XINJE

Extension ED module

XL-2AD2PT-A-ED

Fast manual

Thanks for purchasing XINJE XL series PLC and extension module. This manual will introduce the electric features and using method of XL series extension ED module. Please read this manual carefully before using the products, make sure the wiring operation is safe.

➡ **Features of analog extension module**

XL-2AD2PT-A-ED

- ➤ 2 channels analog input: current input mode, 0~20mA or 4~20mA.
- ➤ 2 channels PT100 temperature input: temperature range -100~500℃, precision 0.1℃.
- ➤ 12-bit high precision analog input.
- ➤ As the special function ED module of XL, XL series PLC can connect 1 XL-2AD2PT-A-ED module.

Safety precautions

■ Control system design attentions

⚠⚠ Dangerous!

◆ Make sure design the safety circuit, to ensure that the control system can still work safety when the external power supply cut off or PLC broken.

◆ Make sure set emergency braking circuit, protection circuit, interlock circuit of forward-reverse running in PLC external circuit and upper-lower limit switch to prevent from machine damage.

◆ In order to make the equipment safe operation, please design external protection circuit for important output signal.

◆ PLC CPU will close all the output when detecting the system error; the output will lose control when the PLC circuit has problem. Please design suitable external control circuit to ensure the device working normally.

◆ If the PLC relay or transistor unit is broken, the output cannot be ON or OFF.

◆ The PLC is designed for indoor environment, the lightning protection must be installed in the power supply system to avoid PLC and other device damage.

■ Installation and wiring attentions

⚠⚠ Dangerous!
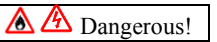
◆ Do not use the PLC in the following environment: dust, soot, corrosive gases, flammable gas, high temperature, condensation, vibration, impact, lightning, fire.

◆ Do not let the metal scrap and wire head drop into the ventilation hole of PLC, otherwise it will cause fire or error operation.

◆ Do not cover the ventilation hole of PLC, otherwise it will cause fire, error operation.

◆ The I/O wiring must be fixed enough, otherwise the bad contactor will cause fault.

⚠ Attention!
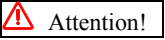
◆ It can use external power supply for extension module DC24V power.

◆ Please use shield cable for high frequency I/O wiring to avoid interference.

■ Run and maintenance

⚠⚠ Dangerous!
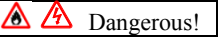
◆ Please connect all the cable include PLC, extension module and BD board after shutting down the power supply.

◆ Please operate as the manual for online operation, forced output, RUN, STOP.

⚠ Attention!
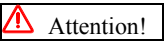
◆ Please discard the product as industrial waste.

◆ Make sure cut off the power supply when installing or uninstalling the extension card.

Product information

■ Naming rule

$$\underset{①}{XL} - \underset{②③}{2\ AD}\ \underset{④⑤}{2\ PT} - \underset{⑥}{A} - \underset{⑦}{ED}$$

①	Product series	XL: XL series extension module
②	Analog input channel: 2: 2 channels	
③	Analog input	AD: analog input
④	Temperature input channel: 2: 2 channels	
⑤	Temperature input	PT: PT100 temperature input
⑥	I/O type	A: current type for input
⑦	Module type	ED: left extension ED module

■ Basic parameters

XL series PLC can connect 1 extension ED module, the type is not limited.

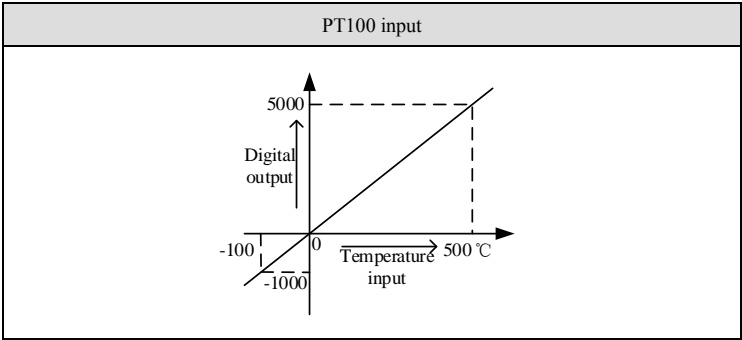**Table 1: analog extension module XL-2AD2PT-A-ED general specifications**

Item	Specifications
Using environment	No corrosive gas
Environment temperature	0℃~60℃
Storage temperature	-20~70℃
Environment humidity	5~95%RH
Storage humidity	5~95%RH
Installation	Fix with M3 screw or install on the rail DIN46277(width 35mm)

Table 2: analog extension module XL-2AD2PT-A-ED I/O precision

Item	Analog voltage input (V)	Temperature input (PT)
Analog input range	0~20mA, 4~20mA	—
Temperature input range	—	-100~500℃
Max input range	0~40mA	—
Digital output range	12-bit binary number (0~4095)	-1000~5000
Resolution	1/4095(12Bit)	0.1℃
integrated precision	1%	±0.8% of the full scale
Transformation speed	10ms/1 channel	10ms/1 channel
Power supply for analog	DC24V±10%, 150mA	

**Table 3: analog extension module XL-2AD2PT-A-ED AD transformation diagram**

The relationship between analog input and transformed digital value	
0~20mA analog input	4~20mA analog input
+4095 ... / ... 0 → 20mA (digital / analog)	+4095 ... / ... 0 4mA → 20mA (digital / analog)

PT100 input

5000
Digital output
-100 ... 0 ... 500℃ Temperature input
-1000

Product appearance

Here listed I/O terminal configurations of XL series extension module XL-2AD2PT-A-ED.

■ Product structure

Module type
LED light
XL-2AD2PT-A-ED
PWR / COM / ERR
Wiring terminals
L+ / M / AI0 / AI1 / CI0 / A0 / A1 / C0
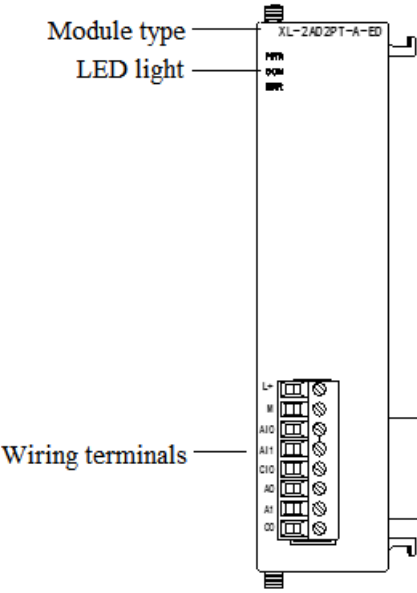
Each part name:

Name		Function
Indicator light	PWR	The LED lights when the ED module has power supply
	COM	The LED lights when the ED module communication port works well
	ERR	The LED lights when the ED module has error
Wiring terminal	L+	ED module external power supply 24V +
	M	ED module external power supply 24V -
	AI0	Channel 1 analog input
	AI1	Channel 2 analog input
	CI0	AI0, AI1 ground
	A0	Channel 1 PT100 input
	A1	Channel 2 PT100 input
	C0	PT1, PT2 ground

◆ **Terminal specifications**

When wiring the module, its connector shall meet the following requirements:

(1) stripping length: 9mm;

(2) flexible conductor with tubular bare end 0.25-1.5mm²;

(3) flexible conductor with tubular pre-insulated end 0.25-0.5 mm².

## Product dimension and installation

■ Installation

Do not install the module in below environment:

- Direct sunlight

- Environment temperature out of range 0-50℃
- Environment humidity out of range 35%-85% RH
- Condensation as severe changes in temperature
- Corrosive gas and flammable gas
- Dust, iron filing, salt, fume
- Vibration and impact
- Spray oil, water and medicine
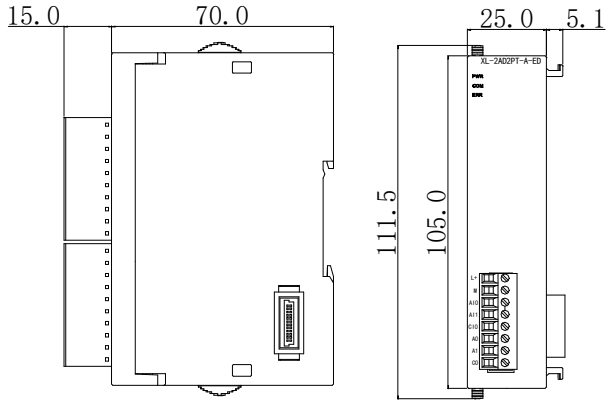- Strong magnetic field and strong electric field

XL series extension ED module can be installed in com3 port of XL series PLC.

Note: please cut off the power before operation!

COM3
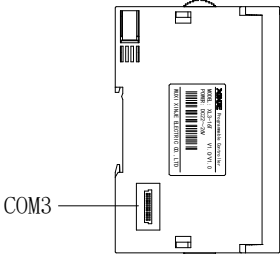
■ Product dimension (Unit: mm)

XL series extension ED module dimension is shown as below:

15.0   70.0   25.0 5.1
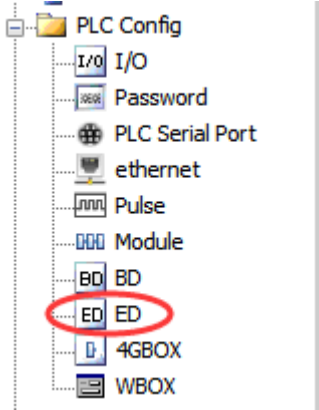XL-2AD2PT-A-ED
111.5 / 105.0

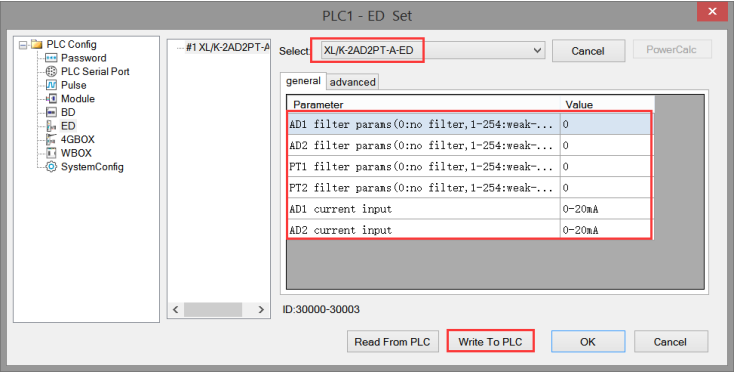## Electric design reference

■ I/O address

XL series extension ED module will not occupy I/O unit, the transformed value is stored in PLC register. The following is the PLC register corresponding to each channel.

Channel	AD signal
0CH	ID30000
1CH	ID30001

Channel	PT signal
0CH	ID30002
1CH	ID30003

■ Working mode setting

- PLC Config
  - I/O I/O
  - Password
  - PLC Serial Port
  - ethernet
  - Pulse
  - Module
 - BD BD
  - ED ED
  - 4GBOX
  - WBOX

Steps:

1. open the XDPpro software, find the left project bar, click PLC config/ED.

2. choose the correct module type.

3. set the module parameters such as voltage input range.

4. click write to PLC, then re-power on the PLC to make the setting effective.

Note: first-order low-pass filtering weighted this sampled value with last filter output value, and got the effective filtering value. The filter coefficient is set by user, the range is 0-254, 0 means no filter.
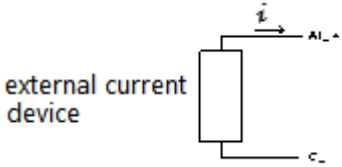
■ **External connection**

Please use shield cable to avoid interference, and single point connect to ground for the shield layer.
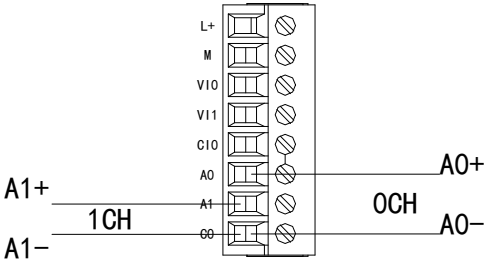
◆ **Current single-ended input**
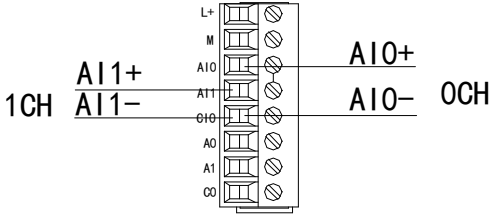
XL-2AD2PT-A-ED current input side wiring diagram:


◆ **PT100 temperature input**

Programming example

Example: it needs to collect one channel pressure sensor signal (pressure sensor performance parameter: pressure range 0Mp~10Mp, output signal range 4~20mA), and real-time read one channel of PT100 temperature signal.

Analysis: as the pressure sensor testing range is 0Mp~10Mp, and related analog output is 4~20mA, the ED module AD transformation range is 0~4095. So 0Mp~10Mp is related to digital range 0~4095. 10Mp/4096=0.002442 is the pressure value related to digital value 1. So the real-time pressure=ID register value * 0.002442. For example, ID register value is

1023, so the pressure is 2.5Mp.
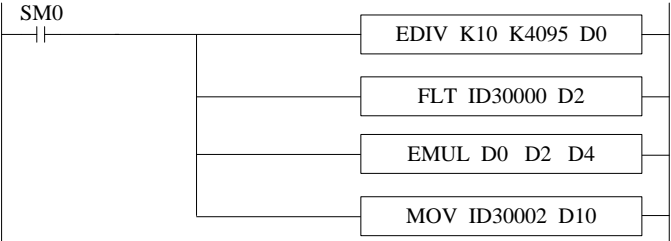
Note: please use floating number for calculation, otherwise the calculation precision will be error!

Explanation:

SM0 is normally ON coil, it will be ON when PLC is running.

When the PLC starts to run, the analog quantity acquisition first calculates the pressure value corresponding to each digit 1 of the digital quantity collected by the expansion module, and then converts the digital quantity (integer) collected in the ID30000 register into a floating point number. Therefore, as long as the real-time value collected in the ID30000 register of the expansion module is multiplied by the pressure value corresponding to each digit 1 of the digital quantity collected by the expansion module, the current real-time pressure value can be calculated.