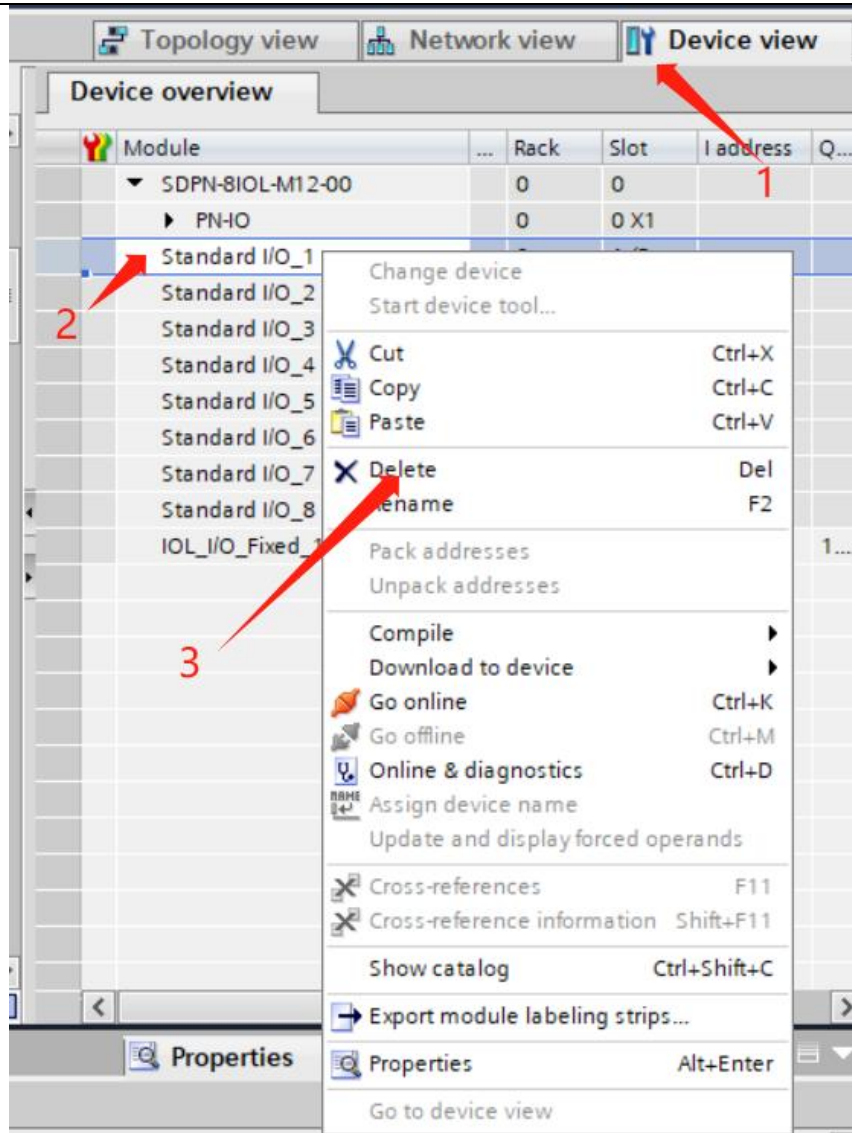


Figure 4-1-7 Deleting the port 1 object

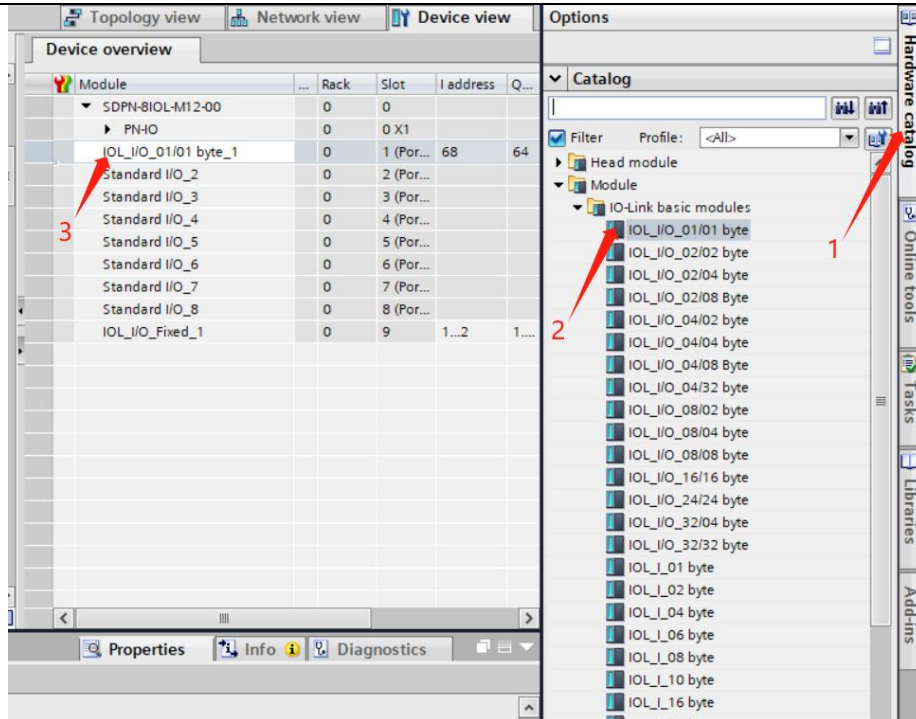


Figure 4-1-8 Adding an SD slave station

The remote I/O module assigns the device name. Right-click the module and select "Assign device name" as shown in Figure 4-1-1-9, select the interface type, update the list, and assign the name as shown in Figure 4-1-10:

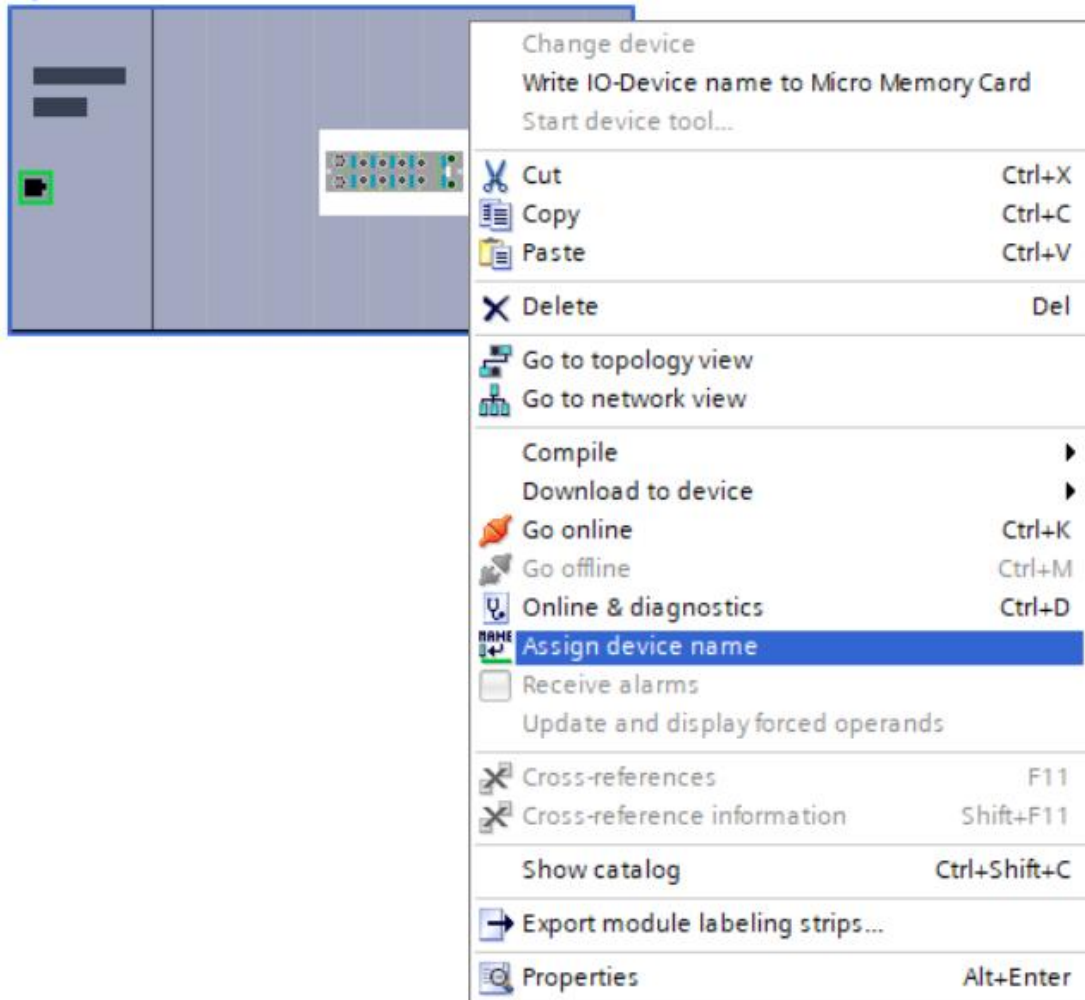


Figure 4-1-9 Assigning device names

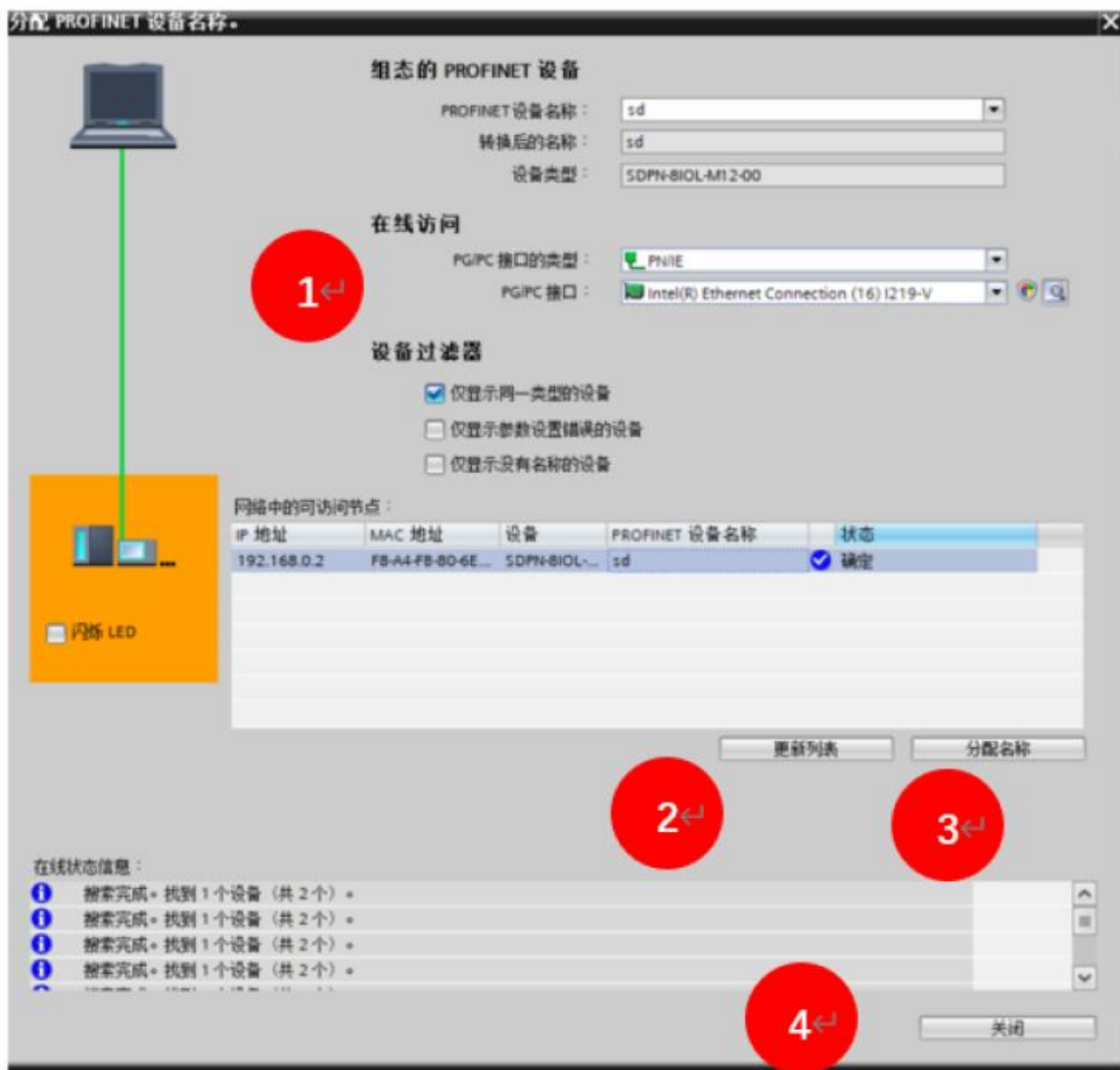


Figure 4-1-10 Write device name

Select all devices in the network view and download, as shown in FIG. 3-1-10 below. After the program is downloaded, start the CPU to run, and switch to online monitoring for normal communication, as shown in FIG. 4-1-11 below:

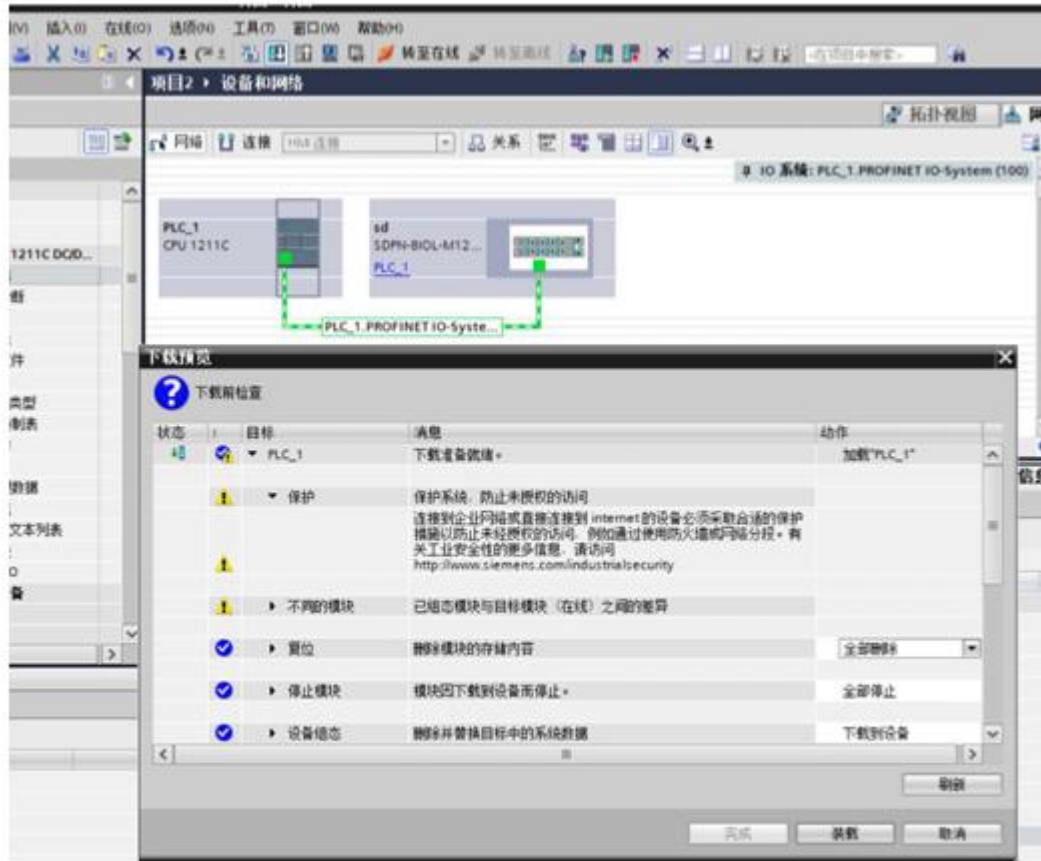


Figure 4-1-1-11 Program download

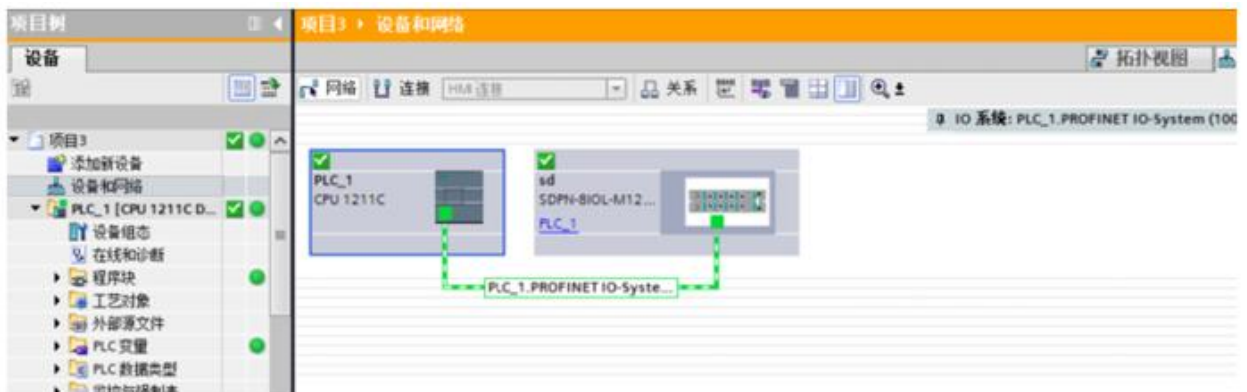


Figure 4-1-12 Device monitoring

#### 4.2.2 Connection and configuration of STEP7-Microwin and SDBN-8IOL-M12-00

1. The communication connection diagram is shown in Figure 4-2-2-1:



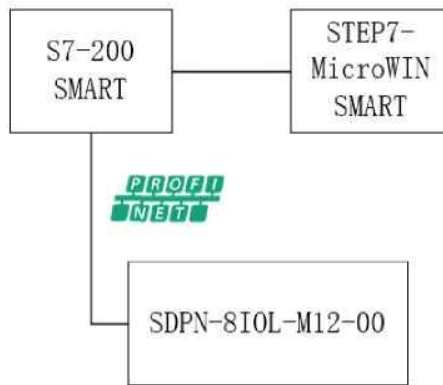


Figure 4-2-2-1 Communication connection diagram

2. The hardware configuration table is as follows:

| Hardware                    | Quantity | Remark                          |
|-----------------------------|----------|---------------------------------|
| Programming computer        | 1        | Install STEP7-MicroWIN SMART    |
| Controller                  | 1        | S7-200 SMART                    |
| SDPN-8IOL-M12-00            | 1        | PROFINET protocol master module |
| IO-Link communication cable | Several  |                                 |

3, Install the GSD file

Go to Step 7-Microwin SMART and choose GSDML Management on the menu bar, as shown in 4-2-1-2

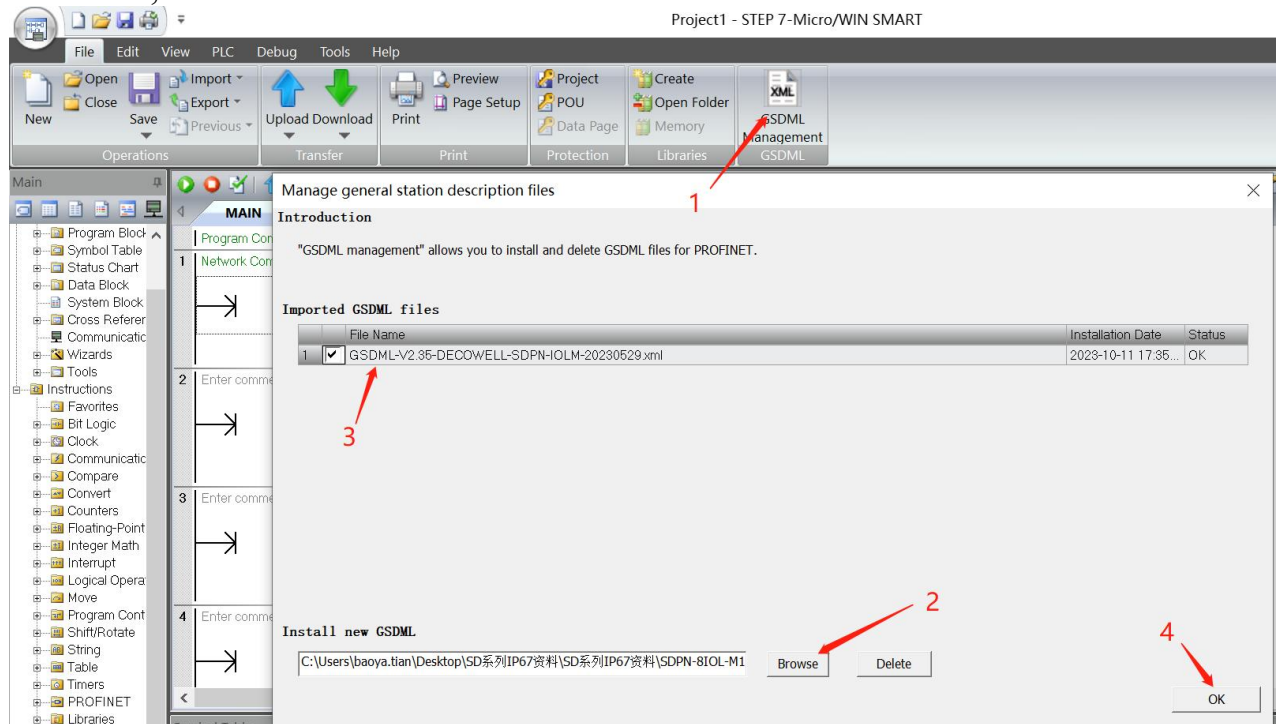


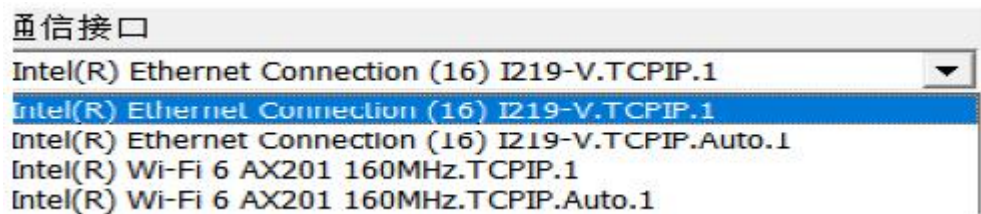
Figure 4-2-2-2 Installing the GSD file

#### 4. Assign device name

In the menu bar, select "Tools" >"Find PROFINET Device", select the network card connected to the module in the window and search for the device, select the module in the network and edit its device name, as shown in Figure 4-2-1-3 below.

Attention:

- ① When you select a network adapter, two options are displayed for the same network adapter, as shown in the following figure. Select the network adapter without Auto



- ② After the device name is assigned, note that the device name used in the configuration of the IO module must be consistent with the above assigned name, otherwise the PLC will not be able to communicate with the IO module normally

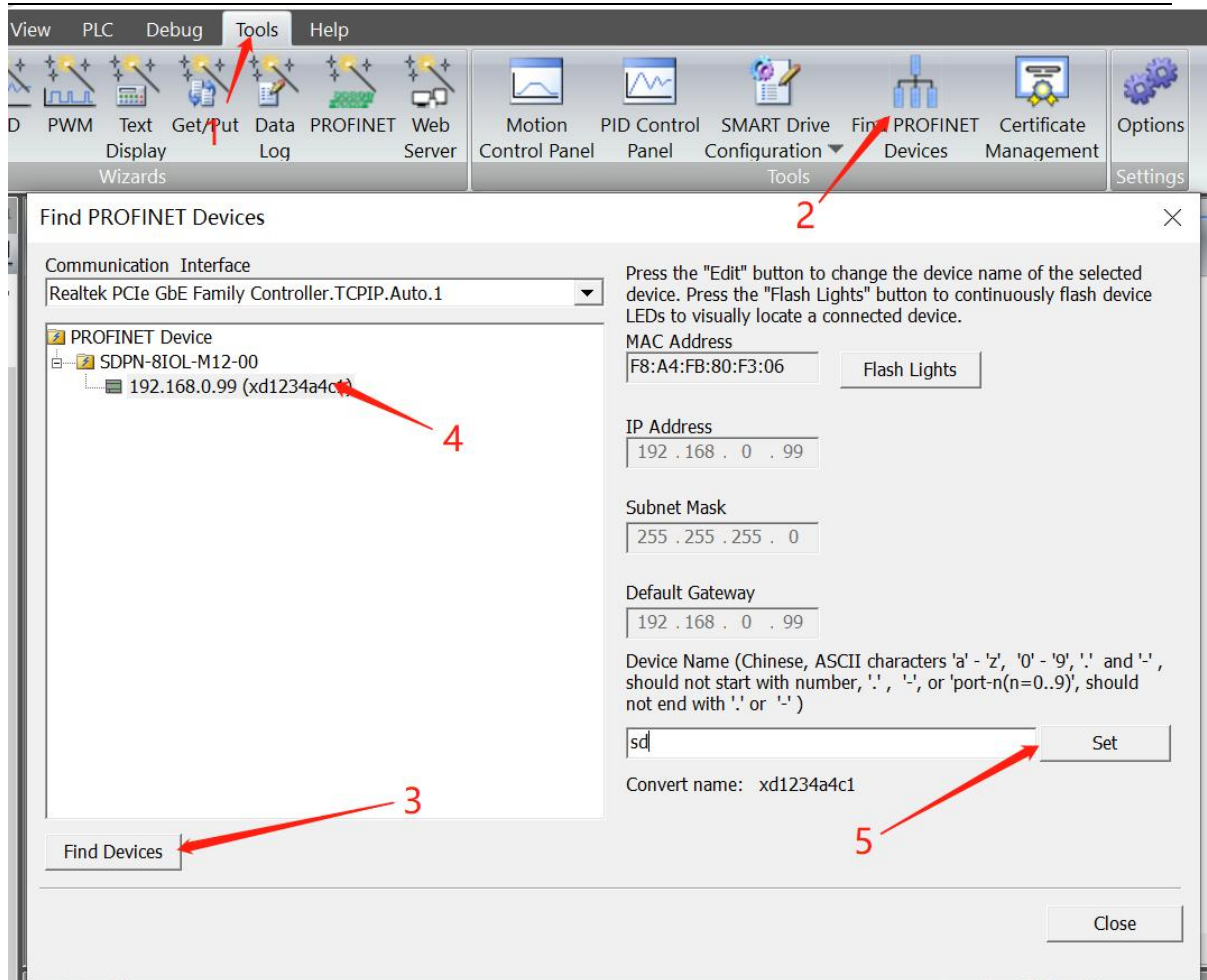


Figure 4-2-2-3 Assigning device name

## 5. New engineering and equipment configuration

Select "Tools">"PROFINET" from the menu bar. Select the PLC controller, as shown in Figure 4-2-1-4, add the master module, and assign the device name (the same as the device name assigned in Step 4) and IP address.

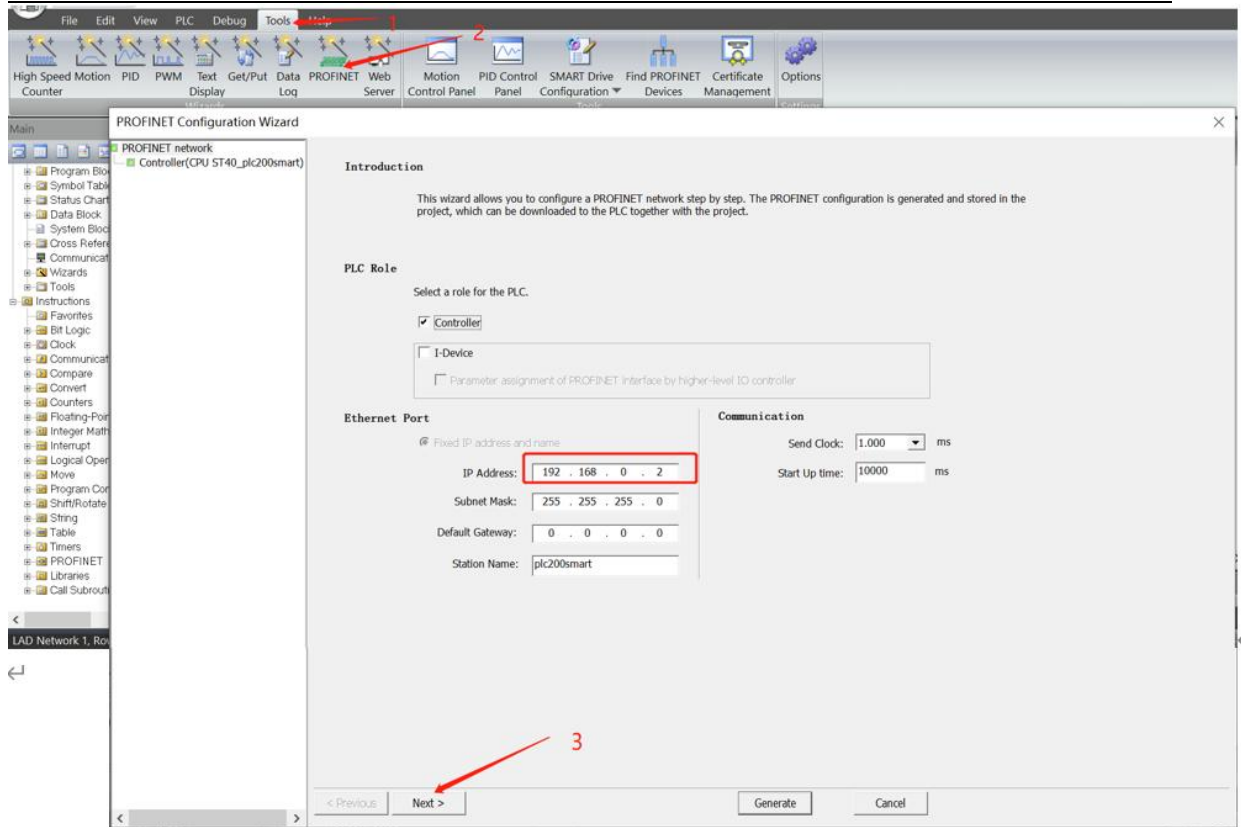


Figure 4-2-2-4 Selecting the PLC as the controller

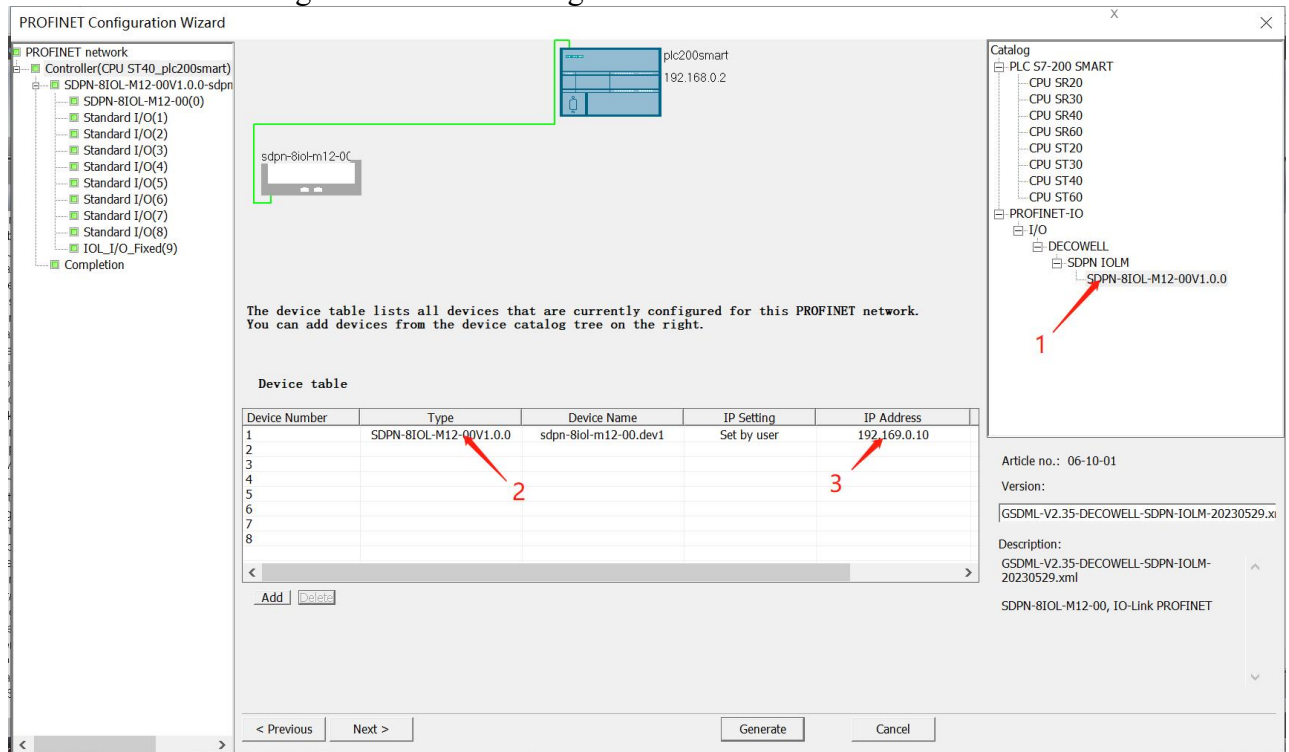


Figure 4-2-2-5 Adding the master module and assigning IP addresses

To add slave station module, click master module and delete port 1 object. In the right directory, add slave station module and click Generate, as shown in Figure 4-2-1-6 and Figure 4-2-1-7

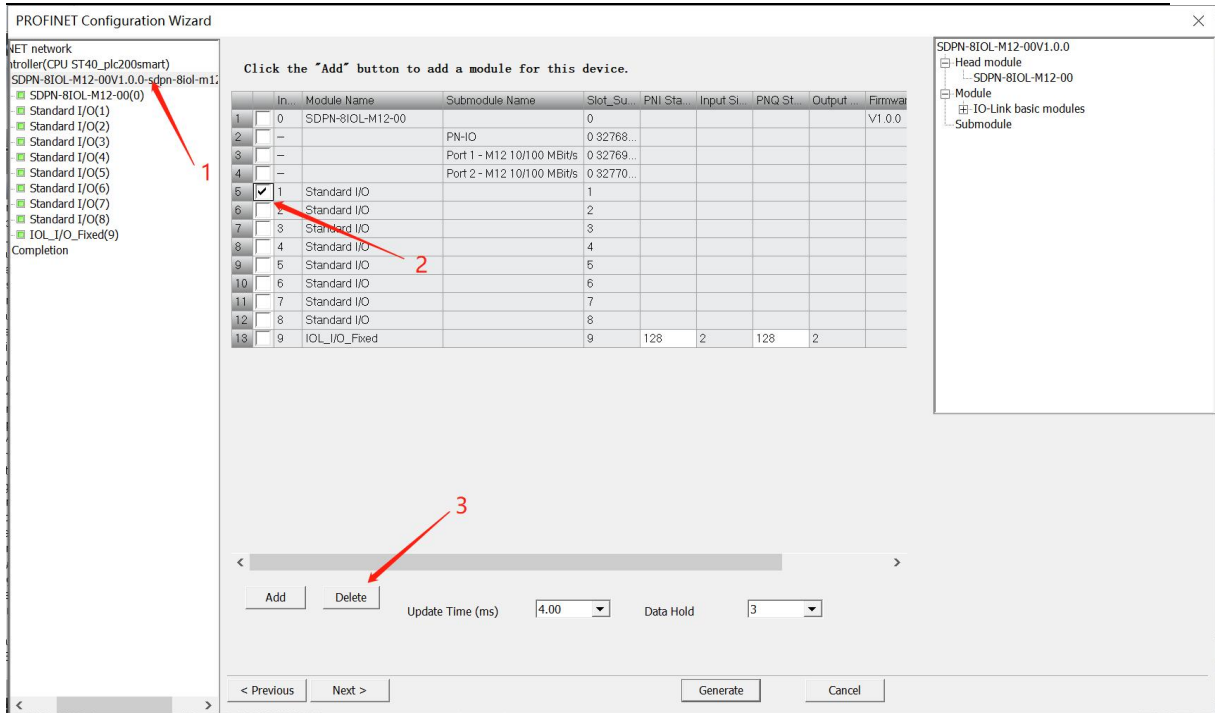


Figure 4-2-2 Deleting the port 1 object

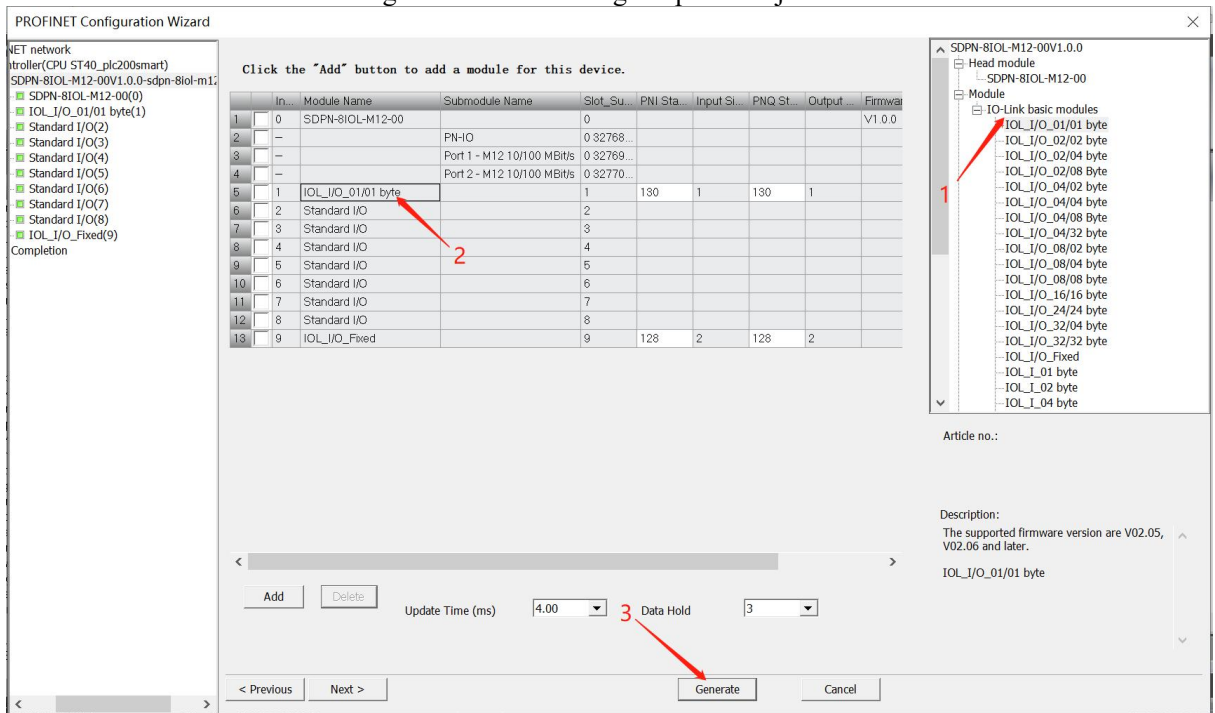


Figure 4-2-7 Add slave station module and click Generate

## 6, Program download

Select "PLC" > "Download" in the menu bar; and select "Find CPU" in the communication window, select the PLC that needs to download the program, and download the program.

### 4.2.3 The connection and its configuration of STEP7 and SDPN-8IOL-M12-00

1, Figure 4-2-3-1 shows the communication connection diagram:

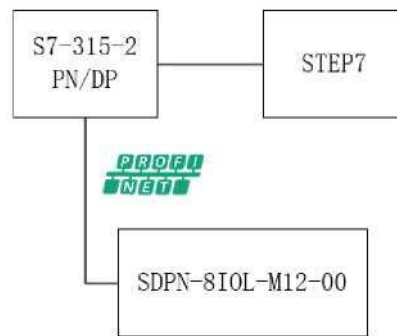


Figure 4-2-3-1 Communication connection diagram

2, The following table shows the hardware configuration table:

| Hardware                    | Quantity | remark                          |
|-----------------------------|----------|---------------------------------|
| Programming computer        | 1        | Install STEP7                   |
| Controller                  | 1        | S7-315-2 PN/DP                  |
| SDPN-8IOL-M12-00            | 1        | PROFINET protocol master module |
| IO-Link communication cable | Several  |                                 |

3, Install the GSD file

After creating a new project, click "SIMATIC300" and double-click "Hardware". In the HW Config window, choose "Options" > "Install GSD file" from the menu bar, as shown in FIG. 4-2-3-2 below:

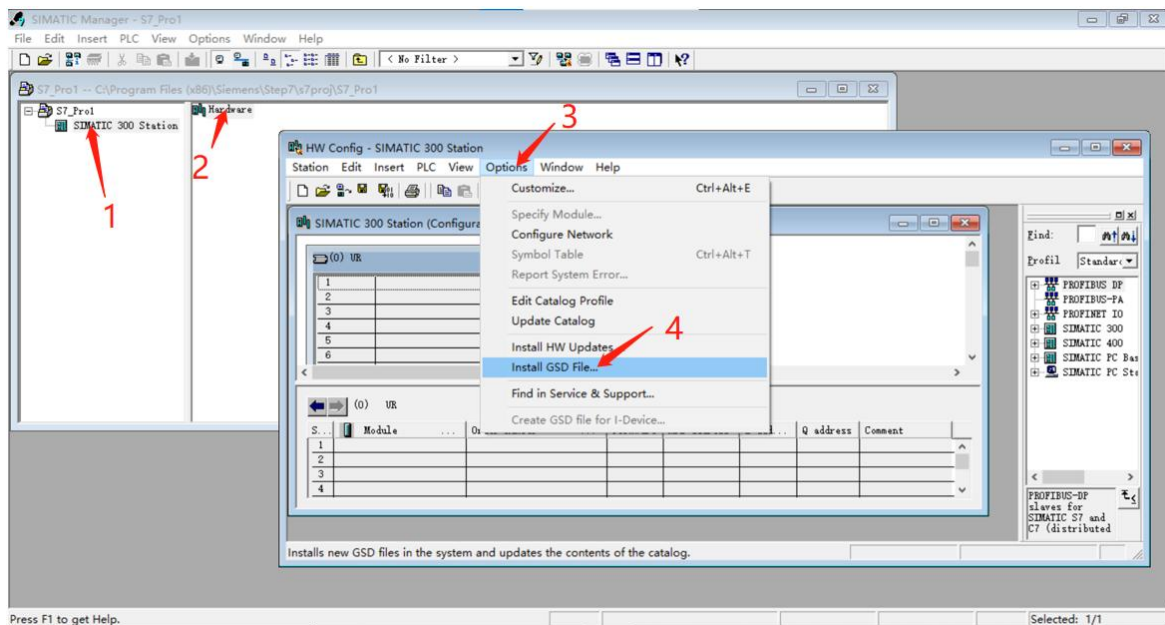


Figure 4-2-3-2 Install the GSD file

4, New engineering and equipment configuration

Open SIMATIC Manager, choose New Project from the menu bar, name the project and select the path to save the project, as shown in Figure 4-2-3-3:

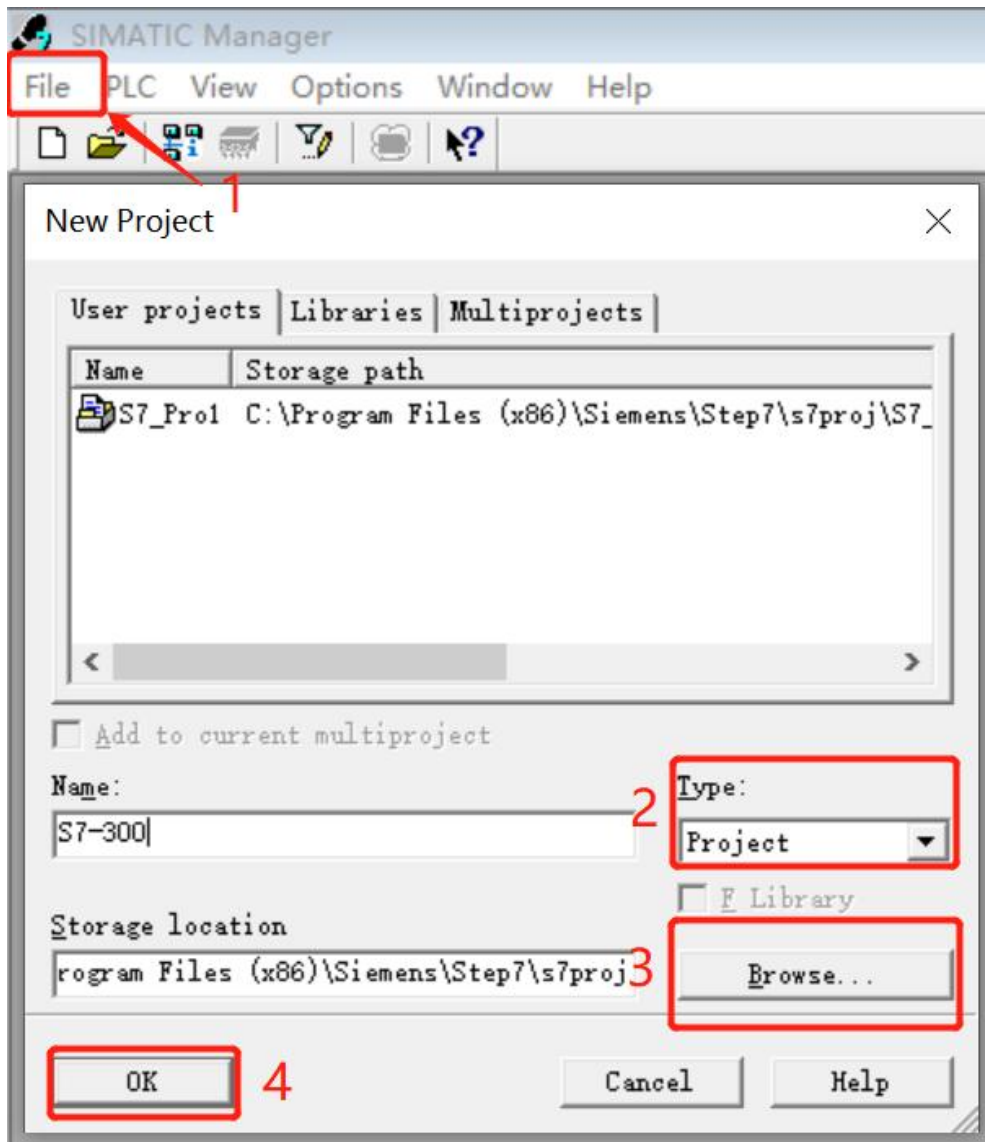


Figure 4-2-3-3 New project

Add 300 sites to the project, as shown in Figure 4-2-3-4. Click the newly added site 300 and choose Hardware. The HWConfig configuration screen is displayed, as shown in Figure 4-2-3-5. Add RACK Reil for RACK 300, as shown in Figure 4-2-3-6. Add a CPU module. In HW Config, select CPU315-2 PN/DP V2.6 of CPU-300 in the right pane, and drag the CPU to slot 2 of the rack using a mouse, as shown in Figure 4-2-3-7. In the properties interface of the Ethernet interface port, you can use other IP addresses as required. Here, use the default IP address and subnet mask, select the new button, and create a sub-network Ethernet (1). Click OK, as shown in Figure 4-2-3-8.

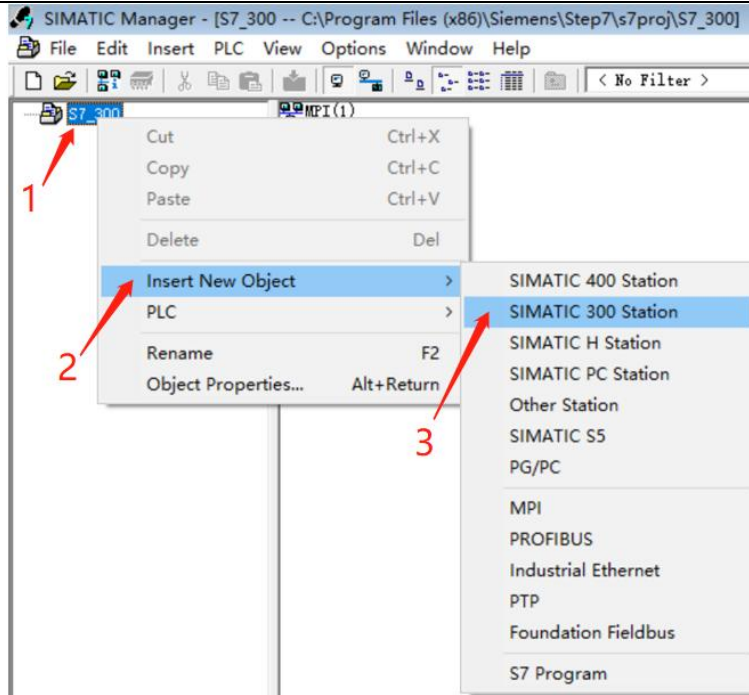


Figure 4-2-3-4 Adding 300 sites

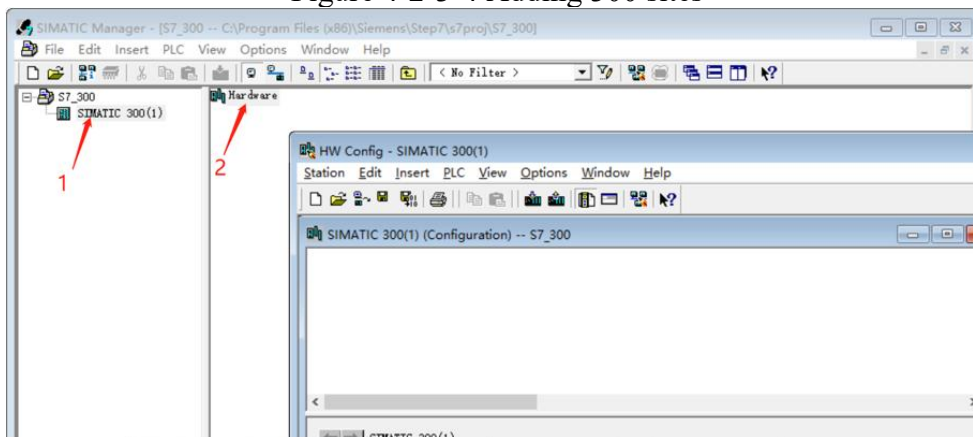


Figure 4-2-3-5 Entering the HW Config screen



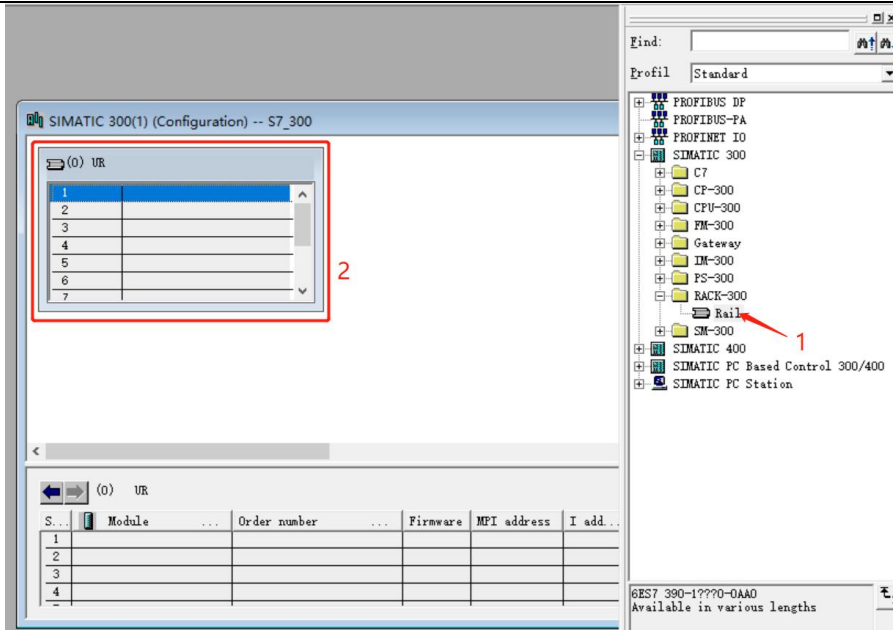


Figure 4-2-3-6 Adding rack Rail

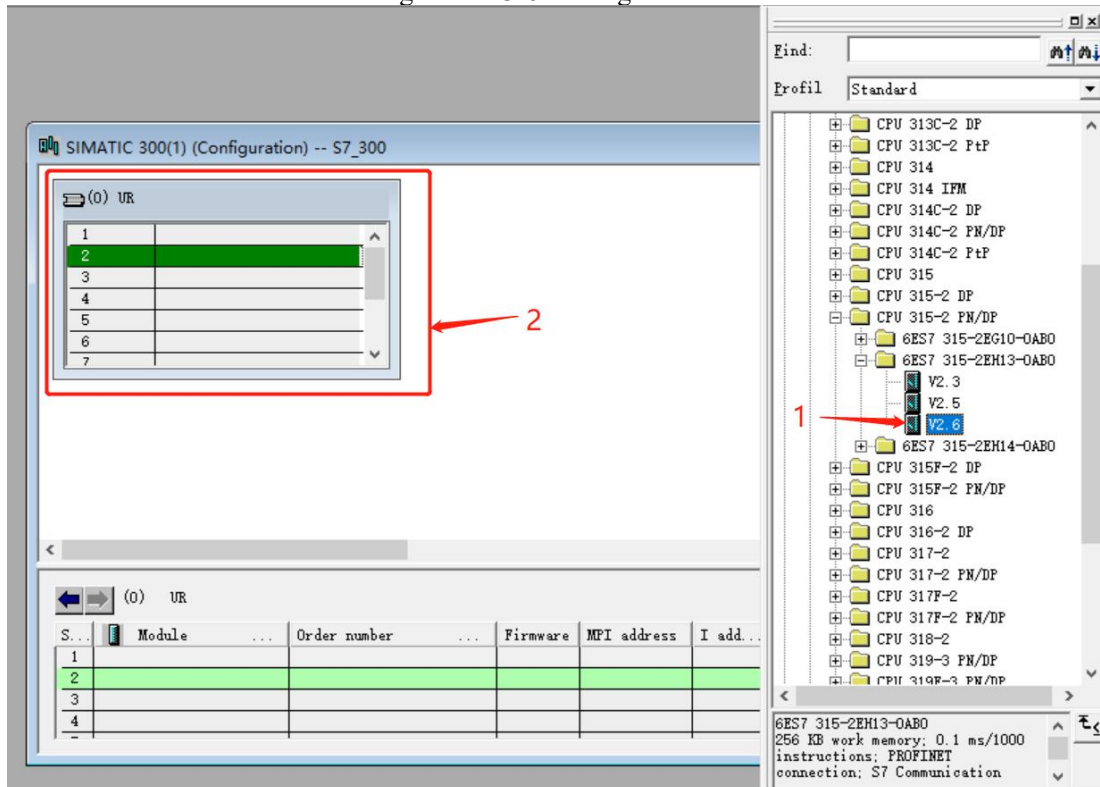


Figure 4-2-3-7 Adding a CPU module to the rack

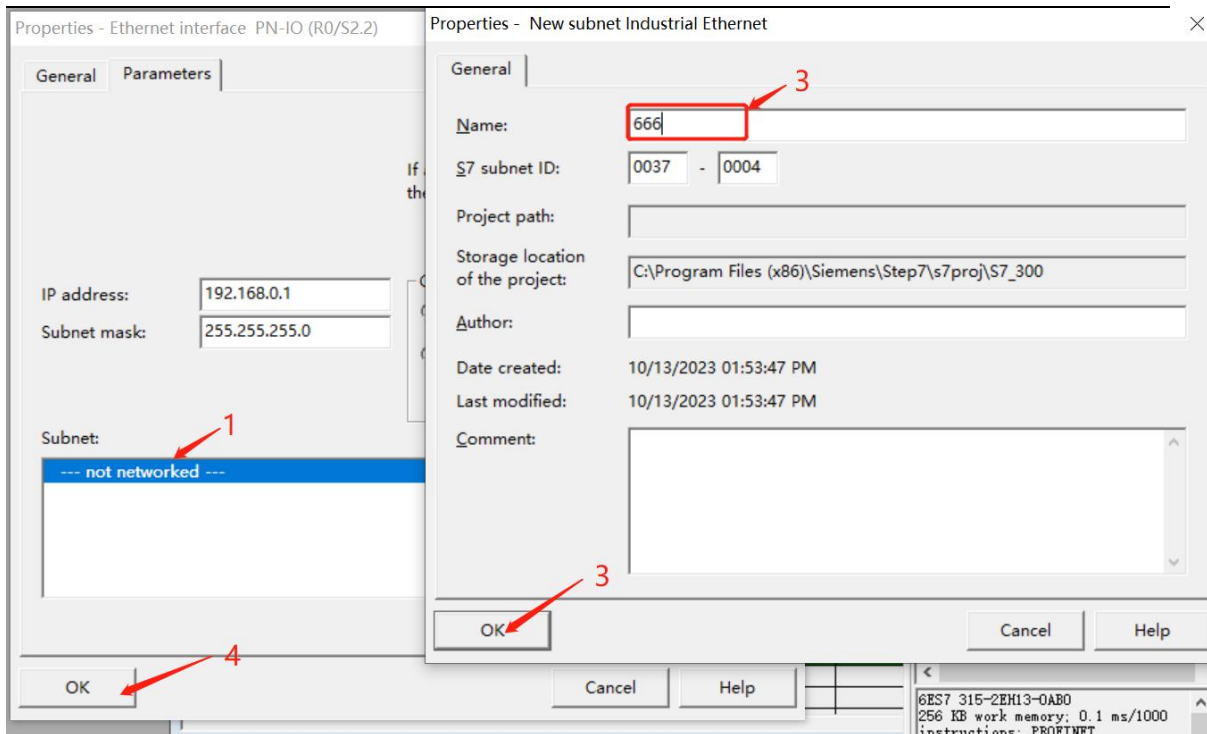


Figure 4-2-3-8 Adding an Ethernet subnet

On Ethernet (1), configure the I/O device station, select SDPN-8IOL-M12-00 in the right pane, and drag it to the Ethernet (1) subnet, as shown in Figure 4-2-3-9

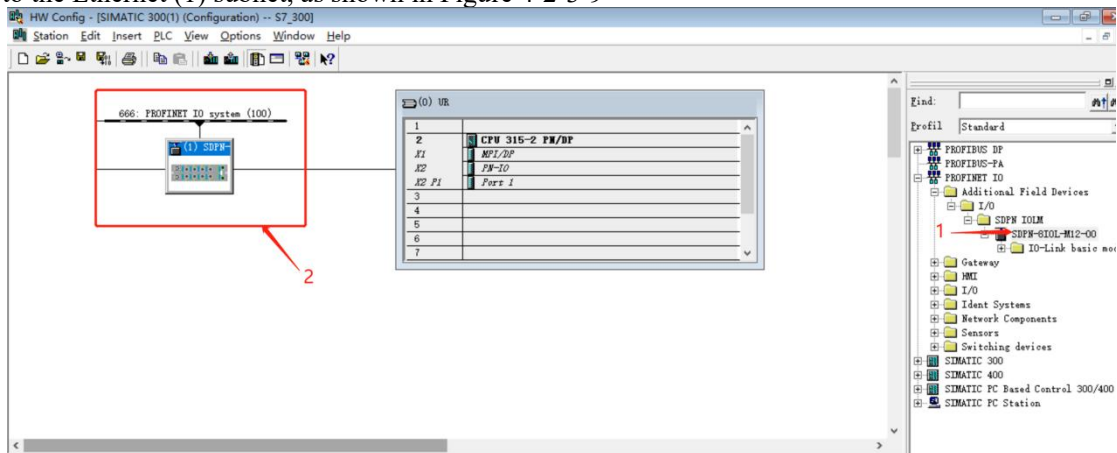


Figure 4-2-3-9 Adding IO to Ethernet (1) subnet

Double-click SD master module, select port 1 object information of master module and click Delete, as shown in FIG. 4-2-3-10 below:

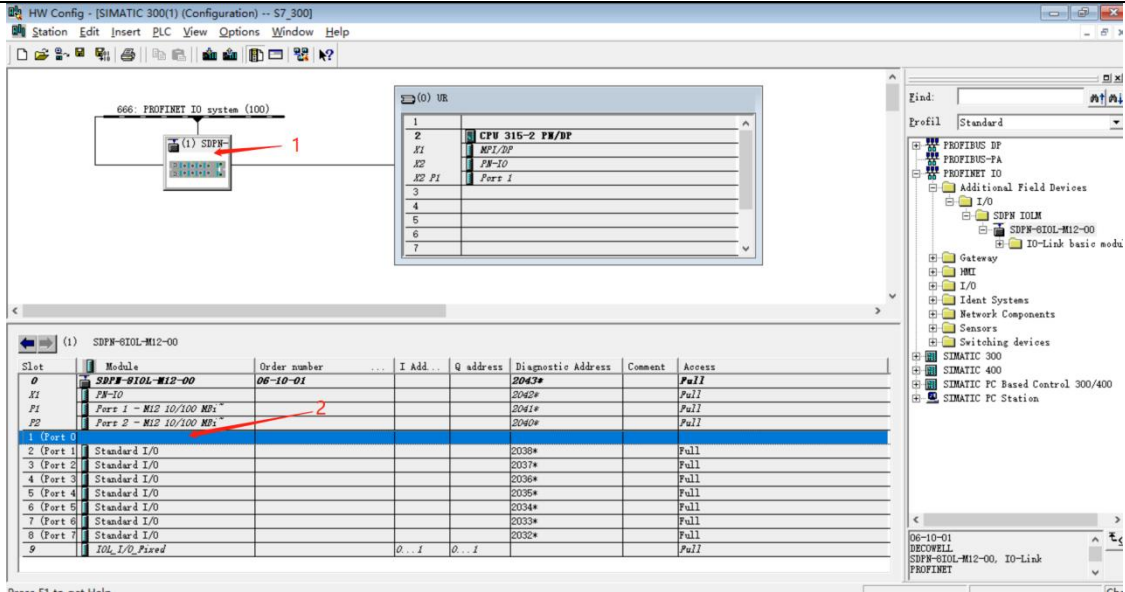


Figure 4-2-3-10 Deleting port 1

Add the slave station module, expand the right SDPN-8IOL-M12-00, and drag the SD slave station to the lower left slot, as shown in Figure 4-2-3-11 below:

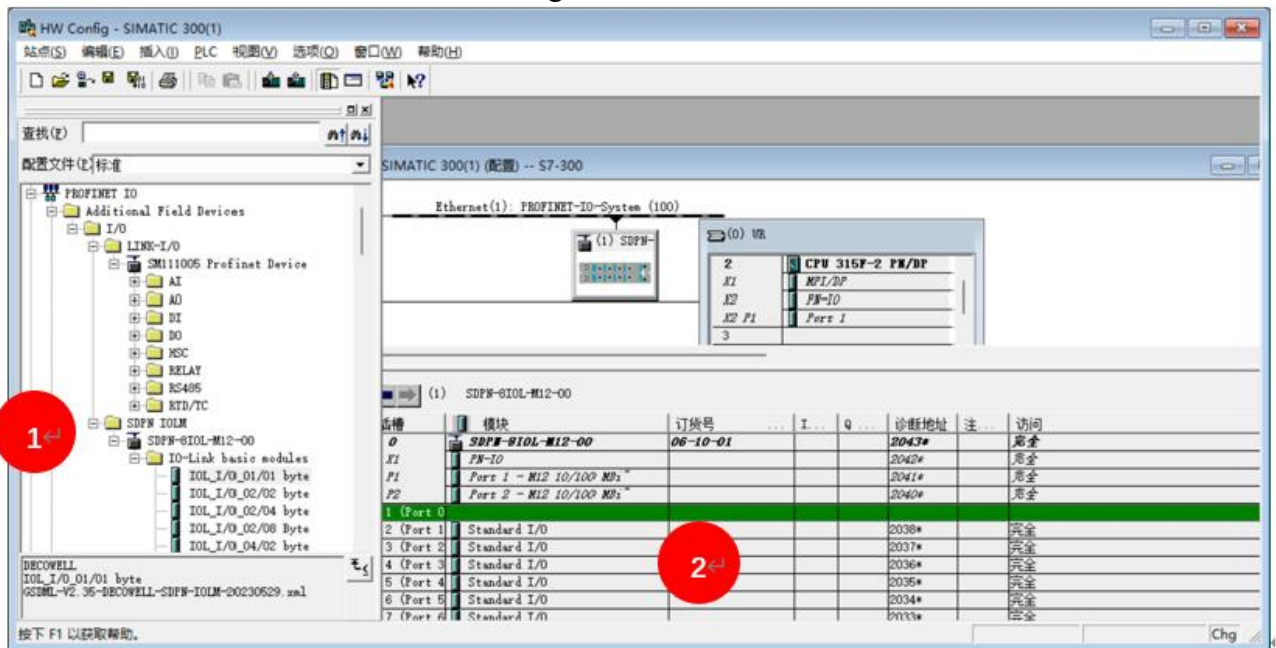


Figure 4-2-3-11 Adding a slave station module

To change the IP address of the SD master module, double-click SDPN-8IOL-M12-00 master module on the subnet, and choose Ethernet in the properties window. In the properties window, you can change the IP address, as shown in Figure 4-2-3-12:

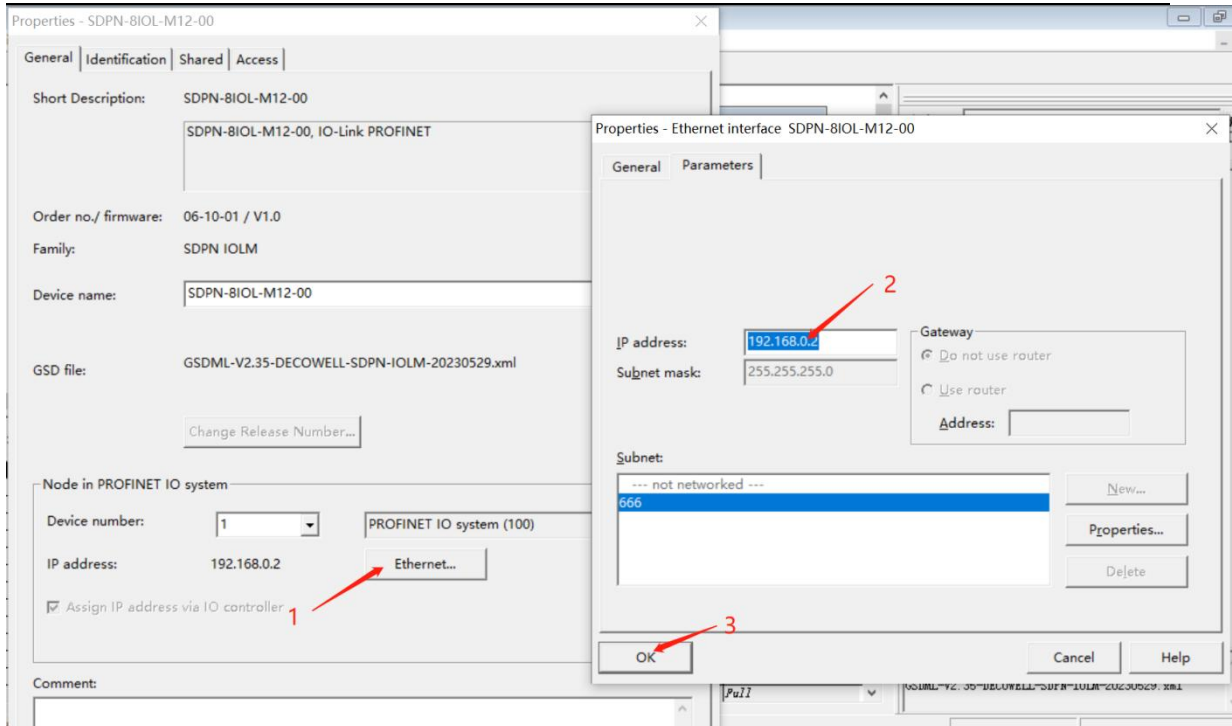


Figure 4-2-3-12 Changing the module IP address

Set the device name for the I/O module, select the subnet icon, choose PLC from the menu bar, select Ethernet > Assign Device Name, as shown in Figure 4-2-3-13. In the Assign Device name window, select the device name to be assigned, and press the confirm name button.

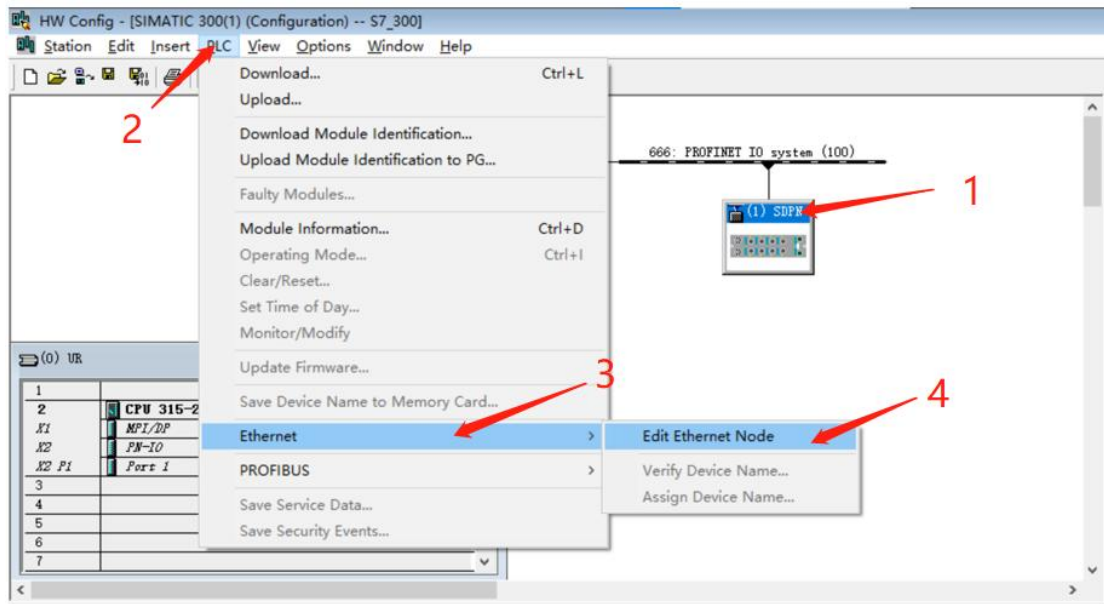


Figure 4-2-3-13 Assigning device names

Check whether the name is successfully assigned, select the subnet icon, choose PLC on the menu bar, select Ethernet > Verify device name, as shown in Figure 4-2-3-14

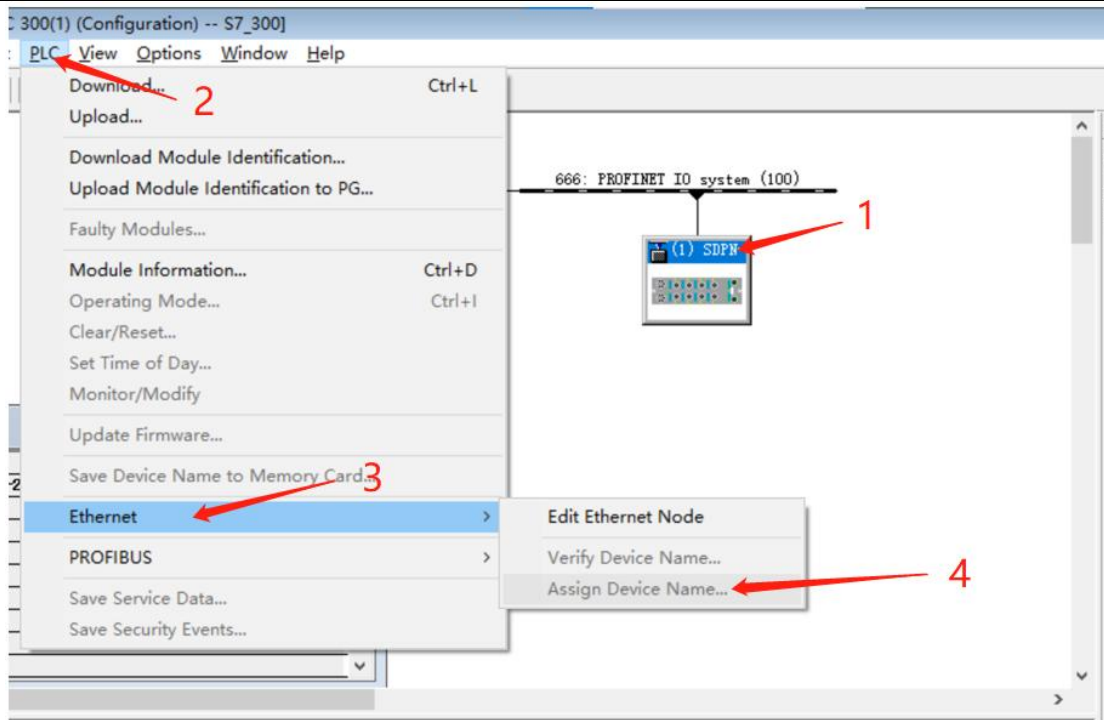


Figure 4-2-3-14 Verifying the device name

## 5. Object list

### 5.1 Process data

#### 5.1.1 IO-Link channel communication status

| Data name                    | Data meaning  | Data type |
|------------------------------|---|-----------|
| Status of IO-Link Port (1~8) | Communication status display of master module and slave station<br>Bit0-3<br>0x_0 Port is invalid<br>0x_1 Input mode<br>0x_2 Output mode<br>0x_3 Communication OP<br>0x_4 Communication fault Bit4-7<br>0x1_ Watchdog has no errors<br>0x2_ Buffer overflow<br>0x3_ Invalid device ID<br>0x4_ Invalid device vendor ID<br>0x5_ Invalid version<br>0x6_ Invalid frame function<br>0x7_ Invalid cycle time<br>0x8_ Invalid input process data length<br>0x9_ Invalid output process data length<br>0xA_ Device not detected | USINT     |

#### 5.2.2 Pin2 pin status monitoring

| Data name          | Data meaning                     | Data type |
|--------------------|----------------------------------|-----------|
| Input Pin2 (ch1-8) | 0x00 non-reverse<br>0x01 reverse | USINT     |



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