

Fast manual

Thanks to choose XINJE XL series PLC, this manual will introduce the specification, using method. For programming instruction, please refer to XD/XL series manual. XL series PLC use XD/Eppro software.

XL features

- Faster processing speed (12 times of XC PLC)
- XL3 can extend 10 digital or analog I/O XL modules, XL5 can extend 16 modules, XL1 cannot extend modules
- Extend 1 XL ED card, XL1 cannot extend ED card
- Compatible with most functions of XC PLC

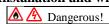
Safety notes

■ Control system design notes



- Make sure to design safe circuit for application, ensure the control system can work safe when the external power outages or PLC has fault.
- It is important to set emergency brake circuit, protection circuit, interlock circuit for forward reverse rotation, position upper and lower limit interlock switch to prevent from machinery damage
- For the safe operation of equipment, please design external protection circuit and safety mechanism for output signal related to major accident.
- All the output will be shut down when PLC found system error. The output maybe out of control when the controller circuit has error, please design suitable external control circuit to ensure the normal working of equipment.
- If the PLC output unit is broken, they cannot be controlled to be ON or OFF.
- PLC is designed for indoor electric environment, the power supply system should have lightning protection device, ensure that lightning overvoltage is not applied to the power input or signal input, output terminal of PLC, avoid equipment damage.

■ Installation and wiring notes



- Do not use the PLC in the following places: dust, lampblack, conductive dust, corrosive gas, flammable gas. Exposure to the environment of high temperature, dew, wind and rain. Electric shock, fire, vibration, malfunction, misoperation also can cause product
- Do not make scrap metal and wire drop into the controller vent when wiring, it may cause fire, fault, wrong operation.
- After installing the PLC, make sure there is no foreign object covering the ventilation, otherwise the heat dissipation will be bad and cause fire, fault and wrong operation.
- The wiring of installation box must be solid and reliable, poor contact may result in wrong action.



- Please use external power supply for extension module DC24V power.
- For serious interference occasions, please use shield cable for high frequency signal input and output to improve system anti-jamming capability.

■ Run and maintenance notes



- Please connect and dismantle communication cable, extension card and control unit cable after the power supply is shut down, otherwise it may cause equipment damage or incorrect operation.
- It needs to understand the manual well and fully confirm the safety before operation for on-line modification, forced output, RUN, STOP and so on.



- Please process the old product as industrial waste.
- Ensure to cut off the power supply when installing and uninstalling the extension card.
- It needs to replace the battery when power is on (ensure the memory data is not lost), when the equipment is running, it must be operated by a professional electrical technician wearing an insulating glove.

Product information

Naming rule

<u>XL 5 –32 T 4</u>

1 series XL: XL ultrathin series PLC 2 type 1: XL1 economic type

> 3: XL3 standard type 5: XL5 enhanced type

③ I/O points 16: 8 input /8 output 32: 16 input /16 output

④ Output type Input is NPN R: relay output

Input is PNP

T: transistor output PR: relay output

(5) Pulse channel Without: T model has 2 channels of high speed pulse output

> (XL1 has no pulse output function) 4: 4 channels of high speed pulse output

Basic parameters

Table 1: XL series general specifications

| Item | Specification |
|-------------------------|---|
| Insulation voltage | Up DC500V 2MΩ |
| Anti-jamming | Noise voltage 1000Vp-p 1us pulse 1 minute |
| Air | No corrosive, flammable gas |
| Environment temperature | 0°C~60°C |
| Environment humidity | 5%RH~95%RH(no condensation) |
| Com 1 | RS232, connect upper device, HMI, PLC |
| Com 2 | RS485, connect meter, VFD |
| Installation | Install on the rail directly |
| Ground | The third ground(cannot ground together with high voltage |
| | system) |

Table 2: XL series performance specifications

| Item | | Specification | | |
|------------------------|-------------------------|---|----------------------------------|---------------------------|
| Program execution mode | | Cyclic scanning mode | | |
| Programming mode | | Instruction, ladder chart | | |
| Proce | ssing speed | 0.05us | | |
| N | 1emory | FlashRO | M and lithium ba | ttery (3V button battery) |
| User prog | ram capacity *1 | XL1/XL3: 256KB XL5: 384KB | | |
| I/O | Total | 16 | | 32 |
| numbers*2 | 2 Input | 8 X0~2 | X7 | 16 X0~X17 |
| | Output | 8 Y0~ | Y7 | 16 Y0~Y17 |
| Internal co | oil (X)**3 | 896 | XL1/XL3: X0~2 | X77, X10000~X11177, |
| | | | X20000~X2017 | 7, X30000~X30077 |
| | | 1280 | XL5: X0~X77, | X10000~X11777, |
| | | | X20000~X2017 | 7, X30000~X30077 |
| Internal co | oil (Y) ^{**} 4 | 896 | XL1/XL3: Y0~ | Y77, Y10000~Y11177, |
| | | | Y20000~Y20177, Y30000~Y30077 | |
| | | 1280 | 1280 XL5: Y0~Y77, Y10000~Y11777, | |
| | | | Y20000~Y20177, Y30000~Y30077 | |
| | | | XL1/XL3: M0~M7999【HM0~HM959】**5 | |
| Internal ac | oil(M, HM) | | | 74999【HM0~HM11999】 |
| internal co | on(wi, riwi) | 92000 Special*6 | | XL1/XL3: SM0~SM2047 |
| | | | Σ | KL5: SM0~SM4999 |
| Process (S | ` | 1152/ XL1/XL3: S0~S1023 【HS0~HS | |)~S1023【HS0~HS127】 |
| 11000000 (5) |) | 9000 XL5: S0~S79 | | 999【HS0~HS999】 |
| | Numbers | 672/ XL1/XL3: T0~T575 【HT0~HT95】 | | 0~T575 【HT0~HT95】 |
| Timer | | 7000 XL5: T0~T4999 【HT0~HT1999】 | | 999 【HT0~HT1999】 |
| (T) | | 100ms timer: 0.1~3276.7s | | |
| (1) | Specification | 10ms timer: 0.01~327.67s | | |
| | | 1ms timer: 0.001~32.767s | | |
| | Numbers | 672/ | | 0~C575【HC0~HC95】 |
| Counter | rumoers | 7000 | XL5: C0~C4999【HC0~HC1999】 | |
| (C) | Specification | 16-bit counter: K0~32,767 | | |
| | | 32-bit counter: -2147483648~+2147483647 | | |

| Data register (D) | 11048/ 90000 words | XL1/XL3: D0~D7999 【HD0~HD999】 **5 XL5: D0~D59999 【HD0~HD24999】 Special**6 XL1/XL3: SD0~SD2047 XL5: SD0~SD4999 | |
|-------------------------------|---|---|--|
| FlashROM register (FD) | 7120/ 14192 words | XL1/XL3: FD0~FD5119 XL5: FD0~FD8191 Special**6 | |
| High speed processing ability | High speed counter, pulse output, external interruption | | |
| Password protection | 6-bit ASCII | | |
| Self diagnostic function | Power on self-inspection, monitoring timer, syntax checking | | |

- X1: user program capacity is the max capacity when secret downloading.
- *2: I/O numbers: the input and output terminal numbers user can connect from outside
- *3: X is internal input relay, the X exceeding I numbers can be used as intermediate relay.
- *4: Y is internal output relay, the Y exceeding O numbers can be used as intermediate relay.
- *5: [] is latched memory area which cannot be changed.
- *6: special means the register is used by system, cannot be used for other way.

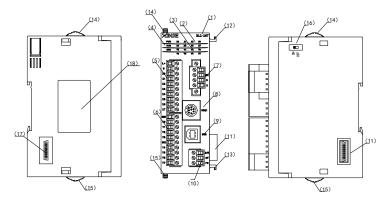
Table 3: XL series product list

| | Model | | | Input | Output |
|-----|---------------------------------|--------------------------------|---|---------|---------|
| | AC power supply/DC power supply | | | numbers | numbers |
| | Relay output | Transistor output Mixed output | | (I) | (O) |
| | i | XL1-16T | - | 8 | 8 |
| NPN | XL3-16R | XL3-16T | - | 8 | 8 |
| | - | XL5-32T4 | - | 16 | 16 |
| PNP | XL3-16PR | - | - | 8 | 8 |

Electrical design reference

Here lists XL series PLC I/O terminal configuration. The terminal configuration of relay output and transistor output terminal is same.

■ Product structure



Each part name:

- (1): PLC model
- (2): input label and light
- (3): output label and light
- (4): system light
- PWR: power supply light
- ERR: error light

RUN: run light

- (5): input terminal
- (6): output terminal
- (7): RS485 port (port2)
- (14): slide lock (up) (15): slide lock (down)
 - (16): DIP switch
 - (17): left extension module access (18): product label

(8): RS232 port (port1)

(10): power supply input

(11): right extension module access

(12): fixed module hook (up)

(13): fixed module hook (down)

(9): USB port

Note:

(1): XL3/XL5 series USB port is only for program downloading, uploading and monitoring. (XL1 does not have USB port)

(2): the DIP switch is for RS485 X-NET communication, if the PLC is the first or last station of the fieldbus, please turn on the switch.

Communication port definition

- XL series PLC has three com port, one USB port(XL1 does not have this port), one RS232 port (com1), one RS485 port (com2). It can extend one RS232 or RS485 port (com3) through the left extension ED card (XL-NES-ED).
- USB port used normal USB cable to connect PC and PLC, please install USB driver
- RS232 port (com1) can connect PC and other device such as HMI, meter and VFD.

COM1 pin figure:



Mini Din 8-pin socket

Programming cable:

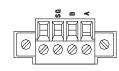


Mini Din 8-pin male socket

DB9 female socket

Note: the above diagram is for DVP cable, if it is XVP cable, please connect pin 1 of Mini Din8 and pin 7 of DB9.

RS485 port



Note: A is RS485+, B is RS485-. Please connect A to A, B to B when communicating. SG is ground terminal, please connect it to servo drive SG terminal. XL1 RS485 port has no isolation, cannot support X-NET fieldbus.

Power supply specification

PLC power supply terminal



(1) PLC power supply terminal is 24V and 0V. (2) FG is ground terminal which can shield the interference.

Please connect to ground separately as needs.

XL series power supply specification: DC power supply

Contents Item Rated voltage DC24V Voltage allowable range DC21.6V~26.4V 120mA DC24V Input current (only for basic unit) 10ms DC24V Allowable instant power outage time 10A DC26.4V Impact current Max consumption power 12W

Input specification and wiring

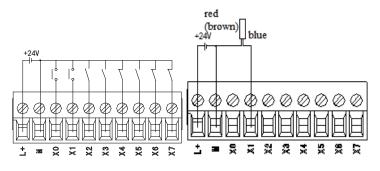
XL series PLC input is NPN or PNP mode, below will introduce the internal structure and wiring of this mode.

NPN mode specification

| Item | Contents |
|----------------------|-------------|
| Input signal voltage | DC24V±10% |
| Input signal current | 7mA/DC24V |
| Input ON current | Below 4.5mA |
| Input OFF current | Below 1.5mA |
| Input response time | About 10ms |

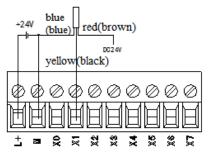
| Input signal mode Contactor input or NPN open collector transistor | |
|--|---------------------------------|
| Circuit insulation | Photocoupling insulation |
| Input action display | LED lights when the input is ON |

• NPN wiring example



Switch button wiring

2-wire(NO or NC) proximity switch wiring

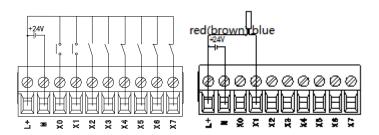


3-wire(NPN) proximity switch wiring

• PNP mode specification

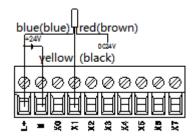
| Item | Contents |
|----------------------|--|
| Input signal voltage | DC24V±10% |
| Input signal current | 7mA/DC24V |
| Input ON current | Below 4.5mA |
| Input OFF current | Below 1.5mA |
| Input response time | About 10ms |
| Input signal mode | Contactor input or PNP open collector transistor |
| Circuit insulation | Photocoupling insulation |
| Input action display | LED lights when the input is ON |

PNP wiring example



Switch button wiring

2-wire(NO or NC) proximity switch wiring



3-wire(PNP) proximity switch wiring

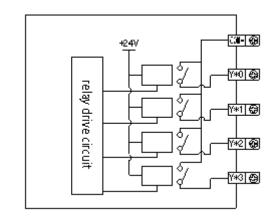
Output specification and wiring

The output specification includes transistor and relay. Below will introduce the internal structure and wiring method of the two modes.

♦ Output specification

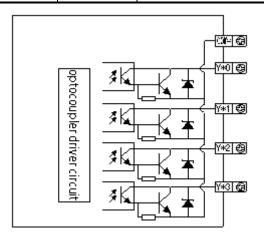
Relay output

| atput | |
|----------------|--|
| wer | Below AC250V, DC30V |
| lation | Mechanical insulation |
| cator | LED light |
| Resistant load | 3A |
| Inductive load | 80VA |
| Lamp load | 100W |
| | DC5V 2mA |
| OFF→ON | 10ms |
| ON→OFF | 10ms |
| | wer slation cator Resistant load Inductive load Lamp load OFF→ON |



Transistor output

| External power | | | Below DC5~30V |
|----------------|----------------|-------------|---------------------------|
| Circuit in | sulati | on | Light coupling insulation |
| Action in | dicate | or | LED |
| Max | Res | istant load | 0.3A |
| load | Inductive load | | 8W/DC24V |
| | Lamp load | | 1.5W/DC24V |
| Mini load | | | DC5V 2mA |
| Response | e OFF→ON | | Below 0.2ms |
| time | ON→OFF | | Below 0.2ms |



High speed pulse output

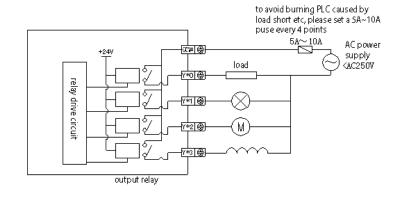
| Model | T |
|----------------------------|----------------------------|
| Output terminal | Y0, Y1 (XL5-32T4 is Y0~Y3) |
| External power supply | Below DC5~30V |
| Action display | LED light |
| Max current | 50mA |
| Max output pulse frequency | 100KHz |

Note: when the output pulse frequency is 100 KHz to 200 KHz, it cannot ensure all the servo can work well, please connect 500Ω resistor between output terminal and 24V power supply.

♦ Relay output

- Relay output type has 2 public terminals. So each public-terminal unit can drive power system with different voltages (E.g.: AC200V, AC100V, DC24V etc.) load.
- Between the relay output coils and contacts, PLC's interior circuits and exterior load circuits are electrical insulating. Besides, each public terminal and block are separate from each other
- LED lamp lights when output relays' coils energize, output contacts are ON.
- From the output relay energize (or cut off) to output contact ON (or OFF), the response time is about 10ms.
- The output current below AC250V can drive the load made up of resistance is 3A per point, inductive load below 80VA (AC100V or AC200V) and lamp load below 100W (AC100V or AC200V).
- When output contact is OFF, there will be no leak current and can directly drive Ne lamp etc.
- Standard life of AC inductive load such as contactor, electromagnetic valve: according
 to company's useful life test, about 500 thousand times for 20VA load; about 300
 thousand times for 35VA; about 100 thousand for 80VA. But if the load parallel
 connect with surge absorber, the useful life will greatly improve.

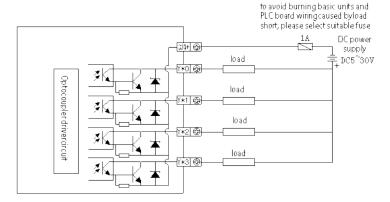
Relay output wiring:



♦ Transistor output

- There are 2 com outputs of CPU unit transistor outputs.
- Please use DC5~30V power supply to drive the load.
- Inside PLC, it uses photoelectric couplers to isolate between internal circuits and output transistors; besides, the COM terminal is separated from each other.
- When photoelectric coupler is driven, LED will be ON and the output transistors will be ON.
- The time interval from PLC photoelectric couplers energizing (or cutting) to transistor ON (or OFF) is below 0.2ms.
- The current output is 0.3A per point. But limited by the temperature rising, every 4 points current is 0.8A.
- Open circuit current is below 0.1mA

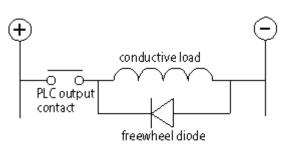
Transistor output wiring:



♦ Output circuit protection

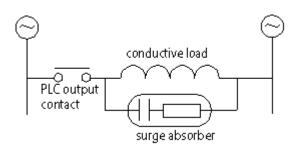
For the inductive load of AC circuit, please use RC instantaneous voltage absorption circuit. For the inductive load of DC circuit, please use freewheeling diode

DC load



Note: freewheeling diode IN4007.

AC load



Note: surge absorber R=200Ω 2W, C=0.022uF 250V AC.

■ Connection head specification of terminal

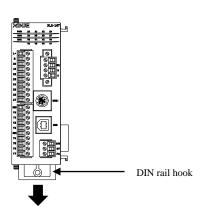
When wiring XL series PLC, its wiring head should meet the following requirements:

- (1) The stripping length is 9 mm;
- (2) Flexible conductors with bare tubular ends are 0.25-1.5 square.
- (3) Flexible conductor with tubular pre-insulated end is 0.25 0.5 square.

Product dimensions and installation

■ Installation

The rail can be used to install the basic unit and extension module. Please use the rail DIN46277.

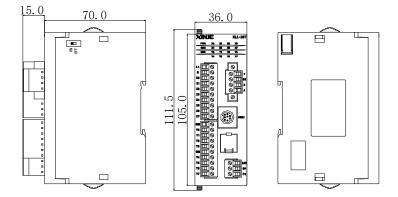


The main unit and extention module can be installed on the DIN46277 rail (width is 35mm). for removing the product, it needs to pull the hook then move right the product.

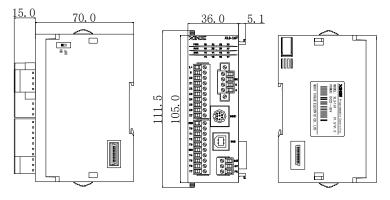
Dimensions

(unit: mm)

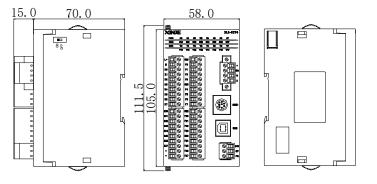
XL1-16T:



XL3-16R, XL3-16T, XL3-16PR:



XL5-32T4:



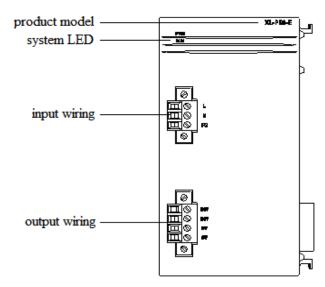
XL-P50-E power adapter

The power supply of XL series PLC can be external switching power supply or power module XL-P50-E.

■ Basic specification

| Item | Specification |
|-------------------------|---|
| Power supply | AC85-265V |
| Output voltage | DC24V |
| Output current | 2A |
| Air | No corrosive and flammable gas |
| Environment temperature | 0°C~60°C |
| Environment humidity | 5%RH~95%RH (no condensation) |
| Installation | Install on the rail directly |
| Ground | The third ground(cannot ground together with high |
| | voltage system) |

■ Structure



| Structure name | Function |
|----------------|---|
| Product model | The detailed model of the product |
| System LED | PWR: power supply light, it is green and always ON when the power is on. RUN: run light, it is green and always ON when the module works well. |
| Input wiring | L, N: power supply input for the module FG: ground terminal |
| Output wiring | It can output two groups of DC24V, 0V power supply, and supply the power to the XL3 series PLC. |

