



# **XL Series PLC Left Extension ED Module**

## **User Manual**

Wuxi Xinje Electric Co., Ltd.

Reference number: PL08 20230531 1.0

|                     |                                               |    |
|---------------------|-----------------------------------------------|----|
|                     | Catalogue                                     |    |
|                     | Module Information Summary                    | 1  |
|                     | Analog Input Module XL-4AD-A-ED               | 2  |
|                     | Analog Input Module XL-4AD-V-ED               | 3  |
| XL Series PLC Left  | Analog Output Module XL-4DA-A-ED              | 4  |
| Extension ED Module | Analog Output Module XL-4DA-V-ED              | 5  |
| user's manual       | Analog Input/Output Module XL-2AD2DA-A-ED     | 6  |
|                     | Analog Input and Output Module XL-2AD2DA-V-ED | 7  |
|                     | Analog temperature module XL-2AD2PT-A-ED      | 8  |
|                     | Analog Temperature Module XL-2AD2PT-V-ED      | 9  |
|                     | Analog Temperature Module XL-2PT2DA-A-ED      | 10 |
|                     | Analog Temperature Module XL-2PT2DA-V-ED      | 11 |
|                     | Analog Temperature Module XL-2PT2DA-V-ED      | 12 |
|                     | Manual update log                             |    |

This manual outlines essential safety measures for personal protection and the protection of this product and its connected devices. These precautions are highlighted with warning triangles in the manual. For other matters, please adhere to the basic electrical operating procedures.

Installation  
Notes



---

Please follow these precautions. Failure to follow the correct operating procedures may cause the control system to malfunction or operate abnormally, potentially resulting in property damage.

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Apply correctly



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This device and its components are intended for use only in the applications specified in the product catalog and technical documentation, and must be used exclusively with equipment or components manufactured by peripheral suppliers approved or recommended by XJ.

Only when the product is transported, stored, configured, and installed correctly, and operated and maintained as recommended, can it function properly.

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#### statement of responsibility

We have verified that the contents of this manual are consistent with the described hardware and software. Since errors are inevitable, we cannot guarantee absolute accuracy. However, we will regularly review the data in the manual and make necessary corrections during future revisions. We welcome your valuable feedback.

November 2018

# Contents

|                                            |           |
|--------------------------------------------|-----------|
| <b>1. Module Information Summary</b>       | <b>1</b>  |
| 1-1. Module Model and Configuration        | 2         |
| 1-1-1. Module Model and Function           | 2         |
| 1-1-2. Module Configuration                | 2         |
| 1-2. Dimensions                            | 3         |
| 1-3. Names and Functions of Each Section   | 4         |
| 1-4. General Specifications                | 5         |
| 1-5. Module Installation                   | 5         |
| 1-5-1. Installation Steps                  | 5         |
| 1-5-2. Installation Requirements           | 6         |
| 1-6. Configuration in Programming Software | 6         |
| <b>2. Analog Input Module XL-4AD-A-ED</b>  | <b>8</b>  |
| 2-1. Module Features and Specifications    | 9         |
| 2-1-1. Module Features                     | 9         |
| 2-1-2. Module Specifications               | 9         |
| 2-2. Terminal Description                  | 10        |
| 2-2-1. Terminal Arrangement                | 10        |
| 2-2-2. Terminal Signal                     | 10        |
| 2-2-3. Connector Specifications            | 10        |
| 2-3. Input definition number allocation    | 10        |
| 2-4. Work Mode Settings                    | 11        |
| 2-4-1. Configure the panel                 | 11        |
| 2-4-2. Flash register settings             | 12        |
| 2-5. External Connections                  | 13        |
| 2-5-1. Single-ended Current Input          | 13        |
| 2-6. Analog-to-Digital Conversion Diagram  | 14        |
| 2-7. Programming Examples                  | 14        |
| <b>3. Analog Input Module XL-4AD-V-ED</b>  | <b>16</b> |
| 3-1. Module Features and Specifications    | 17        |
| 3-1-1. Module Features                     | 17        |
| 3-1-2. Module Specifications               | 17        |
| 3-2. Terminal Description                  | 18        |
| 3-2-1. Terminal Arrangement                | 18        |
| 3-2-2. Terminal Signal                     | 18        |
| 3-2-3. Connector Specifications            | 18        |
| 3-3. Input definition number assignment    | 19        |
| 3-4. Work Mode Settings                    | 19        |
| 3-4-1. Configure the panel                 | 19        |
| 3-4-2. Flash register settings             | 20        |

|                                                           |           |
|-----------------------------------------------------------|-----------|
| 3-5. External Connections .....                           | 21        |
| 3-5-1. Single-ended voltage input .....                   | 21        |
| 3-6. Analog-to-Digital Conversion Diagram .....           | 22        |
| 3-7. Programming Examples .....                           | 22        |
| <b>4. Analog Output Module XL-4DA-A-ED .....</b>          | <b>24</b> |
| 4-1. Module Features and Specifications .....             | 25        |
| 4-1-1. Module Features .....                              | 25        |
| 4-1-2. Module Specifications .....                        | 25        |
| 4-2. Terminal Description .....                           | 26        |
| 4-2-1. Terminal Arrangement .....                         | 26        |
| 4-2-2. Terminal Signal .....                              | 26        |
| 4-2-3. Connector Specifications .....                     | 26        |
| 4-3. Output definition number allocation .....            | 27        |
| 4-4. Work Mode Settings .....                             | 27        |
| 4-4-1. Configure the panel .....                          | 27        |
| 4-4-2. Flash register settings .....                      | 28        |
| 4-5. External Connections .....                           | 29        |
| 4-5-1. Single-ended current output .....                  | 29        |
| 4-6. Module Conversion Chart .....                        | 29        |
| 4-7. Programming Examples .....                           | 30        |
| <b>5. Analog Output Module XL-4DA-V-ED .....</b>          | <b>31</b> |
| 5-1. Module Features and Specifications .....             | 32        |
| 5-1-1. Module Features .....                              | 32        |
| 5-1-2. Module Specifications .....                        | 32        |
| 5-2. Terminal Description .....                           | 33        |
| 5-2-1. Terminal Arrangement .....                         | 33        |
| 5-2-2. Terminal Signals .....                             | 33        |
| 5-2-3. Connector Specifications .....                     | 33        |
| 5-3. Output definition number allocation .....            | 33        |
| 5-4. Work Mode Settings .....                             | 34        |
| 5-4-1. Configure the panel .....                          | 34        |
| 5-4-2. Flash register settings .....                      | 35        |
| 5-5. External Connections .....                           | 36        |
| 5-5-1. Single-ended voltage output .....                  | 36        |
| 5-6. Module Conversion Chart .....                        | 36        |
| 5-7. Programming Examples .....                           | 37        |
| <b>6. Analog Input/Output Module XL-2AD2DA-A-ED .....</b> | <b>38</b> |
| 6-1. Module Features and Specifications .....             | 39        |
| 6-1-1. Module Features .....                              | 39        |
| 6-1-2. Module Specifications .....                        | 39        |
| 6-2. Terminal Description .....                           | 40        |
| 6-2-1. Terminal Arrangement .....                         | 40        |
| 6-2-2. Terminal Signals .....                             | 40        |
| 6-2-3. Connector Specifications .....                     | 40        |

|                                                          |           |
|----------------------------------------------------------|-----------|
| 6-3. Input and Output Definition Number Assignment ..... | 40        |
| 6-4. Work Mode Settings.....                             | 41        |
| 6-4-1. Configure the panel.....                          | 41        |
| 6-4-2. Flash register settings.....                      | 42        |
| 6-5. External Connections.....                           | 43        |
| 6-5-1. Single-ended Current Input .....                  | 43        |
| 6-5-2. Single-ended Current Output.....                  | 44        |
| 6-6. Analog-to-Digital Conversion Diagram .....          | 44        |
| 6-7. Programming Examples .....                          | 45        |
| <b>7. Analog Input/Output Module XL-2AD2DA-V-ED.....</b> | <b>47</b> |
| 7-1. Module Features and Specifications .....            | 48        |
| 7-1-1. Module Features .....                             | 48        |
| 7-1-2. Module Specifications.....                        | 48        |
| 7-2. Terminal Description .....                          | 49        |
| 7-2-1. Terminal Arrangement.....                         | 49        |
| 7-2-2. Terminal Signals.....                             | 49        |
| 7-2-3. Connector Specifications .....                    | 49        |
| 7-3. Input and Output Definition Number Assignment ..... | 49        |
| 7-4. Work Mode Settings.....                             | 50        |
| 7-4-1. Configure the panel.....                          | 50        |
| 7-4-2. Flash register settings.....                      | 51        |
| 7-5. External Connections.....                           | 52        |
| 7-5-1. Single-ended voltage input .....                  | 52        |
| 7-5-2. Single-ended Voltage Output.....                  | 52        |
| 7-6. Module Conversion Diagram .....                     | 53        |
| 7-7. Programming Examples .....                          | 53        |
| <b>8. Analog temperature module XL-2AD2PT-A-ED.....</b>  | <b>55</b> |
| 8-1. Module Features and Specifications .....            | 56        |
| 8-1-1. Module Features .....                             | 56        |
| 8-1-2. Module Specifications.....                        | 56        |
| 8-2. Terminal Description .....                          | 57        |
| 8-2-1. Terminal Arrangement.....                         | 57        |
| 8-2-2. Terminal Signal.....                              | 57        |
| 8-2-3. Connector Specifications .....                    | 57        |
| 8-3. Input definition number assignment .....            | 57        |
| 8-4. Work Mode Settings.....                             | 58        |
| 8-4-1. Configure the panel.....                          | 58        |
| 8-4-2. Flash register settings.....                      | 59        |
| 8-5. External Connections.....                           | 60        |
| 8-5-1. Single-ended Current Input .....                  | 60        |
| 8-5-2. Thermistor Temperature Input .....                | 61        |
| 8-6. Module Conversion Chart.....                        | 61        |
| 8-7. Programming Examples .....                          | 62        |
| <b>9. Analog temperature module XL-2AD2PT-V-ED .....</b> | <b>63</b> |

|                                                           |           |
|-----------------------------------------------------------|-----------|
| 9-1. Module Features and Specifications .....             | 64        |
| 9-1-1. Module Features .....                              | 64        |
| 9-1-2. Module Specifications .....                        | 64        |
| 9-2. Terminal Description .....                           | 65        |
| 9-2-1. Terminal Arrangement.....                          | 65        |
| 9-2-2. Terminal Signal.....                               | 65        |
| 9-2-3. Connector Specifications .....                     | 65        |
| 9-3. Input definition number assignment .....             | 65        |
| 9-4. Work Mode Settings.....                              | 66        |
| 9-4-1. Configure the panel.....                           | 66        |
| 9-4-2. Flash register settings.....                       | 67        |
| 9-5. External Connections.....                            | 68        |
| 9-5-1. Single-ended voltage input .....                   | 68        |
| 9-5-2. Thermistor Temperature Input .....                 | 69        |
| 9-6. Module Conversion Chart.....                         | 69        |
| 9-7. Programming Examples .....                           | 69        |
| <b>10. Analog temperature module XL-2PT2DA-A-ED .....</b> | <b>71</b> |
| 10-1. Module Features and Specifications.....             | 72        |
| 10-1-1. Module Features .....                             | 72        |
| 10-1-2. Module Specifications.....                        | 72        |
| 10-2. Terminal Description .....                          | 73        |
| 10-2-1. Terminal Arrangement.....                         | 73        |
| 10-2-2. Terminal Signals.....                             | 73        |
| 10-2-3. Connector Specifications .....                    | 73        |
| 10-3. Input and Output Definition Number Assignment ..... | 73        |
| 10-4. Work Mode Settings .....                            | 74        |
| 10-4-1. Configure the panel .....                         | 74        |
| 10-4-2. Flash register settings.....                      | 75        |
| 10-5. External Connections.....                           | 76        |
| 10-5-1. Thermistor Temperature Input .....                | 76        |
| 10-5-2. Single-ended Current Output .....                 | 76        |
| 10-6. Analog-to-Digital Conversion Diagram .....          | 77        |
| 10-7. Programming Examples .....                          | 77        |
| <b>11. Analog Temperature Module XL-2PT2DA-V-ED .....</b> | <b>78</b> |
| 11-1. Module Features and Specifications .....            | 79        |
| 11-1-1. Module Features .....                             | 79        |
| 11-1-2. Module Specifications .....                       | 79        |
| 11-2. Terminal Description.....                           | 80        |
| 11-2-1. Terminal Arrangement.....                         | 80        |
| 11-2-2. Terminal Signals .....                            | 80        |
| 11-2-3. Connector Specifications .....                    | 80        |
| 11-3. Input and Output Definition Number Assignment.....  | 80        |
| 11-4. Work Mode Settings.....                             | 81        |
| 11-4-1. Configure the panel.....                          | 81        |
| 11-4-2. Flash register settings.....                      | 82        |

|                                                           |           |
|-----------------------------------------------------------|-----------|
| 11-5. External Connections .....                          | 83        |
| 11-5-1. Thermistor Temperature Input .....                | 83        |
| 11-5-2. Single-ended voltage output .....                 | 83        |
| 11-6. Module Conversion Chart .....                       | 84        |
| 11-7. Programming Examples .....                          | 84        |
| <b>12. Communication expansion module XL-NES-ED .....</b> | <b>85</b> |
| 12-1. Module Functions and Features .....                 | 86        |
| 12-1-1. Module Features .....                             | 86        |
| 12-2. Terminal Description .....                          | 86        |
| 12-2-1. Terminal Arrangement .....                        | 86        |
| 12-2-2. Terminal Signal .....                             | 87        |
| 12-2-3. Connector Specifications .....                    | 87        |
| 12-3. Communication Configuration .....                   | 87        |
| 12-3-1. Configuration in editing software .....           | 87        |
| 12-3-2. Configuration in XINJEConfig .....                | 89        |
| <b>Manual update log .....</b>                            | <b>95</b> |

# 1. Module Information Summary

This chapter introduces the models, appearance, general specifications, installation methods, and software configuration of the XL series left expansion ED modules. These modules are compatible with the XL series PLC models.

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|                                                  |   |
|--------------------------------------------------|---|
| 1. Module Information Summary .....              | 1 |
| 1-1. Module Model and Configuration .....        | 2 |
| 1-1-1. Module Model and Function .....           | 2 |
| 1-1-2. Module Configuration .....                | 2 |
| 1-2. Dimensions .....                            | 3 |
| 1-3. Names and Functions of Each Section .....   | 4 |
| 1-4. General Specifications .....                | 5 |
| 1-5. Module Installation .....                   | 5 |
| 1-5-1. Installation Steps .....                  | 5 |
| 1-5-2. Installation Requirements .....           | 6 |
| 1-6. Configuration in Programming Software ..... | 6 |

## 1-1. Module Model and Configuration

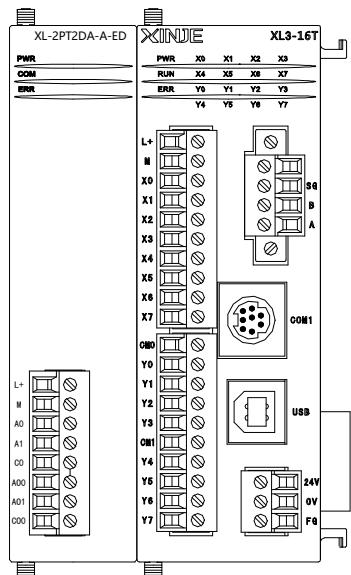
The XL series PLC supports right-side expansion modules and also allows an additional ED module to be added on the left side. The left-side ED module features A/D/D/A conversion, temperature measurement, and remote communication capabilities.

### 1-1-1. Module Model and Function

| model          | function                                                                              |
|----------------|---------------------------------------------------------------------------------------|
| XL-4AD-A-ED    | 4-channel analog current input (12-bit);                                              |
| XL-4AD-V-ED    | 4-channel analog voltage input (12-bit);                                              |
| XL-4DA-A-ED    | 4-channel analog current output (10-bit);                                             |
| XL-4DA-V-ED    | 4-channel analog voltage output (10-bit);                                             |
| XL-2AD2DA-A-ED | 2-channel analog current input (12-bit) and 2-channel analog current output (10-bit); |
| XL-2AD2DA-V-ED | 2-channel analog voltage input (12-bit) and 2-channel analog voltage output (10-bit); |
| XL-2AD2PT-A-ED | 2-channel analog current input (12-bit) and 2-channel temperature input;              |
| XL-2AD2PT-V-ED | 2-channel analog voltage input (12-bit) and 2-channel temperature input;              |
| XL-2PT2DA-A-ED | 2-channel temperature input and 2-channel analog current output (10-bit).             |
| XL-2PT2DA-V-ED | 2-channel temperature input and 2-channel analog voltage output (10-bit).             |
| XL-NES-ED      | Communication port expansion (ED) supports adding either an RS232 or RS485 port.      |

### 1-1-2. Module Configuration

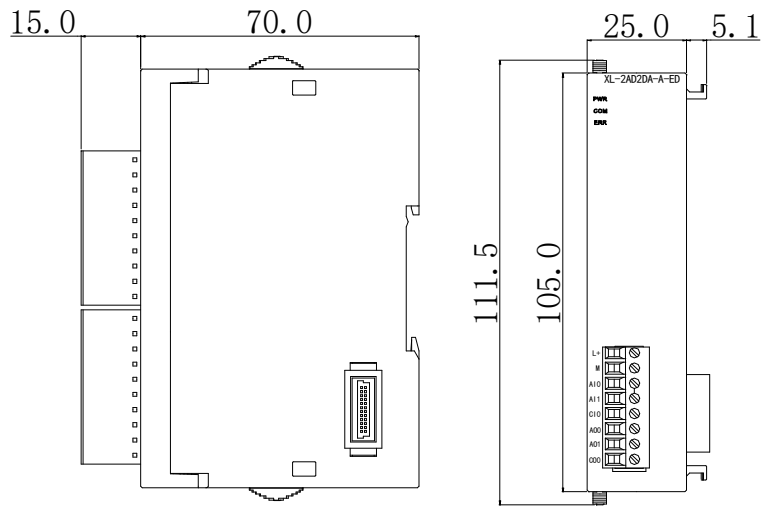
The left expansion ED module of the XL series is installed on the left side of the XL series PLC main unit. Each PLC main unit can connect up to one left expansion ED module (Note: The XL1 series does not support this feature).



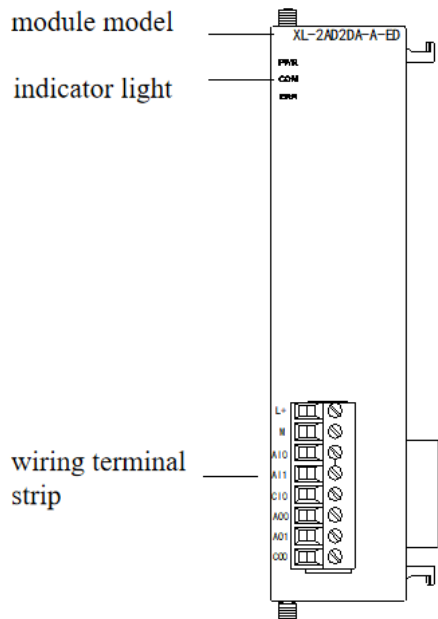
## 1-2. Dimensions

Refer to the figure below for the appearance and dimensions of the XL series analog/temperature left expansion ED module and XL-NES-ED.

(unit:mm)



1-3. Names and Functions of Each Section



The names of the parts are as follows:

| name           |     | function                                                                                                                                                 |
|----------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| pilot lamp     | PWR | The indicator light illuminates when the ED module is powered.                                                                                           |
|                | COM | The indicator light illuminates when the ED module's communication port is functioning normally.                                                         |
|                | ERR | The ERR indicator illuminates to alert when an error occurs in the ED module.                                                                            |
| Terminal block |     | For analog input/output and communication terminal wiring<br>For terminal definitions, refer to the corresponding section in each model's documentation. |

## 1-4. General Specifications

| project                         | specifications                                   |
|---------------------------------|--------------------------------------------------|
| service environment             | non-corrosive gas                                |
| ambient temperature             | 0~55℃                                            |
| Maintain ambient temperature    | -20~70℃                                          |
| ambient humidity                | 5~95%RH                                          |
| Maintain environmental humidity | 5~95%RH                                          |
| install                         | Directly installed on DIN46277 (35mm wide) rails |

## 1-5. Module Installation

### 1-5-1. Installation Steps

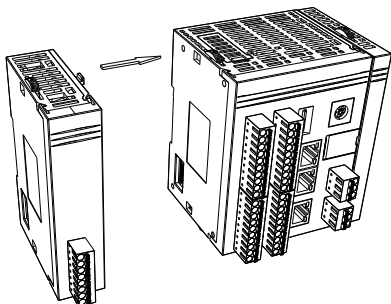
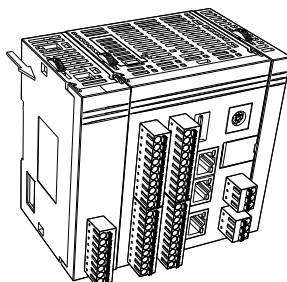
#### 1) Installation environment

Before installing the module, verify that the installation site for the left extended ED module is suitable. Note that the module should not be installed in the following environments:

- Places exposed to direct sunlight
- Places where the ambient temperature is outside the range of 0~50℃
- Places where the ambient humidity exceeds 35~85% RH
- Places where condensation occurs due to rapid temperature changes
- Places with corrosive gases and flammable gases
- Places with heavy dust, salt, iron filings, or oil mist
- Places subject to direct vibration and impact
- Places where water, oil, chemicals, etc. may be spilled
- Places with strong magnetic fields or strong electric fields

#### 2) Installation Steps

The left expansion ED module for the XL series must be installed on the left side of the XL series PLC main unit. The installation steps are as follows:

|                                                                                                                                            |                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| ① Locate the COM3 ports on both sides of the PLC (left and right of the module), then align and install them as shown in the figure below: | ② Push the sliding latch on the module to secure it, as shown in the figure below:    |
|                                                         |  |

Note: After installation, check that the module fastener is securely fastened and that the module is not loose.

## 1-5-2. Installation Requirements

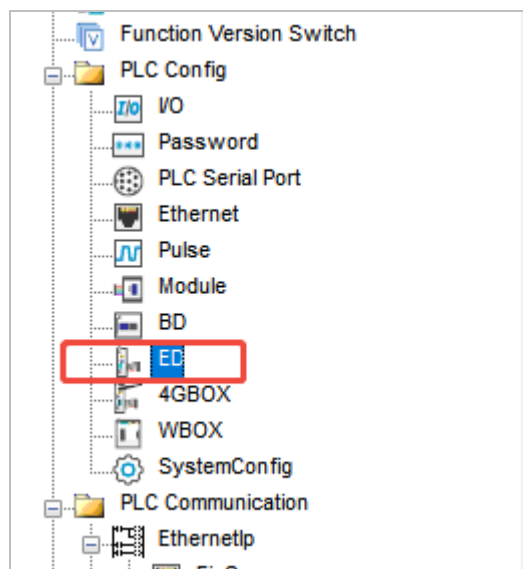
The basic unit and extended ED module are mounted on a DIN46277 rail (35mm wide). To remove them, simply pull down the assembly hook on the DIN rail and detach the product.

### matters need attention

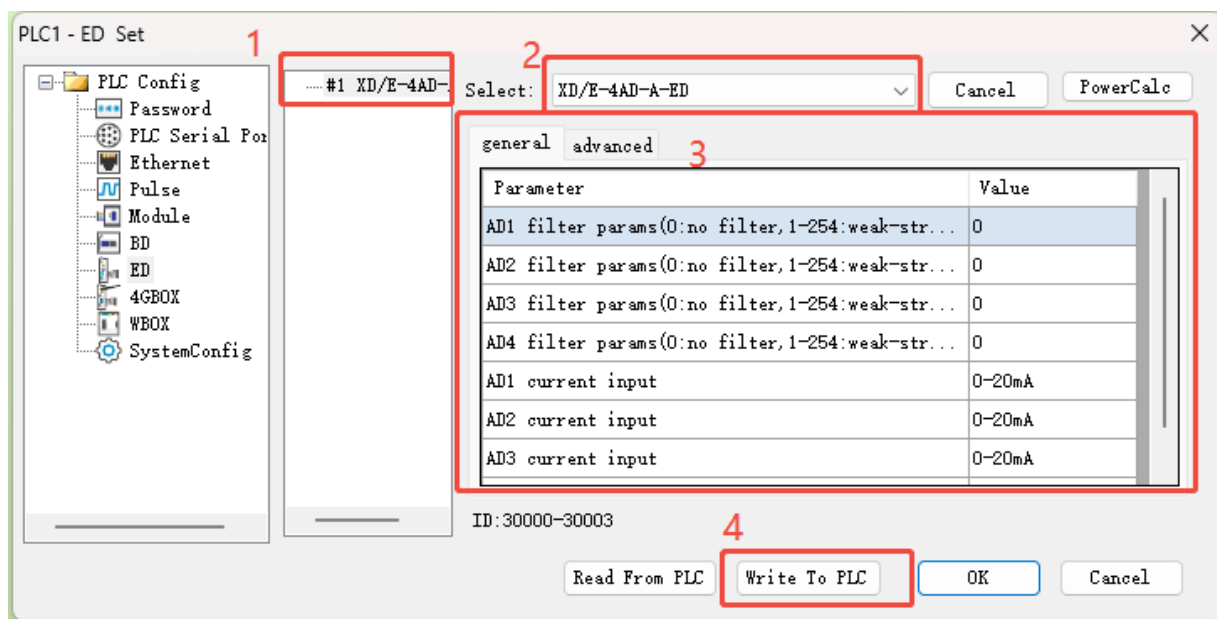
- Confirm the specifications and select the appropriate module.
- When performing screw hole machining and wiring, prevent chips and wire debris from entering the module.
- Before connecting, verify the module and connected device specifications again to ensure there are no issues.
- When connecting cables, ensure they are securely fastened. Loose connections may cause data errors or short circuits.
- Installation and wiring operations must be performed only after all power sources have been disconnected.

## 1-6. Configuration in Programming Software

To use the module, you must first configure it in the PLC's host computer programming software. Taking the XL-4AD-A-ED module as an example, here's how to configure it in the editing software: Open the Xinye PLC programming software, then click on the 'ED Module' under 'PLC Configuration' in the left-side engineering panel.



The following configuration panel appears. Select the corresponding module model and configuration information:



Step 1: Select the corresponding ED module model at the '2' location in the diagram.

Step 2: After completing the first step, the corresponding model will appear at '1'.

Step 3: At option '3', you can select the filter coefficient for the AD module and the input mode corresponding to the AD channel.

Step 4: After completing the configuration, press '4' to write to the PLC. Then power off and power on the PLC again. The configuration will take effect.

## 2. Analog Input Module XL-4AD-A-ED

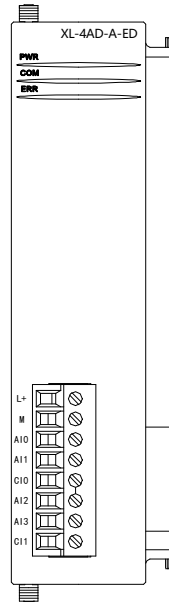
This chapter mainly introduces the specification of XL-4AD-A-ED module, terminal description, input definition number assignment, working mode setting, external connection, analog to digital conversion diagram and related programming examples.

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|                                                 |    |
|-------------------------------------------------|----|
| 2. Analog Input Module XL-4AD-A-ED .....        | 8  |
| 2-1. Module Features and Specifications .....   | 9  |
| 2-1-1. Module Features .....                    | 9  |
| 2-1-2. Module Specifications .....              | 9  |
| 2-2. Terminal Description .....                 | 10 |
| 2-2-1. Terminal Arrangement .....               | 10 |
| 2-2-2. Terminal Signal .....                    | 10 |
| 2-2-3. Connector Specifications .....           | 10 |
| 2-3. Input definition number allocation .....   | 10 |
| 2-4. Work Mode Settings .....                   | 11 |
| 2-4-1. Configure the panel .....                | 11 |
| 2-4-2. Flash register settings .....            | 12 |
| 2-5. External Connections .....                 | 13 |
| 2-5-1. Single-ended Current Input .....         | 13 |
| 2-6. Analog-to-Digital Conversion Diagram ..... | 14 |
| 2-7. Programming Examples .....                 | 14 |

## 2-1. Module Features and Specifications

The XL-4AD-A-ED analog input ED module converts four analog signals into digital values, transmits them to the PLC main unit, and enables real-time data exchange with it.



### 2-1-1. Module Features

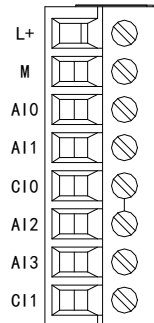
- 4-channel analog input: current input mode.
- 12-bit high precision analog input.
- As a left expansion ED module for the XL series, it can connect up to one module on the left side of the PLC main unit.

### 2-1-2. Module Specifications

| project                | Analog current input (mA) |
|------------------------|---------------------------|
| analog input range     | 0~20mA, 4~20mA            |
| maximum input range    | 0~30mA                    |
| digital output range   | 0~4095                    |
| resolution ratio       | 1/4095(12Bit)             |
| comprehensive accuracy | ±1%                       |
| conversion rate        | 10ms (all channels)       |
| module power supply    | DC24V±10%, 150mA          |

## 2-2. Terminal Description

### 2-2-1. Terminal Arrangement



### 2-2-2. Terminal Signal

| name                         |     | function                                                                    |
|------------------------------|-----|-----------------------------------------------------------------------------|
| terminals for power supplies | L+  | The external power supply provides 24V positive voltage to the ED module.   |
|                              | M   | The external power supply provides a 24V negative voltage to the ED module. |
| CH1、CH2                      | AI0 | Input terminal for current acquisition in the first AD analog channel       |
|                              | AI1 | Input terminal for analog current acquisition of the second AD channel      |
|                              | CI0 | AI0, AI1 input location                                                     |
| CH3、CH4                      | AI2 | Input terminal for AD analog current acquisition on the 3rd channel         |
|                              | AI3 | Input terminal for AD analog current acquisition on channel 4               |
|                              | CI1 | AI2, AI3 input location                                                     |

### 2-2-3. Connector Specifications

When wiring the module, its connectors must meet the following requirements:

- (1) The length of the stripping is 9mm;
- (2) Flexible conductors with tubular bare ends, 0.25-1.5mm<sup>2</sup>;
- (3) Flexible conductors with tubular pre-insulated ends, 0.25-0.5mm<sup>2</sup>.

## 2-3. Input definition number allocation

The XL series analog ED module operates without requiring I/O units, with converted values directly written to PLC registers. The register definitions for each channel are as follows:

| channel | AD signal |
|---------|-----------|
| 0CH     | ID30000   |
| 1CH     | ID30001   |
| 2CH     | ID30002   |
| 3CH     | ID30003   |

## 2-4. Work Mode Settings

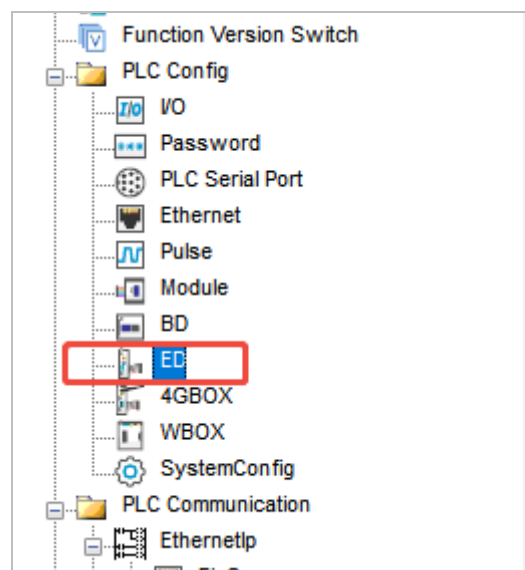
You can set the work mode in two ways (both methods are equivalent):

- 1) Configure through the Control Panel
- 2) Through Flash register settings

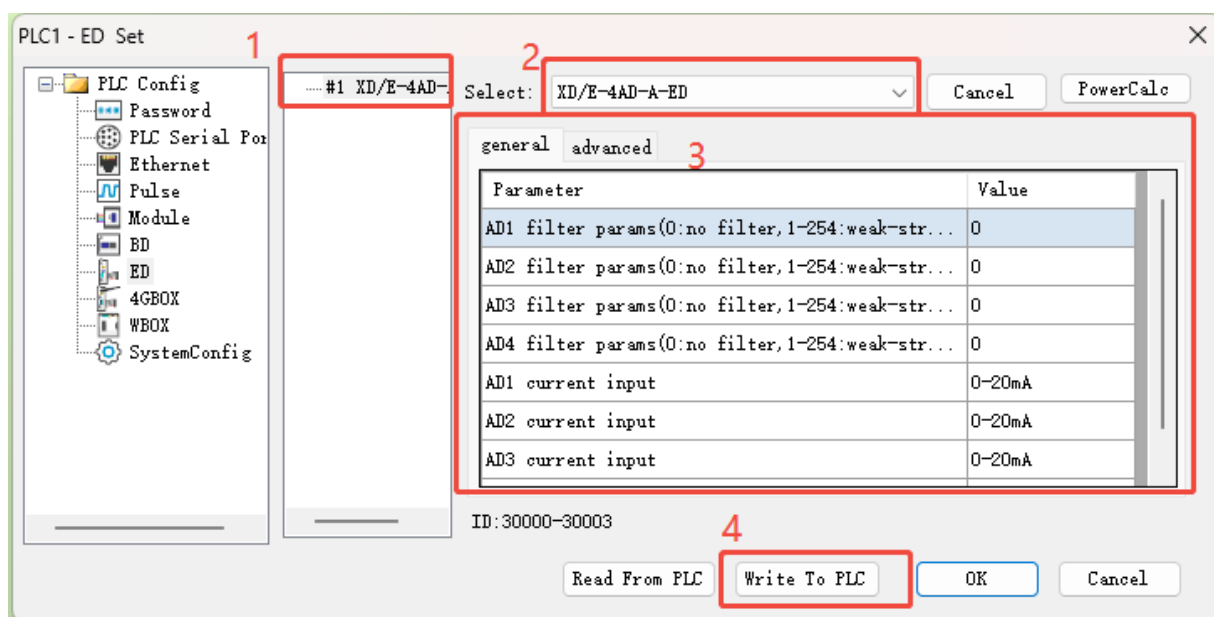
### 2-4-1. Configure the panel

**Use Xinje PLC programming software version 3.5.1 or later to configure the module.**

Open the programming software and click on the "ED Module" under "PLC Configuration" in the left engineering bar.



The following configuration panel appears. Select the corresponding module model and configuration information:



Step 1: Select the corresponding ED module model at the '2' position in the diagram.

Step 2: After completing Step 1, the corresponding model will appear at "1".

Step 3: At option 3, you can select the filter coefficient of the analog-to-digital (AD) converter and the current input mode for the corresponding AD channel.

Step 4: After completing the configuration, press '4' to program the PLC. Then power off and power on the PLC again. The configuration will take effect.

Note: The first-order low-pass filter method combines the current sampling value with the previous filtered output value to produce the effective filtered value. The filter coefficient, set by the user, ranges from 0 to 254. Higher values provide greater stability but may cause data lag. Therefore, setting it to 254 yields the strongest filtering effect and most stable data, while setting it to 1 results in the weakest filtering effect. The default value is 0 (no filtering).

## 2-4-2. Flash register settings

The extended ED module input channel operates in current mode, with selectable current ranges of 0~20mA or 4~20mA, configurable via the PLC's dedicated FLASH data register SFD as shown below.

| ED module ID | configuration information address |
|--------------|-----------------------------------|
| #1           | SFD530~SFD539                     |

### SFD Bit Definition

The bit definitions of the SFD register are shown in the table below:

| register address |       | Bit7                            | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 | explain                  |
|------------------|-------|---------------------------------|------|------|------|------|------|------|------|--------------------------|
| SFD530           | Byte0 | AD channel 1 filter coefficient |      |      |      |      |      |      |      | AD filter<br>coefficient |
|                  | Byte1 | AD channel 2 filter coefficient |      |      |      |      |      |      |      |                          |
| SFD531           | Byte2 | AD Channel 3 Filter Coefficient |      |      |      |      |      |      |      |                          |
|                  | Byte3 | AD Channel 4 Filter Coefficient |      |      |      |      |      |      |      |                          |
| SFD532           | Byte4 | AD2                             |      |      |      | AD1  |      |      |      | Selects the              |

| register address  |                  | Bit7             | Bit6             | Bit5             | Bit4                 | Bit3             | Bit2             | Bit1             | Bit0                 | explain                        |
|-------------------|------------------|------------------|------------------|------------------|----------------------|------------------|------------------|------------------|----------------------|--------------------------------|
|                   |                  | continue to have | continue to have | continue to have | 0:0~20mA<br>1:4~20mA | continue to have | continue to have | continue to have | 0:0~20mA<br>1:4~20mA | input range for the AD channel |
|                   | Byte5            | AD4              |                  |                  |                      | AD3              |                  |                  |                      |                                |
|                   |                  | continue to have | continue to have | continue to have | 0:0~20mA<br>1:4~20mA | continue to have | continue to have | continue to have | 0:0~20mA<br>1:4~20mA |                                |
| SFD533~<br>SFD539 | Byte6~<br>Byte19 | continue to have |                  |                  |                      |                  |                  |                  |                      |                                |

Example: To configure the ED module's input channels (3rd, 2nd, 1st, and 0th) with operational modes of 0-20mA, 4-20mA, 4-20mA, and 0-20mA respectively, set the filtering coefficients to 254 for channels 1 and 2, and 100 for channels 3 and 4.

Method 1:

You can configure it directly on the configuration panel, as shown above.

Method 2:

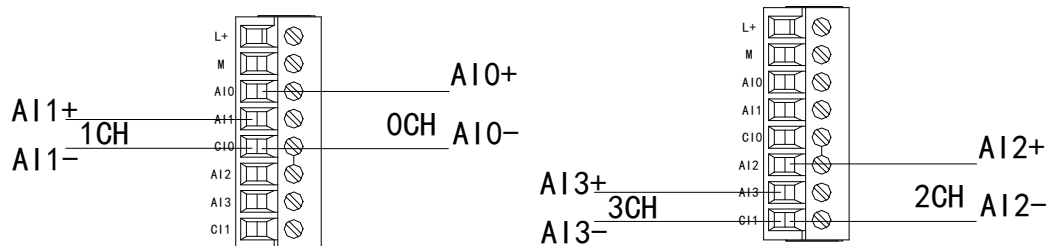
Set the SFD special register directly to the following value:

SFD530=FEFEH    SFD531=6464H    SFD532=0110H

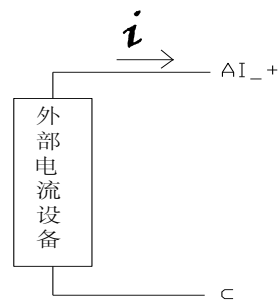
## 2-5. External Connections

When connecting externally, use shielded cables and ground the shield at a single point to avoid interference.

### 2-5-1. Single-ended Current Input

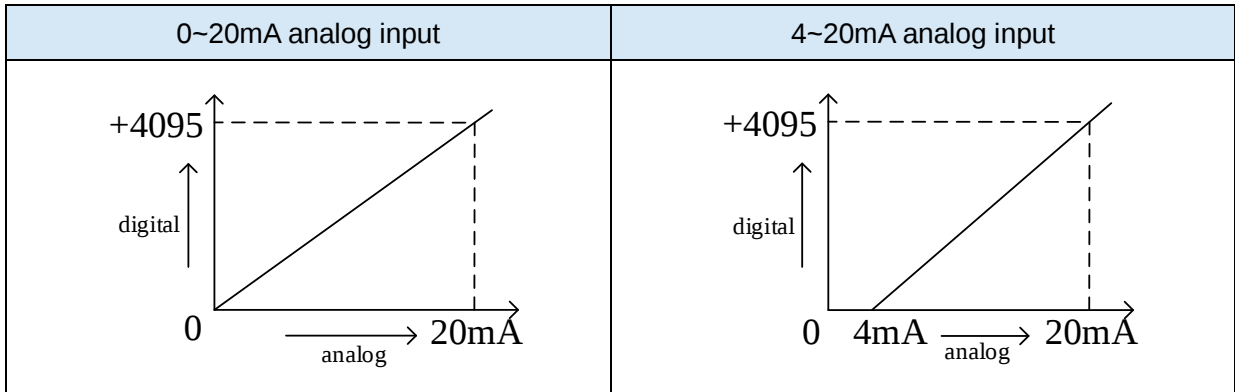


The wiring for the XL-4AD-A-ED current input side is shown in the figure below.



# 2-6. Analog-to-Digital Conversion Diagram

The relationship between input analog signals and converted digital values is shown in the table below:

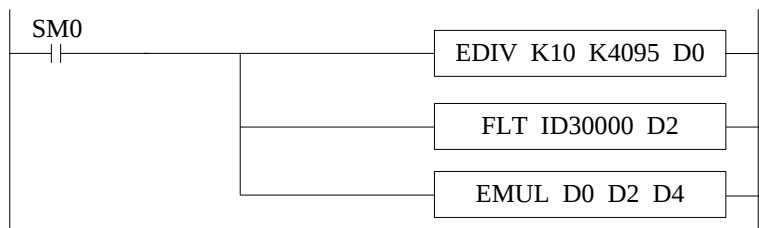


# 2-7. Programming Examples

Example: A pressure sensor with output signal acquisition is required (performance parameters: detection pressure range 0Mp~10Mp, analog output signal 4~20mA).

Analysis: Given that the pressure sensor's detection range spans 0Mp to 10Mp, producing an analog output of 4~20mA, the expansion module converts this to a digital range of 0~4095 through analog-to-digital conversion. This eliminates the need for intermediate conversion of the 4~20mA analog signal, allowing direct mapping between the pressure detection range (0Mp~10Mp) and the digital range (0~4095). The expansion module's digital-to-pressure conversion factor ( $10\text{Mp}/4095 = 0.002442$ ) determines the pressure value corresponding to each digit in the collected digital value. Thus, multiplying the real-time pressure reading from the expansion module's ID register by 0.002442 yields the current pressure reading. For instance, a digital value of 1023 in the ID register corresponds to a pressure of 2.5Mp.

**The procedure is as follows:**



Note: Use floating-point operations for calculations. Otherwise, the accuracy may be affected or the calculation may fail.

## **Explain:**

The SM0 is a normally ON coil that remains active throughout the PLC's operation.

When the PLC starts, the analog signal acquisition first calculates the pressure value corresponding to each digit 1 in the digital values collected by the expansion module. Then, it converts the integer values from the ID30000 register into floating-point numbers. Thus, the

real-time pressure value can be obtained by multiplying the real-time value in the ID30000 register by the pressure value corresponding to each digit 1 in the expansion module's digital values.

## 3. Analog Input Module XL-4AD-V-ED

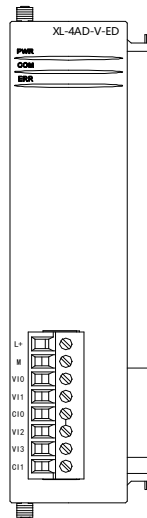
This chapter mainly introduces the specification of XL-4AD-V-ED module, terminal description, input definition number assignment, working mode setting, external connection, analog to digital conversion diagram and related programming examples.

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|                                                 |    |
|-------------------------------------------------|----|
| 3. Analog Input Module XL-4AD-V-ED .....        | 16 |
| 3-1. Module Features and Specifications .....   | 17 |
| 3-1-1. Module Features.....                     | 17 |
| 3-1-2. Module Specifications.....               | 17 |
| 3-2. Terminal Description .....                 | 18 |
| 3-2-1. Terminal Arrangement .....               | 18 |
| 3-2-2. Terminal Signal .....                    | 18 |
| 3-2-3. Connector Specifications.....            | 18 |
| 3-3. Input definition number assignment .....   | 19 |
| 3-4. Work Mode Settings .....                   | 19 |
| 3-4-1. Configure the panel .....                | 19 |
| 3-4-2. Flash register settings .....            | 20 |
| 3-5. External Connections .....                 | 21 |
| 3-5-1. Single-ended voltage input.....          | 21 |
| 3-6. Analog-to-Digital Conversion Diagram ..... | 22 |
| 3-7. Programming Examples .....                 | 22 |

## 3-1. Module Features and Specifications

The XL-4AD-V-ED analog input ED module converts four analog signals into digital values, transmits them to the PLC main unit, and enables real-time data exchange with it.



### 3-1-1. Module Features

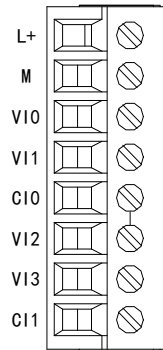
- 4-channel analog input: voltage input mode.
- 12-bit high precision analog input.
- As a left expansion ED module for the XL series, it can connect up to one module on the left side of the PLC main unit.

### 3-1-2. Module Specifications

| project                | Analog current input (V) |
|------------------------|--------------------------|
| analog input range     | 0~5V,0~10V               |
| maximum input range    | -0.5~15V                 |
| digital output range   | 0~4095                   |
| resolution ratio       | 1/4095 (12Bit)           |
| comprehensive accuracy | ±1%                      |
| conversion rate        | 10ms (all channels)      |
| module power supply    | DC24V±10%, 150mA         |

## 3-2. Terminal Description

### 3-2-1. Terminal Arrangement



### 3-2-2. Terminal Signal

| name                         |     | function                                                                                                 |
|------------------------------|-----|----------------------------------------------------------------------------------------------------------|
| terminals for power supplies | L+  | The external power supply provides 24V positive voltage to the ED module.                                |
|                              | M   | The external power supply provides a 24V negative voltage to the ED module.                              |
| CH1,CH2                      | VI0 | Input terminal for voltage acquisition of the first AD analog channel                                    |
|                              | VI1 | Input terminal for voltage acquisition of the second analog signal in the AD (Analog-to-Digital) circuit |
|                              | CI0 | VI0, VI1 input ground                                                                                    |
| CH3,CH4                      | VI2 | The third AD analog voltage acquisition input terminal                                                   |
|                              | VI3 | The 4th AD analog voltage acquisition input terminal                                                     |
|                              | CI1 | VI2, VI3 input locations                                                                                 |

### 3-2-3. Connector Specifications

When wiring the module, its connectors must meet the following requirements:

- (1) The length of the stripping is 9mm;
- (2) Flexible conductors with tubular bare ends, 0.25-1.5mm<sup>2</sup>;
- (3) Flexible conductors with tubular pre-insulated ends, 0.25-0.5mm<sup>2</sup>.

### 3-3. Input definition number assignment

The XL series analog ED module operates without requiring I/O units, with converted values directly written to PLC registers. The register definitions for each channel are as follows:

| channel | AD signal |
|---------|-----------|
| 0CH     | ID30000   |
| 1CH     | ID30001   |
| 2CH     | ID30002   |
| 3CH     | ID30003   |

### 3-4. Work Mode Settings

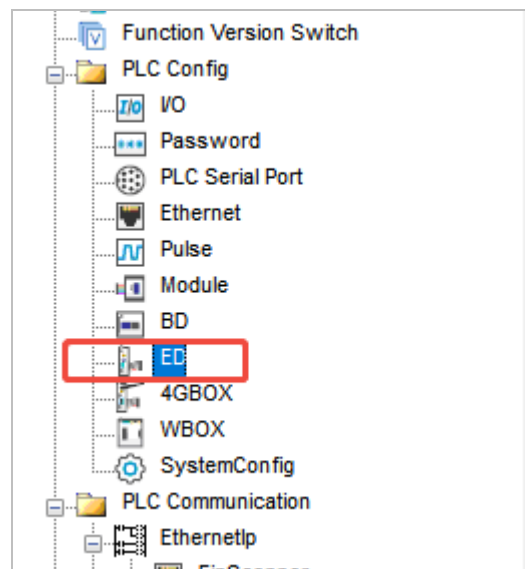
You can set the work mode in two ways (both methods are equivalent):

- 1) Configure through the Control Panel
- 2) Through Flash register settings

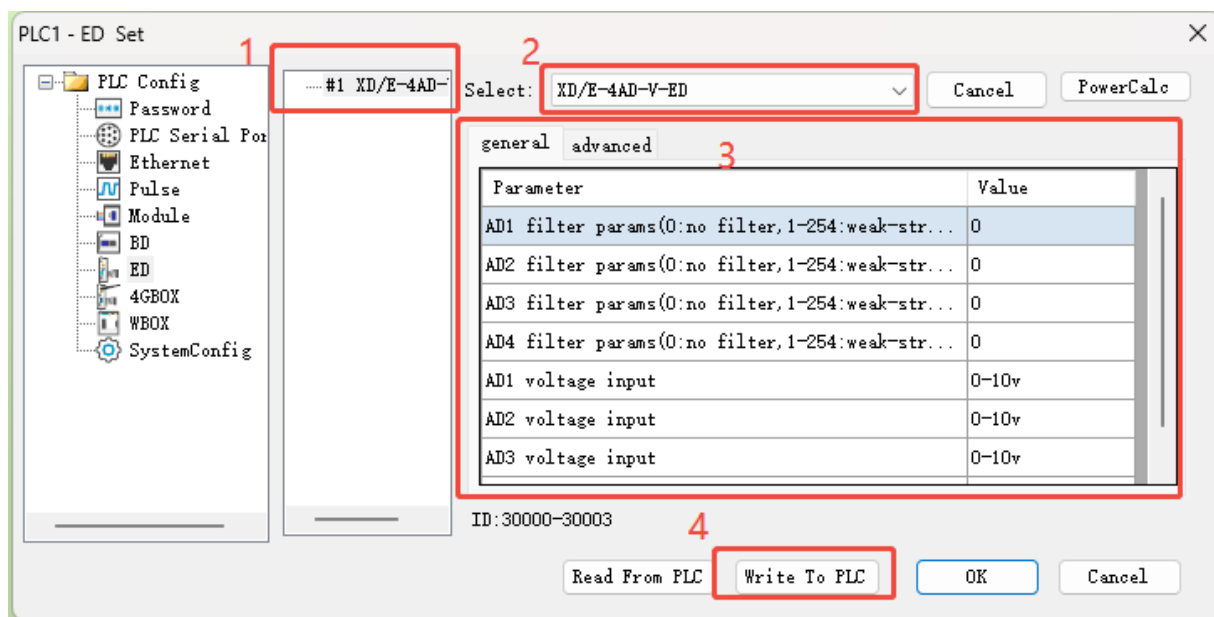
#### 3-4-1. Configure the panel

**Use Xinje PLC programming software version 3.5.1 or later to configure the module.**

Open the programming software and click on the "ED Module" under "PLC Configuration" in the left engineering bar.



The following configuration panel appears. Select the corresponding module model and configuration information:



Step 1: Select the corresponding ED module model at the '2' position in the diagram.

Step 2: After completing Step 1, the corresponding model will appear at "1".

Step 3: At option 3, you can select the filter coefficient of the analog-to-digital (AD) converter and the voltage input mode for the corresponding AD channel.

Step 4: After completing the configuration, press '4' to program the PLC. Then power off and power on the PLC again. The configuration will take effect.

Note: The first-order low-pass filter method combines the current sampling value with the previous filtered output value to produce the effective filtered value. The filter coefficient, set by the user, ranges from 0 to 254. Higher values provide greater stability but may cause data lag. Therefore, setting it to 254 yields the strongest filtering effect and most stable data, while setting it to 1 results in the weakest filtering effect. The default value is 0 (no filtering).

### 3-4-2. Flash register settings

The ED module's input channel is configured for voltage mode, with selectable voltage ranges of 0~5V or 0~10V, which are set via the PLC's internal FLASH data register SFD as shown below.

| ED module ID | configuration information address |
|--------------|-----------------------------------|
| #1           | SFD530~SFD539                     |

#### SFD Bit Definition

The bit definitions of the SFD register are shown in the table below:

| register address |       | Bit7                            | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 | explain               |
|------------------|-------|---------------------------------|------|------|------|------|------|------|------|-----------------------|
| SFD530           | Byte0 | AD channel 1 filter coefficient |      |      |      |      |      |      |      | AD filter coefficient |
|                  | Byte1 | AD channel 2 filter coefficient |      |      |      |      |      |      |      |                       |
| SFD531           | Byte2 | AD Channel 3 Filter Coefficient |      |      |      |      |      |      |      |                       |
|                  | Byte3 | AD Channel 4 Filter Coefficient |      |      |      |      |      |      |      |                       |
| SFD532           | Byte4 | AD2                             |      |      |      | AD1  |      |      |      |                       |

| register address |              | Bit7             | Bit6             | Bit5             | Bit4              | Bit3             | Bit2             | Bit1             | Bit0              | explain                                                |
|------------------|--------------|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|-------------------|--------------------------------------------------------|
|                  |              | continue to have | continue to have | continue to have | 0:0~10V<br>1:0~5V | continue to have | continue to have | continue to have | 0:0~10V<br>1:0~5V | Specifies the input range selection for the AD channel |
|                  | Byte5        | AD4              |                  |                  |                   | AD3              |                  |                  |                   |                                                        |
|                  |              | continue to have | continue to have | continue to have | 0:0~10V<br>1:0~5V | continue to have | continue to have | continue to have | 0:0~10V<br>1:0~5V |                                                        |
| SFD533~SFD539    | Byte6~Byte19 | continue to have |                  |                  |                   |                  |                  |                  |                   |                                                        |

Example: To configure the ED module's input channels (3rd, 2nd, 1st, and 0th) with operational modes of 0-10V,0-5V,0-5V, and 0-10V respectively, set the filtering coefficients to 254 for channels 1 and 2, and 100 for channels 3 and 4.

Method 1:

You can configure it directly on the configuration panel, as shown above.

Method 2:

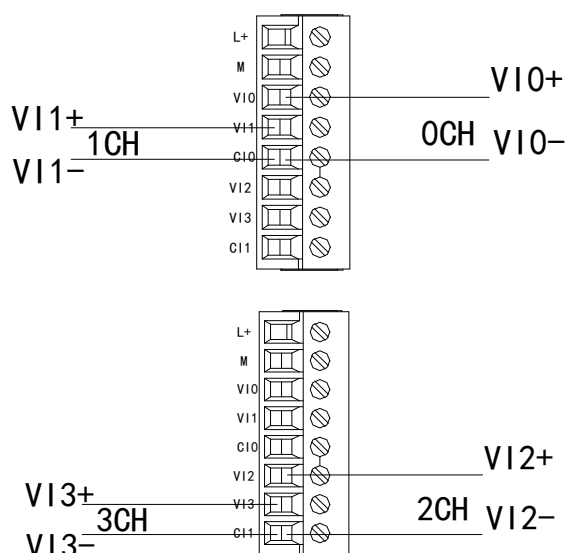
Set the SFD special register directly to the following value:

SFD530=FEFEH    SFD531=6464H    SFD532=0110H

## 3-5. External Connections

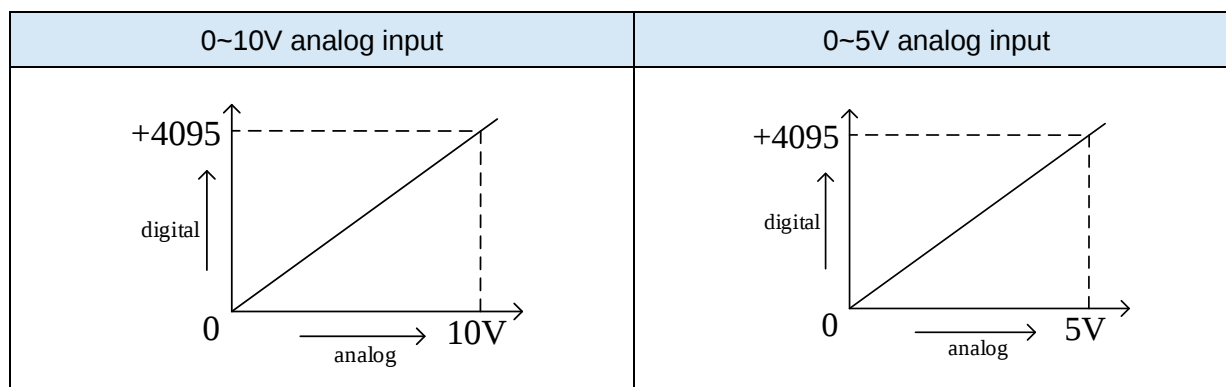
When connecting externally, use shielded cables and ground the shield at a single point to avoid interference.

### 3-5-1. Single-ended voltage input



### 3-6. Analog-to-Digital Conversion Diagram

The relationship between input analog signals and converted digital values is shown in the table below:

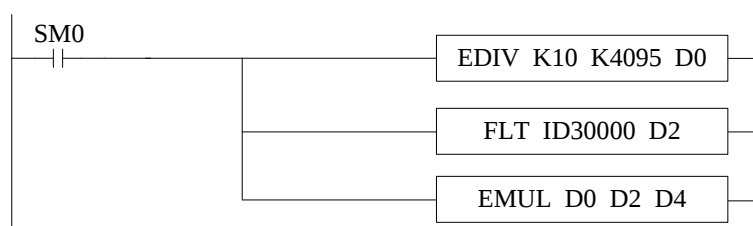


### 3-7. Programming Examples

Example: A pressure sensor with output signal acquisition is required (performance parameters: detection pressure range 0Mp~10Mp, analog output signal 0~10V).

Analysis: Given that the pressure sensor's detection range spans 0Mp to 10Mp, generating an analog output of 0~10V, the expansion module converts this to a digital range of 0~4095 through analog-to-digital conversion. This eliminates the need for intermediate conversion of the 0~10V analog signal, directly mapping the pressure range (0Mp~10Mp) to the digital range (0~4095). The ratio  $10\text{Mp}/4095$  equals 0.002442, representing the pressure value corresponding to each digit 1 in the digital output collected by the expansion module. Thus, multiplying the real-time value stored in the expansion module's ID register by 0.002442 yields the current pressure reading. For instance, a digital value of 1023 in the ID register corresponds to a pressure of 2.5Mp.

**The procedure is as follows:**



Note: Use floating-point operations for calculations. Otherwise, the accuracy may be affected or the calculation may fail.

**Explain:**

The SM0 is a normally ON coil that remains active throughout the PLC's operation.

When the PLC starts, the analog signal acquisition first calculates the pressure value corresponding to each digit 1 in the digital values collected by the expansion module. Then, it

converts the integer values from the ID30000 register into floating-point numbers. Thus, the real-time pressure value can be obtained by multiplying the real-time value in the ID30000 register by the pressure value corresponding to each digit 1 in the expansion module's digital values.

## 4. Analog Output Module XL-4DA-A-ED

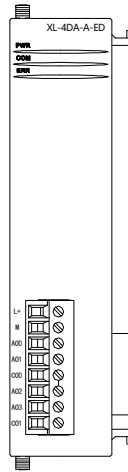
This chapter mainly introduces the specification of XL-4DA-A-ED module, terminal description, output definition number assignment, working mode setting, external connection, analog to digital conversion diagram and related programming examples.

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|                                               |    |
|-----------------------------------------------|----|
| 4. Analog Output Module XL-4DA-A-ED .....     | 24 |
| 4-1. Module Features and Specifications ..... | 25 |
| 4-1-1. Module Features.....                   | 25 |
| 4-1-2. Module Specifications.....             | 25 |
| 4-2. Terminal Description .....               | 26 |
| 4-2-1. Terminal Arrangement .....             | 26 |
| 4-2-2. Terminal Signal .....                  | 26 |
| 4-2-3. Connector Specifications.....          | 26 |
| 4-3. Output definition number allocation..... | 27 |
| 4-4. Work Mode Settings .....                 | 27 |
| 4-4-1. Configure the panel .....              | 27 |
| 4-4-2. Flash register settings .....          | 28 |
| 4-5. External Connections .....               | 29 |
| 4-5-1. Single-ended current output .....      | 29 |
| 4-6. Module Conversion Chart.....             | 29 |
| 4-7. Programming Examples .....               | 30 |

## 4-1. Module Features and Specifications

The XL-4DA-A-ED analog output module converts four digital signals into analog signals.



### 4-1-1. Module Features

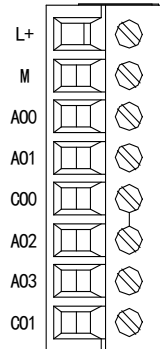
- 4-channel analog output: current mode.
- 10-bit high precision analog output.
- As a left expansion ED module for the XL series, it can connect up to one module on the left side of the PLC main unit.

### 4-1-2. Module Specifications

| project                | Analog current output (mA)                      |
|------------------------|-------------------------------------------------|
| analog output range    | 0~20mA, 4~20mA (external load resistance <500Ω) |
| Digital input range    | 0~1023                                          |
| resolution ratio       | 1/1023 (10Bit)                                  |
| comprehensive accuracy | ±1%                                             |
| conversion rate        | 10ms (all channels)                             |
| module power supply    | DC24V±10%, 150mA                                |

## 4-2. Terminal Description

### 4-2-1. Terminal Arrangement



### 4-2-2. Terminal Signal

| name                         |     | function                                                                    |
|------------------------------|-----|-----------------------------------------------------------------------------|
| terminals for power supplies | L+  | The external power supply provides 24V positive voltage to the ED module.   |
|                              | M   | The external power supply provides a 24V negative voltage to the ED module. |
| CH1,CH2                      | AO0 | Terminal 1 of the AD analog current output                                  |
|                              | AO1 | The second AD analog current output terminal                                |
|                              | CO0 | AO0, AO1 output locations                                                   |
| CH3,CH4                      | AO2 | Terminal 3 of the AD analog current output                                  |
|                              | AO3 | The 4th AD analog current output terminal                                   |
|                              | CO1 | AO2, AO3 output locations                                                   |

### 4-2-3. Connector Specifications

When wiring the module, its connectors must meet the following requirements:

- (1) The length of the stripping is 9mm;
- (2) Flexible conductors with tubular bare ends, 0.25-1.5mm<sup>2</sup>;
- (3) Flexible conductors with tubular pre-insulated ends, 0.25-0.5mm<sup>2</sup>.

### 4-3. Output definition number allocation

The XL series analog ED module operates without requiring I/O units, with converted values directly written to PLC registers. The register definitions for each channel are as follows:

| channel | DA signal |
|---------|-----------|
| 0CH     | QD30000   |
| 1CH     | QD30001   |
| 2CH     | QD30002   |
| 3CH     | QD30003   |

### 4-4. Work Mode Settings

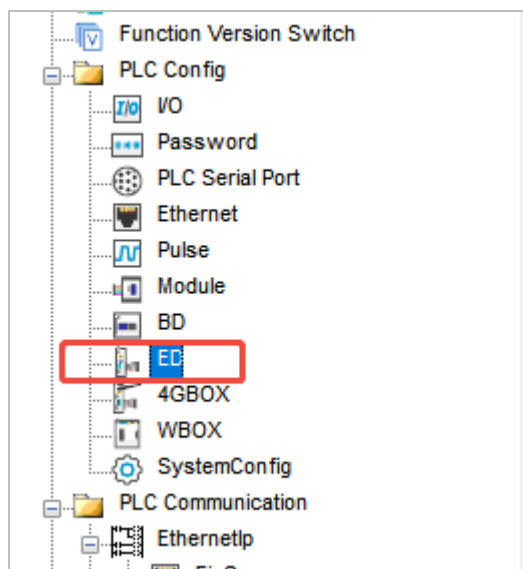
You can set the work mode in two ways (both methods are equivalent):

- 1) Configure through the Control Panel
- 2) Through Flash register settings

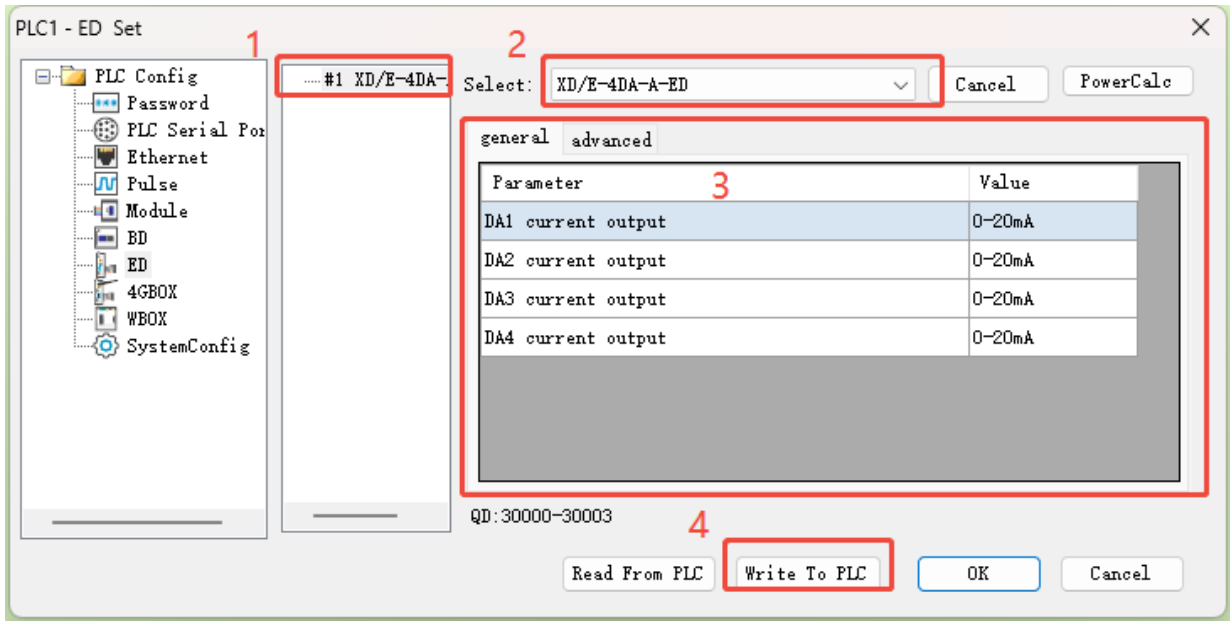
#### 4-4-1. Configure the panel

**Use Xinje PLC programming software version 3.5.1 or later to configure the module.**

Open the programming software and click on the "ED Module" under "PLC Configuration" in the left engineering bar.



The following configuration panel appears. Select the corresponding module model and configuration information:



Step 1: Select the corresponding ED module model at the '2' position in the diagram.

Step 2: After completing Step 1, the corresponding model will appear at "1".

Step 3: Select the current output mode for the DA channel at position 3.

Step 4: After completing the configuration, press '4' to program the PLC. Then power off and power on the PLC again. The configuration will take effect.

Note: The first-order low-pass filter method combines the current sampling value with the previous filtered output value to produce the effective filtered value. The filter coefficient, set by the user, ranges from 0 to 254. Higher values provide greater stability but may cause data lag. Therefore, setting it to 254 yields the strongest filtering effect and most stable data, while setting it to 1 results in the weakest filtering effect. The default value is 0 (no filtering).

### 4-4-2. Flash register settings

The extended ED module output channel supports current output with selectable ranges of 0~20mA or 4~20mA, configurable via the PLC's dedicated FLASH data register SFD as shown below.

| ED module ID | configuration information address |
|--------------|-----------------------------------|
| #1           | SFD530~SFD539                     |

SFD Bit Definition

| register address |       | Bit7             | Bit6             | Bit5             | Bit4                 | Bit3             | Bit2             | Bit1             | Bit0                 | explain                |
|------------------|-------|------------------|------------------|------------------|----------------------|------------------|------------------|------------------|----------------------|------------------------|
| SFD530           | Byte0 | continue to have |                  |                  |                      |                  |                  |                  |                      |                        |
|                  | Byte1 | continue to have |                  |                  |                      |                  |                  |                  |                      |                        |
| SFD531           | Byte2 | continue to have |                  |                  |                      |                  |                  |                  |                      |                        |
|                  | Byte3 | continue to have |                  |                  |                      |                  |                  |                  |                      |                        |
| SFD532           | Byte4 | DA2              |                  |                  |                      | DA1              |                  |                  |                      | Used to specify the DA |
|                  |       | continue to have | continue to have | continue to have | 0:0~20mA<br>1:4~20mA | continue to have | continue to have | continue to have | 0:0~20mA<br>1:4~20mA |                        |

| register address  | Bit7             | Bit6             | Bit5             | Bit4             | Bit3                 | Bit2             | Bit1             | Bit0             | explain                                    |
|-------------------|------------------|------------------|------------------|------------------|----------------------|------------------|------------------|------------------|--------------------------------------------|
|                   |                  | DA4              |                  |                  |                      | DA3              |                  |                  |                                            |
|                   | Byte5            | continue to have | continue to have | continue to have | 0:0~20mA<br>1:4~20mA | continue to have | continue to have | continue to have | 0:0~20mA<br>1:4~20mA                       |
| SFD533~<br>SFD539 | Byte6~<br>Byte19 | continue to have |                  |                  |                      |                  |                  |                  | channel<br>Selection<br>of output<br>range |

For example, to configure the ED module's output channels 3, 2, 1, and 0 to operate in the following ranges: 0-20mA, 4-20mA, 4-20mA, and 0-20mA respectively.

Method 1:

You can configure it directly on the configuration panel, as shown above.

Method 2:

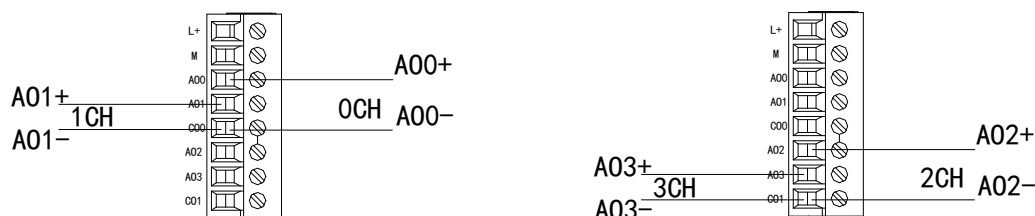
Set the SFD special register directly to the following value:

SFD530=0H SFD531=0H SFD532=0110H

## 4-5. External Connections

When connecting externally, use shielded cables and ground the shield at a single point to avoid interference.

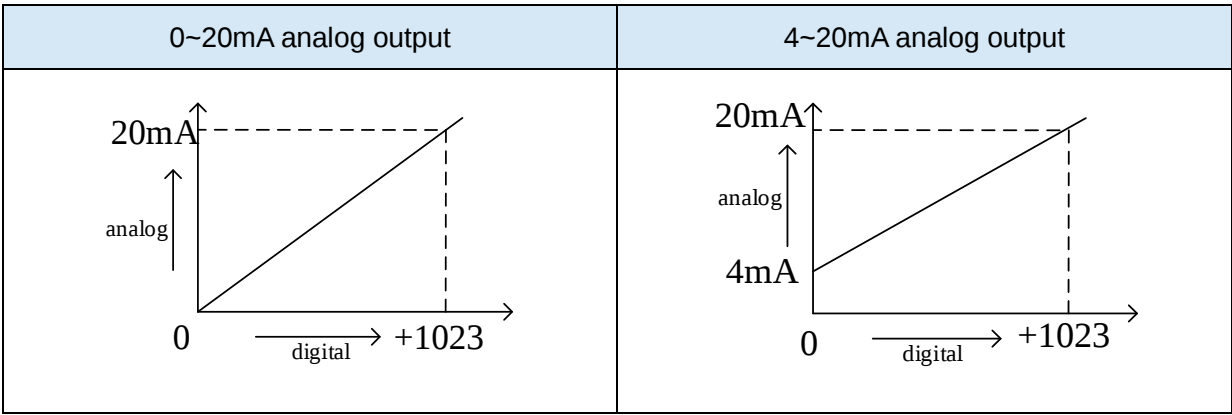
### 4-5-1. Single-ended current output



Note: The current output does not require a DC24V power supply in series!

## 4-6. Module Conversion Chart

The relationship between the output digital values and their corresponding analog data is shown in the table below:

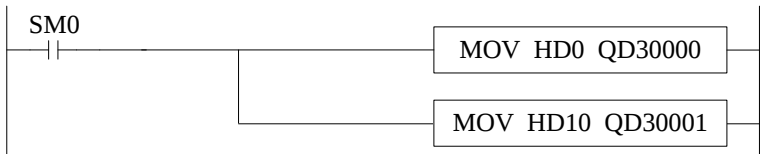


Note: When the input data exceeds 1023, the analog output of the D/A converter remains constant at 20mA.

### 4-7. Programming Examples

Example: Two 0~20mA current signals need to be output to the frequency converter.

**The procedure is as follows:**



**Explain:**

The SM0 is a normally ON coil that remains active throughout the PLC's operation.

The PLC starts up, transmitting the value from HD0 to QD30000 in real time to output the first analog current signal, while simultaneously sending the value from HD10 to QD30001 for the second analog current signal.

## 5. Analog Output Module XL-4DA-V-ED

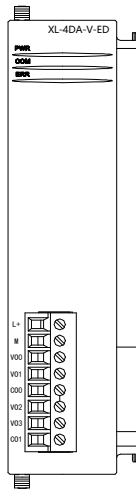
This chapter mainly introduces the specification of XL-4DA-V-ED module, terminal description, output definition number assignment, working mode setting, external connection, analog to digital conversion diagram and related programming examples.

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|                                               |    |
|-----------------------------------------------|----|
| 5. Analog Output Module XL-4DA-V-ED .....     | 31 |
| 5-1. Module Features and Specifications ..... | 32 |
| 5-1-1. Module Features.....                   | 32 |
| 5-1-2. Module Specifications.....             | 32 |
| 5-2. Terminal Description .....               | 33 |
| 5-2-1. Terminal Arrangement .....             | 33 |
| 5-2-2. Terminal Signals .....                 | 33 |
| 5-2-3. Connector Specifications.....          | 33 |
| 5-3. Output definition number allocation..... | 33 |
| 5-4. Work Mode Settings .....                 | 34 |
| 5-4-1. Configure the panel .....              | 34 |
| 5-4-2. Flash register settings .....          | 35 |
| 5-5. External Connections .....               | 36 |
| 5-5-1. Single-ended voltage output.....       | 36 |
| 5-6. Module Conversion Chart.....             | 36 |
| 5-7. Programming Examples .....               | 37 |

## 5-1. Module Features and Specifications

The XL-4DA-V-ED analog output module converts four digital signals into analog signals.



### 5-1-1. Module Features

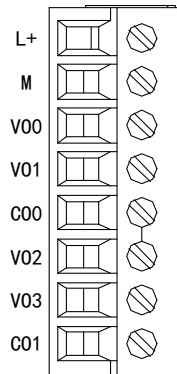
- 4-channel analog output: voltage mode.
- 10-bit high precision analog output.
- As a left expansion ED module for the XL series, it can connect up to one module on the left side of the PLC main unit.

### 5-1-2. Module Specifications

| project                | Analog voltage output (V)                          |
|------------------------|----------------------------------------------------|
| analog output range    | 0~5V,0~10V<br>External load resistance: 2KΩ to 1MΩ |
| Digital input range    | 0~1023                                             |
| resolution ratio       | 1/1023 (10Bit)                                     |
| comprehensive accuracy | ±1%                                                |
| conversion rate        | 10ms (all channels)                                |
| module power supply    | DC24V±10%, 150mA                                   |

## 5-2. Terminal Description

### 5-2-1. Terminal Arrangement



### 5-2-2. Terminal Signals

| name                         |     | function                                                                    |
|------------------------------|-----|-----------------------------------------------------------------------------|
| terminals for power supplies | L+  | The external power supply provides 24V positive voltage to the ED module.   |
|                              | M   | The external power supply provides a 24V negative voltage to the ED module. |
| CH1、CH2                      | VO0 | Terminal 1 of the DA analog voltage output                                  |
|                              | VO1 | The second DA analog voltage output terminal                                |
|                              | CO0 | VO0, VO1 output locations                                                   |
| CH3、CH4                      | VO2 | The third DA analog voltage output terminal                                 |
|                              | VO3 | The 4th DA analog voltage output terminal                                   |
|                              | CO1 | VO2 and VO3 output sites                                                    |

### 5-2-3. Connector Specifications

When wiring the module, its connectors must meet the following requirements:

- (1) The length of the stripping is 9mm;
- (2) Flexible conductors with tubular bare ends, 0.25-1.5mm<sup>2</sup>;
- (3) Flexible conductors with tubular pre-insulated ends, 0.25-0.5mm<sup>2</sup>.

## 5-3. Output definition number allocation

The XL series analog ED module operates without requiring I/O units, with converted values directly written to PLC registers. The register definitions for each channel are as follows:

| channel | DA signal |
|---------|-----------|
| 0CH     | QD30000   |
| 1CH     | QD30001   |
| 2CH     | QD30002   |
| 3CH     | QD30003   |

## 5-4. Work Mode Settings

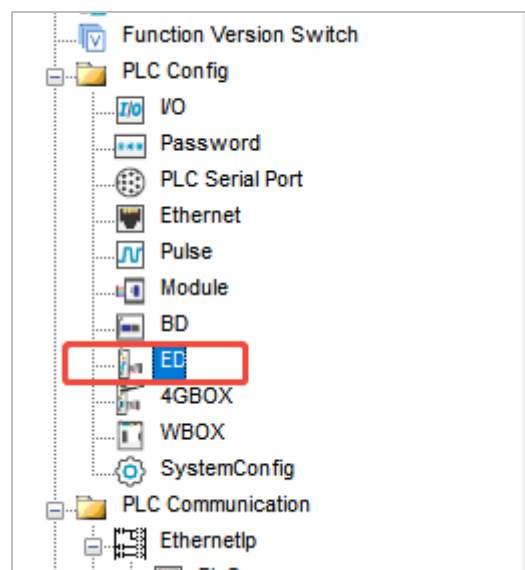
You can set the work mode in two ways (both methods are equivalent):

- 1) Configure through the Control Panel
- 2) Through Flash register settings

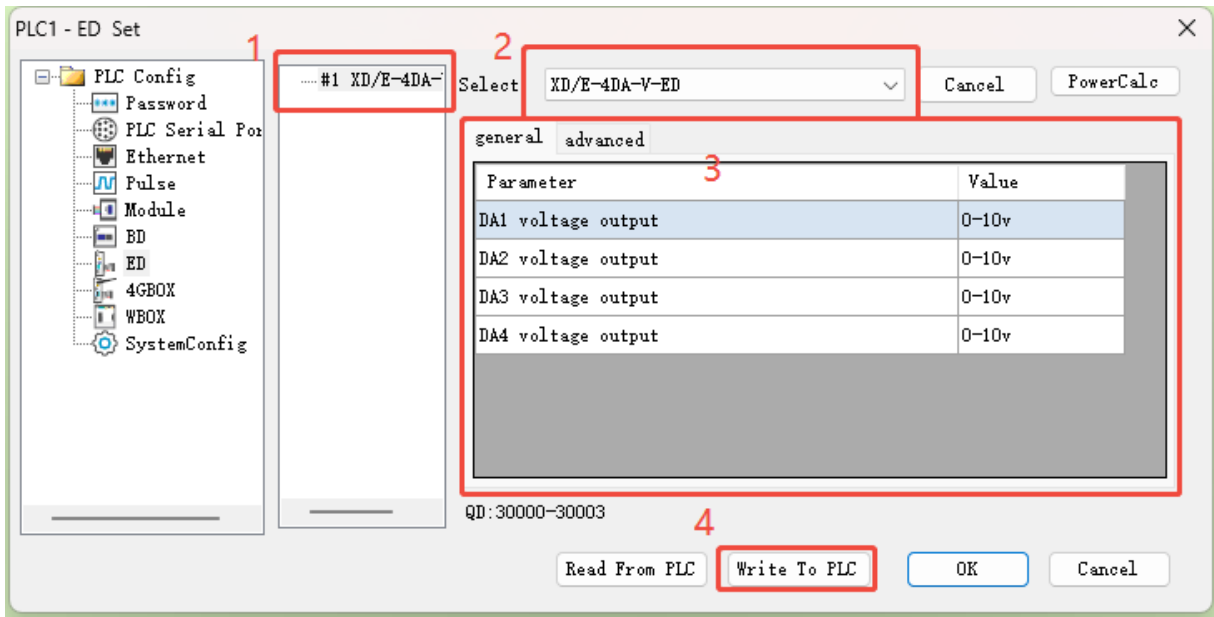
### 5-4-1. Configure the panel

**Use Xinje PLC programming software version 3.5.1 or later to configure the module.**

Open the programming software and click on the "ED Module" under "PLC Configuration" in the left engineering bar.



The following configuration panel appears. Select the corresponding module model and configuration information:



Step 1: Select the corresponding ED module model at the '2' position in the diagram.

Step 2: After completing Step 1, the corresponding model will appear at "1".

Step 3: Select the voltage output mode for the DA channel at position 3.

Step 4: After completing the configuration, press '4' to program the PLC. Then power off and power on the PLC again. The configuration will take effect.

Note: The first-order low-pass filter method combines the current sampling value with the previous filtered output value to produce the effective filtered value. The filter coefficient, set by the user, ranges from 0 to 254. Higher values provide greater stability but may cause data lag. Therefore, setting it to 254 yields the strongest filtering effect and most stable data, while setting it to 1 results in the weakest filtering effect. The default value is 0 (no filtering).

### 5-4-2. Flash register settings

The extended ED module output channels support voltage output with selectable ranges of 0~10V or 0~5V, configurable via the PLC's dedicated FLASH data register SFD as shown below.

| ED module ID | configuration information address |
|--------------|-----------------------------------|
| #1           | SFD530~SFD539                     |

SFD Bit Definition

| register address |       | Bit7             | Bit6             | Bit5             | Bit4              | Bit3             | Bit2             | Bit1             | Bit0              | explain                        |
|------------------|-------|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|-------------------|--------------------------------|
| SFD530           | Byte0 | continue to have |                  |                  |                   |                  |                  |                  |                   |                                |
|                  | Byte1 | continue to have |                  |                  |                   |                  |                  |                  |                   |                                |
| SFD531           | Byte2 | continue to have |                  |                  |                   |                  |                  |                  |                   |                                |
|                  | Byte3 | continue to have |                  |                  |                   |                  |                  |                  |                   |                                |
| SFD532           | Byte4 | DA2              |                  |                  |                   | DA1              |                  |                  |                   | Used to specify the DA channel |
|                  |       | continue to have | continue to have | continue to have | 0:0~10V<br>1:0~5V | continue to have | continue to have | continue to have | 0:0~10V<br>1:0~5V |                                |
|                  | Byte5 | DA4              |                  |                  |                   | DA3              |                  |                  |                   |                                |

| register address |              | Bit7             | Bit6             | Bit5             | Bit4              | Bit3             | Bit2             | Bit1             | Bit0              | explain                   |
|------------------|--------------|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|-------------------|---------------------------|
|                  |              | continue to have | continue to have | continue to have | 0:0~10V<br>1:0~5V | continue to have | continue to have | continue to have | 0:0~10V<br>1:0~5V | Selection of output range |
| SFD533~SFD539    | Byte6~Byte19 | continue to have |                  |                  |                   |                  |                  |                  |                   |                           |

For example, set the working modes of the ED module's output channels 3, 2, 1, and 0 to 0-10V,0-5V,0-5V, and 0-10V respectively.

Method 1:

You can configure it directly on the configuration panel, as shown above.

Method 2:

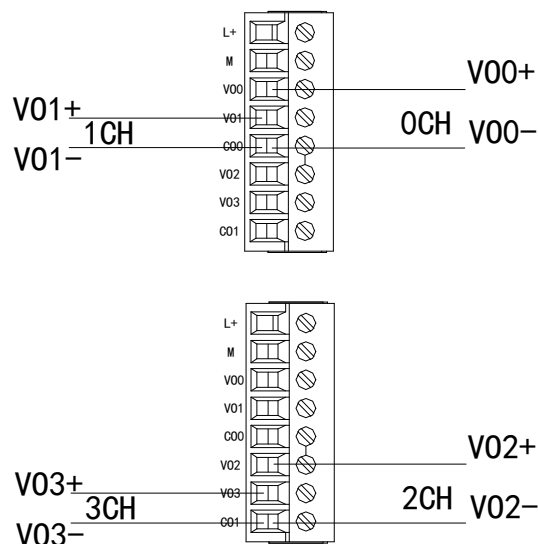
Set the SFD special register directly to the following value:

SFD530=0H SFD531=0H SFD532=0110H

## 5-5. External Connections

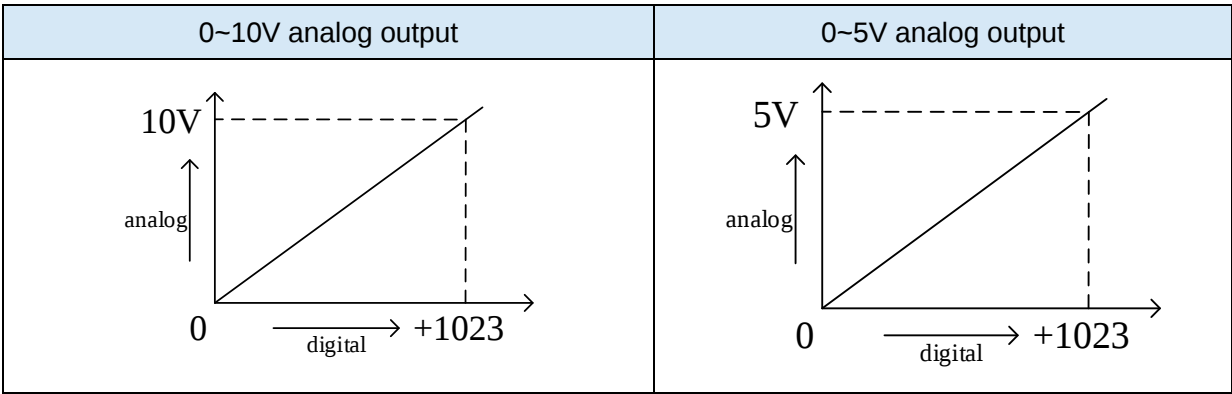
When connecting externally, use shielded cables and ground the shield at a single point to avoid interference.

### 5-5-1. Single-ended voltage output



## 5-6. Module Conversion Chart

The relationship between the output digital values and their corresponding analog data is shown in the table below:

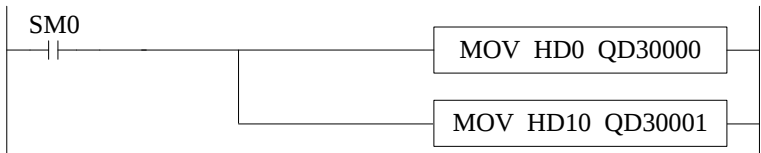


Note: When the input data exceeds 1023, the D/A converter's analog output will remain at 10V or 5V.

### 5-7. Programming Examples

Example: Two 0-10V voltage signals need to be sent to the inverter.

The procedure is as follows:



**Explain:**

The SM0 is a normally ON coil that remains active throughout the PLC's operation.

The PLC starts up, transmitting the value from HD0 to QD30000 in real time to output the first analog voltage signal, while simultaneously sending the value from HD10 to QD30001 to generate the second analog voltage signal.

## 6. Analog Input/Output Module XL-2AD2DA-A-ED

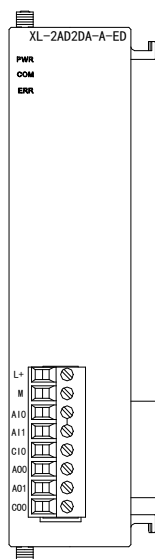
This chapter mainly introduces the specification of XL-2AD2DA-A-ED module, terminal description, input and output definition number assignment, working mode setting, external connection, analog to digital conversion diagram and related programming examples.

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|                                                         |    |
|---------------------------------------------------------|----|
| 6. Analog Input/Output Module XL-2AD2DA-A-ED .....      | 38 |
| 6-1. Module Features and Specifications .....           | 39 |
| 6-1-1. Module Features.....                             | 39 |
| 6-1-2. Module Specifications.....                       | 39 |
| 6-2. Terminal Description .....                         | 40 |
| 6-2-1. Terminal Arrangement .....                       | 40 |
| 6-2-2. Terminal Signals .....                           | 40 |
| 6-2-3. Connector Specifications.....                    | 40 |
| 6-3. Input and Output Definition Number Assignment..... | 40 |
| 6-4. Work Mode Settings .....                           | 41 |
| 6-4-1. Configure the panel .....                        | 41 |
| 6-4-2. Flash register settings .....                    | 42 |
| 6-5. External Connections .....                         | 43 |
| 6-5-1. Single-ended Current Input .....                 | 43 |
| 6-5-2. Single-ended Current Output .....                | 44 |
| 6-6. Analog-to-Digital Conversion Diagram.....          | 44 |
| 6-7. Programming Examples .....                         | 45 |

## 6-1. Module Features and Specifications

The XL-2AD2DA-A-ED analog input/output module converts two analog inputs into digital values and two digital inputs into analog values. It transmits these signals to the PLC main unit and enables real-time data exchange with it.



### 6-1-1. Module Features

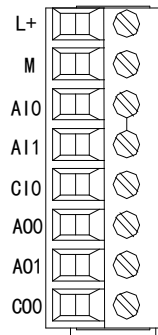
- 2-channel analog input: current input.
- 12-bit high precision analog input.
- 2-channel analog output: current output.
- 10-bit high precision analog output.
- As a left expansion ED module for the XL series, it can connect up to one module on the left side of the PLC main unit.

### 6-1-2. Module Specifications

| project                | Analog current input (mA) | Analog current output (mA)                         |
|------------------------|---------------------------|----------------------------------------------------|
| analog input range     | 0~20mA, 4~20mA            | —                                                  |
| maximum input range    | 0~30mA                    | —                                                  |
| analog output range    | —                         | 0~20mA, 4~20Ma<br>(external load resistance <500Ω) |
| Digital input range    | —                         | 0~1023                                             |
| digital output range   | 0~4095                    | -                                                  |
| resolution ratio       | 1/4095(12Bit)             | 1/1023(10Bit)                                      |
| comprehensive accuracy | ±1%                       |                                                    |
| conversion rate        | 10ms (all channels)       |                                                    |
| module power supply    | DC24V±10%,150mA           |                                                    |

## 6-2. Terminal Description

### 6-2-1. Terminal Arrangement



### 6-2-2. Terminal Signals

| name                         |     | function                                                                    |
|------------------------------|-----|-----------------------------------------------------------------------------|
| terminals for power supplies | L+  | The external power supply provides 24V positive voltage to the ED module.   |
|                              | M   | The external power supply provides a 24V negative voltage to the ED module. |
| CH1、CH2                      | AI0 | Terminal 1 of the AD analog current input                                   |
|                              | AI1 | The second AD analog current input terminal                                 |
|                              | CI0 | AI0, AI1 input location                                                     |
| CH3、CH4                      | AO0 | Terminal 1 of the DA analog current output                                  |
|                              | AO1 | The second DA analog current output terminal                                |
|                              | CO0 | AO0, AO1 output locations                                                   |

### 6-2-3. Connector Specifications

When wiring the module, its connectors must meet the following requirements:

- (1) The length of the stripping is 9mm;
- (2) Flexible conductors with tubular bare ends, 0.25-1.5mm<sup>2</sup>;
- (3) Flexible conductors with tubular pre-insulated ends, 0.25-0.5mm<sup>2</sup>.

## 6-3. Input and Output Definition Number Assignment

The XL series analog ED module operates without requiring I/O units, with converted values directly written to PLC registers. The register definitions for each channel are as follows:

| channel | AD signal |
|---------|-----------|
| 0CH     | ID30000   |
| 1CH     | ID30001   |
| channel | DA signal |
| 0CH     | QD30000   |
| 1CH     | QD30001   |

## 6-4. Work Mode Settings

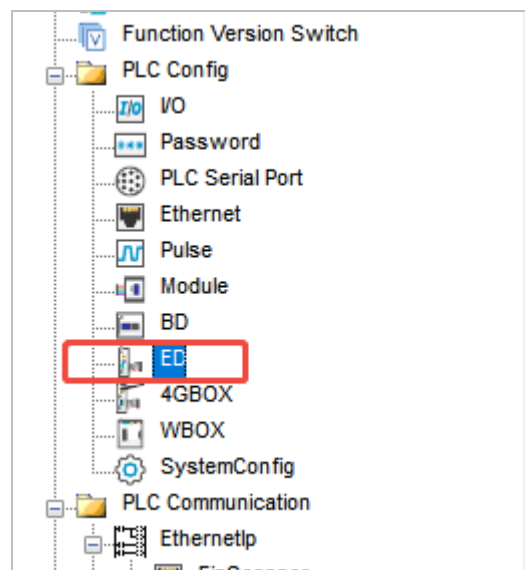
You can set the work mode in two ways (both methods are equivalent)

- 1) Configure through the Control Panel
- 2) Through Flash register settings

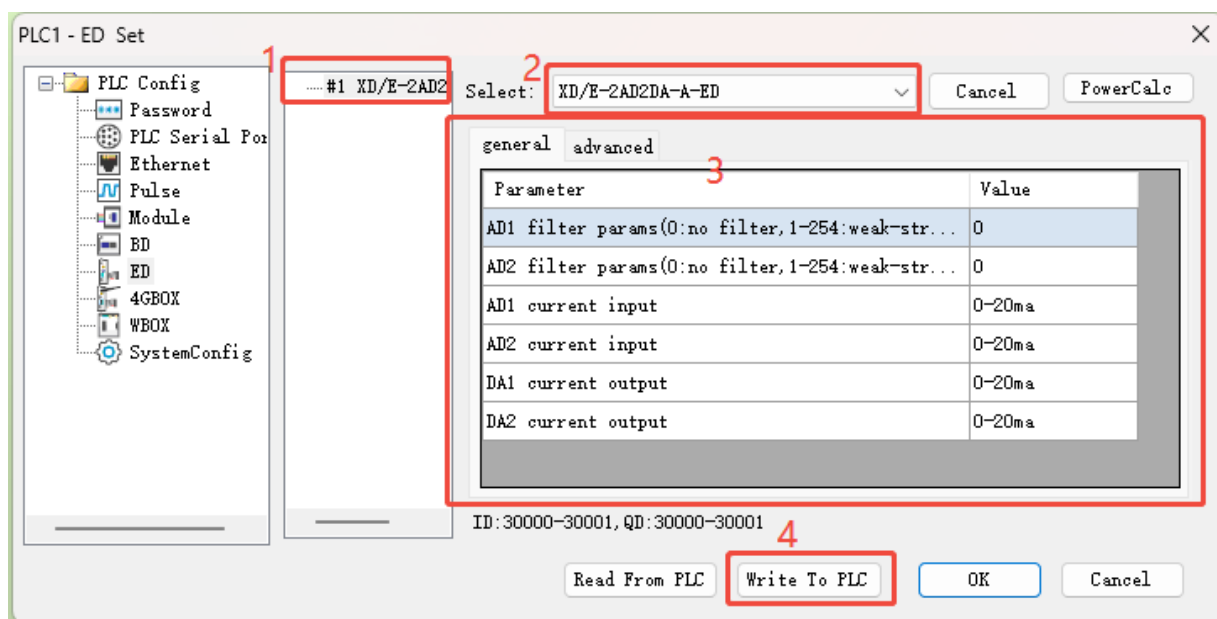
### 6-4-1. Configure the panel

**Use Xinje PLC programming software version 3.5.1 or later to configure the module.**

Open the programming software and click on the "ED Module" under "PLC Configuration" in the left engineering bar.



The following configuration panel appears. Select the corresponding module model and configuration information:



Step 1: Select the appropriate module model at the '2' position in the diagram.

Step 2: After completing Step 1, the corresponding model will appear at position "1".

Step 3: At option 3, you can select the filter coefficient of AD and the current mode for AD and DA channels.

Step 4: After completing the configuration, press '4' to program the PLC. Then power off and power on the PLC again. The configuration will take effect.

Note: The first-order low-pass filter method combines the current sampling value with the previous filtered output value to produce the effective filtered value. The filter coefficient, set by the user, ranges from 0 to 254. Higher values provide greater stability but may cause data lag. Therefore, setting it to 254 yields the strongest filtering effect and most stable data, while setting it to 1 results in the weakest filtering effect. The default value is 0 (no filtering).

## 6-4-2. Flash register settings

The expansion module features current-mode input/output with selectable current ranges of 0-20mA or 4-20mA, configurable via the PLC's dedicated FLASH data register SFD as shown below.

| ED module ID | configuration information address |
|--------------|-----------------------------------|
| #1           | SFD530~SFD539                     |

### SFD Bit Definition

| register address |       | Bit7                            | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 | explain                                |
|------------------|-------|---------------------------------|------|------|------|------|------|------|------|----------------------------------------|
| SFD530           | Byte0 | AD channel 1 filter coefficient |      |      |      |      |      |      |      | AD<br>channel<br>filter<br>coefficient |
|                  | Byte1 | AD channel 2 filter coefficient |      |      |      |      |      |      |      |                                        |
| SFD531           | Byte2 | continue to have                |      |      |      |      |      |      |      |                                        |
|                  | Byte3 | continue to have                |      |      |      |      |      |      |      |                                        |
| SFD532           | Byte4 | AD2                             |      |      |      | AD1  |      |      |      | Specifies                              |

| register address  |                  | Bit7             | Bit6             | Bit5             | Bit4                 | Bit3             | Bit2             | Bit1             | Bit0                 | explain                                                         |
|-------------------|------------------|------------------|------------------|------------------|----------------------|------------------|------------------|------------------|----------------------|-----------------------------------------------------------------|
|                   |                  | continue to have | continue to have | continue to have | 0:0~20mA<br>1:4~20mA | continue to have | continue to have | continue to have | 0:0~20mA<br>1:4~20mA | the selection of input and output ranges for AD and DA channels |
|                   | Byte5            | DA2              |                  |                  |                      | DA1              |                  |                  |                      |                                                                 |
|                   |                  | continue to have | continue to have | continue to have | 0:0~20mA<br>1:4~20mA | continue to have | continue to have | continue to have | 0:0~20mA<br>1:4~20mA |                                                                 |
| SFD533~<br>SFD539 | Byte6~<br>Byte19 | continue to have |                  |                  |                      |                  |                  |                  |                      |                                                                 |

Example: Set the working mode of the first and zero channels of the ED module to 0-20mA, the third and second channels to 4-20mA, and the filter coefficients for both channels to 254.

Method 1:

You can configure it directly on the configuration panel, as shown in the figure above.

Method 2:

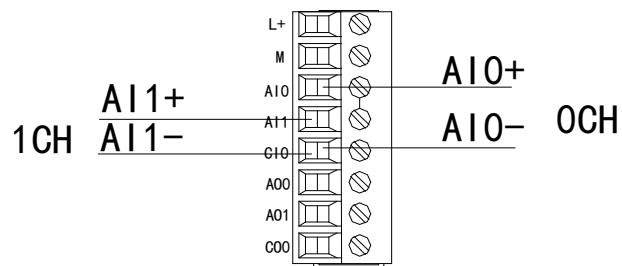
Set the SFD special register directly to the following value:

SFD530=FEFEH SFD531=0H SFD532=1100H

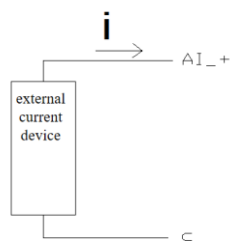
## 6-5. External Connections

When connecting externally, use shielded cables and ground the shield at a single point to avoid interference.

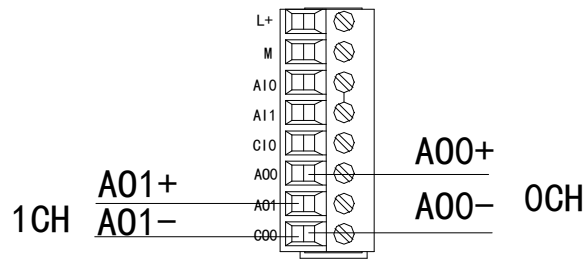
### 6-5-1. Single-ended Current Input



The wiring for the XL-2AD2DA-A-ED current input side is shown in the figure below:



6-5-2. Single-ended Current Output



Note: The current output does not require a DC24V power supply in series!

6-6. Analog-to-Digital Conversion Diagram

The relationship between input analog signals and converted digital values is shown in the table below:

| 0~20mA analog input  | 4~20mA analog input  |
|----------------------|----------------------|
|                      |                      |
| 0~20mA analog output | 4~20mA analog output |
|                      |                      |

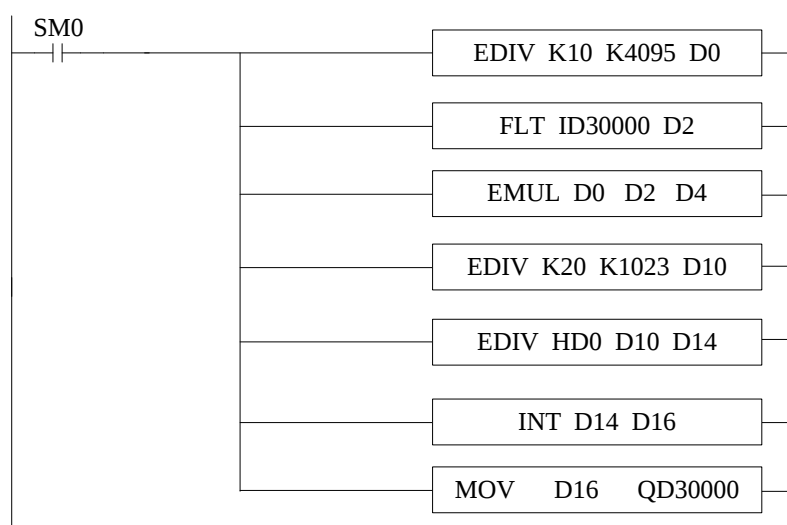
## 6-7. Programming Examples

Example: A pressure sensor with output signal acquisition is required (performance parameters: detection pressure range 0Mp~10Mp, analog output signal 4~20mA), and a 0~20mA current signal must be sent to the frequency converter.

Analysis: Given that the pressure sensor's detection range spans 0Mp to 10Mp, producing an analog output of 4~20mA, the expansion module converts this to a digital range of 0~4095 through analog-to-digital conversion. This eliminates the need for intermediate conversion of the 4~20mA analog signal, allowing direct mapping between the pressure detection range (0Mp~10Mp) and the digital range (0~4095). The expansion module's digital-to-pressure conversion factor ( $10\text{Mp}/4095 = 0.002442$ ) determines the pressure value corresponding to each digit in the collected digital value. Thus, multiplying the real-time pressure reading from the expansion module's ID register by 0.002442 yields the current pressure reading. For instance, a digital value of 1023 in the ID register corresponds to a pressure of 2.5Mp.

Similarly, the digital range 0-1023 in the extended module register QD corresponds to the current output signal 0-20mA. The ratio  $20\text{mA}/1023=0.01955$  indicates the current output per digital value set in QD. For example, to output 10mA,  $10\text{mA}/0.01955=511.5$ . The calculated digital value is rounded to the nearest integer and written into the corresponding QD register.

**The procedure is as follows:**



Note: Use floating-point operations for calculations. Otherwise, the accuracy may be affected or the calculation may fail.

### Explain:

The SM0 is a normally ON coil that remains active throughout the PLC's operation.

When the PLC starts, the analog signal acquisition first calculates the pressure value corresponding to each digit 1 in the digital values collected by the expansion module. Then, it converts the integer values from the ID30000 register into floating-point numbers. Thus, the real-time pressure value can be obtained by multiplying the real-time value in the ID30000 register by the pressure value corresponding to each digit 1 in the expansion module's digital values.

Similarly, the analog output first calculates the current value corresponding to each digit 1 in the digital quantity collected by the expansion module. By dividing the set target current value by this current value, the required digital quantity (floating-point number) can be obtained. Since the QD30000 register can only store integers, the resulting floating-point number must be converted to an integer and transmitted to the QD30000.

## 7. Analog Input/Output Module XL-2AD2DA-V-ED

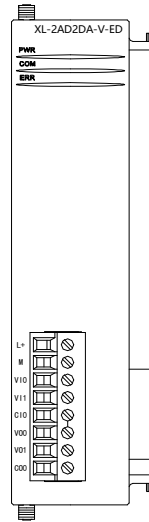
This chapter mainly introduces the specification of XL-2AD2DA-V-ED module, terminal description, input and output definition number assignment, working mode setting, external connection, analog to digital conversion diagram and related programming examples.

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|                                                         |    |
|---------------------------------------------------------|----|
| 7. Analog Input/Output Module XL-2AD2DA-V-ED .....      | 47 |
| 7-1. Module Features and Specifications .....           | 48 |
| 7-1-1. Module Features.....                             | 48 |
| 7-1-2. Module Specifications.....                       | 48 |
| 7-2. Terminal Description .....                         | 49 |
| 7-2-1. Terminal Arrangement .....                       | 49 |
| 7-2-2. Terminal Signals .....                           | 49 |
| 7-2-3. Connector Specifications.....                    | 49 |
| 7-3. Input and Output Definition Number Assignment..... | 49 |
| 7-4. Work Mode Settings .....                           | 50 |
| 7-4-1. Configure the panel .....                        | 50 |
| 7-4-2. Flash register settings .....                    | 51 |
| 7-5. External Connections .....                         | 52 |
| 7-5-1. Single-ended voltage input.....                  | 52 |
| 7-5-2. Single-ended Voltage Output .....                | 52 |
| 7-6. Module Conversion Diagram.....                     | 53 |
| 7-7. Programming Examples .....                         | 53 |

## 7-1. Module Features and Specifications

The XL-2AD2DA-V-ED analog input/output module converts two analog inputs into digital values and two digital inputs into analog values, transmitting them to the PLC main unit for real-time data exchange.



### 7-1-1. Module Features

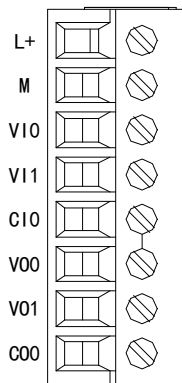
- 2-channel analog input: voltage input.
- 12-bit high precision analog input.
- 2-channel analog output: voltage output.
- 10-bit high precision analog output.
- As a left expansion ED module for the XL series, it can connect up to one module on the left side of the PLC main unit.

### 7-1-2. Module Specifications

| project                | Analog voltage input (V) | Analog voltage output (V)                      |
|------------------------|--------------------------|------------------------------------------------|
| analog input range     | 0~5V,0~10V               | —                                              |
| maximum input range    | -0.5~15V                 | —                                              |
| analog output range    | —                        | 0~5V,0~10V (external load resistance: 2KΩ~1MΩ) |
| Digital input range    | —                        | 0~1023                                         |
| digital output range   | 0~4095                   | -                                              |
| resolution ratio       | 1/4095(12Bit)            | 1/1023(10Bit)                                  |
| comprehensive accuracy | ±1%                      |                                                |
| conversion rate        | 10ms (all channels)      |                                                |
| module power supply    | DC24V±10%, 150mA         |                                                |

## 7-2. Terminal Description

### 7-2-1. Terminal Arrangement



### 7-2-2. Terminal Signals

| name                         |     | function                                                                    |
|------------------------------|-----|-----------------------------------------------------------------------------|
| terminals for power supplies | L+  | The external power supply provides 24V positive voltage to the ED module.   |
|                              | M   | The external power supply provides a 24V negative voltage to the ED module. |
| CH1,CH2                      | VI0 | Terminal 1 of the AD analog voltage input                                   |
|                              | VI1 | The second AD analog voltage input terminal                                 |
|                              | CI0 | VI0, VI1 input ground                                                       |
| CH3,CH4                      | VO0 | Terminal 1 of the DA analog voltage output                                  |
|                              | VO1 | The second DA analog voltage output terminal                                |
|                              | CO0 | VO0, VO1 output locations                                                   |

### 7-2-3. Connector Specifications

When wiring the module, its connectors must meet the following requirements:

- (1) The length of the stripping is 9mm;
- (2) Flexible conductors with tubular bare ends, 0.25-1.5mm<sup>2</sup>;
- (3) Flexible conductors with tubular pre-insulated ends, 0.25-0.5mm<sup>2</sup>.

## 7-3. Input and Output Definition Number Assignment

The XL series analog ED module operates without requiring I/O units, with converted values directly written to PLC registers. The register definitions for each channel are as follows:

| channel | AD signal |
|---------|-----------|
| 0CH     | ID30000   |
| 1CH     | ID30001   |
| channel | DA signal |
| 0CH     | QD30000   |
| 1CH     | QD30001   |

## 7-4. Work Mode Settings

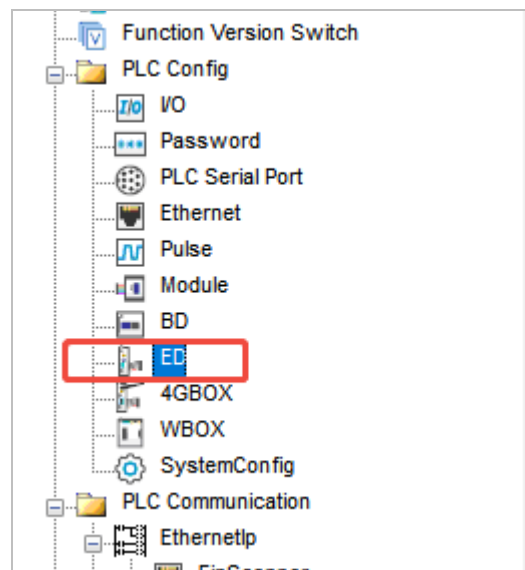
You can set the work mode in two ways (both methods are equivalent)

- 1) Configure through the Control Panel
- 2) Through Flash register settings

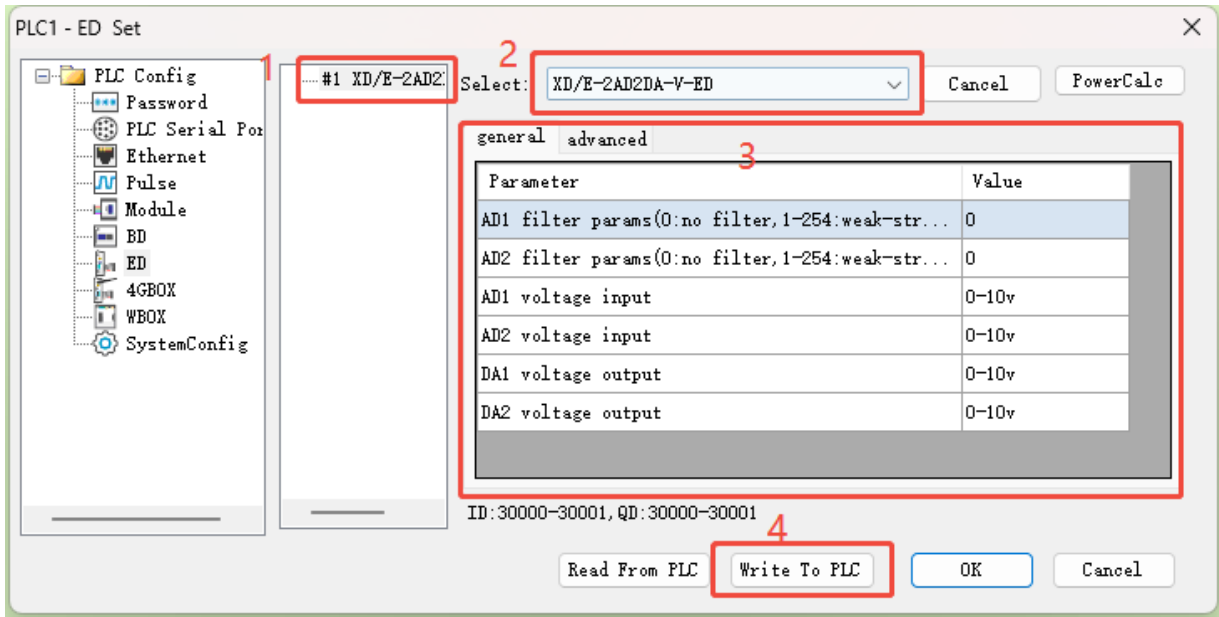
### 7-4-1. Configure the panel

**Use Xinje PLC programming software version 3.5.1 or later to configure the module.**

Open the programming software and click on the "ED Module" under "PLC Configuration" in the left engineering bar.



The following configuration panel appears. Select the corresponding module model and configuration information:



Step 1: Select the appropriate module model at the '2' position in the diagram.

Step 2: After completing Step 1, the corresponding model will appear at position "1".

Step 3: At option 3, you can select the filter coefficient of the analog-to-digital (AD) converter and the voltage mode for both AD and digital-to-analog (DA) channels.

Step 4: After completing the configuration, press '4' to program the PLC. Then power off and power on the PLC again. The configuration will take effect.

Note: The first-order low-pass filter method combines the current sampling value with the previous filtered output value to produce the effective filtered value. The filter coefficient, set by the user, ranges from 0 to 254. Higher values provide greater stability but may cause data lag. Therefore, setting it to 254 yields the strongest filtering effect and most stable data, while setting it to 1 results in the weakest filtering effect. The default value is 0 (no filtering).

## 7-4-2. Flash register settings

The expansion module features voltage-mode input/output with selectable voltage ranges of 0-10V and 0-5V, configurable via the PLC's dedicated FLASH data register SFD as shown below.

| ED module ID | configuration information address |
|--------------|-----------------------------------|
| #1           | SFD530~SFD539                     |

SFD Bit Definition

| register address |       | Bit7                            | Bit6             | Bit5             | Bit4              | Bit3             | Bit2             | Bit1             | Bit0              | explain                       |
|------------------|-------|---------------------------------|------------------|------------------|-------------------|------------------|------------------|------------------|-------------------|-------------------------------|
| SFD530           | Byte0 | AD channel 1 filter coefficient |                  |                  |                   |                  |                  |                  |                   | AD channel filter coefficient |
|                  | Byte1 | AD channel 2 filter coefficient |                  |                  |                   |                  |                  |                  |                   |                               |
| SFD531           | Byte2 | continue to have                |                  |                  |                   |                  |                  |                  |                   |                               |
|                  | Byte3 | continue to have                |                  |                  |                   |                  |                  |                  |                   |                               |
| SFD532           | Byte4 | AD2                             |                  |                  |                   | AD1              |                  |                  |                   | Specifies the selection       |
|                  |       | continue to have                | continue to have | continue to have | 0:0~10V<br>1:0~5V | continue to have | continue to have | continue to have | 0:0~10V<br>1:0~5V |                               |

| register address | Bit7         | Bit6             | Bit5             | Bit4             | Bit3              | Bit2             | Bit1             | Bit0             | explain                                           |
|------------------|--------------|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|---------------------------------------------------|
|                  | Byte5        | DA2              |                  |                  | DA1               |                  |                  |                  | of input and output ranges for AD and DA channels |
|                  |              | continue to have | continue to have | continue to have | 0:0~10V<br>1:0~5V | continue to have | continue to have | continue to have |                                                   |
| SFD533~SFD539    | Byte6~Byte19 | continue to have |                  |                  |                   |                  |                  |                  |                                                   |

Example: Set the working mode of the ED module's input channels 1 and 0 to 0-10V, channels 3 and 2 to 0-5V, and set the filter coefficients for channels 1 and 2 to 254.

Method 1:

You can configure it directly on the configuration panel, as shown in the figure above.

Method 2:

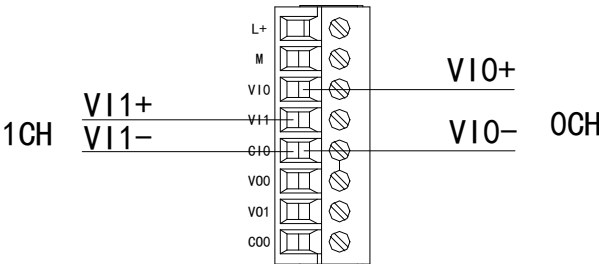
Set the SFD special register directly to the following value:

SFD530=FEFEH SFD531=0H SFD532=1100H

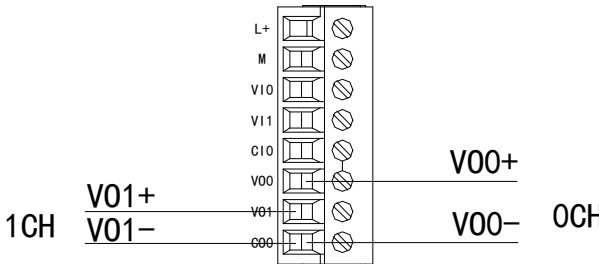
# 7-5. External Connections

When connecting externally, use shielded cables and ground the shield at a single point to avoid interference.

## 7-5-1. Single-ended voltage input



## 7-5-2. Single-ended Voltage Output



# 7-6. Module Conversion Diagram

The relationship between input analog signals and converted digital values is shown in the table below:

| 0~10V analog input  | 0~5V analog input  |
|---------------------|--------------------|
|                     |                    |
| 0~10V analog output | 0~5V analog output |
|                     |                    |

# 7-7. Programming Examples

Example: A pressure sensor with output signal acquisition is required (performance parameters: detection pressure range 0Mp~10Mp, analog output signal 0~10V), and a 0~5V voltage signal must be sent to the frequency converter.

Analysis: Given that the pressure sensor's detection range spans 0Mp to 10Mp, generating an analog output of 0~10V, the expansion module converts this to a digital range of 0~4095 via analog-to-digital conversion. This eliminates the need for intermediate conversion of the 0~10V analog signal, directly mapping the pressure range (0Mp to 10Mp) to the digital range (0~4095). The expansion module's digital-to-physical conversion factor ( $10\text{Mp}/4095 = 0.002442$ ) determines the pressure value corresponding to each digit in the collected digital value. Thus, multiplying the real-time pressure reading from the expansion module's ID register by 0.002442 yields the current pressure reading. For instance, a digital value of 1023 in the ID register corresponds to a pressure of 2.5Mp.

Similarly, the digital value range 0-1023 in the expansion module register QD corresponds to the voltage output signal 0-5V. The ratio  $5\text{V}/1023=0.00488758$  indicates the output voltage per digital value set in QD. For example, to output 2.5V,  $2.5\text{V}/0.00488758 = 511.5$ . The calculated digital value is rounded to the nearest integer and written into the corresponding QD register.



## 8. Analog temperature module XL-2AD2PT-A-ED

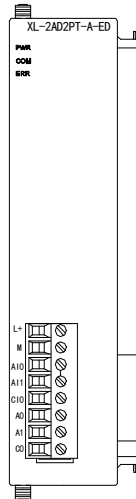
This chapter mainly introduces the specification of XL-2AD2PT-A-ED module, terminal description, input definition number assignment, working mode setting, external connection, analog to digital conversion diagram and related programming examples.

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|                                                   |    |
|---------------------------------------------------|----|
| 8. Analog temperature module XL-2AD2PT-A-ED ..... | 55 |
| 8-1. Module Features and Specifications .....     | 56 |
| 8-1-1. Module Features.....                       | 56 |
| 8-1-2. Module Specifications.....                 | 56 |
| 8-2. Terminal Description .....                   | 57 |
| 8-2-1. Terminal Arrangement .....                 | 57 |
| 8-2-2. Terminal Signal .....                      | 57 |
| 8-2-3. Connector Specifications.....              | 57 |
| 8-3. Input definition number assignment .....     | 57 |
| 8-4. Work Mode Settings .....                     | 58 |
| 8-4-1. Configure the panel .....                  | 58 |
| 8-4-2. Flash register settings .....              | 59 |
| 8-5. External Connections .....                   | 60 |
| 8-5-1. Single-ended Current Input .....           | 60 |
| 8-5-2. Thermistor Temperature Input .....         | 61 |
| 8-6. Module Conversion Chart.....                 | 61 |
| 8-7. Programming Examples .....                   | 62 |

## 8-1. Module Features and Specifications

The XL-2AD2PT-A-ED analog temperature input module converts two analog current inputs and two thermistor temperature inputs into digital values, then transmits them to the PLC main unit for real-time data exchange.



### 8-1-1. Module Features

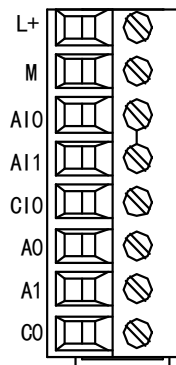
- 2-channel analog input: current input.
- 12-bit high precision analog input.
- 2-channel temperature input: Pt100.
- The temperature measurement range is -100 to 500°C, with an accuracy of 0.1°C.
- As a left expansion ED module for the XL series, it can connect up to one module on the left side of the PLC main unit.

### 8-1-2. Module Specifications

| project                       | Analog current input (mA) | Temperature Input (PT) |
|-------------------------------|---------------------------|------------------------|
| analog input range            | 0~20mA, 4~20mA            | —                      |
| Temperature measurement range | —                         | -100~500°C             |
| maximum input range           | 0~30mA                    | —                      |
| digital output range          | 0~4095                    | -1000~5000             |
| resolution ratio              | 1/4095(12Bit)             | 0.1°C                  |
| comprehensive accuracy        | ±1%                       | Full scale ±0.8%       |
| conversion rate               | 10ms (all channels)       |                        |
| module power supply           | DC24V±10%, 150mA          |                        |

## 8-2. Terminal Description

### 8-2-1. Terminal Arrangement



### 8-2-2. Terminal Signal

| name                         |     | function                                                                    |
|------------------------------|-----|-----------------------------------------------------------------------------|
| terminals for power supplies | L+  | The external power supply provides 24V positive voltage to the ED module.   |
|                              | M   | The external power supply provides a 24V negative voltage to the ED module. |
| CH1,CH2                      | AI0 | Terminal 1 of the AD analog current input                                   |
|                              | AI1 | The second AD analog current input terminal                                 |
|                              | CI0 | AI0, AI1 input location                                                     |
| CH3,CH4                      | AO  | Input terminal of the first PTt100 circuit                                  |
|                              | A1  | Input terminal of the second PTt100 circuit                                 |
|                              | CO  | AO, A1 input locations                                                      |

### 8-2-3. Connector Specifications

When wiring the module, its connectors must meet the following requirements:

- (1) The length of the stripping is 9mm;
- (2) Flexible conductors with tubular bare ends, 0.25-1.5mm<sup>2</sup>;
- (3) Flexible conductors with tubular pre-insulated ends, 0.25-0.5mm<sup>2</sup>.

## 8-3. Input definition number assignment

The XL series analog ED module operates without requiring I/O units, with converted values directly written to PLC registers. The register definitions for each channel are as follows:

| channel | AD signal |
|---------|-----------|
| CH0     | ID30000   |
| CH1     | ID30001   |
| channel | PT signal |
| CH0     | ID30002   |
| CH1     | ID30003   |

## 8-4. Work Mode Settings

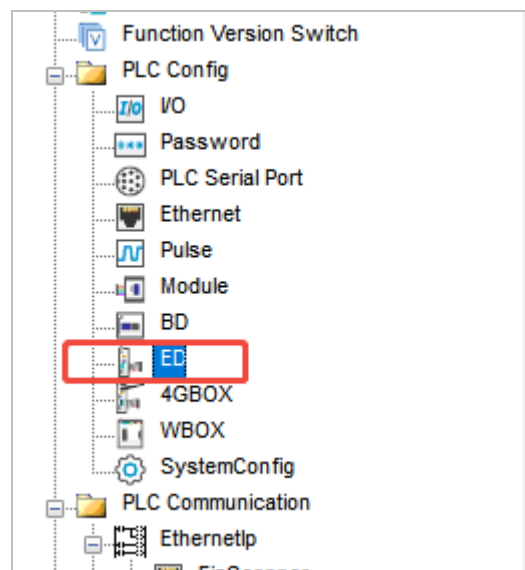
You can set the work mode in two ways (both methods are equivalent)

- 1) Configure through the Control Panel
- 2) Through Flash register settings

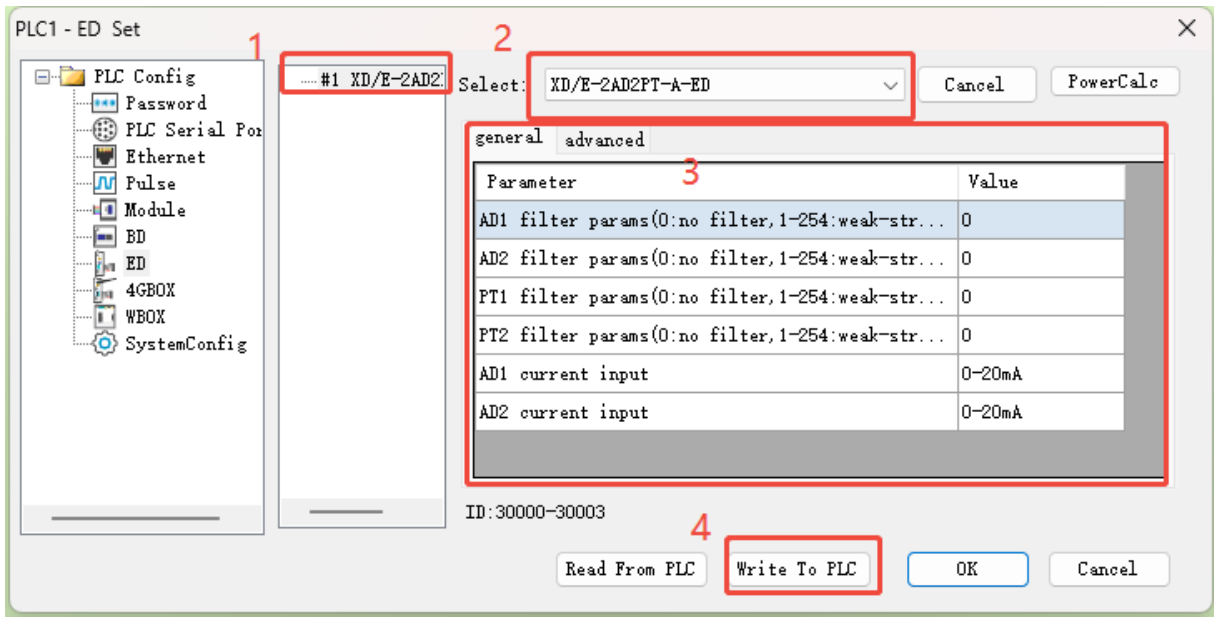
### 8-4-1. Configure the panel

**Use Xinje PLC programming software version 3.5.1 or later to configure the module.**

Open the programming software and click on the "ED Module" under "PLC Configuration" in the left engineering bar.



The following configuration panel appears. Select the corresponding module model and configuration information:



Step 1: Select the appropriate module model at the '2' position in the diagram.

Step 2: After completing Step 1, the corresponding model will appear at position "1".

Step 3: At position 3, you can select the filter coefficients for AD and PT, as well as the current mode corresponding to the AD channel.

Step 4: After completing the configuration, press '4' to program the PLC. Then power off and power on the PLC again. The configuration will take effect.

Note: The first-order low-pass filter method combines the current sampling value with the previous filtered output value to produce the effective filtered value. The filter coefficient, set by the user, ranges from 0 to 254. Higher values provide greater stability but may cause data lag. Therefore, setting it to 254 yields the strongest filtering effect and most stable data, while setting it to 1 results in the weakest filtering effect. The default value is 0 (no filtering).

### 8-4-2. Flash register settings

All input modules of the expansion module operate in current mode, with current ranges selectable between 0-20mA and 4-20mA. These settings are configured via the PLC's dedicated FLASH data register SFD, as illustrated below:

| ED module ID | configuration information address |
|--------------|-----------------------------------|
| #1           | SFD530~SFD539                     |

SFD Bit Definition

| register address |       | Bit7                            | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 | explain                                     |
|------------------|-------|---------------------------------|------|------|------|------|------|------|------|---------------------------------------------|
| SFD530           | Byte0 | AD channel 1 filter coefficient |      |      |      |      |      |      |      | AD, PT<br>channel<br>filter<br>coefficients |
|                  | Byte1 | AD channel 2 filter coefficient |      |      |      |      |      |      |      |                                             |
| SFD531           | Byte2 | PT Channel 1 Filter Coefficient |      |      |      |      |      |      |      |                                             |
|                  | Byte3 | PT Channel 2 Filter Coefficient |      |      |      |      |      |      |      |                                             |
| SFD532           | Byte4 | AD2                             |      |      |      | AD1  |      |      |      | Selects the                                 |

| register address  |                  | Bit7             | Bit6             | Bit5             | Bit4                 | Bit3             | Bit2             | Bit1             | Bit0                 | explain                        |
|-------------------|------------------|------------------|------------------|------------------|----------------------|------------------|------------------|------------------|----------------------|--------------------------------|
|                   |                  | continue to have | continue to have | continue to have | 0:0~20mA<br>1:4~20mA | continue to have | continue to have | continue to have | 0:0~20mA<br>1:4~20mA | input range for the AD channel |
|                   | Byte5            | PT2              |                  |                  |                      | PT1              |                  |                  |                      |                                |
|                   |                  | continue to have | continue to have | continue to have | continue to have     | continue to have | continue to have | continue to have | continue to have     |                                |
| SFD533~<br>SFD539 | Byte6~<br>Byte19 | continue to have |                  |                  |                      |                  |                  |                  |                      |                                |

Example: Configure the ED module's input channels 1 and 0 to operate in 0-20mA range, with filter coefficients set to 254 for channels 1 and 2, and 100 for channels 3 and 4.

Method 1:

You can configure it directly on the configuration panel, as shown in the figure above.

Method 2:

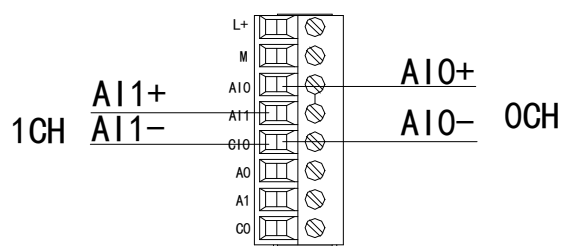
Set the SFD special register directly to the following value:

SFD530=FEFEH SFD531=6464H SFD532=1100H

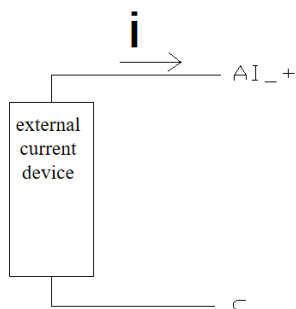
## 8-5. External Connections

When connecting externally, use shielded cables and ground the shield at a single point to avoid interference.

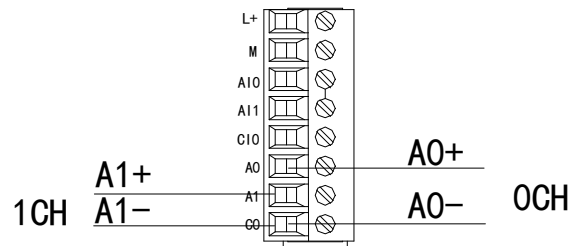
### 8-5-1. Single-ended Current Input



The wiring for the XL-2AD2PT-A-ED current input side is shown in the figure below:



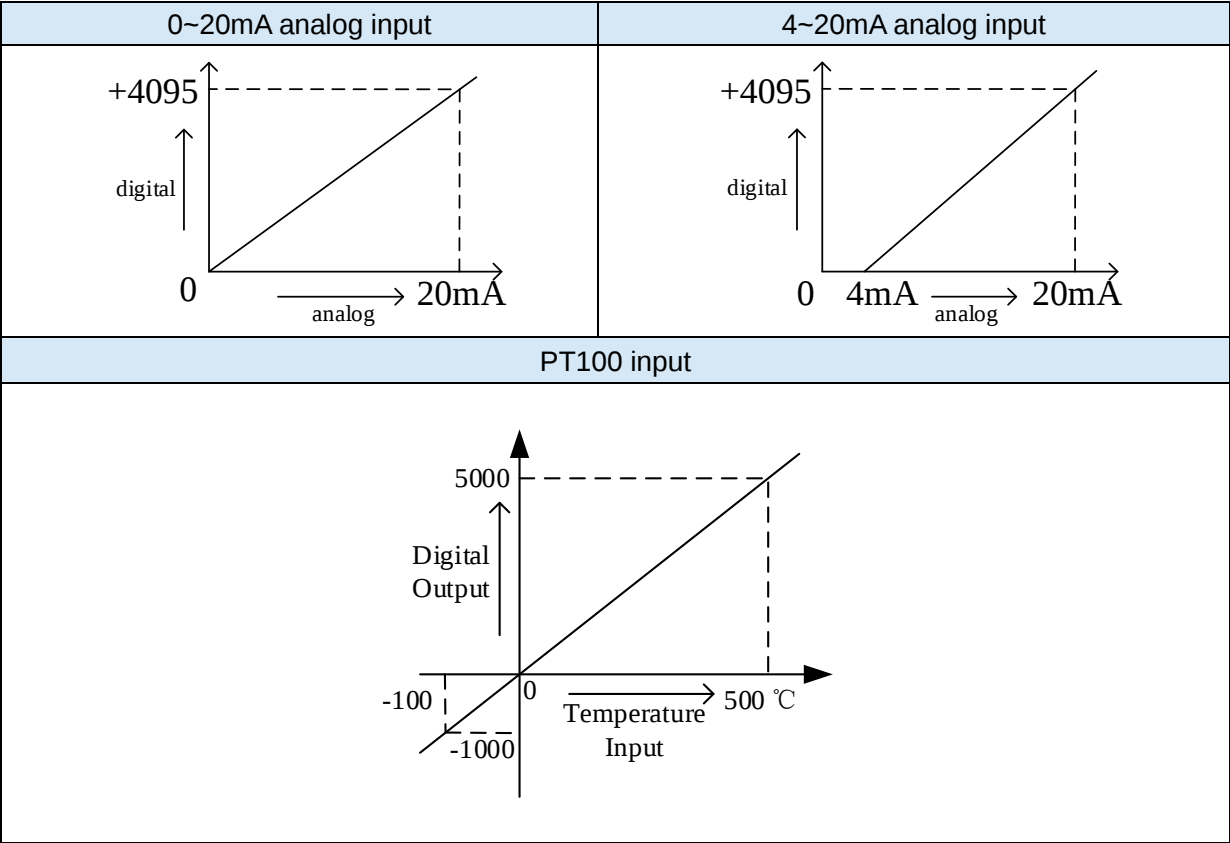
8-5-2. Thermistor Temperature Input



Note: For a three-wire platinum thermistor, connect two wires of the same color to terminal C0, and the third wire to terminal A0 or A1.

8-6. Module Conversion Chart

The relationship between input analog signals and converted digital values is shown in the table below:

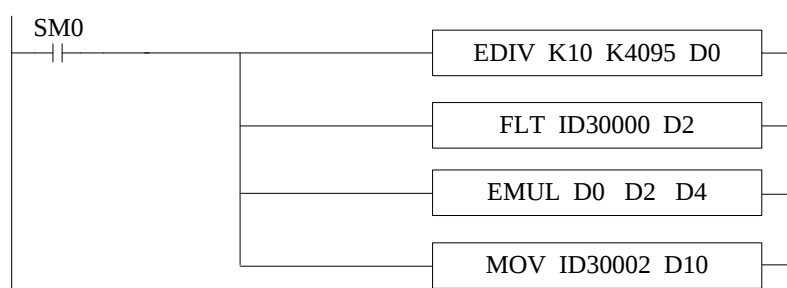


## 8-7. Programming Examples

Example: A pressure sensor with output signal acquisition is required (performance parameters: detection pressure range 0Mp~10Mp, analog output signal 4~20mA), while simultaneously real-time reading of a Pt100 temperature signal.

Analysis: Given that the pressure sensor's detection range spans 0Mp to 10Mp, producing an analog output of 4~20mA, the expansion module converts this to a digital range of 0~4095 through analog-to-digital conversion. This allows bypassing the intermediate 4~20mA conversion stage, directly mapping the pressure range (0Mp~10Mp) to the digital value range (0~4095). The expansion module's digital-to-physical conversion factor ( $10\text{Mp}/4095 = 0.002442$ ) determines the pressure value per digit in the collected digital value. Thus, multiplying the real-time value from the expansion module's ID register by 0.002442 yields the current pressure reading. For instance, a digital value of 1023 in the ID register corresponds to a pressure of 2.5Mp.

**The procedure is as follows:**



Note: Use floating-point operations for calculations. Otherwise, the accuracy may be affected or the calculation may fail.

### Explain:

The SM0 is a normally ON coil that remains active throughout the PLC's operation.

When the PLC starts, the analog signal acquisition first calculates the pressure value corresponding to each digit 1 in the digital values collected by the expansion module. Then, it converts the integer values from the ID30000 register into floating-point numbers. Thus, the real-time pressure value can be obtained by multiplying the real-time value in the ID30000 register by the pressure value corresponding to each digit 1 in the expansion module's digital values.

## 9. Analog temperature module XL-2AD2PT-V-ED

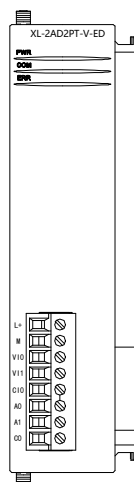
This chapter mainly introduces the specification of XL-2AD2PT-V-ED module, terminal description, input definition number assignment, working mode setting, external connection, analog to digital conversion diagram and related programming examples.

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|                                                   |    |
|---------------------------------------------------|----|
| 9. Analog temperature module XL-2AD2PT-V-ED ..... | 63 |
| 9-1. Module Features and Specifications .....     | 64 |
| 9-1-1. Module Features.....                       | 64 |
| 9-1-2. Module Specifications.....                 | 64 |
| 9-2. Terminal Description .....                   | 65 |
| 9-2-1. Terminal Arrangement .....                 | 65 |
| 9-2-2. Terminal Signal .....                      | 65 |
| 9-2-3. Connector Specifications.....              | 65 |
| 9-3. Input definition number assignment .....     | 65 |
| 9-4. Work Mode Settings .....                     | 66 |
| 9-4-1. Configure the panel .....                  | 66 |
| 9-4-2. Flash register settings .....              | 67 |
| 9-5. External Connections .....                   | 68 |
| 9-5-1. Single-ended voltage input.....            | 68 |
| 9-5-2. Thermistor Temperature Input .....         | 69 |
| 9-6. Module Conversion Chart.....                 | 69 |
| 9-7. Programming Examples .....                   | 69 |

## 9-1. Module Features and Specifications

The XL-2AD2PT-V-ED analog temperature input module converts two analog voltage inputs and two thermistor temperature inputs into digital values, then transmits them to the PLC main unit for real-time data exchange.



### 9-1-1. Module Features

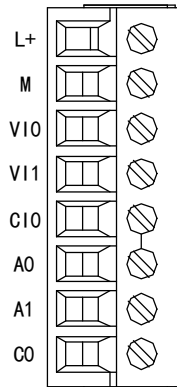
- 2-channel analog input: voltage input.
- 12-bit high precision analog input.
- 2-channel temperature input: Pt100.
- The temperature measurement range is -100 to 500°C, with an accuracy of 0.1°C.
- As a left expansion ED module for the XL series, it can connect up to one module on the left side of the PLC main unit.

### 9-1-2. Module Specifications

| project                       | Analog voltage input (V) | Temperature Input (PT) |
|-------------------------------|--------------------------|------------------------|
| analog input range            | 0~5V,0~10V               | —                      |
| Temperature measurement range | —                        | -100~500°C             |
| maximum input range           | -0.5~15V                 | —                      |
| digital output range          | 0~4095                   | -1000~5000             |
| resolution ratio              | 1/4095(12Bit)            | 0.1°C                  |
| comprehensive accuracy        | ±1%                      | Full scale ±0.8%       |
| conversion rate               | 10ms (all channels)      |                        |
| module power supply           | DC24V±10%,150mA          |                        |

## 9-2. Terminal Description

### 9-2-1. Terminal Arrangement



### 9-2-2. Terminal Signal

| name                         |     | function                                                                    |
|------------------------------|-----|-----------------------------------------------------------------------------|
| terminals for power supplies | L+  | The external power supply provides 24V positive voltage to the ED module.   |
|                              | M   | The external power supply provides a 24V negative voltage to the ED module. |
| CH1,CH2                      | VI0 | Terminal 1 of the AD analog voltage input                                   |
|                              | VI1 | The second AD analog voltage input terminal                                 |
|                              | CI0 | VI0, VI1 input ground                                                       |
| CH3,CH4                      | A0  | Input terminal of the first Pt100 sensor                                    |
|                              | A1  | Input terminal of the second PT100 circuit                                  |
|                              | C0  | A0, A1 input locations                                                      |

### 9-2-3. Connector Specifications

When wiring the module, its connectors must meet the following requirements:

- (1) The length of the stripping is 9mm;
- (2) Flexible conductors with tubular bare ends, 0.25-1.5mm<sup>2</sup>;
- (3) Flexible conductors with tubular pre-insulated ends, 0.25-0.5mm<sup>2</sup>.

## 9-3. Input definition number assignment

The XL series analog ED module operates without requiring I/O units, with converted values directly written to PLC registers. The register definitions for each channel are as follows:

| channel | AD signal |
|---------|-----------|
| CH0     | ID30000   |
| CH1     | ID30001   |
| channel | PT signal |
| CH0     | ID30002   |
| CH1     | ID30003   |

## 9-4. Work Mode Settings

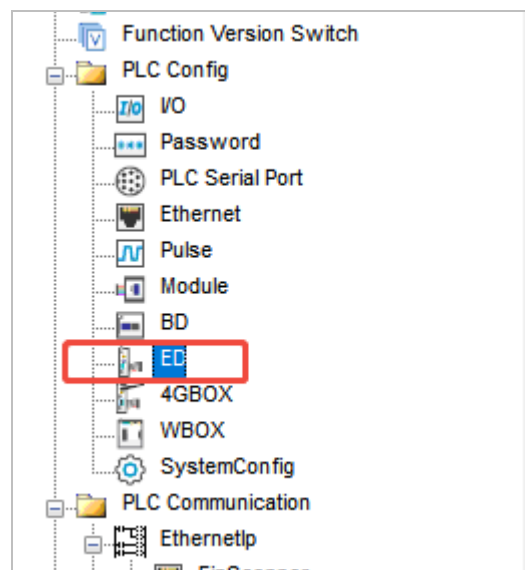
You can set the work mode in two ways (both methods are equivalent)

- 1) Configure through the Control Panel
- 2) Through Flash register settings

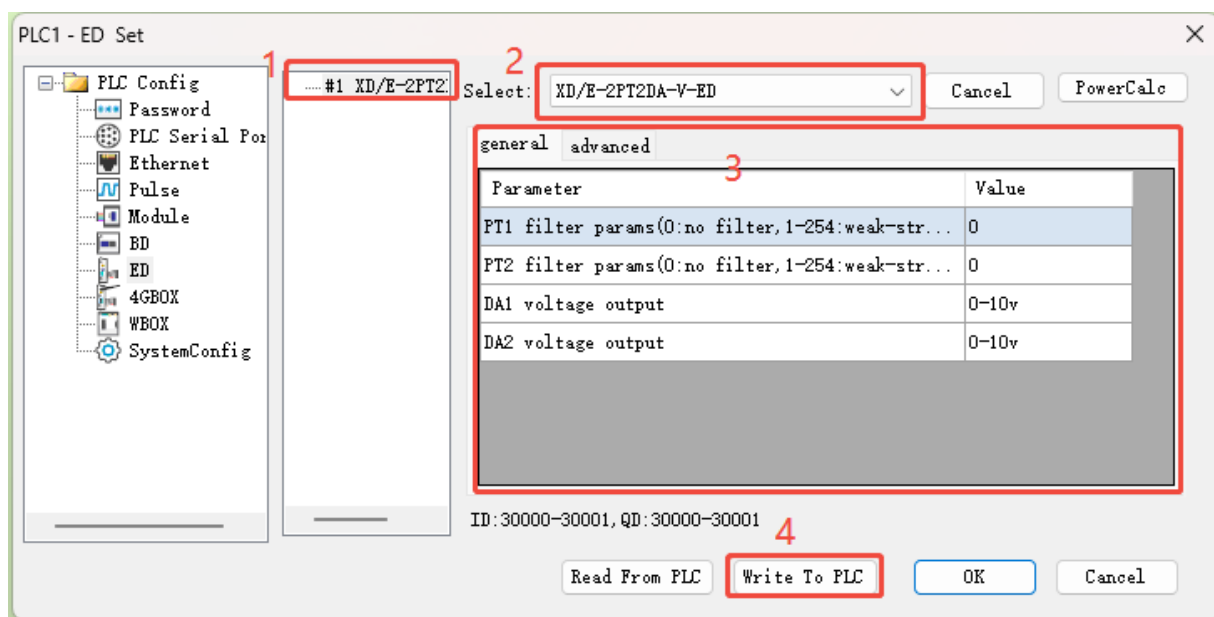
### 9-4-1. Configure the panel

**Use Xinje PLC programming software version 3.5.1 or later to configure the module.**

Open the programming software and click on the "ED Module" under "PLC Configuration" in the left engineering bar.



The following configuration panel appears. Select the corresponding module model and configuration information:



Step 1: Select the appropriate module model at the '2' position in the diagram.

Step 2: After completing Step 1, the corresponding model will appear at position "1".

Step 3: At position 3, you can select the filter coefficients for AD and PT, along with the voltage mode corresponding to the AD channel.

Step 4: After completing the configuration, press '4' to program the PLC. Then power off and power on the PLC again. The configuration will take effect.

Note: The first-order low-pass filter method combines the current sampling value with the previous filtered output value to produce the effective filtered value. The filter coefficient, set by the user, ranges from 0 to 254. Higher values provide greater stability but may cause data lag. Therefore, setting it to 254 yields the strongest filtering effect and most stable data, while setting it to 1 results in the weakest filtering effect. The default value is 0 (no filtering).

## 9-4-2. Flash register settings

All input modules of the expansion module operate in voltage mode, with voltage options of 0-10V and 0-5V, which are configured via the PLC's dedicated FLASH data register SFD, as shown below:

| ED module ID | configuration information address |
|--------------|-----------------------------------|
| #1           | SFD530~SFD539                     |

### SFD Bit Definition

| register address |       | Bit7                            | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 | explain                                     |
|------------------|-------|---------------------------------|------|------|------|------|------|------|------|---------------------------------------------|
| SFD530           | Byte0 | AD channel 1 filter coefficient |      |      |      |      |      |      |      | AD, PT<br>channel<br>filter<br>coefficients |
|                  | Byte1 | AD channel 2 filter coefficient |      |      |      |      |      |      |      |                                             |
| SFD531           | Byte2 | PT Channel 1 Filter Coefficient |      |      |      |      |      |      |      |                                             |
|                  | Byte3 | PT Channel 2 Filter Coefficient |      |      |      |      |      |      |      |                                             |
| SFD532           | Byte4 | AD2                             |      |      |      | AD1  |      |      |      |                                             |

| register address |              | Bit7             | Bit6             | Bit5             | Bit4              | Bit3             | Bit2             | Bit1             | Bit0              | explain                                    |
|------------------|--------------|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|-------------------|--------------------------------------------|
|                  |              | continue to have | continue to have | continue to have | 0:0~10V<br>1:0~5V | continue to have | continue to have | continue to have | 0:0~10V<br>1:0~5V | Selects the input range for the AD channel |
|                  | Byte5        | PT2              |                  |                  |                   | PT1              |                  |                  |                   |                                            |
|                  |              | continue to have | continue to have | continue to have | continue to have  | continue to have | continue to have | continue to have | continue to have  |                                            |
| SFD533~SFD539    | Byte6~Byte19 | continue to have |                  |                  |                   |                  |                  |                  |                   |                                            |

Example: Configure the ED module's input channels 1 and 0 to operate in 0-10V mode, with filter coefficients of 254 for channels 1 and 2, and 100 for channels 3 and 4.

Method 1:

You can configure it directly on the configuration panel, as shown in the figure above.

Method 2:

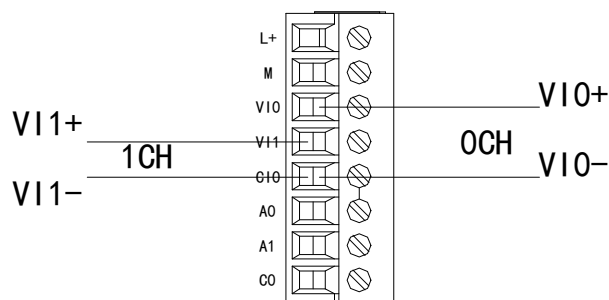
Set the SFD special register directly to the following value:

SFD530=FEFEH SFD531=6464H SFD532=1100H

## 9-5. External Connections

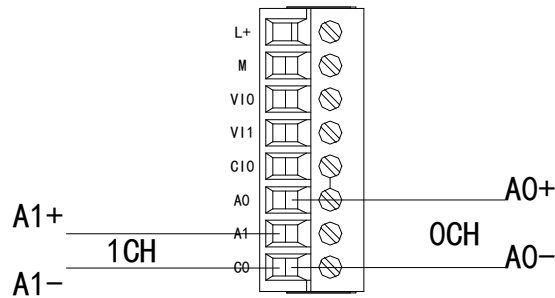
When connecting externally, use shielded cables and ground the shield at a single point to avoid interference.

### 9-5-1. Single-ended voltage input



Note: For a three-wire platinum thermistor, connect two wires of the same color to terminal C0, and the third wire to terminal A0 or A1.

9-5-2. Thermistor Temperature Input



9-6. Module Conversion Chart

The relationship between input analog signals and converted digital values is shown in the table below:

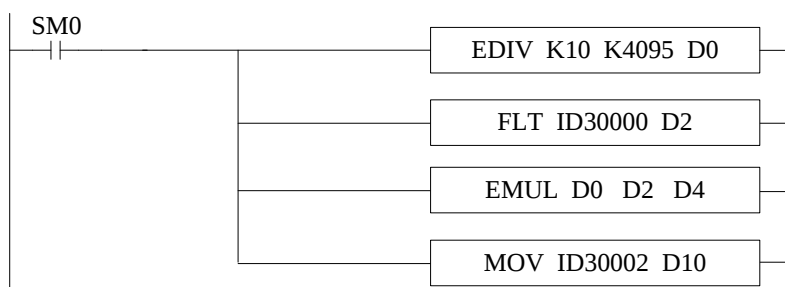
| 0~10V analog input | 0~5V analog input |
|--------------------|-------------------|
|                    |                   |
| PT100 input        |                   |
|                    |                   |

9-7. Programming Examples

Example: A pressure sensor with output signal acquisition is required (performance parameters: detection pressure range 0Mp~10Mp, analog output signal 0~10V), while simultaneously reading a real-time PT100 temperature signal.

Analysis: Given that the pressure sensor's detection range spans 0Mp to 10Mp, generating an analog output of 0~10V, the expansion module converts this to a digital range of 0~4095 through analog-to-digital conversion. This eliminates the need for intermediate conversion of the 0~10V analog signal, directly mapping the pressure range (0Mp~10Mp) to the digital range (0~4095). The ratio  $10\text{Mp}/4095$  equals 0.002442, representing the pressure value corresponding to each digit 1 in the digital output collected by the expansion module. Thus, multiplying the real-time value stored in the expansion module's ID register by 0.002442 yields the current pressure reading. For instance, a digital value of 1023 in the ID register corresponds to a pressure of 2.5Mp.

**The procedure is as follows:**



Note: Use floating-point operations for calculations. Otherwise, the accuracy may be affected or the calculation may fail.

#### **explain:**

The SM0 is a normally ON coil that remains active throughout the PLC's operation.

When the PLC starts, the analog signal acquisition first calculates the pressure value corresponding to each digit 1 in the digital values collected by the expansion module. Then, it converts the integer values from the ID30000 register into floating-point numbers. Thus, the real-time pressure value can be obtained by multiplying the real-time value in the ID30000 register by the pressure value corresponding to each digit 1 in the expansion module's digital values.

## 10. Analog temperature module XL-2PT2DA-A-ED

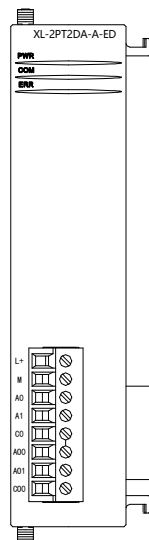
This chapter mainly introduces the specification of XL-2PT2DA-A-ED module, terminal description, input and output definition number assignment, working mode setting, external connection, analog to digital conversion diagram and related programming examples.

---

|                                                          |    |
|----------------------------------------------------------|----|
| 10. Analog temperature module XL-2PT2DA-A-ED.....        | 71 |
| 10-1. Module Features and Specifications.....            | 72 |
| 10-1-1. Module Features.....                             | 72 |
| 10-1-2. Module Specifications.....                       | 72 |
| 10-2. Terminal Description.....                          | 73 |
| 10-2-1. Terminal Arrangement .....                       | 73 |
| 10-2-2. Terminal Signals .....                           | 73 |
| 10-2-3. Connector Specifications.....                    | 73 |
| 10-3. Input and Output Definition Number Assignment..... | 73 |
| 10-4. Work Mode Settings .....                           | 74 |
| 10-4-1. Configure the panel .....                        | 74 |
| 10-4-2. Flash register settings .....                    | 75 |
| 10-5. External Connections .....                         | 76 |
| 10-5-1. Thermistor Temperature Input.....                | 76 |
| 10-5-2. Single-ended Current Output .....                | 76 |
| 10-6. Analog-to-Digital Conversion Diagram.....          | 77 |
| 10-7. Programming Examples.....                          | 77 |

## 10-1. Module Features and Specifications

The XL-2PT2DA-A-ED analog temperature control module processes two thermistor temperature signals and transmits them to the PLC main unit, while also outputting two analog current signals.



### 10-1-1. Module Features

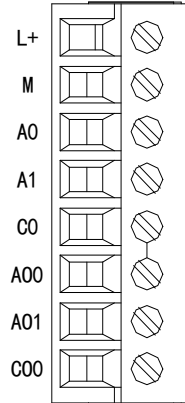
- 2-channel platinum thermistor input with Pt100 calibration.
- The temperature measurement range is -100 to 500°C, with an accuracy of 0.1°C.
- 2-channel analog output: current output mode.
- 10-bit high precision analog output.
- As a left expansion ED module for the XL series, it can connect up to one module on the left side of the PLC main unit.

### 10-1-2. Module Specifications

| project                       | Temperature Input (PT) | Analog current output (mA)                         |
|-------------------------------|------------------------|----------------------------------------------------|
| Temperature measurement range | -100~500°C             | —                                                  |
| analog output range           | —                      | 0~20mA, 4~20mA<br>(external load resistance <500Ω) |
| Digital input range           | —                      | 0~1023                                             |
| digital output range          | -1000~5000             | —                                                  |
| resolution ratio              | 0.1°C                  | 1/1023(10Bit)                                      |
| comprehensive accuracy        | Full scale ±0.8%       | ±1%                                                |
| conversion rate               | 10ms (all channels)    |                                                    |
| module power supply           | DC24V±10%,150mA        |                                                    |

## 10-2. Terminal Description

### 10-2-1. Terminal Arrangement



### 10-2-2. Terminal Signals

| name           |     | function                                                                    |
|----------------|-----|-----------------------------------------------------------------------------|
| Terminal block | L+  | The external power supply provides 24V positive voltage to the ED module.   |
|                | M   | The external power supply provides a 24V negative voltage to the ED module. |
|                | A0  | Input terminal of the first PT100 channel                                   |
|                | A1  | Input terminal of the second PT100 channel                                  |
|                | C0  | A0, A1 input locations                                                      |
|                | AO0 | Terminal 1 of the DA analog current output                                  |
|                | AO1 | The second DA analog current output terminal                                |
|                | CO0 | AO0, AO1 output locations                                                   |

### 10-2-3. Connector Specifications

When wiring the module, its connectors must meet the following requirements:

- (1) The length of the stripping is 9mm;
- (2) Flexible conductors with tubular bare ends, 0.25-1.5mm<sup>2</sup>;
- (3) Flexible conductors with tubular pre-insulated ends, 0.25-0.5mm<sup>2</sup>.

## 10-3. Input and Output Definition Number Assignment

The XL series analog ED module operates without requiring I/O units, with converted values directly written to PLC registers. The register definitions for each channel are as follows:

| channel | PT signal |
|---------|-----------|
| CH0     | ID30000   |
| CH1     | ID30001   |
| channel | DA signal |
| CH0     | QD30000   |
| CH1     | QD30001   |

## 10-4. Work Mode Settings

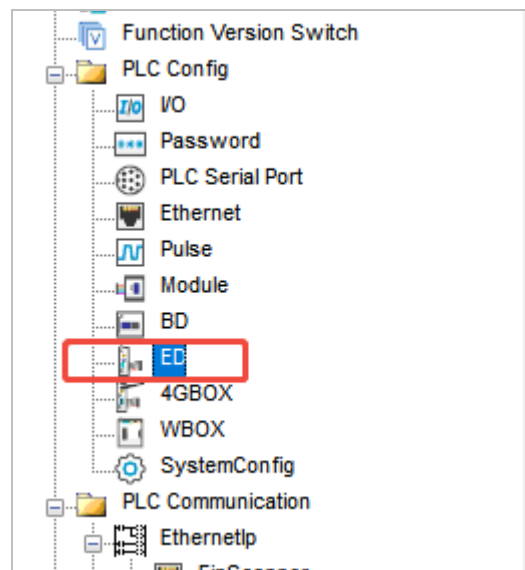
You can set the work mode in one of the following two ways (both methods are equivalent):

- 1: Configure through the settings panel
- 2: Set through the Flash register (FD)

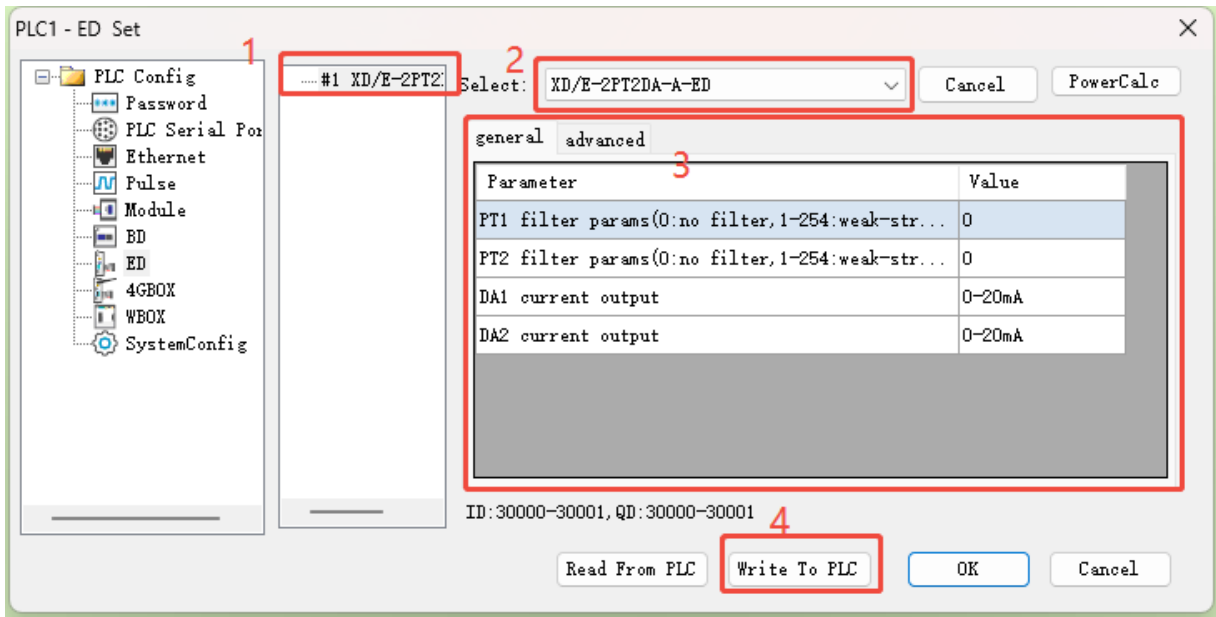
### 10-4-1. Configure the panel

**Use Xinje PLC programming software version 3.5.1 or later to configure the module.**

Open the programming software and click on the "ED Module" under "PLC Configuration" in the left engineering bar.



The following configuration panel appears. Select the corresponding module model and configuration information:



Step 1: Select the appropriate module model at the '2' position in the diagram.

Step 2: After completing Step 1, the corresponding model will appear at position "1".

Step 3: At position 3, you can select the filter coefficient and current output range for the corresponding channel.

Step 4: After completing the configuration, press '4' to program the PLC. Then power off and power on the PLC again. The configuration will take effect.

Note: The first-order low-pass filter method combines the current sampling value with the previous filtered output value to produce the effective filtered value. The filter coefficient, set by the user, ranges from 0 to 254. Higher values provide greater stability but may cause data lag. Therefore, setting it to 254 yields the strongest filtering effect and most stable data, while setting it to 1 results in the weakest filtering effect. The default value is 0 (no filtering).

### 10-4-2. Flash register settings

The extended ED module operates in current mode, with selectable current ranges of 0-20mA or 4-20mA, which are configured via the PLC's dedicated FLASH data register SFD, as shown below:

| ED module ID | configuration information address |
|--------------|-----------------------------------|
| #1           | SFD530~SFD539                     |

#### SFD Bit Definition

| register address |       | Bit7                               | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 | explain                       |
|------------------|-------|------------------------------------|------|------|------|------|------|------|------|-------------------------------|
| SFD530           | Byte0 | Filter coefficient of PT channel 1 |      |      |      |      |      |      |      | PT channel filter coefficient |
|                  | Byte1 | Filter coefficient of PT channel 2 |      |      |      |      |      |      |      |                               |
| SFD531           | Byte2 | continue to have                   |      |      |      |      |      |      |      |                               |
|                  | Byte3 | continue to have                   |      |      |      |      |      |      |      |                               |
| SFD532           | Byte4 | DA2                                |      |      |      | DA1  |      |      |      | Selects the                   |

| register address |              | Bit7             | Bit6             | Bit5             | Bit4                 | Bit3             | Bit2             | Bit1             | Bit0                 | explain                      |
|------------------|--------------|------------------|------------------|------------------|----------------------|------------------|------------------|------------------|----------------------|------------------------------|
|                  |              | continue to have | continue to have | continue to have | 0:0~20mA<br>1:4~20mA | continue to have | continue to have | continue to have | 0:0~20mA<br>1:4~20mA | output range for DA channels |
|                  | Byte5        | continue to have |                  |                  |                      |                  |                  |                  |                      |                              |
| SFD533~SFD539    | Byte6~Byte19 | continue to have |                  |                  |                      |                  |                  |                  |                      |                              |

Example: Set the working mode of the first and second channels in the ED module to 0-20mA, and set the temperature filter coefficients for these channels to 254.

Method 1:

You can configure it directly on the configuration panel, as shown in the figure above.

Method 2:

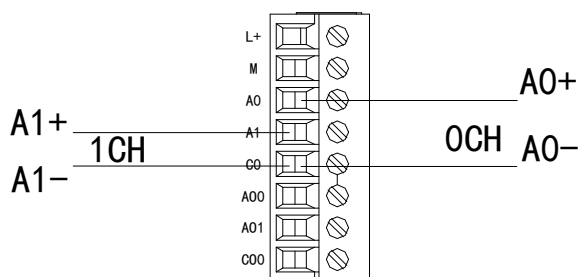
Set the SFD special register directly to the following value:

SFD530=FEFEH SFD531=0H SFD532=0011H

## 10-5. External Connections

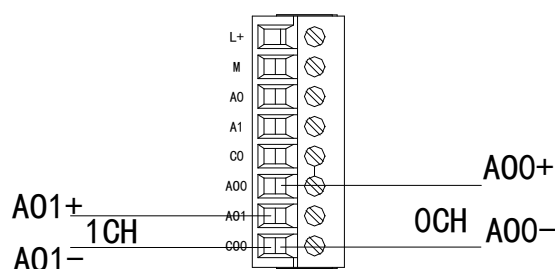
To avoid interference, the signal lines should be shielded when thermistor is connected.

### 10-5-1. Thermistor Temperature Input



Note: For a three-wire platinum thermistor, connect two wires of the same color to terminal C0, and the third wire to terminal A0 or A1.

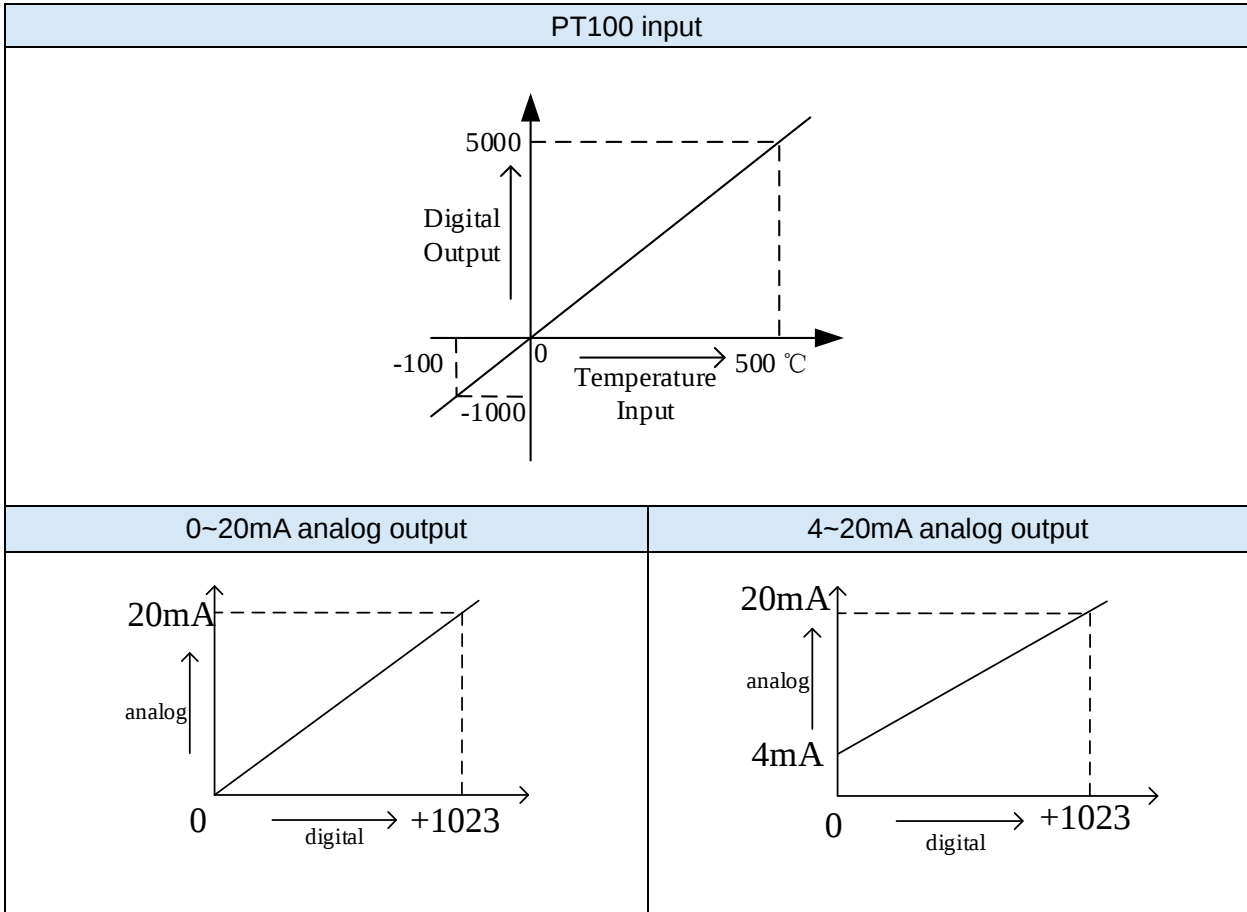
### 10-5-2. Single-ended Current Output



Note: The current output does not require a DC24V power supply in series!

# 10-6. Analog-to-Digital Conversion Diagram

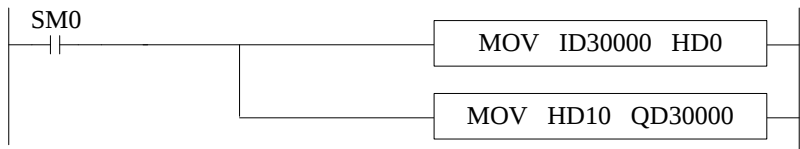
The relationship between input analog signals and converted digital values is shown in the table below:



# 10-7. Programming Examples

Example 1: Reads a temperature signal while simultaneously outputting a 0~20mA current signal.

The procedure is as follows:



**Explain:**

The SM0 is a normally ON coil that remains active throughout the PLC's operation.

The PLC initiates operation, reading the digital value (actual temperature × 10) from the first Pt channel into the HD0 register in real time, while simultaneously transmitting the digital value from HD10 to the QD30000 to generate the corresponding analog current signal.

# 11. Analog Temperature Module XL-2PT2DA-V-ED

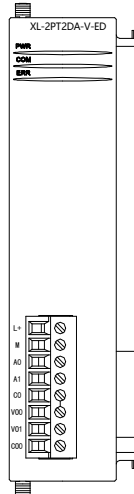
This chapter mainly introduces the specification of XL-2PT2DA-V-ED module, terminal description, input and output definition number assignment, working mode setting, external connection, analog to digital conversion diagram and related programming examples.

---

|                                                           |    |
|-----------------------------------------------------------|----|
| 11. Analog Temperature Module XL-2PT2DA-V-ED .....        | 78 |
| 11-1. Module Features and Specifications .....            | 79 |
| 11-1-1. Module Features .....                             | 79 |
| 11-1-2. Module Specifications .....                       | 79 |
| 11-2. Terminal Description .....                          | 80 |
| 11-2-1. Terminal Arrangement .....                        | 80 |
| 11-2-2. Terminal Signals .....                            | 80 |
| 11-2-3. Connector Specifications .....                    | 80 |
| 11-3. Input and Output Definition Number Assignment ..... | 80 |
| 11-4. Work Mode Settings .....                            | 81 |
| 11-4-1. Configure the panel .....                         | 81 |
| 11-4-2. Flash register settings .....                     | 82 |
| 11-5. External Connections .....                          | 83 |
| 11-5-1. Thermistor Temperature Input .....                | 83 |
| 11-5-2. Single-ended voltage output .....                 | 83 |
| 11-6. Module Conversion Chart .....                       | 84 |
| 11-7. Programming Examples .....                          | 84 |

## 11-1. Module Features and Specifications

The XL-2PT2DA-V-ED analog temperature control module processes two thermistor temperature signals and transmits them to the PLC main unit, while also outputting two analog voltage signals.



### 11-1-1. Module Features

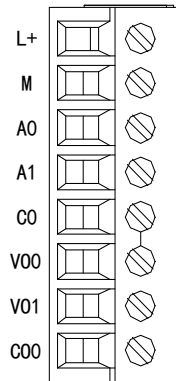
- 2-channel platinum thermistor input with Pt100 calibration.
- The temperature measurement range is -100 to 500°C, with an accuracy of 0.1°C.
- 2-channel analog output: voltage output mode.
- 10-bit high precision analog output.
- As a left expansion ED module for the XL series, it can connect up to one module on the left side of the PLC main unit.

### 11-1-2. Module Specifications

| project                       | Temperature Input (PT) | Analog voltage output (V)                             |
|-------------------------------|------------------------|-------------------------------------------------------|
| Temperature measurement range | -100~500°C             | —                                                     |
| analog output range           | —                      | 0~5V, 0~10V<br>(external load resistance:<br>2KΩ~1MΩ) |
| Digital input range           | —                      | 0~1023                                                |
| digital output range          | -1000~5000             | -                                                     |
| resolution ratio              | 0.1°C                  | 1/1023(10Bit)                                         |
| comprehensive accuracy        | Full scale ±0.8%       | ±1%                                                   |
| conversion rate               | 10ms (all channels)    |                                                       |
| module power supply           | DC24V±10%, 150mA       |                                                       |

## 11-2. Terminal Description

### 11-2-1. Terminal Arrangement



### 11-2-2. Terminal Signals

| name           |     | function                                                                    |
|----------------|-----|-----------------------------------------------------------------------------|
| Terminal block | L+  | The external power supply provides 24V positive voltage to the ED module.   |
|                | M   | The external power supply provides a 24V negative voltage to the ED module. |
|                | A0  | Input terminal of the first Pt100 sensor                                    |
|                | A1  | The second Pt100 input terminal                                             |
|                | C0  | A0, A1 input locations                                                      |
|                | VO0 | Terminal 1 of the DA analog voltage output                                  |
|                | VO1 | The second DA analog voltage output terminal                                |
|                | CO0 | VO0, VO1 output locations                                                   |

### 11-2-3. Connector Specifications

When wiring the module, its connectors must meet the following requirements:

- (1) The length of the stripping is 9mm;
- (2) Flexible conductors with tubular bare ends, 0.25-1.5mm<sup>2</sup>;
- (3) Flexible conductors with tubular pre-insulated ends, 0.25-0.5mm<sup>2</sup>.

## 11-3. Input and Output Definition Number Assignment

The XL series analog ED module operates without requiring I/O units, with converted values directly written to PLC registers. The register definitions for each channel are as follows:

| channel | PT signal |
|---------|-----------|
| CH0     | ID30000   |
| CH1     | ID30001   |
| channel | DA signal |
| CH0     | QD30000   |
| CH1     | QD30001   |

## 11-4. Work Mode Settings

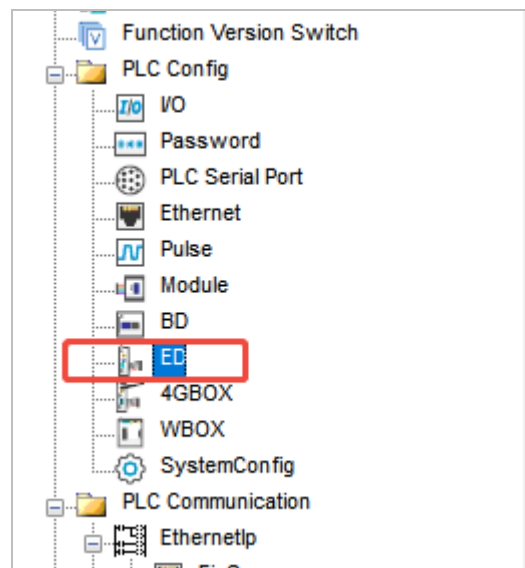
You can set the work mode in one of the following two ways (both methods are equivalent):

- 1: Configure through the settings panel
- 2: Set through the Flash register (FD)

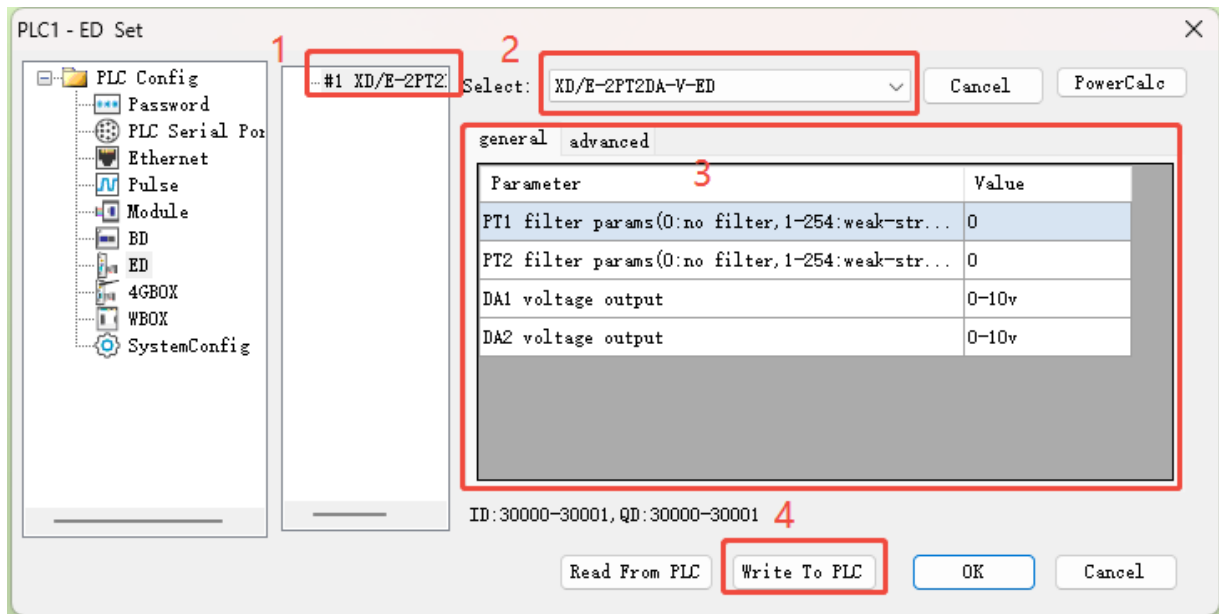
### 11-4-1. Configure the panel

**Use Xinje PLC programming software version 3.5.1 or later to configure the module.**

Open the programming software and click on the "ED Module" under "PLC Configuration" in the left engineering bar.



The following configuration panel appears. Select the corresponding module model and configuration information:



Step 1: Select the appropriate module model at the '2' position in the diagram.

Step 2: After completing Step 1, the corresponding model will appear at position "1".

Step 3: At position 3, you can select the filter coefficients and voltage output range for the corresponding channel.

Step 4: After completing the configuration, press '4' to program the PLC. Then power off and power on the PLC again. The configuration will take effect.

Note: The first-order low-pass filter method combines the current sampling value with the previous filtered output value to produce the effective filtered value. The filter coefficient, set by the user, ranges from 0 to 254. Higher values provide greater stability but may cause data lag. Therefore, setting it to 254 yields the strongest filtering effect and most stable data, while setting it to 1 results in the weakest filtering effect. The default value is 0 (no filtering).

## 11-4-2. Flash register settings

The extended ED module operates in voltage mode with selectable ranges of 0-10V or 0-5V, configured via the PLC's dedicated FLASH data register SFD as shown below.

| ED module ID | configuration information address |
|--------------|-----------------------------------|
| #1           | SFD530~SFD539                     |

SFD Bit Definition

| register address |       | Bit7                               | Bit6             | Bit5             | Bit4              | Bit3             | Bit2             | Bit1             | Bit0              | explain                       |
|------------------|-------|------------------------------------|------------------|------------------|-------------------|------------------|------------------|------------------|-------------------|-------------------------------|
| SFD530           | Byte0 | Filter coefficient of PT channel 1 |                  |                  |                   |                  |                  |                  |                   | PT channel filter coefficient |
|                  | Byte1 | Filter coefficient of PT channel 2 |                  |                  |                   |                  |                  |                  |                   |                               |
| SFD531           | Byte2 | continue to have                   |                  |                  |                   |                  |                  |                  |                   |                               |
|                  | Byte3 | continue to have                   |                  |                  |                   |                  |                  |                  |                   |                               |
| SFD532           | Byte4 | DA2                                |                  |                  |                   | DA1              |                  |                  |                   | Selects the output range for  |
|                  |       | continue to have                   | continue to have | continue to have | 0:0~10V<br>1:0~5V | continue to have | continue to have | continue to have | 0:0~10V<br>1:0~5V |                               |

| register address |              | Bit7             | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 | explain     |
|------------------|--------------|------------------|------|------|------|------|------|------|------|-------------|
|                  | Byte5        | continue to have |      |      |      |      |      |      |      | DA channels |
| SFD533~SFD539    | Byte6~Byte19 | continue to have |      |      |      |      |      |      |      |             |

Example: Set the operating mode of the first and second channels of the ED module to 0-10V, and set the temperature filter coefficients for these channels to 254.

Method 1:

You can configure it directly on the configuration panel, as shown in the figure above.

Method 2:

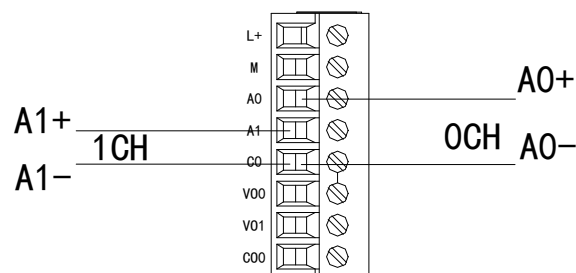
Set the SFD special register directly to the following value:

SFD530=FEFEH SFD531=0H SFD532=0011H

## 11-5. External Connections

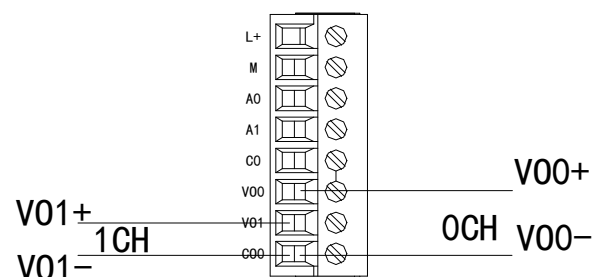
To avoid interference, the signal lines should be shielded when thermistor is connected.

### 11-5-1. Thermistor Temperature Input



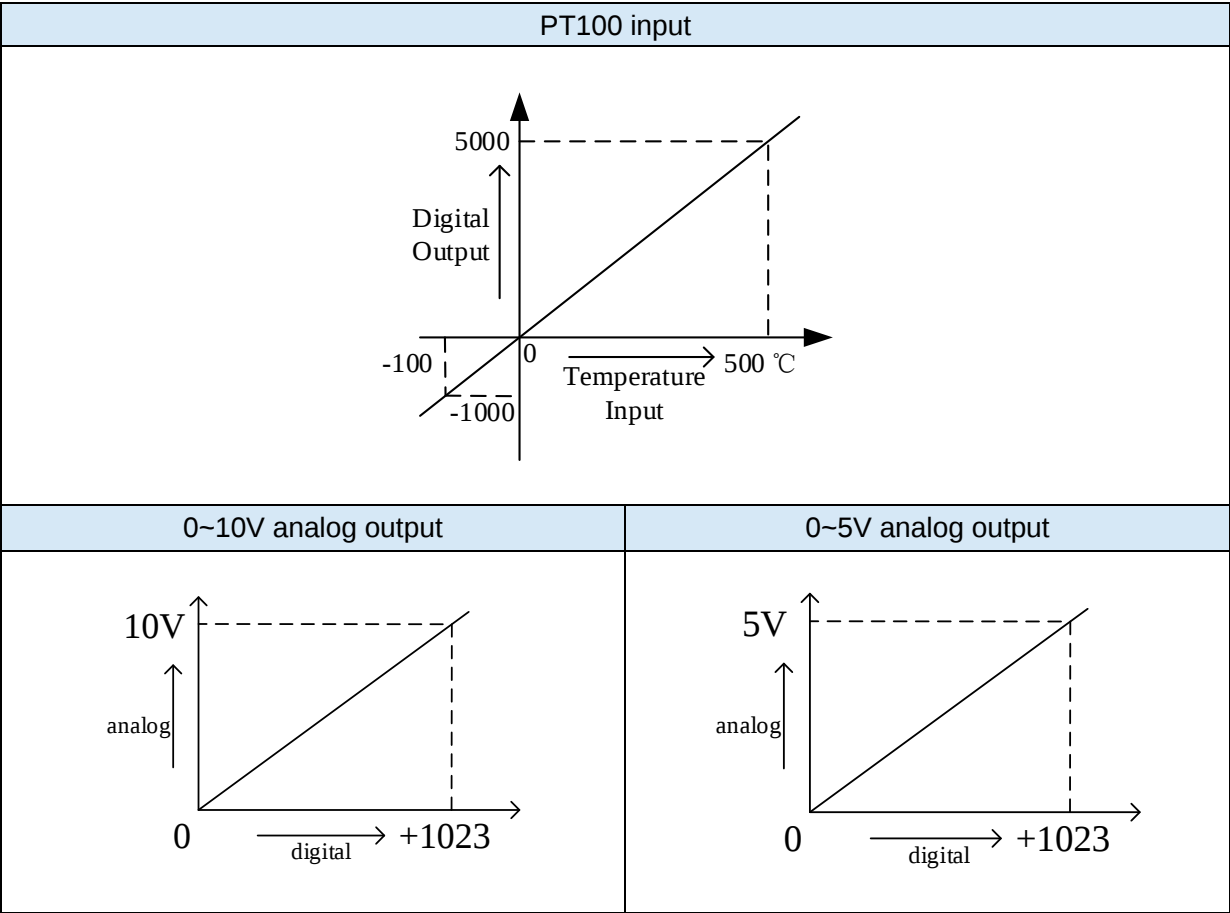
Note: For a three-wire platinum thermistor, connect two wires of the same color to terminal C0, and the third wire to terminal A0 or A1.

### 11-5-2. Single-ended voltage output



### 11-6. Module Conversion Chart

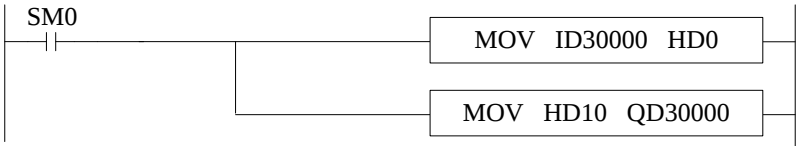
The relationship between input analog signals and converted digital values is shown in the table below:



### 11-7. Programming Examples

Example 1: Reads a temperature signal while simultaneously outputting a 0-10V voltage signal.

The procedure is as follows:



**Explain:**

The SM0 is a normally ON coil that remains active throughout the PLC's operation.

The PLC initiates operation, reading the digital value (actual temperature × 10) from the first PT channel into the HD0 register in real time, while simultaneously transmitting the digital value from HD10 to the QD30000 to generate the corresponding analog voltage signal.

# 12. Communication expansion module XL-NES-ED

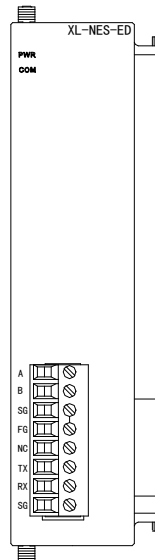
This chapter mainly introduces the functions and characteristics of the XL-NES-ED module, the terminal description, and the communication configuration.

---

|                                                    |    |
|----------------------------------------------------|----|
| 12. Communication expansion module XL-NES-ED ..... | 85 |
| 12-1. Module Functions and Features.....           | 86 |
| 12-1-1. Module Features.....                       | 86 |
| 12-2. Terminal Description.....                    | 86 |
| 12-2-1. Terminal Arrangement .....                 | 86 |
| 12-2-2. Terminal Signal .....                      | 87 |
| 12-2-3. Connector Specifications.....              | 87 |
| 12-3. Communication Configuration.....             | 87 |
| 12-3-1. Configuration in editing software.....     | 87 |
| 12-3-2. Configuration in XINJEConfig.....          | 89 |

## 12-1. Module Functions and Features

The XL-NES-ED communication expansion module adds either an RS232 or RS485 port to XL series PLCs, but only one port can be used at a time.

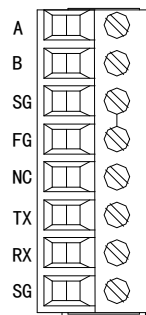


### 12-1-1. Module Features

- The XL series expansion communication ED module is designed to extend RS232 or RS485 communication ports.
- The XL-NES-ED can be used for left-side expansion of XL series PLCs, but only one of the two communication protocols—RS232 or RS485—is supported.
- As a left expansion ED module for the XL series, it can connect up to one module on the left side of the PLC main unit.

## 12-2. Terminal Description

### 12-2-1. Terminal Arrangement



## 12-2-2. Terminal Signal

| name           |    | function                                      |
|----------------|----|-----------------------------------------------|
| Terminal block | A  | RS485 communication 485+ terminal             |
|                | B  | RS485 communication 485 terminal              |
|                | SG | signal ground                                 |
|                | FG | earth terminal                                |
|                | NC | air terminal                                  |
|                | TX | RS232 communication data transmitter terminal |
|                | RX | RS232 communication data receiving terminal   |
|                | SG | signal ground                                 |

## 12-2-3. Connector Specifications

When wiring the module, its connectors must meet the following requirements:

- (1) The length of the stripping is 9mm;
- (2) Flexible conductors with tubular bare ends, 0.25-1.5mm<sup>2</sup>;
- (3) Flexible conductors with tubular pre-insulated ends, 0.25-0.5mm<sup>2</sup>.

## 12-3. Communication Configuration

To configure the parameters of the XL series extended communication ED module, you must use the Xinje PLC programming software version 3.5.1 or later, or the XINJEConfig configuration tool.

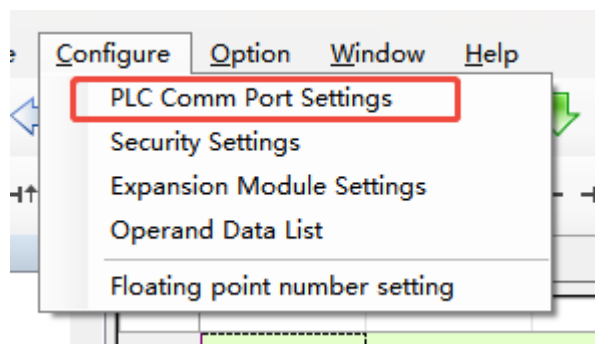
If the XL-NES-ED is configured for MODBUS communication only, you can either configure the communication parameters directly in the XINJE PLC programming software version 3.5.1 or later, or use the XINJEConfig tool for configuration.

If XL-NES-ED is configured for X-NET bus communication, use the XINJEConfig tool to configure it.

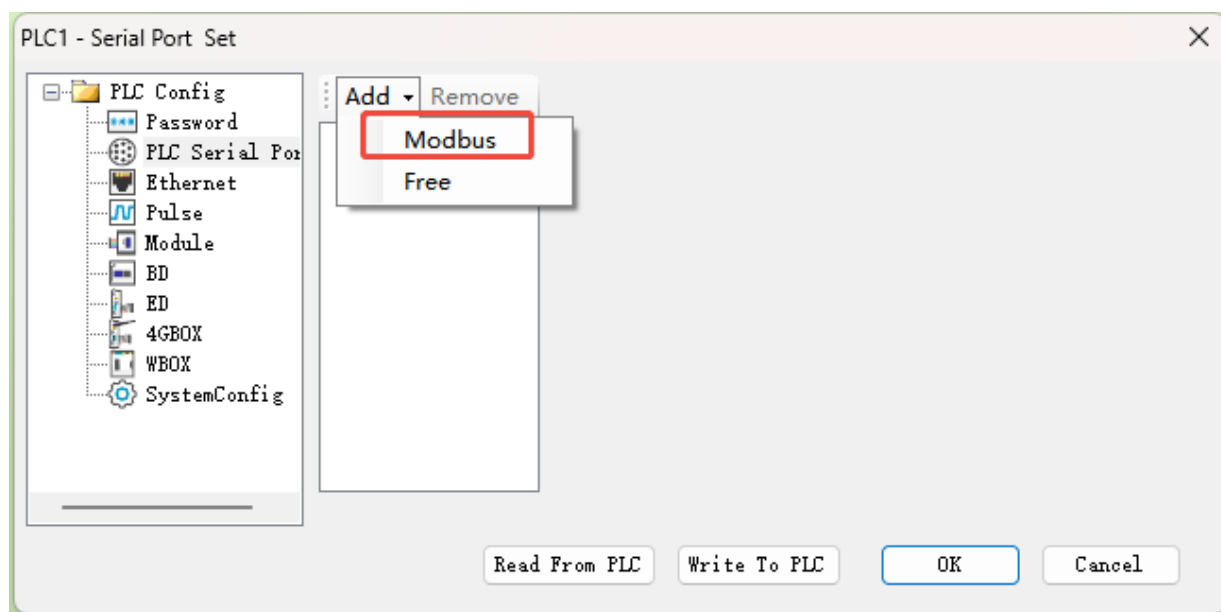
### 12-3-1. Configuration in editing software

For Xinje PLC programming software versions V3.5.1 and above, the ED module configuration for RS232 or RS485 communication is as follows:

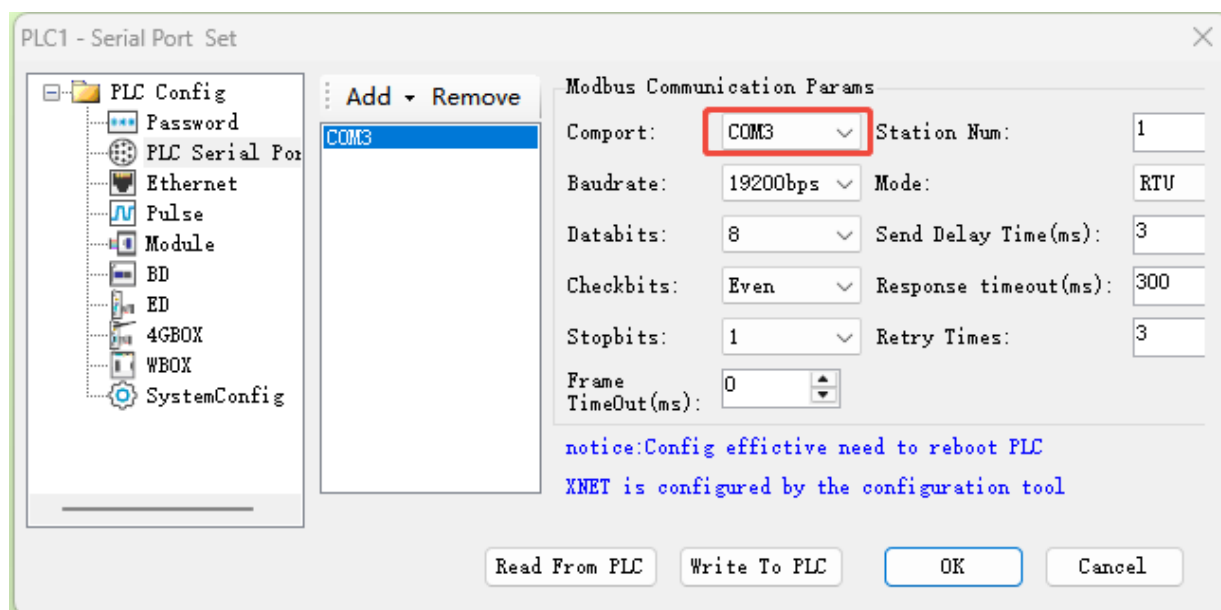
1. In the Xinje PLC programming software, select "PLC Settings (C)" → "PLC Serial Port Settings" as shown in the figure below:



2. In the pop-up window, click the "Add" button and select "Modbus Communication", as shown in the figure below:



3. In the pop-up window, select "COM3" as the port number, and adjust other parameters as needed. After configuring the communication settings, click the "Write to PLC" button below, then power off and power on the PLC. The configured parameters will take effect.



## 12-3-2. Configuration in XINJEConfig

The XNETConfig tool supports configuration for both Modbus and XNET communication modes in the ED module. This section demonstrates the XNETConfig software configuration using the XNET method.

### 1. Installation of XINJEConfig

Typically, the XINJEConfig installation file is included in the software package. Simply double-click the installation file "XnetSetup.exe" and follow the installation wizard to complete the setup.

### 2. How to Use XINJEConfig

The two XL3-16T units are used to communicate with the X-NET through the XL-NES-ED.

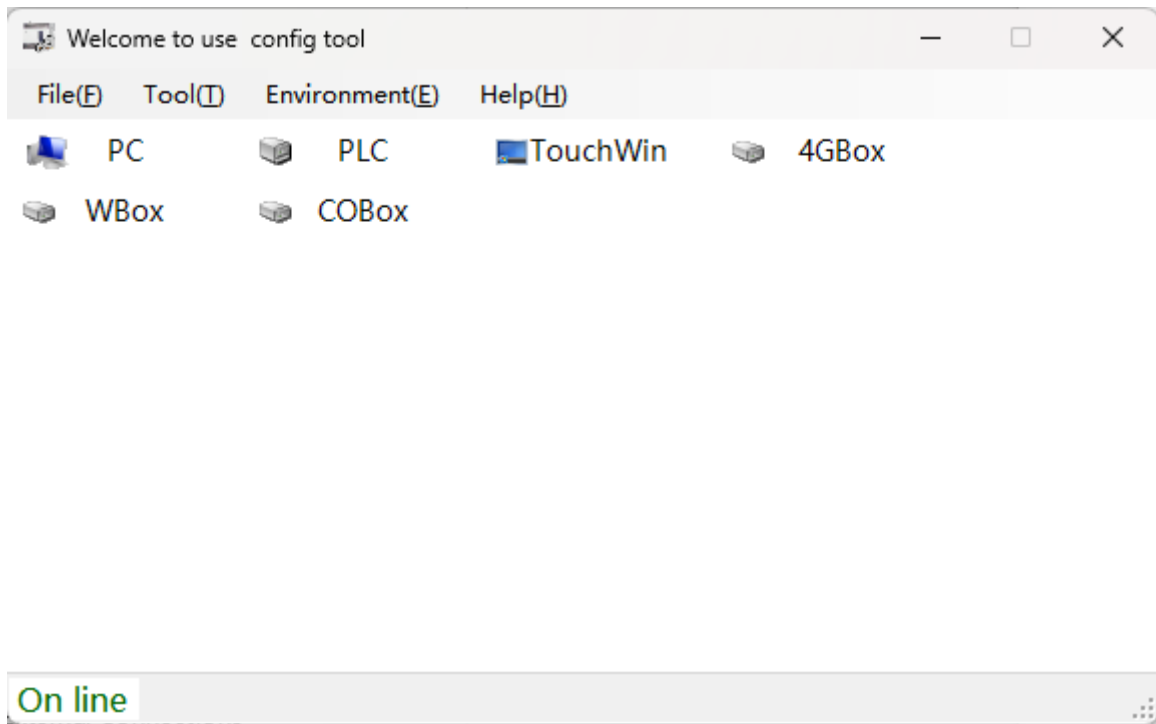
Note: When configuring the PLC with software, first connect the PLC to the computer using the USB download cable. This cable is the same one used for the touchscreen, as shown in the figure below.



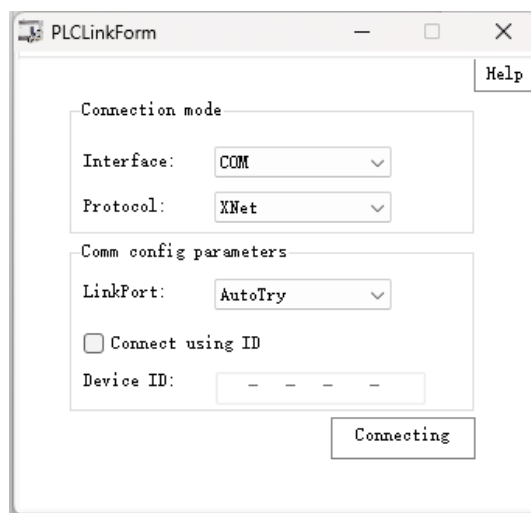
The USB cable requires drivers to function. These drivers are usually included in the software package. Double-click the installation file "VirtualCOMSetUp.exe" and follow the installation wizard to complete the setup.



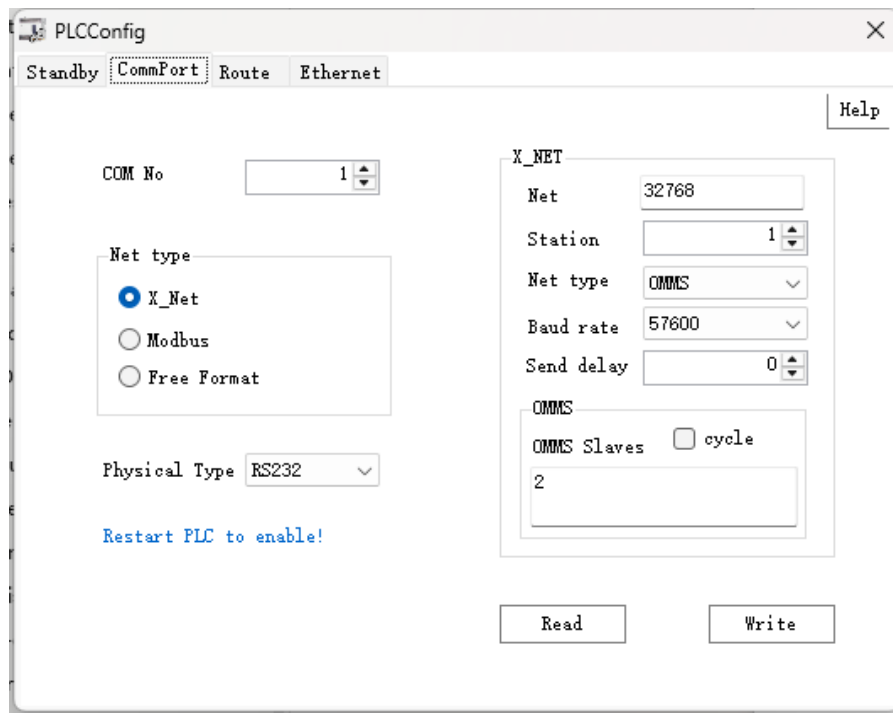
(1) Double-click the desktop shortcut  icon or open the "XINJEConfig" software from the Start menu. The "Welcome to XINJE Device Configuration Tool" window will appear:



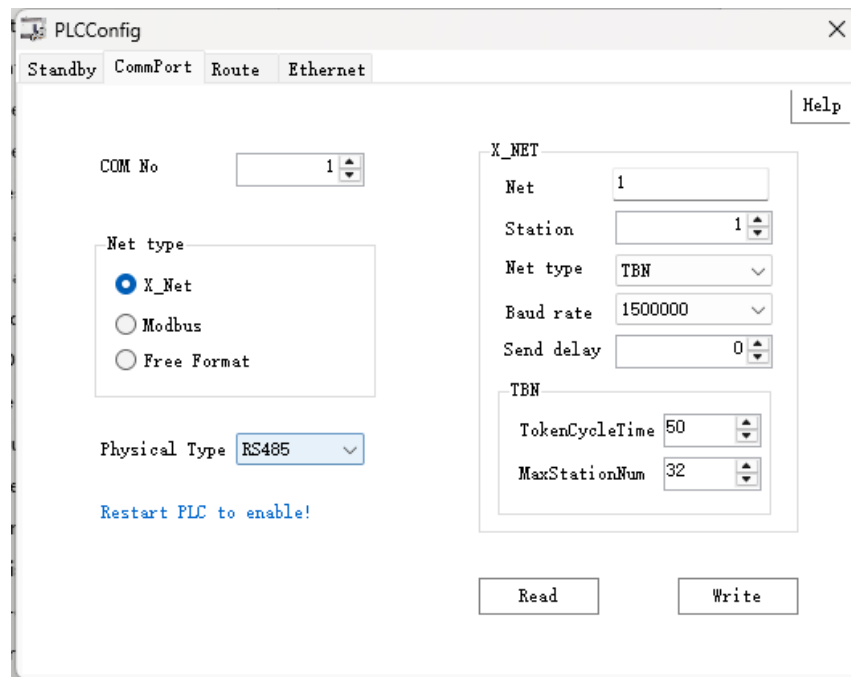
(2) Click "PLC" to open the "PLC Connected Devices" window.



(3) In the "Port to Find" field, select the connection port between your computer and the PLC. Choose XNet as the connection protocol, then click "Find Device" to open the "PLC Configuration" window:



(4) Since the XL3-16T can only expand one ED module (COM3 port), the XL-NES-ED is also configured at Serial Port 3. Therefore, we select 3 as the Serial Port number. For X-NET communication, we choose X-Net as the Network Type and RS485 as the Physical Layer.



**Network ID:** This refers to the identifier for the communication network formed by two PLCs that need to communicate. Devices within the same network must share identical network IDs, and we designate this communication network as Network 1.

**Site number** refers to the unique identifier assigned to each PLC within the same network. For example, PLC A is designated as Site 1, while PLC B is designated as Site 2.

**Network type:** Three options are available. For PLC-to-PLC communication, select TBN. For screen-to-PLC communication, choose either OMMS or TBN. For PLC-to-servo communication,

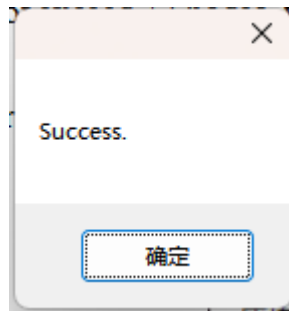
select OMMS. Note: When PLC-to-PLC communication is used, TBN must be selected. All devices within the same network must have the same network type.

Baud rate: 1.5M is selected here.

Token round-trip time: This measures the duration for a network node to complete one full cycle, measured in milliseconds (ms). With only two PLCs in this setup, we set it to 10ms.

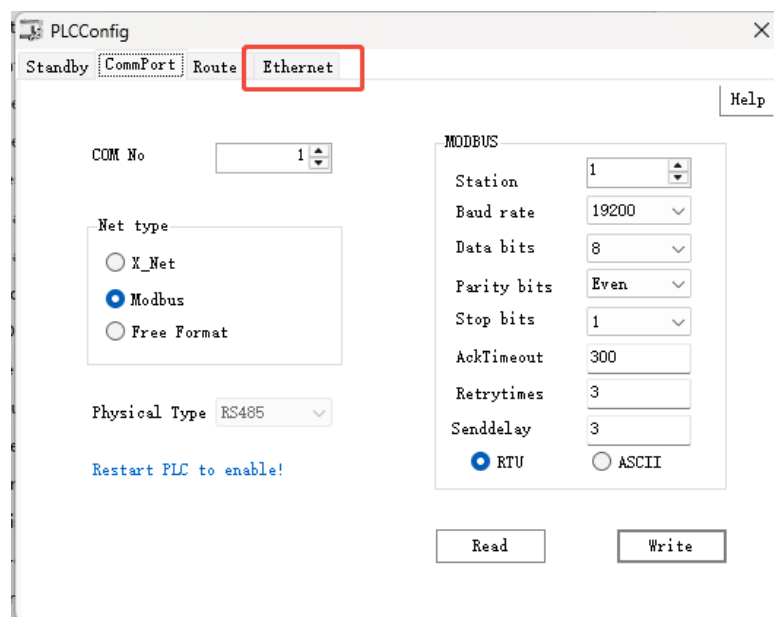
Maximum number of sites: This refers to the maximum number of devices a network can support. As X-NET communication cannot exceed 32 nodes, we set this limit to 32.

(5) Click Write Configuration. The system will confirm the configuration was written successfully.

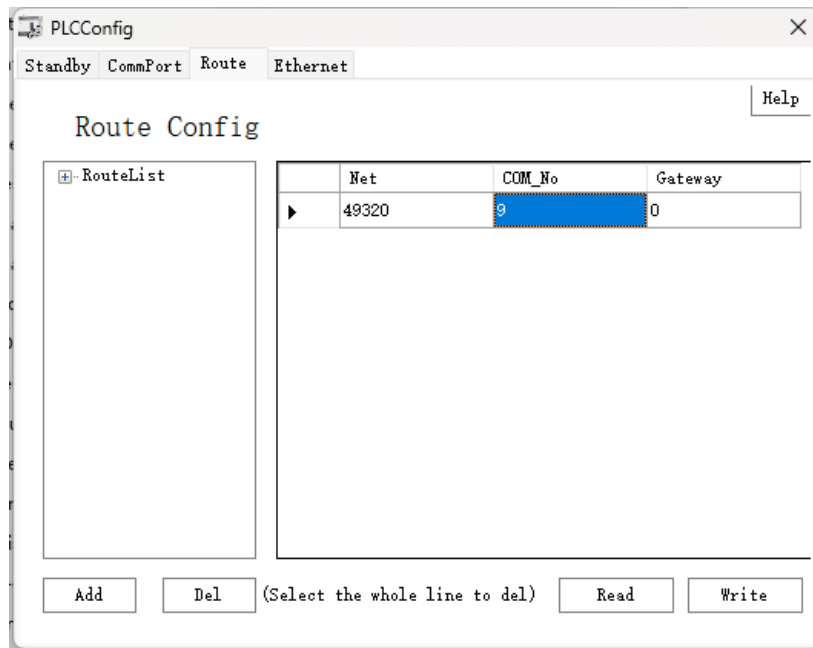


(6) Click OK, then power off and power on the PLC to apply the serial port configuration.

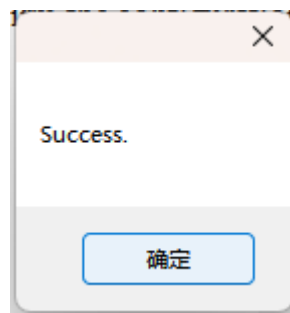
(7) In the PLC Configuration window, click Routing Table Configuration.



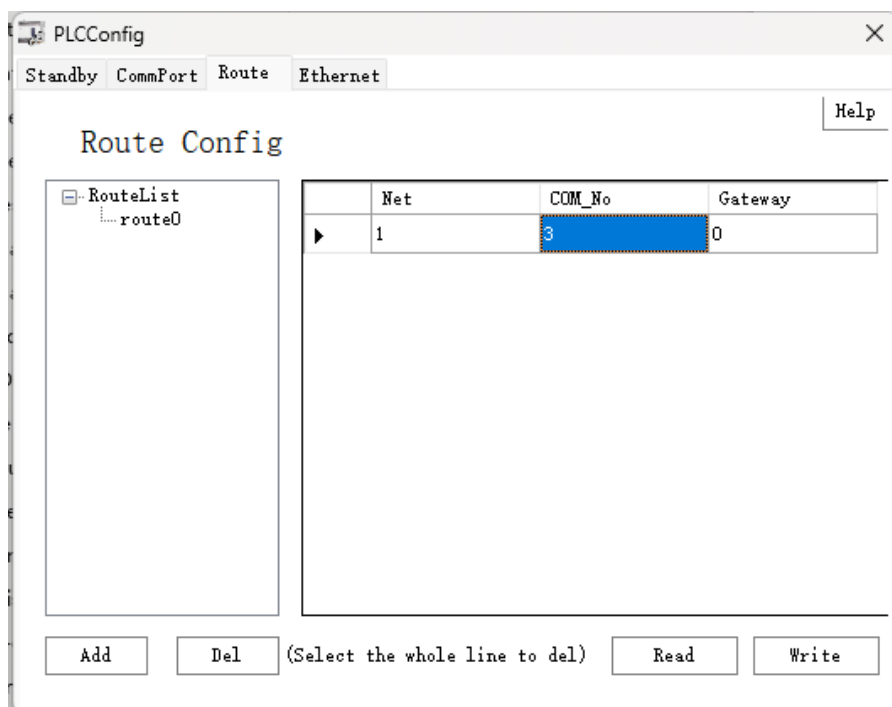
(8) The "Routing Table Configuration" window appears.



(9) Click "Read" to confirm the configuration is ready.

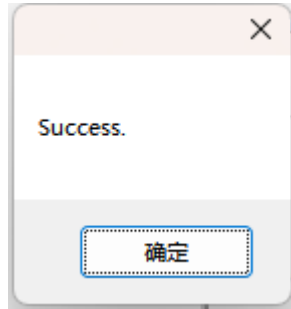


(10) Click "OK" to display the subnet routing configuration options in the "Routing Table Configuration" window.



The "NET" here refers to the network number configured in the "Serial Port Configuration" window. "COM\_NO" indicates the physical interface for PLC communication, specifically the serial port number. As we are using the extended XL-NES-BD, the communication port number is 3. The "Gateway" setting defaults to 0, and any unused configuration items can be omitted.

(11) After configuration, click "Write" and the system will confirm the configuration was successfully written.



(12) Click 'OK' to terminate the configuration tool, then power off and power on the PLC. The serial port configuration is now complete.

Note: After replacing the device, if you need to reconfigure it, you must re-find the device by repeating step (2).

For detailed information on X-NET communication and instruction explanations, please refer to the manual "X-NET Bus User Manual". For Modbus communication specifics, consult the relevant chapters in the manual "XD/XL Series Programmable Controller User Manual [Basic Instructions Section]".

# Manual update log

The data number of this manual is recorded in the lower right corner of the cover of the manual.  
The information about the revision of the manual is summarized as follows:

| order number | Document ID       | Update content                                                                                                                      |
|--------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 1            | PL08 20230531 1.0 | 1. Update the configuration steps for the XL-NES-ED module<br>2. Update the temperature-related section descriptions in all modules |



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