

Extension ED module

XL-2AD2DA-V-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-2AD2DA-V-ED

- ➤ 2 channels analog input: voltage input mode, 0~5V or 0~10V.
- 2 channels analog output: voltage output mode, 0~5V or 0~10V.
- 12-bit high precision analog input, 10-bit high precision analog output.
- As the special function ED module of XL, XL series PLC can connect 1 XL-2AD2DA-V-ED module.

Safety precautions

■ Control system design attentions



- ◆ 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 forwardreverse 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



- ◆ 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



- ♦ Please connect all the cable include PLC, extension module and BD board after shutting
- ◆ Please operate as the manual for online operation, forced output, RUN, STOP.
- Attention!

Product information

- Please discard the product as industrial waste.
- ◆ Make sure cut off the power supply when installing or uninstalling the extension card.

■ Naming rule

<u>XL-2AD 2 DA - V - ED</u>

2 3 4 5 6 7

Product series XL: XL series extension module

Analog input channel: 2: 2 channels

AD: analog input

Analog output channel: 2: 2 channels

Analog output DA: analog output I/O type V: voltage type for input and output

Module type ED: left extension ED module

■ Basic parameters

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

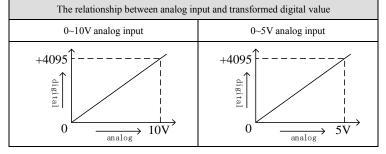
Table 1: analog extension module XL-2AD2DA-V-ED general specifications

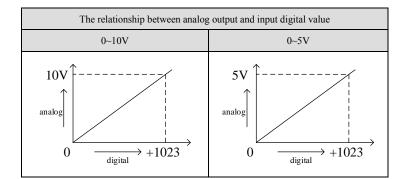
| Item | Specifications |
|-------------------------|---|
| Using environment | No corrosive gas |
| Environment temperature | 0°C~60°C |
| Storage temperature | -20~70°C |
| Environment humidity | 5~95%RH |
| Storage humidity | 5~95%RH |
| Installation | Fix with M3 screw or install on the rail DIN46277(width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

Table 2: analog extension module XL-2AD2DA-V-ED I/O precision

| Table 2: analog extens | Table 2: analog extension module AL-ZADZDA-V-ED I/O precision | | | | |
|------------------------|---|---|--|--|--|
| Item | Analog voltage input (V) | Analog voltage output (V) | | | |
| Analog input | 0~5, 0~10V | | | | |
| range | 0~3, 0~10 V | _ | | | |
| Max input range | DC±15V | _ | | | |
| Analog output | | 0~5, 0~10V | | | |
| range | | External load resistor $2K\Omega\sim1M\Omega$ | | | |
| Digital input | | 10-bit binary value (0~1023) | | | |
| range | | | | | |
| Digital output | 12-bit binary number | _ | | | |
| range | (0~4095) | | | | |
| Resolution | 1/4095(12Bit) | 1/1023(10-bit) | | | |
| integrated | 1% | | | | |
| precision | | | | | |
| Transformation | 10ms | | | | |
| speed | | | | | |
| Power supply for | DC24V±10%, 150mA | | | | |
| analog | | | | | |

Table 3: analog extension module XL-2AD2DA-V-ED AD transformation diagram

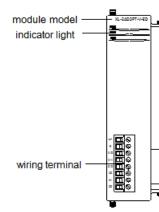




Product appearance

Here listed I/O terminal configurations of XL series extension module XL-2AD2DA-V-ED.

Product structure



Each part name:

| Name | | Function |
|-----------|-----|--|
| | PWR | The LED lights when the ED module has power supply |
| Indicator | COM | The LED lights when the ED module communication |
| light | | port works well |
| | ERR | The LED lights when the ED module has error |
| | L+ | ED module external power supply 24V + |
| | M | ED module external power supply 24V - |
| | VI0 | Channel 1 analog input |
| Wiring | VI1 | Channel 2 analog input |
| terminal | CI0 | VI0, VI1 input ground |
| | VO0 | Channel 1 analog output |
| | VO1 | Channel 2 analog output |
| | CO0 | VO0, VO1 output 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

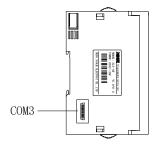
Do not install the module in below environment:

- · Direct sunlight
- Environment temperature out of range 0-50°C
- 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

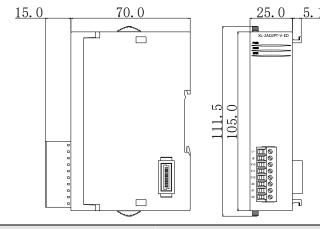
XL series extension ED module can be installed in com3 port of XL series PLC.

Note: please cut off the power before operation!



Product dimension (Unit: mm)

XL series extension ED module dimension is shown as below



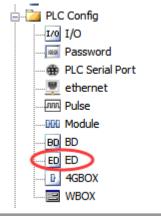
Electric design reference

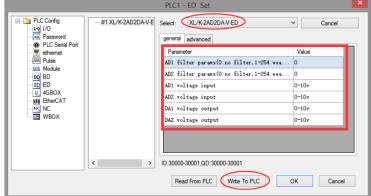
■ I/O address

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.

| AD signal |
|-----------|
| ID30000 |
| ID30001 |
| PT signal |
| QD30000 |
| QD30001 |
| |

Working mode setting





Steps:

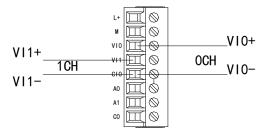
- 1. open the XDPpro software, find the left project bar, click PLC config/ED.
- 2. choose the correct module type.
- 3. set the module parameters such as voltage input range.
- 4. click write to PLC, then re-power on the PLC to make the setting effective.

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.

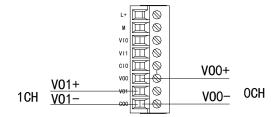
■ External connection

Please use shield cable to avoid interference, and single point connect to ground for the shield layer.

♦ Voltage single-ended input



♦ Voltage single-ended output



Programming example

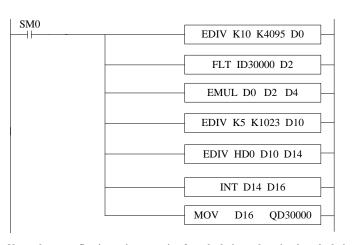
Example:

The output signal of the existing pressure sensor needs to be collected (the performance parameters of the pressure sensor: the detection pressure range is $0\text{Mp} \sim 10\text{Mp}$, the output analog signal is $0 \sim 10\text{V}$), and at the same time, it needs to output a channel of $0 \sim 5\text{V}$ voltage signal to the frequency converter.

Analysis: since the pressure detection range of the pressure sensor is 0Mp \sim 10Mp, the corresponding output analog quantity is 0 \sim 10V, and the digital quantity range of the expansion module through analog-to-digital conversion is 0 \sim 4095; therefore, we can skip the analog quantity 0 \sim 10V in the intermediate conversion link, which is directly the pressure detection range of 0Mp \sim 10MP corresponding to the digital range of 0 \sim 4095; 10Mp / 4095 = 0.002442, therefore, the real-time pressure of the current pressure sensor can be calculated by multiplying the real-time value collected in the ID register of the expansion module by 0.002442. For example, if the number collected in the ID register is 1024, the corresponding pressure is 2.5Mp.

In the same way, the set digital value range of $0 \sim 1023$ in the expansion module register QD corresponds to the voltage output signal of $0 \sim 5V$, 5V / 1023 = 0.00488758, which indicates how much voltage value is output for each set digital quantity in the expansion module register QD; for example, it needs to output 2.5V voltage value, 2.5 / 0.00488758 = 511.5, and send the calculated digital value to the corresponding QD register.

Program:



Note: please use floating-point operation for calculation, otherwise the calculation accuracy will be affected or even unable to calculate!

Explanation:

SM0 is normally on coil and is always on during PLC operation.

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

Similarly, the analog output first calculates the voltage value of each digit 1 collected by the expansion module, then the digital quantity (floating-point number) to be set equals to the set target voltage value divided by the corresponding voltage value of each digit 1. Since the QD30000 register can only store integers, it is necessary to convert the floating-point digital quantity to an integer and send to QD30000.