



**XD/XL series PLC**

**User manual [Hardware]**

# XD/XL series PLC

## User manual [hardware]

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## General descriptions

- Thank you for purchasing Xinje XD/XL series PLC.
- This manual mainly introduces XD/XL series PLC hardware features etc.
- Please read this manual carefully before using and wire after understanding the content.
- About software and programming instructions, please refer to related manuals.
- Please hand this manual over to operation users.

## Notices for users

- Only experienced operator can wire the plc. If any problem, please contact our technical department.
- The listed examples are used to help users to understand, so it may not act.
- Please conform that PLC specifications and principles are suitable when connect PLC to other products.
- Please conform safety of PLC and machines by yourself when use the PLC. Machines may be damaged by PLC errors.

## Responsibility state

- The manual content has been checked carefully, however, mistakes may happen.
- We often check the manual and will correct the problems in subsequent version. Welcome to offer advices to us.
- Excuse us that we will not inform you if manual is changed.

## Contact information

If you have any problem about products, please contact the agent or Xinje company.

- Brazil Agent KALATEC AUTOMAÇÃO + 55 19-3045-4900  
WWW.KALATEC.COM.BR

## Safety notes

Please read this part carefully before using and operate after understanding the usage, safety and notices. Pay attention to safety and wire correctly.

We have summarized possible problems that may happen and classify them by warning and caution. About other matters, please operate in basic working order.



Caution

Incorrect use may lead to danger, such as moderate and slight injury, property loss.



Warning

Critical miss may lead to serious danger, such as death or serious injury, serious loss of property.

### ● Conform about products



Caution

Do not install the controller which is damaged, lack parts or type unfit. Otherwise, injury may occur.

### ● Product design



Warning

Please make safety circuit outside controller to make sure the system can run in safety when controller errors. Otherwise, incorrect action or fault may occur.



Caution

Do not put control wiring or power wiring together, separate them at least 10cm in principle. Otherwise, incorrect action or damage may occur.

### ● Product installation



#### Warning

Cut off all external power before installing controller. Otherwise, an electric shock may occur.



#### Caution

1. Please install and use the PLC in the environment condition that specified in general specifications in this manual. Do not use in wet, high temperature, smog, conductive dust, corrosive gas, combustible gas, vibration, shock occasion. Otherwise, electric shock, fire disaster, incorrect action, damage etc.
2. Do not touch conductive parts of PLC. Otherwise, incorrect action or fault may occur.
3. Please install the product by DIN46277 or M3screw and install them on flat surface. Otherwise, incorrect action or damage may occur.
4. Avoid ablation powder or clastic wires into product shell when processing screw holes. Otherwise, incorrect action or fault may occur.
5. Make sure connection compact and good when using expansion cables to connect expansion modules. Otherwise, bad communication or incorrect action may occur.
6. Cut off power when connecting external devices, expansion devices and battery etc. Otherwise, incorrect action or default may occur.

### ● Product wiring



#### Warning

1. Cut off external power before wiring. Otherwise, an electric shock may occur.
2. Connect AC or DC power to special power terminal correctly. Otherwise, may burn the controller.
3. Close the panel cover plate before controller powering on and running. Otherwise, an electric shock may occur.



#### Caution

1. Do not connect external 24V power to controllers' or expansion modules' 24V and 0V terminals , products damage may occur.

2. Use 2mm<sup>2</sup> cable to ground the ground terminals of expansion modules and controllers, never common ground to high voltage system. Otherwise, products fault or damage may occur.
3. Do not wiring between idle terminals. Otherwise, incorrect action or damage may occur.
4. Avoid ablation powder or clastic wires into product shell when processing screw holes. Otherwise, incorrect action or fault may occur.
5. Tighten up wiring terminals and separate conductive parts. Otherwise, incorrect action or product damage may occur.

#### ● Run and maintenance



##### Warning

1. Do not touch terminals after power on. Otherwise, an electric shock may occur.
2. Do not connect or move the wires when power on. Otherwise, an electric shock may occur.
3. Make sure to stop the PLC before changing the controller program. Otherwise, malfunction may occur.



##### Caution

1. Do not disassemble and assemble product arbitrarily. Damage to product may occur.
2. Plug and connect cables on the condition of power off. Otherwise, cable damage or malfunction may occur.
3. Do not wire the idle terminals. Otherwise, malfunction or damage may occur.
4. Cut off the power when disassemble expansion modules, external devices and batteries. Otherwise, malfunction and fault may occur.
5. Dispose them as industrial waste when out of use.



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## Preface

We will introduce constitution of content, application, convention, relevant manuals and how to get data in this part.

### Content Components

This manual includes XD/XL series PLC types and system constitutions. It mainly introduces XD/XL series PLC basic units' specification, I/O wiring, run and maintenance, and XD/XL series PLC expansion modules' parameters, appearance and features etc.

This manual has 9 chapters, an overview of each chapter are as follows:

#### 1. Summary

This chapter mainly introduces XD/XL series PLC specifications, types and descriptions.

#### 2. Specifications

This chapter mainly introduces XD/XL series PLC basic units' common specifications, performance specifications, terminal placement, product dimensions, interface descriptions etc.

#### 3. System constitutions

This chapter mainly introduces XD/XL series PLC system constitutions, peripheral devices, expansion devices, CPU and expansion devices connection principles, products installation, I/O point calculation, I/O address number distribution etc.

#### 4. Power specifications and wiring

This chapter mainly introduces XD/XL series PLC power specifications, wiring methods.

#### 5. Input specifications and wiring

This chapter mainly introduces XD/XL series PLC input specifications, input wiring, high speed counting etc.

#### 6. Output specifications and wiring

This chapter mainly introduces XD/XL series PLC output specifications, relay output and transistor output etc.

#### 7. Run, debug, maintenance

This chapter mainly introduces XD/XL series PLC run, debug steps, daily maintenance etc.

#### 8. Expansion devices

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This chapter mainly introduces I/O expansion modules, analog temperature modules' specifications, dimensions and terminal placements.

#### 9. Switch between soft elements

This chapter mainly introduces XD/XL series PLC special function that free switch between input and output points.

#### Appendix 1. Special soft elements schedule

This chapter mainly introduces XD/XL series PLC special function soft elements, registers and expansion module address distribution etc.

#### Appendix 2. Instruction schedule

This chapter mainly introduces basic instructions, application instructions and special instructions that XD/XL series PLC support.

#### Appendix 3. PLC function configuration schedule

This chapter mainly introduces XD/XL series PLC main function of each type for lectotype.

#### Appendix 4. Common questions A&Q

This chapter mainly introduces XD/XL series PLC problems and solutions that may occur when using.

### **Manual scope of application**

This manual is hardware manual of XD/XL series PLC, contents are as follows:

#### 1. XD series PLC basic units

XD1-16R/T-E

XD1-32R/T-E

XD2-16R/T/RT-E/C

XD2-24R/T/RT-E/C

XD2-32R/T/RT-E/C

XD2-48R/T/RT-E/C

XD2-60R/T/RT-E/C

XD3-24R/T/RT-E/C, XD3-24PR/T/RT-E/C

XD3-32R/T/RT-E/C, XD3-32PR/T/RT-E/C

XD3-48R/T/RT-E/C, XD3-48PT-E/C

XD3-60R/T/RT-E/C, XD3-60PT-E/C

XD5-16R/T-E/C

XD5-24R/T/RT-E/C, XD5-24T4-E/C

XD5-32R/T/RT-E/C, XD5-32T4-E/C

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XD5-48R/T/RT-E/C  
XD5-60R/T/RT-E/C  
XD5-48T4-E/C  
XD5-48T6-E/C  
XD5-60T4-E/C  
XD5-60T6-E/C  
XD5-60T10-E/C

XDM-24T4-E/C, XDM-24PT4-E/C  
XDM-32T4-E/C, XDM-32PT4-E/C  
XDM-60T4-E/C, XDM-60T4L-E/C  
XDM-60T10-E/C, XDM-60PT10-E/C

XDC-24T-E/C  
XDC-32T-E/C  
XDC-48T-E/C  
XDC-60T-E/C

XD5E-30T4-E  
XD5E-60T10-E

XDME-60T10-E

## 2. XD series PLC expansion modules

- I/O expansion

XD-E8X8YR, XD-E8PX8YR, XD-E8X8YT, XD-E8PX8YT, XD-E16X, XD-E16PX, XD-E16YR, XD-E16YT, XD-E16X16YR, XD-E16PX16YR, XD-E16X16YT,  
XD-E16PX16YT, XD-E32X, XD-E32PX, XD-E32YR, XD-E32YT

- Analog expansion modules

AD: XD-E4AD, XD-E8AD, XD-E8AD-A, XD-E8AD-V

DA: XD-E2DA, XD-E4DA

AD/DA: XD-E4AD2DA, XD-E4AD2DA-B

- Temperature measurement

XD-E6PT-P, XD-E6TC-P, XD-E2TC-P

- Pressure measurement

XD-E1WT-A, XD-E2WT-A, XD-E4WT-A

XD-E2WT-B

XD-E1WT-C, XD-E2WT-C, XD-E4WT-C

## 3. XD series expansion board

- XD series expansion BD board

XD-NE-BD, XD-NO-BD, XD-NS-BD

- 
- XD series left expansion ED board  
XD-WBOX-ED, XD-SBOXT-ED, XD-4GBOX-ED, XD-NES-ED  
XD-4AD-A-ED, XD-4AD-V-ED  
XD-4DA-A-ED, XD-4DA-V-ED  
XD-2AD2DA-A-ED, XD-2AD2DA-V-ED  
XD-2AD2PT-A-ED, XD-2AD2PT-V-ED  
XD-2PT2DA-A-ED, XD-2PT2DA-V-ED

4. XL series PLC basic units  
XL3-16T, XL3-16R, XL1-16T  
XL3-16T, XL3-16R, XL3-16PR  
XL5-32T4  
XL5E-32T4  
XLME-32T4

5. XL series PLC expansion module

- I/O expansion  
XL-E8X8YR, XL-E8X8YT  
XL-E16X  
XL-E16YR, XL-E16YT  
XL-E16X16YT, XL-E32X, XL-E32YT
- Analog expansion  
XL-E4AD2DA, XL-E8AD-A, XL-E8AD-V, XL-E4DA, XL-E4PT3-P, XL-E4TC-P

6. XL series ED expansion module

- XL communication expansion ED module  
XL-NES-ED
- XL analog expansion ED module  
XL-2AD2DA-A-ED, XL-2AD2DA-V-ED  
XL-2AD2PT-A-ED, XL-2AD2PT-V-ED  
XL-2PT2DA-A-ED, XL-2PT2DA-V-ED  
XL-4AD-A-ED, XL-4AD-V-ED  
XL-4DA-A-ED, XL-4DA-V-ED

7. XL power supply module  
XL-P50-E

## Manual conventions

We use some short names to replace the original names in the manual. The possible names have been listed in the table below to compare.

Short name	Explanation
XC series PLC	General name of XC series programmable logic controllers
XL series PLC	General name of XL series programmable logic controllers
XD series PLC	General name of XD series programmable logic controllers
Basic units or noumenon	Short name of XD series PLC basic units
Expansion devices or expansion units	General name of XD series PLC expansion modules and BD cards
Expansion modules	General name of XD series PLC all expansion modules.
Input and output expansion or I/O expansion	Short name of XD series PLC all input and output expansion modules
Analog expansions	Short name of XD series PLC all analog expansion modules
Peripheral units	General name of programming software, HMI and network modules
Programming software	General name of XD series PLC programming software XDPPro
HMI	General name of TG, TH, TP, OP, MP series products
TG series	General name of TG series touch screen
TH series	General name of TH series touch screen
TP series	General name of TP series touch screen
OP series	General name of OP series text panel
MP series	General name of MP series touch display

## Relevant manual

This manual includes XD/XL series PLC hardware, about more application such as programming and instructions, please refer to relevant manuals.

Manual name	Manual introduction	Notes
Installation manual		



XD/XL series PLC installation manual	Descript XD/XL series basic units' specification, dimensions, installation, wiring etc.	Electronic version Need additional request
Programming software		
XD/XL series PLC users' manual 【software】	Introduce XD/XL series PLC software XDPPro usage and skill etc.	Electronic version Need additional request
Instruction programming manual		
XD/XL series PLC users' manual 【instructions】	Introduce XD/XL series PLC basic instructions, application instructions, communication, PID, C language, BLOCK etc.	Electronic version Need additional request
Expansion manual		
XD/XL series analog temperature expansion manual	Introduce XD/XL series analog, temperature expansion module feature, parameters, ID, dimension, terminals and wiring etc.	Electronic version need additional request
X-NET manual		
X-NET fieldbus communication manual	Introduce X-NET fieldbus using method	Electronic version need additional request

## Manual Acquisition

Users can get manual above in the following ways:

1. Paper manual  
Please ask product vendor, agent or agency to supply.
2. Electronic version  
Please ask product vendor, agent or agency to supply CD.

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## 1 Summary of XD/XL Series PLC

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XD/XL series PLC have diverse CPU units and expansions with powerful functions. In this chapter, we mainly introduce the XD/XL series PLC performance, program summary and product different parts.

1-1. Product Specifications

1-2. Type Constitute and Type Table

1-3. Each Part's Description

## 1-1. Product Specifications

### 1-1-1. XD series CPU units

1

#### Models

XD series PLC CPU unit have rich product types.

- I/O Points 16, 24, 30, 32, 48, 60 points
- Output Type transistor, relay, transistor and relay mixed.
- Input Type PNP, NPN
- Power Type AC220V, DC24V

Series	Description
XD1(economic type)	Include 16, 32 points. cannot support right expansion module, left expansion ED module, expansion BD.
XD2(basic)	Include 16, 24, 32, 48, 60 points. cannot support right expansion module, can connect left expansion ED module, expansion BD (except 16 points model).
XD3(standard)	Include 16, 24, 32, 48, 60 points. Can connect expansion module, ED module, expansion BD (except 16 points model).
XD5(enhanced)	Include 16, 24, 32, 48, 60 points. With all the XD3 functions, the speed is 12 times of XC series, larger capacity. Support 2~6 axes pulse output, can connect expansion module, ED and BD.
XDM (motion control)	Include 24, 32, 48, 60 points. With all the XD3 functions, support 4~10 axes high speed pulse output, support 2-axis linkage motion, interpolation, follow-cutting, can connect expansion module, ED and BD.
XDC (motion fieldbus)	With all the functions of XD3. Support 2~4 axes pulse output, 20-axis fieldbus motion control, special model supports 6-axis fieldbus motion control (4~6 axes interpolation), can connect expansion module, ED, BD.
XDE (Ethernet model)	Include 30 points model. With all the functions of XD3. Support Ethernet communication,

	support 4-axis high speed pulse output, support 2-axis linkage motion, interpolation, follow-cutting, can connect expansion module, ED and BD.
XDME(motion control, Ethernet)	Contains 60 points functions. It is compatible with most functions of XDM, supports Ethernet communication, supports motion control commands such as interpolation and servo, supports 10-axis high-speed pulse output, connects expansion module, expands ED and expands BD.

※1: About non-cpu function of products, please refer to appendix 3.

## 2 Powerful functions

XD series PLC have rich basic functions and many special functions. Different type is fit for different application.

### Abundant basic function

- **High speed operation**  
Basic processing instruction: 0.02~0.05us. Scanning time: 10,000 per 1ms. Program capacity is up to 384KB.
- **Abundant expansions**  
The CPU units support 10~16 different expansion modules and 1~2 expansion boards, 1 left expansion ED module.
- **Multiple communication ports**  
CPU units have 1~4 communication ports, support RS232, RS485, and can work with many external devices, such as frequency inverters, instruments, printers.
- **Abundant software capacity**  
Up to 1024 processes S, 128 retention processes HS, 8000 intermediate relays M, 960 retention relays HM, 1280 input relays X, 1280 output relays Y, 576 normal timers T, 96 latched timers HT, 576 counters C, 96 retention counters HC, 8000 data registers D, 1000 retention data registers HD, 6144 registers FD.
- **Two programming types**  
XD series PLC support two programming types, instruction list and ladder chart which can switch to each other.
- **Rich instructions**

---

Include order control, data move and compare, arithmetic, data circulate and shift, pulse output, HSC, interruption, PID etc.

- **Real time clock**

XD series PLC has built-in clock to control time.

- **Compact size, convenient to install**

XD series PLC has DIN and screw two installation modes.

### **Enhanced special function**

- **X-NET fieldbus**

XD2, XD3, XD5, XDM, XDE series PLC support X-NET fieldbus, which can fast communicate with XD series PLC and TG/TN series HMI. XDC series PLC supports X-NET fieldbus function, can control 20 motors at the same time. Refer to X-NET fieldbus manual for details.

- **Ethernet Communication**

Ethernet PLC has RJ45 port and supports TCP/IP protocol. It can realize MODBUS-TCP communication and free format communication based on Ethernet. Supports program download, online monitoring, remote monitoring, and communication with other TCP/IP devices.

- **High-speed pulse counter, frequency up to 80KHz**

XD series PLC CPU units have 2~10 channels two-phase high-speed counter and high-speed counting comparer, can realize single-phase and AB-phase counting, frequency up to 80 KHz.

- **High-speed pulse output, frequency up to 100 KHz.**

XD series PLC<sup>\*1</sup> usually have 2~10 pulse output terminals, pulse frequency up to 100KHz.

- **Interruption function**

XD series PLC interruption functions include external interruption, timing interruption and high-speed counting interruption to meet different interruption demands.

- **I/O points switch freely**

XD series PLC unique function. Do not need to change program when terminals are damaged.

- **C language function block**

C language block makes the program more secured. C language rich operation function can realize many functions, which saves internal space and improves programming efficiency.

- **PID function on CPU units**

XD series PLC<sup>\*1</sup> CPU units have PID control function and auto-tuning control function.

- **Sequence BLOCK**

Sequence block makes instructions carry out in sequence, especially suitable for pulse output, motion control, module read and write etc, and largely simplifys the program writing.



- **100 segments high speed counting interruption**  
XD series PLC※<sup>1</sup> high speed counter have 100 segments 32 bits preset value. Each segment can generate interruption with good real-time, high reliability, low cost.
- **PWM(pulse width modulation)**  
XD series PLC※<sup>1</sup> PWM function can be used to control DC motor.
- **Frequency measure**  
XD series PLC※<sup>1</sup> can measure frequency.
- **Precise time**  
XD series PLC※<sup>1</sup> can realize 1ms and 32bit precise timing.

※<sup>1</sup>: Here XD series PLC means the PLC that can realize the related function, not all XD series can realize the all above functions. Please refer to appendix 3 about PLC specific functions.

※<sup>2</sup>: PLC can output 100KHz to 200KHz high speed pulse, but cannot ensure all the servo can work well. Please connect 500Ω resistor between output terminal and 24V power supply.

3	Easy to program
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XD/E series also use XDPPro program software. Improved aspects:

- Ladder and instruction can be switched at any time.
- Add Software annotation, ladder annotation, instruction hints etc.
- Offer many editing panel of special instructions.
- Perfect monitor modes: ladder monitor, free monitor, data monitor.
- Mutely-windows display, convenient to manage.

※<sup>1</sup>: More about XDPPro application, please refer to XD series PLC user manual (software).

## 1-1-2. XL series CPU units

1	Models
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XL series ultra-thin PLC, the basic unit has one sub-series product.

- I/O Points      16 points, 32 points
- Output Type    transistor, relay
- Input Type      NPN, PNP
- Power Type     DC24V

Series	Description
XL1(economic type)	Contains 16 points. Compatible with all functions of XD1 series PLC, the speed is 12 times faster than XC series. It does not support special functions such as pulse output, high-speed counting, X-NET field bus, right expansion module and left expansion ED module, and can meet the simple use needs of users.
XL3(basic)	Include 16 points. With all the functions of XD3 series PLC, the processing speed is 12 times of XC series PLC. Support right expansion module and left expansion ED module.
XL5(enhanced)	Contains 32-point. Compatible with all functions of XD5 series PLC, the speed is 12 times that of XC series, supporting four pulse output, supporting right expansion module and left expansion ED module, which can meet the needs of most users.
XL5E(Ethernet)	Contains 32-point. Compatible with all functions of XD5 series PLC, the speed is 12 times faster than XC series. It supports Ethernet communication, 4-channel pulse output, right expansion module and left expansion ED module. It can meet the needs of most users.
XLME(motion control, Ethernet)	Contains 32-point. Compatible with all functions of XDM series PLC, the speed is 12 times faster than XC series. It supports Ethernet communication, motion control instructions such as interpolation and servo, 4-channel pulse output, right expansion module and left expansion ED module. It can meet the needs of most users.

2

## Powerful functions

XL series PLC have rich basic functions and many special functions.

### Abundant basic function

- **High speed operation**  
Basic processing instruction: 0.02~0.05us. Scanning time: 10,000 per 1ms. Program capacity is up to 256KB.
- **Abundant expansions**  
The CPU units support 10 different right expansion modules and 1 left expansion ED module.
- **Multiple communication ports**  
CPU units have 1~3 communication ports, support RS232, RS485, and can work with many external devices, such as frequency inverters, instruments, printers.
- **Abundant software capacity**  
Up to 1024 processes S, 128 retention processes HS, 8000 intermediate relays M, 960 retention relays HM, 1280 input relays X, 1280 output relays Y, 576 normal timers T, 96 latched timers HT, 576 counters C, 96 retention counters HC, 8000 data registers D, 1000 retention data registers HD, 5120 registers FD.
- **Two programming types**  
XL series PLC support two programming types, instruction list and ladder chart which can switch to each other.
- **Rich instructions**  
Include order control, data move and compare, arithmetic, data circulate and shift, pulse output, HSC, interruption, PID etc.
- **Real time clock**  
XL series PLC has built-in clock to control time.
- **Compact size, convenient to install**  
XL series PLC has mini size and is easy to install on the DIN rail.

### Enhanced special function

- **X-NET fieldbus**  
XL series PLC support X-NET fieldbus, which can fast communicate with XD/XL series PLC and TG/TN series HMI. Refer to X-NET fieldbus manual for details.
- **Ethernet Communication**  
Ethernet PLC has RJ45 port and supports TCP/IP protocol. It can realize MODBUS-TCP communication and free format communication based on Ethernet. Support program download, on-line monitoring, remote monitoring, and communication with other TCP/IP devices. Specific applications can be referred to "TCP/IP Communication User Manual Based on Ethernet Communication".
- **High-speed pulse counter, frequency up to 80KHz**  
XL series PLC CPU units have 3 channels two-phase high-speed counter and high-speed counting comparer, can realize single-phase and AB-phase counting, frequency up to 80 KHz.

- **High-speed pulse output, frequency up to 100 KHz.**  
XL series PLC※<sup>1</sup> usually have 2 pulse output terminals, pulse frequency up to 100KHz.
- **Interruption function**  
XL series PLC interruption functions include external interruption, timing interruption and high-speed counting interruption to meet different interruption demands.
- **I/O points switch freely**  
XL series PLC unique function. Do not need to change program when terminals are damaged.
- **C language function block**  
C language block makes the program more secured. C language rich operation function can realize many functions, which saves internal space and improves programming efficiency.
- **PID function on CPU units**  
XL series PLC CPU units have PID control function and auto-tuning control function.
- **Sequence BLOCK**  
Sequence block makes instructions carry out in sequence, especially suitable for pulse output, motion control, module read and write etc, and largely simplifys the program writing.
- **100 segments high speed counting interruption**  
XL series PLC high speed counter have 100 segments 32 bits preset value. Each segment can generate interruption with good real-time, high reliability, low cost.
- **PWM(pulse width modulation)**  
XL series PLC PWM function can be used to control DC motor.
- **Frequency measure**  
XL series PLC can measure frequency.
- **Precise time**  
XL series PLC can realize 1ms and 32 bits precise timing.

3

**Easy to program**

XL series PLC also use XDPPro program software.

### 1-1-3. XD Expansions

1

**Expansion Modules**



To meet control requirement better, XD series PLC can work with expansions, XD1, XD2 cannot connect expansion modules, and XD3 can link 10 expansion modules, XD5, XDM, XDC, XD5E, XDME can connect 16 modules.

- Diverse types: I/O module, analog module.
- Compact size
- DC24V power

I/O module	Analog module	Temperature control
Power : DC24V Input points: 8-32 Output points: 8-32 Output type: Transistor Relay	Power: DC24V Type: DA, AD AD/DA DA channel No.: 2-4 AD channel No.: 4-8	Power: DC24V Input: PT100 thermocouple Channel: 6 PID control: built-in relay

## 2 Expansion BD

XD series can connect expansion BD board, 24~32 points can connect 1 BD, 48~60 points type can connect 2 BD boards. (16 points cannot connect BD)

- RS485 communication BD: X-NET interface, filedbus communication function, XD-NE-BD
- Optical fiber BD: X-NET optical fiber interface, filedbus communication function, XD-NO-BD
- RS232 communication BD: XD-NS-BD

## 3 Expansion ED

XD series left expansion ED board is for wireless communication. It can connect 1 ED board.

- Wifi communication ED: XD-WBOX-ED, support PLC program upload and download, remote monitoring.
- Wireless transparent transmission ED: XD-SBOXT-ED, support communication between PLC, HMI, PC.
- 4GBOX communication module: XD-4GBOX-ED, support remote wireless monitoring, PLC program upload and download, mobile phone message exchange, support 4G network.



- Communication expansion module: XD-NES-ED, support RS232 or RS485 (high-speed, support X-NET fieldbus), the two ports cannot use at the same time.
- Analog I/O:
  - XD-2AD2DA-A-ED, support current I/O
  - XD-2AD2DA-V-ED, support voltage I/O
  - XD-4AD-A-ED, support current input
  - XD-4AD-V-ED, support voltage input
  - XD-4DA-A-ED, support current output
  - XD-4DA-V-ED, support voltage output
- Analog and temperature mixed type:
  - XD-2AD2PT-A-ED, support 2 channels current input, 2 channels PT100 temperature input.
  - XD-2AD2PT-V-ED, support 2 channels voltage input, 2 channels PT100 temperature input.
  - XD-2PT2DA-A-ED, support 2 channels PT100 temperature input, 2 channels current output.
  - XD-2PT2DA-V-ED, support 2 channels PT100 temperature input, 2 channels voltage output.

#### 1-1-4. XL Expansions

##### 1 Expansion Modules

To meet control requirement better, XL series PLC can work with expansions, XL3 can link 10 expansion modules, XL5/XL5E/XLME can link 16 expansion modules, XL1 cannot support expansion modules.

- Diverse types: I/O module, analog module.
- Compact size
- DC24V power

I/O module	Analog module	Temperature control module
Power : DC24V Input points: 8~32 Output points: 8~32 Output type: Transistor Relay	Power: DC24V DA channel No.: 2-4 AD channel No.: 4-8 Analog type: current voltage	Power: DC24V Temperature input: PT100 Thermocouple Temperature channel: 4 PID control: built-in relay

XL series PLC can connect one ED module on the left side.

- Communication expansion module: XL-NES-ED, support RS232 or RS485 (high-speed, support X-NET fieldbus), the two ports cannot use at the same time.
- Analog I/O:
  - XL-2AD2DA-A-ED, support current I/O
  - XL-2AD2DA-V-ED, support voltage I/O
  - XL-4AD-A-ED, support current input
  - XL-4AD-V-ED, support voltage input
  - XL-4DA-A-ED, support current output
  - XL-4DA-V-ED, support voltage output
- Analog and temperature mixed type:
  - XL-2AD2PT-A-ED, support 2 channels current input, 2 channels PT100 temperature input.
  - XL-2AD2PT-V-ED, support 2 channels voltage input, 2 channels PT100 temperature input.
  - XL-2PT2DA-A-ED, support 2 channels PT100 temperature input, 2 channels current output.
  - XL-2PT2DA-V-ED, support 2 channels PT100 temperature input, 2 channels voltage output.

## 1-2. Model list

### 1-2-1. XD series basic unit model and list

1

#### Basic unit model

XD series PLC basic unit model constitute:

$\text{XD} \square - \bigcirc \bigcirc \square \square \bigcirc - \square$   
 $\text{①} \quad \text{②} \quad \text{③} \quad \text{④} \quad \text{⑤} \quad \text{⑥} \quad \text{⑦}$

1	Series name	XD
2	Series type	1: XD1 series economic type 2: XD2 series basic type 3: XD3 series standard type 5: XD5 series enhanced type M: XDM series motion control type C: XDC series X-NET motion fieldbus control type E: XDE Ethernet communication type
3	I/O points	16: 8 input/ 8 output 24: 14 input/ 10 output 30: 18 input/12 output 32: 18 input/ 14 output 48: 28 input/ 20 output 60: 36 input/ 24 output
4	Input point type	Nothing: NPN type P: PNP type
5	Output point type	R: Relay output T: Transistor output RT: Relay/Transistor mixed
6	Pulse channels	Nothing: item 5 is T/RT means 2 pulse channels 4: 4 channels 6: 6 channels 10: 10 channels
7	Power supply	E: AC power supply (220V) C: DC power supply (24V)

2

#### Basic unit model list

### XD1 series List

Type							Input points (DC24V )	Output points (R, T )
AC power				DC power				
	Relay output	Transistor output	Relay/transistor mixed	Relay output	Transistor output	Relay/transistor mixed		
NPN	XD1-16R- E	XD1-16T- E	-	-	-	-	8	8
	XD1-32R- E	XD1-32T- E	-	-	-	-	16	16

### XD2 series List

Type							Input points (DC24V )	Output points (R, T )
AC power				DC power				
	Relay output	Transistor output	Relay/transistor mixed	Relay output	Transistor output	Relay/transistor mixed		
NPN	XD2-16R-E	XD2-16T-E	XD2-16RT-E	XD2-16R-C	XD2-16T-C	XD2-16RT-C	8	8
	XD2-24R-E	XD2-24T-E	XD2-24RT-E	XD2-24R-C	XD2-24T-C	XD2-24RT-C	14	10
	XD2-32R-E	XD2-32T-E	XD2-32RT-E	XD2-32R-C	XD2-32T-C	XD2-32RT-C	18	14
	XD2-48R-E	XD2-48T-E	XD2-48RT-E	XD2-48R-C	XD2-48T-C	XD2-48RT-C	28	20
	XD2-60R-E	XD2-60T-E	XD2-60RT-E	XD2-60R-C	XD2-60T-C	XD2-60RT-C	36	24

### XD3 series List

Type							Input points (DC24V )	Output points (R, T )
AC power				DC power				
	Relay output	Transistor output	Relay/transistor mixed	Relay output	Transistor output	Relay/transistor mixed		
N P N	XD3-16R-E	XD3-16T-E	XD3-16RT-E	XD3-16R-C	XD3-16T-C	XD3-16RT-C	8	8
	XD3-24R-E	XD3-24T-E	XD3-24RT-E	XD3-24R-C	XD3-24T-C	XD3-24RT-C	14	10
	XD3-32R-E	XD3-32T-E	XD3-32RT-E	XD3-32R-C	XD3-32T-C	XD3-32RT-C	18	14
	XD3-48R-E	XD3-48T-E	XD3-48RT-E	XD3-48R-C	XD3-48T-C	XD3-48RT-C	28	20
	XD3-60R-E	XD3-60T-E	XD3-60RT-E	XD3-60R-C	XD3-60T-C	XD3-60RT-C	36	24

P N P	XD3-16PR- E	XD3-16PT- E	-	XD3-16PR- C	XD3-16PT- C	-	8	8
	XD3-24PR- E	XD3-24PT- E	XD3-24PRT-E	XD3-24PR- C	XD3-24PT- C	XD3-24PRT-C	14	10
	XD3-32PR- E	XD3-32PT- E	XD3-32PRT-E	XD3-32PR- C	XD3-32PT- C	XD3-32PRT-C	18	14
	XD3-48PR- E	XD3-48PT- E	XD3-48PRT-E	XD3-32PR- C	XD3-32PT- C	XD3-32PRT-C	28	20
	XD3-60PR- E	XD3-60PT- E	XD3-60PRT-E	XD3-48PR- C	XD3-48PT- C	XD3-48PRT-C	36	24

### XD5 series list

Type							Input points ( DC24V )	Output points (R, T )
AC power			DC power					
	Relay output	Transistor output	Relay/transistor mixed	Relay output	Transistor output	Relay/transistor mixed		
NPN 型	XD5-16R- E	XD5-16T-E	-	XD5-16R- C	XD5-16T-C	-	8	8
	XD5-24R- E	XD5-24T-E	XD5-24RT-E	XD5-24R- C	XD5-24T-C	XD5-24RT-C	14	10
	-	XD5-24T4- E	-	-	XD5-24T4- C	-	14	10
	XD5-32R- E	XD5-32T-E	XD5-32RT-E	XD5-32R- C	XD5-32T-C	XD5-32RT-C	18	14
	-	XD5-32T4- E	-	-	XD5-32T4- C	-	18	14
	XD5-48R- E	XD5-48T-E	XD5-48RT-E	XD5-48R- C	XD5-48T-C	XD5-48RT-C	28	20
	-	XD5-48T4- E	-	-	XD5-48T4- C	-	28	20
	-	XD5-48T6- E	-	-	XD5-48T6- C	-	28	20
	XD5-60R- E	XD5-60T-E	XD5-60RT-E	XD5-60R- C	XD5-60T-C	XD5-60RT-C	36	24
	-	XD5-60T4- E	-	-	XD5-60T4- C	-	36	24
	-	XD5-60T6- E	-	-	XD5-60T6- C	-	36	24
	-	XD5- 60T10-E	-	-	XD5- 60T10-C	-	36	24



PNP 型	XD5-24PR-E	XD5-24PT-E	XD5-24PRT-E	XD5-24PR-C	XD5-24PT-C	XD5-24PRT-C	14	10
	XD5-32PR-E	XD5-32PT-E	XD5-32PRT-E	XD5-32PR-C	XD5-32PT-C	XD5-32PRT-C	18	14
	XD5-48PR-E	XD5-48PT-E	XD5-48PRT-E	XD5-48PR-C	XD5-48PT-C	XD5-48PRT-C	28	20
	XD5-60PR-E	XD5-60PT-E	XD5-60PRT-E	XD5-60PR-C	XD5-60PT-C	XD5-60PRT-C	36	24
	-	XD5-48PT6-E	-	-	XD5-48PT6-C	-	28	20

### XDM series list

Type							Input points (DC24V)	Output points (R, T)
AC power supply				DC power supply				
	Relay output	Transistor output	Relay/transistor mixed	Relay output	Transistor output	Relay/transistor mixed		
NPN	-	XDM-24T4-E	-	-	XDM-24T4-C	-	14	10
	-	XDM-32T4-E	-	-	XDM-32T4-C	-	18	14
	-	XDM-60T4-E	-	-	XDM-60T4-C	-	36	24
	-	XDM-60T10-E	-	-	XDM-60T10-C	-	36	24
	-	XDM-60T4L-E	-	-	XDM-60T4L-C	-	36	24
PNP	-	XDM-24PT4-E	-	-	XDM-24PT4-C	-	14	10
	-	XDM-32PT4-E	-	-	XDM-32PT4-C	-	18	14
	-	XDM-60PT10-E	-	-	XDM-60PT10-C	-	36	24

### XDC series list

Type							Input points (DC24V)	Output points (R, T)
AC power			DC power					
	Relay output	Transistor output	Relay/transistor mixed	Relay output	Transistor output	Relay/transistor mixed		
NPN	-	XDC-24T-E	-	-	XDC-24T-C	-	14	10
	-	XDC-32T-E	-	-	XDC-32T-C	-	18	14
	-	XDC-48T-E	-	-	XDC-48T-C	-	28	20
	-	XDC-60T-E	-	-	XDC-60T-C	-	36	24
	-	XDC-60C4-E	-	-	XDC-60C4-C	-	36	24
	-	XDC-60C6-E	-	-	XDC-60C6-C	-	36	24

## XD5E series list

Type							Input points (DC24V)	Output points (R, T)
AC power				DC power				
	Relay output	Transistor output	Relay/transistor mixed	Relay output	Transistor output	Relay/transistor mixed		
NPN	-	XDE-30T4-E	-	-	-	-	18	12
	-	XD5E-60T10-E	-	-	-	-	36	24

## XDME series list

Type							Input points (DC24V)	Output points (R, T)
AC power				DC power				
	Relay output	Transistor output	Relay/transistor mixed	Relay output	Transistor output	Relay/transistor mixed		
NPN	-	XDME-60T10-E	-	-	-	-	36	24

## 1-2-2. XL series basic unit model and list

1	Basic unit model
---	------------------

XL series PLC basic unit model constitute:

$\text{XL} \square \square - \square \square \square$   
 $\text{①} \quad \text{②} \quad \text{③} \quad \text{④} \quad \text{⑤} \quad \text{⑥} \quad \text{⑦}$

①: series

②: type

③: Ethernet

④: I/O points

⑤: input type

⑥: output type

XL: XL series ultra-thin PLC

1: XL1 economic type

	3: XL3 series standard type

	5: XL5 enhanced type

	M: XLM series motion control type

E: Ethernet

	--: normal

16: 8 input /8 output

	32: 16 input /16 output

--: NPN

	P: PNP

T: transistor output

	R: relay output

⑦: pulse output    -: output type is T, 2 channels  
channel

4: 4 channels

2	Basic unit model list
---	--------------------------

### XL3 series List

Type							Input points (DC24V )	Output points (R, T )
AC power				DC power				
	Relay output	Transistor output	Relay/transistor mixed	Relay output	Transistor output	Relay/transistor mixed		
NPN	-	-	-	XL3-16R	XL3-16T	-	8	8

Type							Input points (DC24V )	Output points (R, T )
AC power			DC power					
	Relay output	Transistor output	Relay/transistor mixed	Relay output	Transistor output	Relay/transistor mixed		
NPN	-	-	-	-	XL1-16T	-	8	8
	-	-	-	XL3-16R	XL3-16T	-	8	8
	-	-	-	-	XL5-32T4	-	16	16
	-	-	-	-	XL5E-32T4	-	16	16
	-	-	-	-	XLME-32T4	-	16	16
PNP	-	-	-	XL3-16PR	-	-	8	8

### 1-2-3. XD expansion module list

1	I/O expansion
---	------------------

I/O expansion modules name constitute:

$$\frac{\text{XD}}{1} - \frac{\text{E}}{2} \frac{\bigcirc}{3} \frac{\square}{4} \frac{\bigcirc}{5} \frac{\square}{6} - \frac{\square}{7}$$

1	Series name	XD
2	Expansion module	E
3	Input points	8 or 16 or 32

4	Special for input	When input is NPN: X When input is PNP: PX
5	Output points	8 or 16 or 32
6	Output mode	YR: relay output YT: transistor output
7	Power supply type	E: AC220V C: DC24V

● I/O expansion module type list

Model				I/O points	Input points (DC24V)	Output points (R, T)
type	Input	Output				
		Relay output	Transistor output			
NPN	XD-E8X	-	-	8	8	-
	-	XD-E8YR	XD-E8YT	8	-	8
	-	XD-E8X8YR	XD-E8X8YT	16	8	8
	XD-E16X	-	-	16	16	-
		XD-E16YR	XD-E16YT	16	-	16
	-	XD-E16X16YR-E	XD-E16X16YT-E	32	16	16
	-	XD-E16X16YR-C	XD-E16X16YT-C	32	16	16
	XD-E32X-E	-	-	32	32	-
	XD-E32X-C	-	-	32	32	-
	-	XD-E32YR-E	XD-E32YT-E	32	-	32
	-	XD-E32YR-C	XD-E32YT-C	32	-	32
PNP	XD-E8PX	-	-	8	8 点	-
	-	XD-E8PX8YR	XD-E8PX8YT	16	8 点	8
	XD-E16PX	-	-	16	16 点	-
	-	XD-E16PX16YR-E	XD-E16PX16YT-E	32	16 点	16
	-	XD-E16PX16YR-C	XD-E16PX16YT-C	32	16 点	16
	XD-E32PX-E	-	-	32	32 点	-
	XD-E32PX-C	-	-	32	32 点	-

2	Analog temperature modules
---	----------------------------

Analog, temperature model constitute:

XD—E 4AD 2DA 6PT 6TC 1WT — P  
           ①     ②     ③     ④     ⑤     ⑥     ⑦

1	Expansion module	E
2	Analog input	4AD: 4 channels analog input

		8AD: 8 channels analog input
3	Analog output	2DA: 2 channels analog output
4, 5	Temperature input	6PT: 6 channels PT100 sensor input 6TC: 6 channels thermocouple sensor input
6	Pressure measurement	1WT: 1 channel pressure measurement 2WT: 2 channels pressure measurement 4WT: 4 channels pressure measurement
7	Type	P: PID control A: hardware is new version B: analog voltage output -5~5V or -10~10V C: hardware difference (only for WT model) V: input is voltage type

Analog, temperature expansion module type schedule

Type		Function
Analog input	XD-E4AD	4 channels analog input
	XD-E8AD	8 channels analog input
	XD-E8AD-A	8 channels analog input, current input type
	XD-E8AD-V	8 channels analog input, voltage input type
Analog input and output	XD-E4AD2DA	4 channels analog input, 2 channels analog output
	XD-E4AD2DA-B	4 channels analog input, 2 channels analog output
Analog output	XD-E2DA	2 channels analog output
	XD-E4DA	4 channels analog output
Temperature measurement	XD-E6PT-P	6 channels PT100 temperature measurement, with PID control
	XD-E6TC-P	6 channels K-type thermocouple temperature measurement, with PID control
Pressure measurement	XD-E1WT-A	1 channel pressure measurement, -39.06mV~39.06mV
	XD-E2WT-A	2 channels pressure measurement, -39.06mV~39.06mV
	XD-E4WT-A	4 channels pressure measurement, -39.06mV~39.06mV
	XD-E2WT-B	2 channels pressure measurement, 0~10mV
	XD-E1WT-C	1 channels pressure measurement, 0~10mV
	XD-E2WT-C	2 channels pressure measurement, 0~10mV
	XD-E4WT-C	4 channels pressure measurement, 0~10mV



## 1-2-4. XL expansion module list

1

### I/O expansion

I/O expansion modules name constitute:

$\frac{\text{XL}}{1} - \frac{\text{E}}{2} \frac{\bigcirc}{3} \frac{\square}{4} \frac{\bigcirc}{5} \frac{\square}{6}$

- 1: Series XL series expansion module
- 2: Expansion module E: expansion module
- 3: Input points 8 or 16 or 32
- 4: Input type X: NPN type input  
PX: PNP type input
- 5: Output points 8 or 16 or 32
- 6: Output mode YT: transistor output  
YR: relay output

#### ● I/O expansion module type list

Model				I/O points	Input points (DC24V)	Output points (R, T)
type	Input	Output				
		Relay output	Transistor output			
NPN	-	XL-E8X8YR	XL-E8X8YT	16	8	8
	XL-E16X	-	-	16	16	-
		XL-E16YR	XL-E16YT	16	-	16
	-		XL-E16X16YT	32	16	16
	XL-E32X	-	-	32	32	-
	-	-	XL-E32YT	32	-	32

2

### Analog expansion modules

Analog model constitute:

$\frac{\text{XL}}{1} - \frac{\text{E}}{2} \frac{\bigcirc}{3} \frac{\square}{4} \frac{\bigcirc}{5} \frac{\square}{6} - \frac{\square}{7}$

- 1: Series XL series expansion module
- 2: Expansion module E: expansion module

- |    |                |   |
|----|----------------|---|
| 3: | Input channel  | 2 or 4 or 8   |
| 4: | Analog input   | AD: analog voltage, current input                     |
| 5: | Output channel | 2 or 4  |
| 6: | Analog output  | DA: analog voltage, current output                    |
| 7: | Analog type    | A: current mode<br>V: voltage mode<br>P: PID function |

## Analog expansion module type list

Type		Description
Analog I/O	XL-E4AD2DA	4 channels analog input, 2 channels analog output
	XL-E4DA	4 channels analog output, current/voltage mode
	XL-E8AD-A	8 channels analog input, current mode
	XL-E8AD-V	8 channels analog input, voltage mode
Temperature control	XL-E4PT3-P	4 channels PT100 temperature measuring, built-in PID function
	XL-E4TC-P	4 channels thermocouple temperature measuring, built-in PID function

3	Left expansion ED module
---	--------------------------

Analog module model constitute:

**XL-2AD 2DA 2PT NES-A-ED**

1      2      3      4      5      6

- |    |                         |  |
|----|-------------------------|--|
| 1: | Analog input            | 2AD: 2 channels analog input                     |
| 2: | Analog output           | 2DA: 2 channels analog output                    |
| 3: | Temperature measurement | 2PT: 2 channels PT100 input                      |
| 4: | Communication           | NES: RS232 or RS458 communication                |
| 5: | Analog type             | A: I/O is current mode<br>V: I/O is voltage mode |
| 6: | Left expansion          | ED: left expansion ED module                     |

Left expansion ED module list:

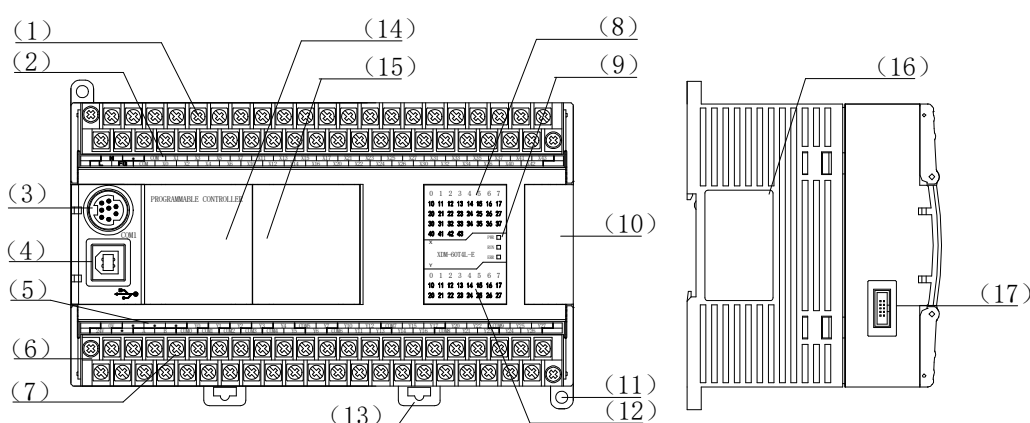
Model		Description
Analog input	XL-E4AD-A-ED	4 channels analog current input
	XL-E4AD-V-ED	4 channels analog voltage input
Analog output	XL-E4DA-A-ED	4 channels analog current output
	XL-E4DA-V-ED	4 channels analog voltage output

<b>Analog I/O</b>	XL-E2AD2DA-A-ED	2 channels analog current input, 2 channels analog current output
	XL-E2AD2DA-V-ED	2 channels analog voltage input, 2 channels analog voltage output
<b>Analog temperature mixed type</b>	XL-E2AD2PT-A-ED	2 channels analog current input, 2 channels PT100 temperature input
	XL-E2AD2PT-V-ED	2 channels analog voltage input, 2 channels PT100 temperature input
	XL-E2PT2DA-A-ED	2 channels PT100 temperature input, 2 channels analog current output
	XL-E2PT2DA-V-ED	2 channels PT100 temperature input, 2 channels analog voltage output
<b>Communication</b>	XL-NES-ED	One RS232 port, one RS485 port, cannot use at the same time

### 1-3. Each Part's Description

1

#### XD series structure

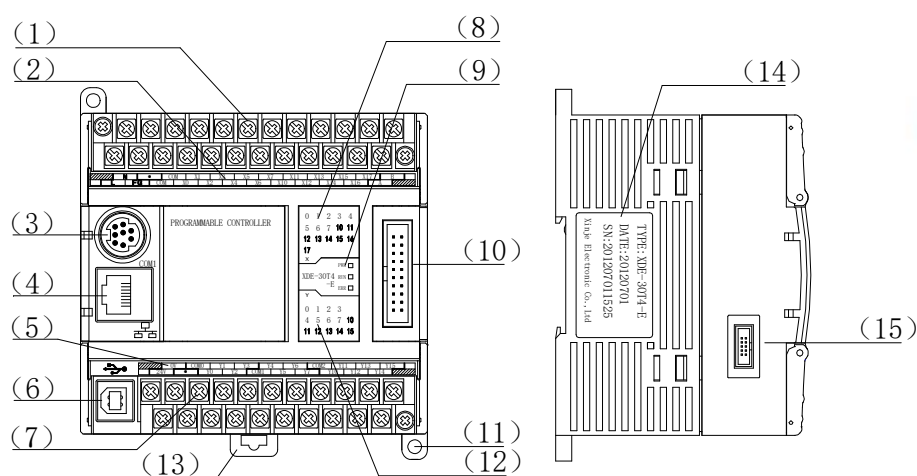


Each part's name is listed below:

- |                                      |                                      |
|--------------------------------------|--------------------------------------|
| ⑨ :Input & power supply terminals    | ① : expansion module connection port |
| ⑩ :Input terminal label              | ② : installation hole (2 holes)      |
| ⑪ :COM1                              | ③ : output action display            |
| ⑫ :USB port                          | ④ : rail mounting hook (2 hooks)     |
| ⑬ :Output terminal label             | ⑤ : expansion BD (COM4)              |
| ⑭ :Output & 24V power terminals      | ⑥ : expansion BD (COM5)              |
| ⑮ :output terminal, RS485 port(COM2) | ⑦ : product label                    |
|                                      | ⑧ : expansion ED (COM3)              |

Note: (1) for the PLC hardware version below 3.2, position 4 is RS232 port.  
 (2) for XD1, XD2, XDC series PLC, position 4 is RS232 port.  
 (3) for XDC series PLC, position 4 RS232 port and terminal A and B (RS485 port) is the same port, they cannot be used at the same time.

<b>2</b>	<b>XD5E-30T4 structure</b>
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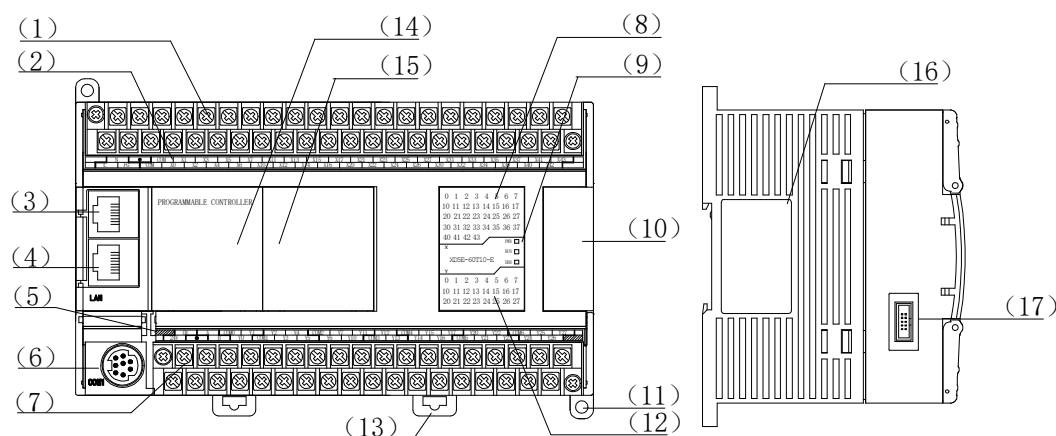


Each part's name is listed below:

- (1) : input terminal, power supply input, COM2
- (2) : input label
- (3) : COM1
- (4) : Ethernet port RJ45
- (5) : output label
- (6) : USB port
- (7) : output terminal, 24V output terminal
- (8) : input indicator light

- (9) : system indicator light  
PWR: power  
RUN: run  
ERR: error
- (10) : expansion module access
- (11) : installation hole (2 holes)
- (12) : output indicator light
- (13) : rail installation hook
- (14) : product label
- (15) : ED module access

<b>3</b>	<b>XD5E-60T10</b> <b>XDME-60T10</b> <b>structure</b>
----------	--

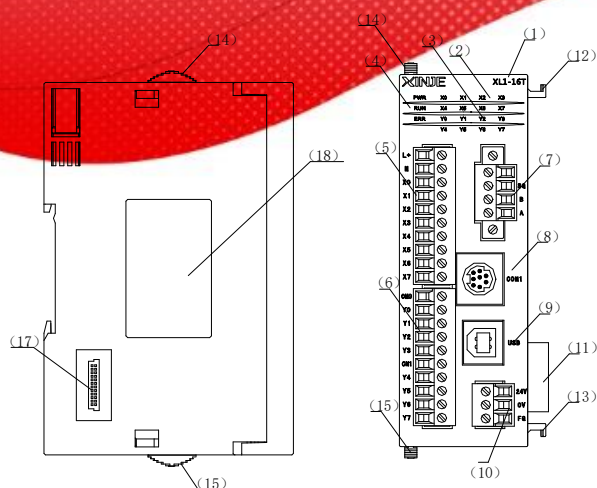


Each part's name is listed below:

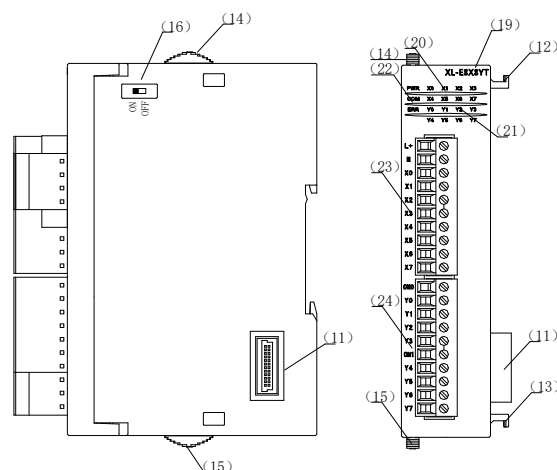
- |                                       |                                      |
|---------------------------------------|--------------------------------------|
| 1: Input & power supply terminals     | 10: expansion module connection port |
| 2: Input terminal label               | 11: installation hole (2 holes)      |
| 3: RJ45 port 1                        | 12: output action display            |
| 4: RJ45 port 2                        | 13: rail mounting hook (2 hooks)     |
| 5: Output terminal label              | 14: expansion BD (COM4)              |
| 6: RS232 port (COM1)                  | 15: expansion BD (COM5)              |
| 7: output terminal, RS485 port (COM2) | 16: product label                    |
| 8: Input action display               | 17: expansion ED (COM3)              |
| 9: system LED                         |                                      |
| PWR: power supply                     |                                      |
| RUN: working                          |                                      |
| ERR: error                            |                                      |

<b>4</b>	<b>XL series</b> <b>structure</b>
----------	--------------------------------------





**CPU unit**



**Right expansion module**

Each part's name is listed below:

- (1) : PLC model
- (2) : input label and indicator light
- (3) : output label and indicator light
- (4) : system indicator light
  - PWR: power
  - RUN: run
  - ERR: error
- (5) : input terminal
- (6) : output terminal
- (7) : RS485 port (PORT2)
- (8) : RS232 port (PORT1)
- (9) : USB port
- (10) : power input terminal
- (11) : right expansion module access
- (12) : module fixed hook

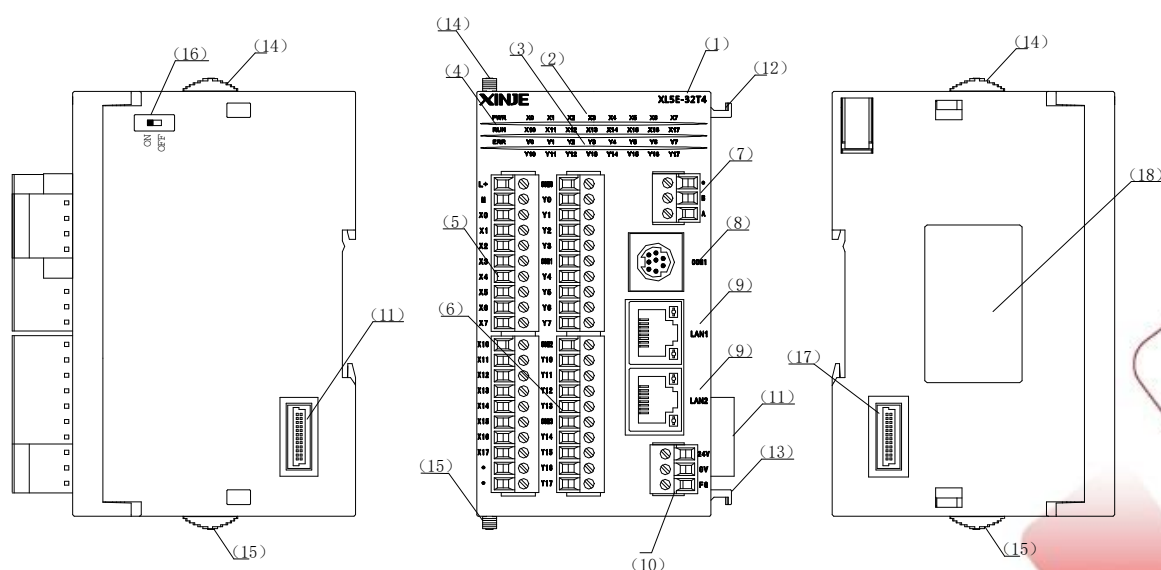
- (13) : module fixed hook (down)
- (14) : slide lock (up)
- (15) : slide lock (down)
- (16) : DIP switch
- (17) : left expansion Ed module access
- (18) : product label
- (19) : expansion module model
- (20) : expansion module input label and indicator light
- (21) : expansion module output label and indicator light
- (22) : expansion module system indicator light
  - PWR: power
  - COM: communication
  - ERR: error
- (23) : expansion module input terminal
- (24) : expansion module output terminal

**Note:**

- (1) XL3/XL5 series USB communication ports are only for download and monitoring of programs. (XL1 series does not have USB ports.)
- (2) When the dial switch on the side of XL body is used for RS485 port communication, whether the PLC is the terminal? When the PLC is at the beginning or end of the bus, please turn the dial switch to ON.

(3) RS485 port of XL1 series does not have isolation, so it does not support X-NET Fieldbus function.

<b>5</b>	<b>XL5E-32T4</b> <b>XLME-32T4</b> <b>structure</b>
----------	--



Each part's name is listed below:

- |                                  |   |
|----------------------------------|---|
| (1) : PLC model                  | (8) : RS232 port (PORT1)                  |
| (2) : input label and indicator  | (9) : Ethernet port 1, 2                  |
| (3) : output label and indicator | (10) : Power supply input terminal        |
| (4) : system LED                 | (11) : right expansion module access port |
| PWR: power supply                | (12) : module fixing hook(up)             |
| RUN: working                     | (13) : module fixing hook(down)           |
| ERR: error                       | (14) : sliding lock (up)                  |
| (5) : input terminals            | (15) : sliding lock (down)                |
| (6) : output terminals           | (16) : dial switch                        |
| (7) : RS485 port (PORT2)         | (17) : left expansion module access port  |

When the dial switch on the side of PLC body is used for RS485 port communication, whether the PLC is the terminal? When the PLC is at the beginning or end of the bus, please turn the dial switch to ON.

---

## 2 Specifications and parameters of CPU

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This chapter mainly introduces XD/XL CPU's general specifications, performance, dimensions, terminals arrangement and communication interfaces.

The Expansions' description, please refer to XD series expansion module manual.

2-1. Specification and Parameters

2-2. External Dimensions

2-3. Terminals Arrangement

2-4. Communication Interfaces

## 2-1. Specifications and Parameters

### 2-1-1. General Specifications

This specification is fit for XD and XL series PLC.

Items	Specifications
Isolation voltage	Above DC 500V 2MΩ
Anti-noise	Noise voltage 1000Vp-p 1us pulse per 1 minute
Atmosphere	No corrosive, flammable gas
Ambient temperature	0°C~60°C
Ambient humidity	5%~95% (NO condensation)
USB port	USB download port, connect PC to upload/download/online monitoring
Port 0	RS-232, to connect upper computer, HMI for program or debug.
Port 1	RS-232, to connect upper computer, HMI for program or debug.
Port 2	RS-485, to connect intelligent instruments or inverters.
Ethernet port	RJ45, connect to upper device, monitoring, connect to other devices in the LAN
Installation	Use M3screws or DIN to fix
Grounding (FG)	The third type grounding (do not grounding with strong power system)

※1: XD1 series, XD2 series, XDC series, XL1 series, XDME-60, XD5E-60 models without USB port.

※2: PORT0 port only has XD1, XD2 series PLC, other models do not have this port.

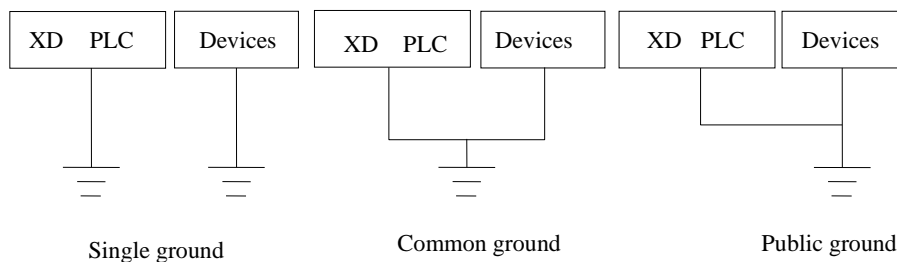
※3: XD1-16 without PORT2 is RS485 port.

※4: For XDC series PLC, PORT2 port is divided into RS232 and RS485 two communication interfaces, two communication ports can not be used at the same time.

※5: Ethernet port only has XD5E, XDME, XL5E, XLME series PLC.

※6: The DIN type should be DIN46277, with width 35 mm.

※7: The grounding should use type1 and 2, not 3.



## 2-1-2. Performance and Specifications

XD series PLC specifications:

Items		Specifications					
Program execution mode		Loop scan mode					
Program mode		Instructions and ladder					
Processing speed		0.05us					
Power off retentive		FlashROM and Li-battery(3V button battery)					
Users' program capacity※1		XD1/XD2/XD3: 256KB, XD5/XDM/XDC: 384KB XD5E/XDME: 1MB XDM-60T4L: 1.5MB					
I/O points ※2	Total I/O	16	24	30	32	48	60
	Input	8	14	18	18	28	36
	Output	8	10	12	14	20	24
Internal Coils(X)※3		1280 points: X0~X77, X10000~X11777, X20000~X20277					
Internal Coils(Y)※4		1280 points: Y0~Y77, Y10000~Y11777, Y20000~Y20277					
Internal Coils(M, HM)		11008/87000	XD1/XD2/XD3: M0~M7999 【HM0~HM959】 ※5 XD5/XDM/XDC/XD5E/XDME: M0~M69999 【HM0~HM11999】				
			For Special Use※6 XD1/XD2/XD3: SM0~SM2047 XD5/XDM/XDC/XD5E/XDME: SM0~SM4999				
Procedure(S)		1152/9000	XD1/XD2/XD3: S0~S1023 【HS0~HS127】 XD5/XDM/XDC/XD5E/XDME: S0~S7999 【HS0~HS999】				
Timer(T)	points	672/7000	XD1/XD2/XD3: T0~T575 【HT0~HT95】 XD5/XDM/XDC/XD5E/XDME: T0~T4999 【HT0~HT1999】				
	Spec.	100mS timer: set time 0.1~3276.7sec. 10mS timer: set time 0.01~327.67sec. 1mS timer: set time 0.001~32.767sec.					



Counter (C)	points	672/700 0	XD1/XD2/XD3: C0~C575 【HC0~HC95 】 XD5/XDM/XDC/XD5E/XDME: C0~C4999 【HC0~HC1999】
	Spec.	16 bits counter: set value K0~32,767 32 bits counter: set value -2147483648~+ 2147483647	
Data Register(D)		11048 words/90 000 words/ 100000 words	XD1/XD2/XD3: D0~D7999 【 HD0~HD999】※5 XD5: D0~D69999※7 【HD0~HD24999 】 XDM/XDC/XD5E/XDME: D0~D69999 【 HD0~HD24999】
			For Special Use※6 XD1/XD2/XD3: SD0~SD2047 XD5/XDM/XDC/XD5E/XDME: SD0~SD4999
FlashROM Register (FD)		8144 words/ 14192 words	XD1/XD2/XD3: FD0~FD6143 XD5/XDM/XDC/XD5E/XDME: FD0~FD8191
			For Special Use※6 XD1/XD2/XD3: SFD0~SFD1999 XD5/XDM/XDC/XD5E/XDME: SFD0~SFD5999
High Speed Dispose Ability		High speed counter, pulse output, external interruption	
Password Protection		6 bits ASCII	
Self-diagnose Function		Power on self-check, monitor timer, grammar check	

XL3 series PLC specifications:

Items		Specifications	
Program execution mode		Loop scan mode	
Program mode		Instructions and ladder	
Processing speed		0.05us	
Power off retentive		FlashROM and Li-battery(3V button battery)	
Users' program capacity※1		XL1/XL3: 256KB XL5: 384KB XL5E/XLME: 1MB	
	Total I/O	16	32

I/O points ※2	Input	8		16
	Output	8		16
Internal Coils(X)※3	896 points	XL1/XL3: X0~X77, X10000~X11177, X20000~X20177, X30000~X30077		
	1280 points	XL5/XL5E/XLME: X0~X77, X10000~X11777, X20000~X20177, X30000~X30077		
Internal Coils(Y)※4	896 points	XL1/XL3: Y0~Y77, Y10000~Y11177, Y20000~Y20177, Y30000~Y30077		
	1280 points	XL5/XL5E/XLME: Y0~Y77, Y10000~Y11777, Y20000~Y20177, Y30000~Y30077		
Internal Coils(M, HM)	11008/ 92000 points	XL1/XL3: M0~M7999 【HM0~HM959】 ※5		
		XL5/XL5E/XLME: M0~M69999 【 HM0~HM11999】		
Procedure(S)	1152/900 0 points	Special※6 XL1/XL3: SM0~SM2047 XL5/XL5E/XLME: SM0~SM4999		
		XL1/XL3: S0~S1023 【HS0~HS127】 XL5/XL5E/XLME: S0~S7999 【HS0~HS999】		
Timer(T)	points	672/7000 points	XL1/XL3: T0~T575 【HT0~HT95】 XL5/XL5E/XLME: T0~T4999 【HT0~HT1999】	
	Spec.	100mS timer: set time 0.1~3276.7sec. 10mS timer: set time 0.01~327.67sec. 1mS timer: set time 0.001~32.767sec.		
Counter (C)	points	672/7000 points	XL1/XL3: C0~C575 【HC0~HC95】 XL5/XL5E/XLME: C0~C4999 【HC0~HC1999】	
	Spec.	16 bits counter: set value K0~32,767 32 bits counter: set value -2147483648~+ 2147483647		
Data Register(D)		11048/ 100000 words	XL1/XL3: D0~D7999 【HD0~HD999】 ※5	
			XL5/XL5E/XLME: D0~D69999 【HD0~HD24999】	
			Special※6 XL1/XL3: SD0~SD2047 XL5/XL5E/XLME: SD0~SD4999	

FlashROM Register (FD)	7120/ 14192 words	XL1/XL3: FD0~FD5119 XL5/XL5E/XLME: FD0~FD8191
		Special※6 XL1/XL3: SFD0~SFD1999 XL5/XL5E/XLME: SFD0~SFD5999
High Speed Dispose Ability	High speed counter, pulse output, external interruption	
Password Protection	6 bits ASCII	
Self-diagnose Function	Power on self-check, monitor timer, grammar check	

#### Note:

※1: The users' program capacity means the maximum program capacity when download in secret.

※2: I/O points mean terminal number that users can connect from outside.

※3: X stands for the internal input relays and can be used as middle relay when input points are exceeded.

※4: Y stands for the internal output relays and can be used as middle relay when output points are exceeded.

※5: 【】 marks the default power off retentive area, this area can't be changed.

※6: For special use means special usage registers that are occupied by system, can't be applied for other usage. For details, please refer to Appendix 1.

※7: The XD5 series data registers for firmware versions V3.5.3 and above range from D0 to D69999, and the XD5 series data registers for firmware versions V3.5.2 and below range from D0 to D59999.

※8: Input and output coils no. is octal, other coils and registers are decimal.

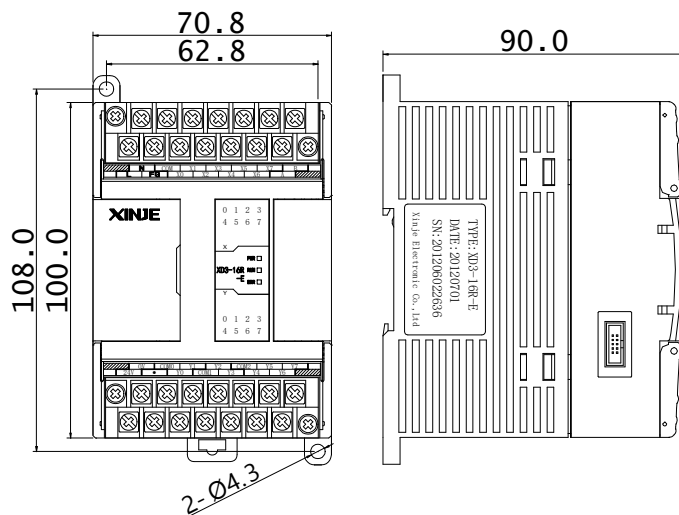
※9: The I/O which is not connected to other device can be used to internal coil.

## 2-2. Dimensions

Note: the height is 79.9mm for PLC hardware version v3.4 and below.

1 Picture 1

(Unit: mm)

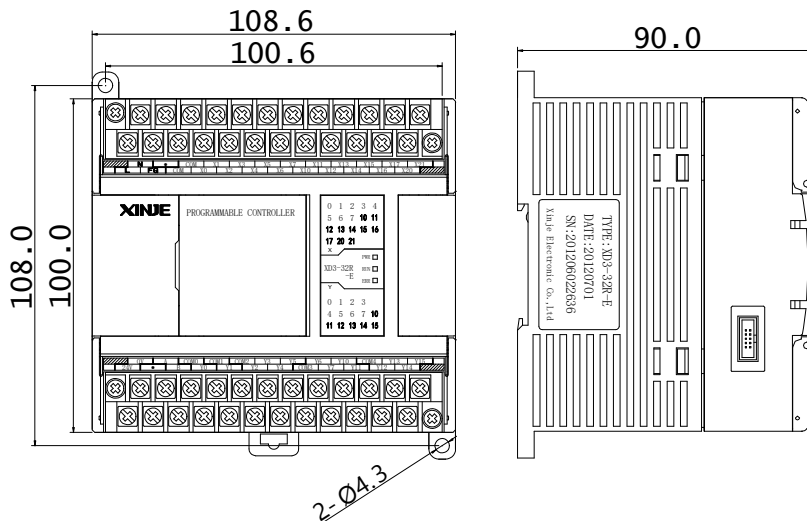


Suitable Model:

Series	Points
XD1	16
XD2	
XD3	
XD5	

2 Picture 2

(Unit: mm)

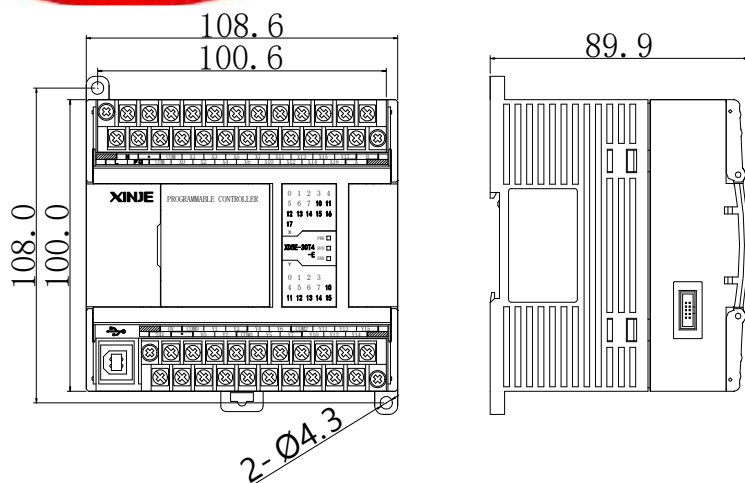


Suitable Model:

Series	Points
XD1	24/32
XD2	
XD3	
XD5	
XDM	
XDC	

**3 Picture 3**

(Unit: mm)

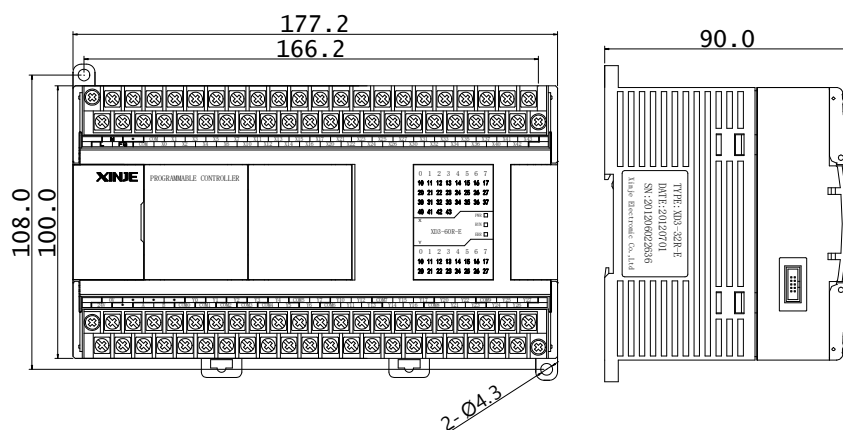


Suitable Model:

Series	Points
XD5E	30

**4 Picture 4**

(Unit: mm)

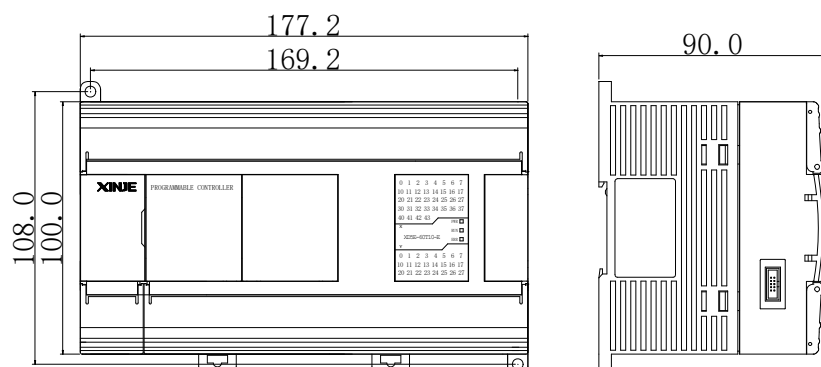


Suitable Model:

Series	Points
XD2	48/60
XD3	
XD5	
XDM	
XDC	

**5 Picture 5**

(Unit: mm)



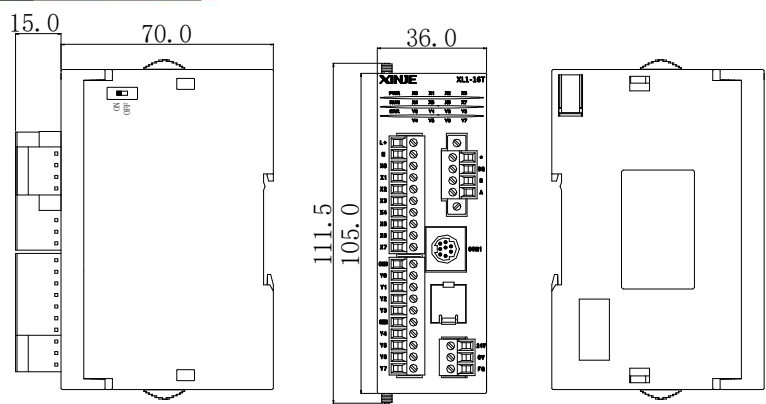
Suitable model:

Series	Points
XD5E	60
XDME	60



6

Picture 6



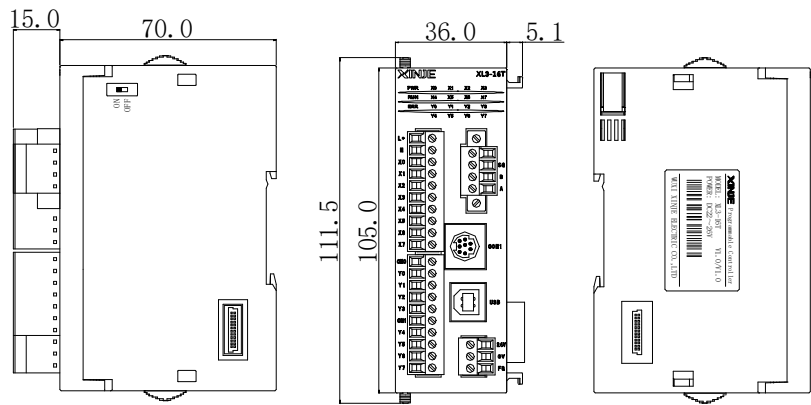
(Unit: mm)

Suitable model:

Series	Points
XL1	16

7

Picture 7



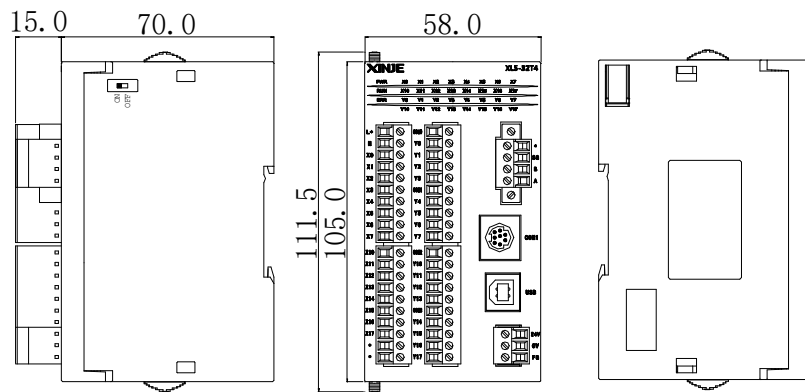
(Unit: mm)

Suitable model:

Series	Points
XL3	16

8

Picture 8



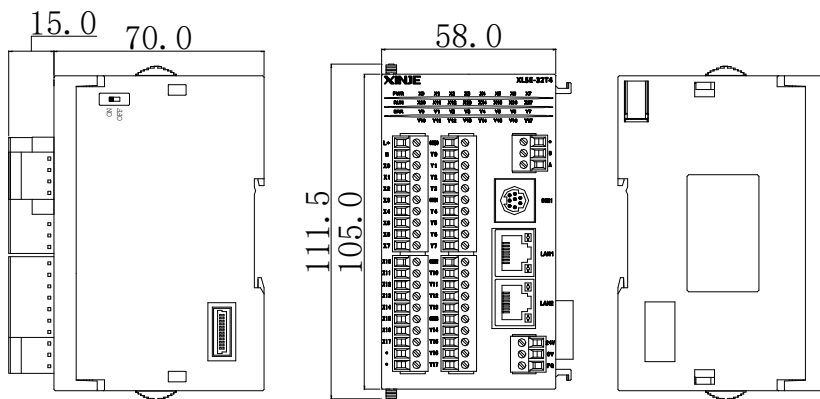
(Unit: mm)

Suitable model:

Series	Points
XL5	32

9

Picture 9



(Unit: mm)

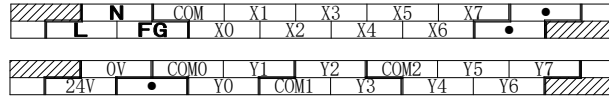
Suitable model:

Series	Points
XL5E	32
XLME	

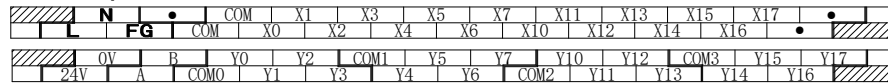
## 2-3. Terminal arrangement

### 2-3-1. XD series terminal arrangement

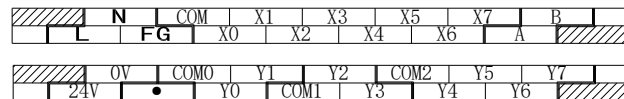
#### ● Graph A



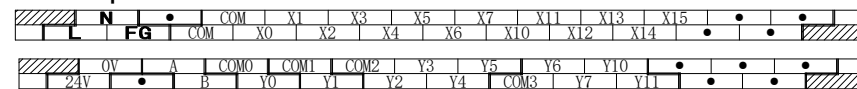
#### ● Graph B



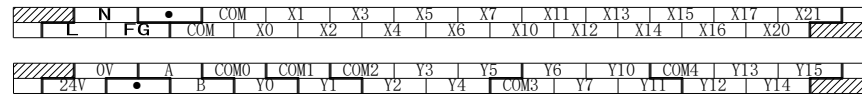
#### ● Graph C



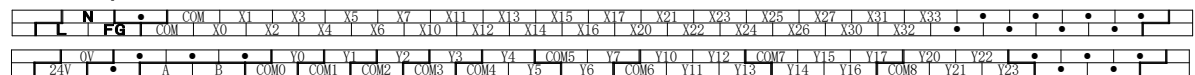
#### ● Graph D



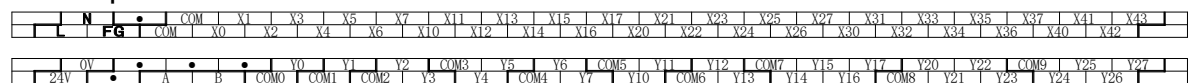
#### ● Graph E



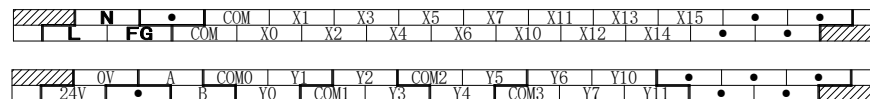
#### ● Graph F



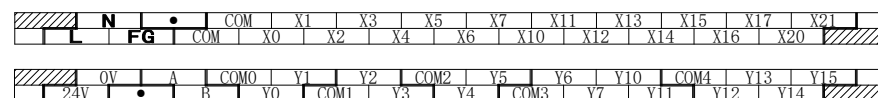
#### ● Graph G



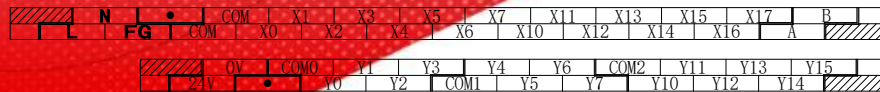
#### ● Graph H



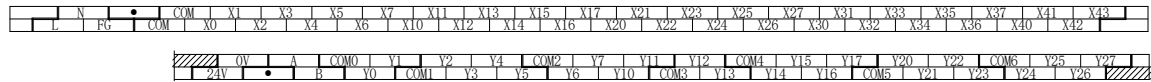
#### ● Graph I



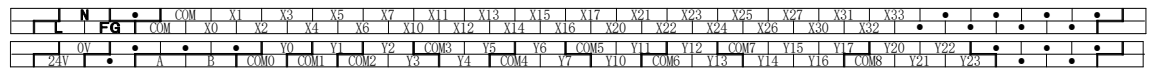
#### ● Graph J



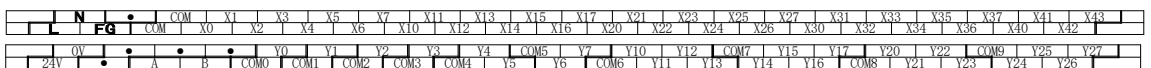
### ● Graph K



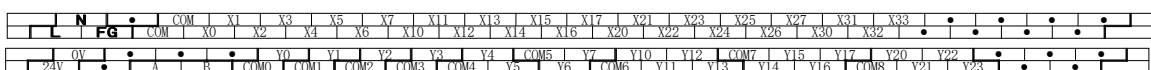
### ● Graph L



### ● Graph M



### ● Graph N



The graph for the model:

graph	Suitable model	Note
A	XD1-16	8 input /8 output
B	XD1-32	16 input /16 output
C	XD2-16、XD3-16、XD5-16	8 input /8 output
D	XD2-24、XD3-24、XD5-24、XDM-24	14 input /10 output
E	XD2-32、XD3-32、XD5-32、XDM-32	18 input /14 output
F	XD2-48、XD3-48、XD5-48、XDC-48	28 input /20 output
G	XD5-60T6、XD5-60T10、XDM-60T10	36 input /24 output
H	XD5-24T4、XDM-24T4、XDC-24T	14 input /10 output
I	XD5-32T4、XDM-32T4、XDC-32T	18 input /14 output
J	XD5E-30T4	16 input /14 output
K	XD5E-60T10、XDME-60T10	36 input /24 output
L	XD5-48T6	28 input /20 output

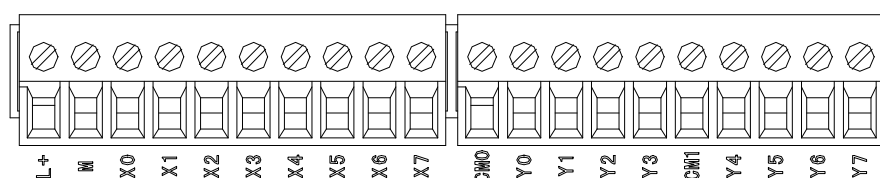
M	XD2-60、XD3-60、XD5-60、XD5-60T4、 XDC-60、XDM-60T4	36 input /24 output
N	XD5-48T4	28 input /20 output

Note:

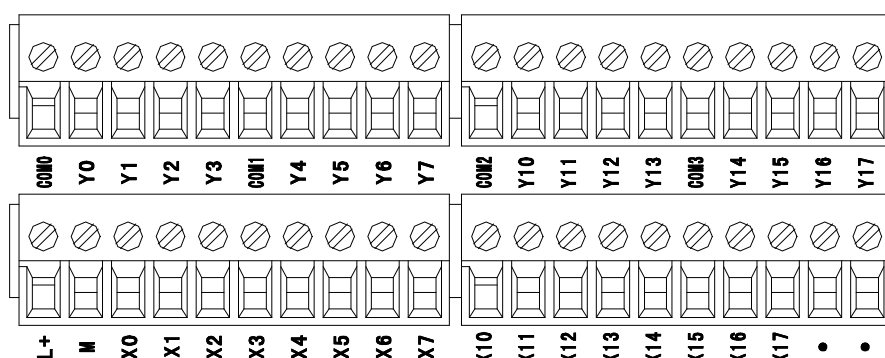
1. Transistor and relay mixed type, only the first two channels are transistor output, others are relay output.
2. E type PLC power supply terminal is L, N; C type PLC power supply terminal is 24V+, 24V-.
3. The 24V, 0V terminal is external output terminal, it can supply power for module and sensor. Do not over the max output current when using, please refer to chapter 4-1.
4. FG ground terminal can shield the interference, it can single connect to the ground.
5. The com terminal of input corresponding to all the input points; the com terminal of output corresponding to different output points. Please connect the wire as the division on the terminal label.
6. The terminals A and B on the terminal row are RS485 communication interfaces, A is RS485+, B is RS485-.

### 2-3-2. XL series terminal arrangement

XL series I/O terminals:



XL1-16, XL3-16



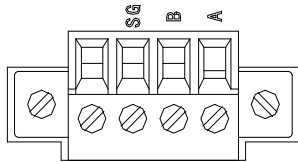
XL5-32T4, XL5E-32T4, XLME-32T4

Note:



- (1) XL series PLC has no built-in 24V power supply, it needs external DC24V power supply. L+ connects to 24V+, M connects to 24V-.
- (2) The common terminal of input terminal X0-X7 is M, the common terminal of output terminal Y0-Y3 is CM0. The common terminal of output terminal Y4-Y7 is CM1.

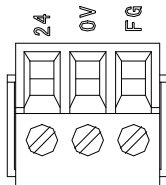
XL series RS485 terminals:



Note:

- (1) A is RS485+, B is RS485-. Please connect A to A, B to B when communicating.
- (2) SG is communication ground terminal, it can connect to SG terminal of servo drive in general.
- (3) RS485 port of XL1 series does not have isolation, so it does not support X-NET Fieldbus function.

XL series PLC power supply terminals:



Note:

- (1) PLC power supply input terminals are 24V, 0V.
- (2) FG is ground terminal for shield interference, please connect to ground separately.

Connection head specifications 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 conductors with tubular pre-insulated end is 0.25-0.5 square.

## 2-4. Communication Ports

XD series PLC have USB port, port0 (RS232), port0 (RS232, only XD1/XD2 support), port1(RS232), port2 (RS485, XDC is RS485/RS232), Ethernet port

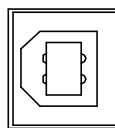
(XD5E/XDME series support). USB port can high-speed upload, download and monitor program, port0, port1 and port2 can communicate and download program, Ethernet port can download and monitor program, communicate with other equipment in the LAN.

XL series PLC have USB port(XL1/XL5E/XLME without this port), port1 (RS232), port2 (RS485), Ethernet port(XL5E/XLME support). USB port can high-speed upload, download and monitor program, port1 and port2 can communicate and download program. Ethernet port can download and monitor program, communicate with other equipment in the LAN.

## 1 USB port

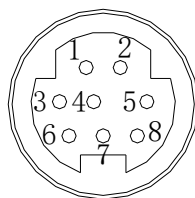
USB port only can download program but cannot communicate with other device.

Please use printer USB cable or XINJE USB cable to download.



## 2 RS232 port

RS232 port can upload, download program and communication. Port0 only supports X-NET mode, port 1 supports Modbus and X-NET mode. The pin diagram of port0, port1, port2 are shown as below:



4: RxD  
5: TxD  
8: GND

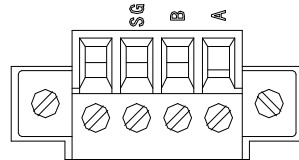
Mini Din 8-core plug-in (holes)

## 3 RS485 port

The port2 of XD series PLC are the terminal A and B. A is RS485+, B is RS485-.(

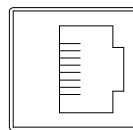
XD1-16 does not have RS485 port.

The port2 of XL series PLC is separately, they are terminal A, B and SG(signal ground).



#### 4 Ethernet port

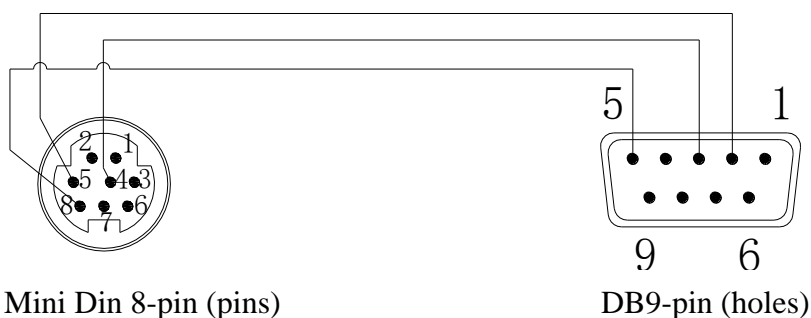
The Ethernet port is RJ45 access, can upload, download program, online monitoring, remote monitoring, communicate with other device in the LAN.



#### 5 Program Cable

download program via RS232 port must use XINJE XVP cable.

Program cables are as below:



Note: above diagram is for DVP cable. If it is XVP cable, please connect pin1 of Mini Din8 and pin7 of DB9 based on above diagram.

### 3 System Structure

---

As the controllers, XD/XL series PLC can connect with many kinds of peripheral devices, expansion devices. In this chapter, we mainly introduce PLC basic units, peripheral devices and expansion devices connection. And also introduce the connection principle of PLC with expansions, products installation, points calculation, address number distribution etc. For the introduction of expansions, please refer to chapter 8.

3-1. System Structure

3-2. Peripheral Devices

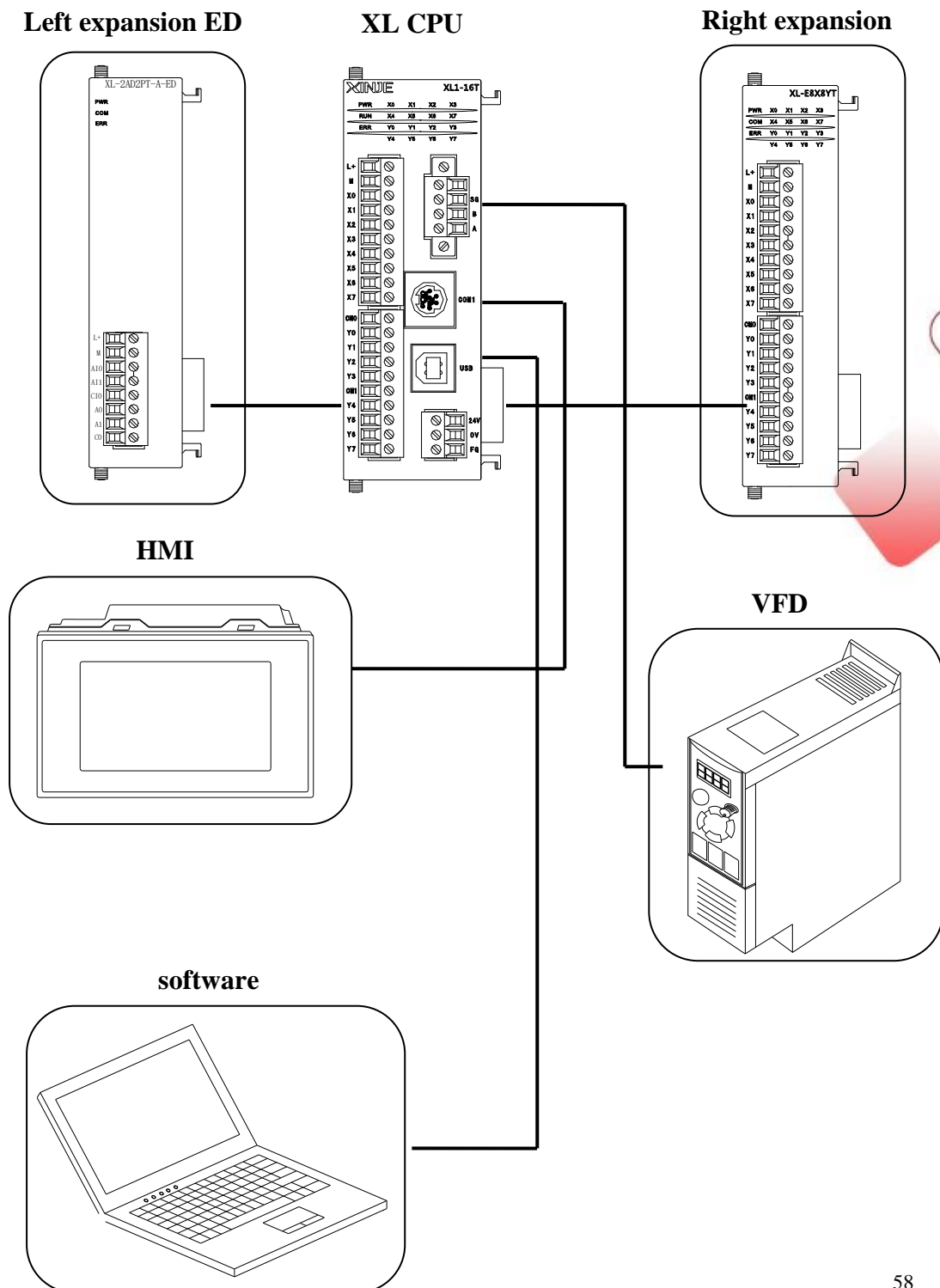
3-3. Combination Principle

3-4. Expansions' ID Assignment

3-5. Install the Products

### 3-1. System Structure

According to XD/XL series PLC basic configuration, we build the system structure chart as below. We can know the general connection among PLC, peripheral equipments and expansions from the chart; also classic applications of PLC's each COM port, connection and expansions etc.





※1: In the above chart, the communication devices connected to the COM port are only samples for your reference. Each COM port can connect with many devices in real applications.

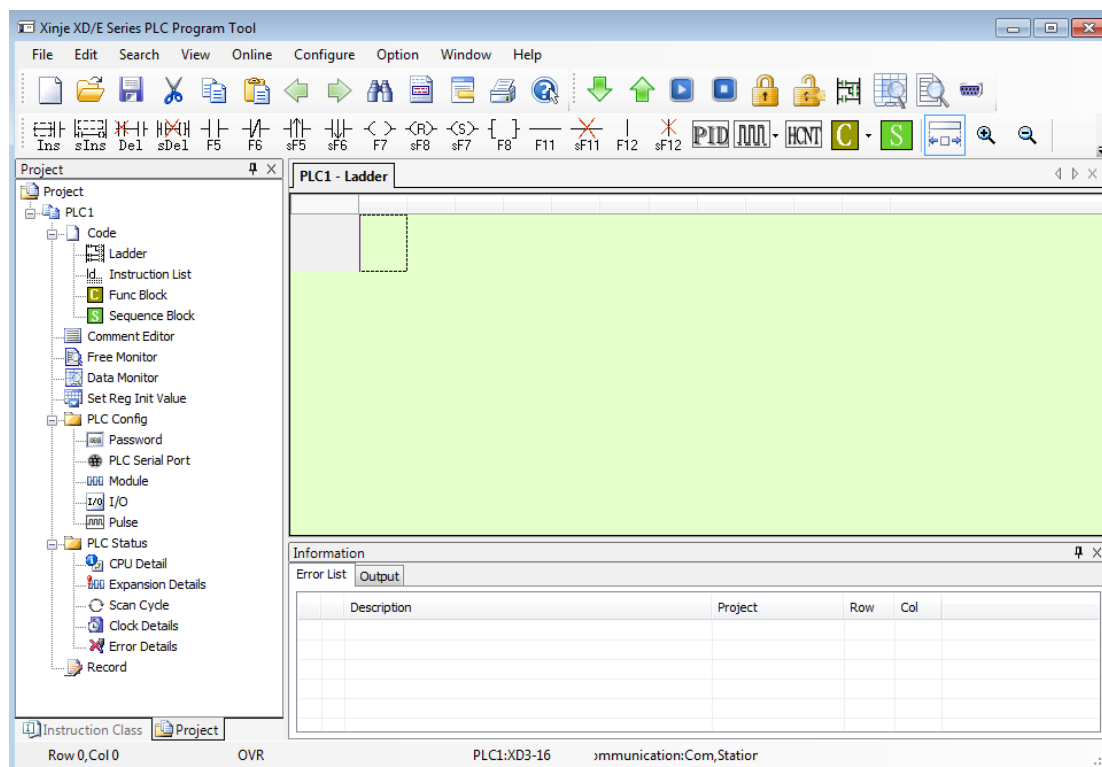
## 3-2. Peripheral Devices

XD/XL series PLC basic units can work with many kinds of peripheral devices.

### 3-2-1. Program Software

Users can write to or upload program from PLC, real time monitor PLC, configure PLC etc; After installing XDPPro on your PC, use the program cable, via port1 or USB port on PLC(CPU Units), to link PLC with XDPPro.

#### ● Program Interface



※1: Please use the download cable offered by XINJE Company or make the cable by yourself. Connecting method, please refer to chapter 2-4.

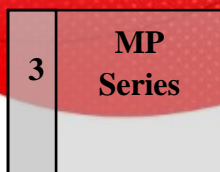
### 3-2-2 Human Machine Interface (HMI)

The HMI link PLC to the operators. The HMI can send the commands from operators to PLC, and then PLC executes the commands.

XD/XL series PLC support diverse brands of HMI; the connection is based on the communication protocol. Generally communicate via Modbus protocol, the detailed parameters setting depends on the HMI.

The Xinje HMI can work with PLC directly (the communication parameters are set in accordance already). Presently Xinje HMI has TG, TH, TP, OP, MP series.

1	<b>TG,TH series</b>	<ul style="list-style-type: none"><li>● Size 4.3", 7", 8", 10.1", 10.4", 15.6"</li><li>● Display 16 million color, 65536 color</li><li>● Operation touch screen</li><li>● Interface RS232, RS422, RS485, USB, Internet port</li><li>● Communication Work with many PLC brands, inverters, instruments etc.</li></ul> <p>Drive panel printer directly, support multiple printer.</p> <p>Dual COM ports make it possible that work with 2 different devices at the same time.</p> <p>Support free format protocol, users can write the driver program freely</p> <ul style="list-style-type: none"><li>● Recipe input different group of data in the table</li><li>● Picture Rich stereoscopic 3D gallery, font effects, data collect, data backup etc.</li><li>● Password nine-level setting</li><li>● Advanced function animation design and so on</li></ul>
2	<b>OP Series</b>	<ul style="list-style-type: none"><li>● Size 3.7"</li><li>● Display Blue LCD, 256 true color</li><li>● Buttons Nr. 7, 20 not touch screen</li><li>● Interface RS232, RS422, RS485</li><li>● Communication work with many PLC brands.</li></ul> <p>Communicate with Xinje Inverters</p> <ul style="list-style-type: none"><li>● RTC Built-in</li></ul>



- Size 3.7"
- Display STN-LCD
- Buttons Nr.: 26, 20, the LCD is touch screen
- Interface RS232, RS422, RS485
- Communication work with many PLC brands.  
Communicate with Xinje Inverters
- RTC: Built-in

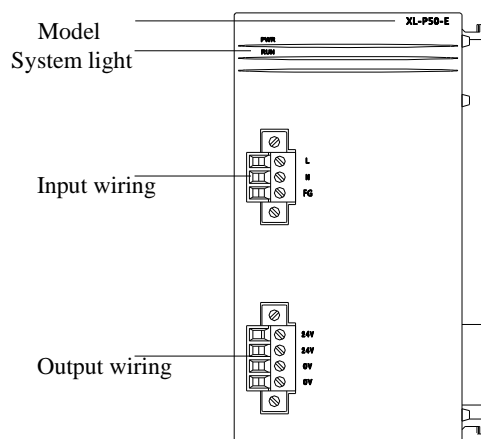
### 3-2-3 XL adapter power supply

XL series PLC can use external power supply or XL special power supply module XL-P50-E.

#### 1 Basic specification

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

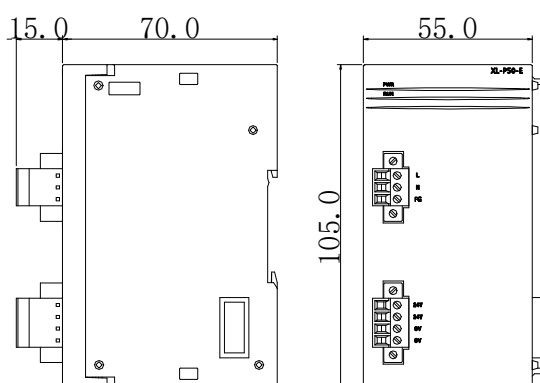
#### 2 Structure



Structure name	Function
Model	The model of the product
System light	PWR: power light, always ON when the module is energized RUN: run light, always ON when the module is running well
Input wiring	L, N: power supply input terminal FG: ground terminal
Output wiring	Can output two groups of 24V, 0V power supply

<b>3</b>	<b>Dimensions</b>
----------	-------------------

Unit: mm



### 3-3. Configuration Principle

#### COM port

- XD/XL series PLC (CPU units) are usually equipped with port1 and port2.
- In principle, both ports can be used to program, download, communication; but please make sure not change the parameters of two ports at one time, otherwise the ports can't be used to program and download any more.
- Port1 is equipped with RS232. Port2 is RS485. The two ports are independent.

#### About Expansion Devices

- Generally, one CPU unit can work with different types of expansions, can expand digital I/O, analog I/O, temperature control etc.
- XD1/XD2 cannot support expansion module, XD3 can work with 10 expansions and XD5/XDM/XDC/XD5E /XDME can connect 16 modules.
- XL1 does not support extension modules, XL3 series can expand up to 10 modules, XL5/XL5E/XLME series can expand up to 16 modules.
- After connecting the CPU unit with the expansion, if the "PWR" LED of expansion ON, then the expansion can work properly; after installing the BD card to CPU unit, users need to configure it before using;

#### How to calculate the I/O

- I/O points include actual input and output points.
- After connect with the expansions, the total I/O points=I/O on basic unit + I/O on expansions.
- Digital I/O is octal.
- Analog I/O is decimal.
- After expansion, the total I/O can up to 572 points.

#### How to calculate the I/O

Basic Unit XD3-32R-E (18I/14O) connect with 5 XD-E8X8Y expansions, then the total I/O points should be:

Input Points:  $18 + 8 * 5 = 58$

Output points:  $14 + 8 * 5 = 54$

Total points: Input+ Output =  $58+54=112$



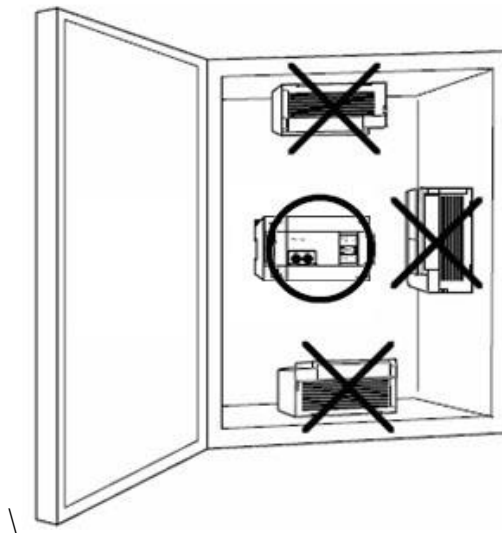
### 3-4. ID Assignment of Expansions

Sign	Name	Range		points
X	Input points		X10000~X10077 (#1 extension module) ..... XD X11100~X11177 (#10 extension module) XL ..... X11700~X11777 (#16 extension module)	1024
		XD	X20000~X20077 (#1 extension BD) X20100~X20177 (#2 extension BD)	128
		XD XL	X30000~X30077 (#1 extension ED)	64
Y	Output points		Y10000~Y10077 (#1 extension module) ..... XD Y11100~Y11177 (#10 extension module) XL ..... Y11700~Y11777 (#16 extension module)	1024
		XD	Y20000~Y20077 (#1 extension BD) Y20100~Y20177 (#2 extension BD)	128
		XD XL	Y30000~Y30077 (#1 extension ED)	64
ID	extension module		ID10000~ID10099 (#1 extension module) ..... XD ID10900~ID10999 (#10 extension module) XL ..... ID11500~ID11599 (#16 extension module)	1600
		XD	ID20000~ID20099 (#1 extension BD) ID20100~ID20199 (#2 extension BD)	200
		XD XL	ID30000~ID30099 (#1 extension ED)	100
	extension BD			

QD	extension module	XD XL	QD10000~QD10099 (#1 extension module) ..... QD10900~QD10999 (#10 extension module) ..... QD11500~QD11599 (#16 extension module)	1600
	extension BD	XD	QD20000~QD20099 (#1 extension BD) QD20100~QD20199 (#2 extension BD)	200
	extension ED	XD XL	QD30000~QD30099 (#1 extension ED)	100

### 3-5. Install The Products

#### 1 Installation Position

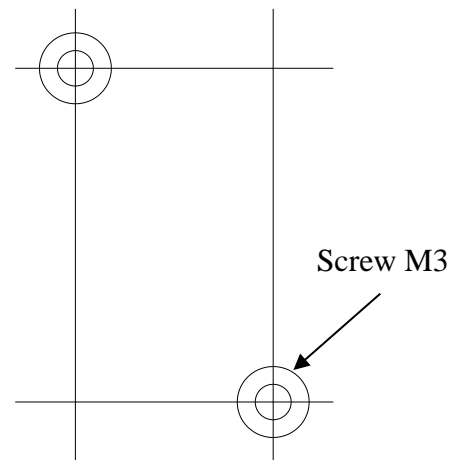


#### 2 Installation Method

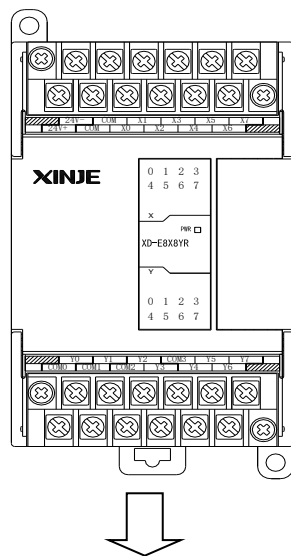
Use DIN or screws to install the CPU units and expansions.

- DIN46277

- Directly install by screws



← DIN installation



Basic units or expansion modules install on DIN46277 rail (width 35mm). Pull down the hook on DIN rail and take down the product.

### 3 Installation Environment

Please install the products according to chapter 2-1-1.

---

## 4 Power Supply Specification and Wiring Method

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In this chapter, we tell the structure, specification and external wiring of XD/XL series PLC. The wiring method differs due to different models, and the main difference is the terminals' position. About terminals arrangement, please refer to chapter 2-3.

4-1. Power Supply Specification

4-2. AC Power, DC Input Type

## 4-1. Power Supply Specifications

The power supply specifications of XD series PLC (Type with '-E' is AC power, type with '-C' is DC power).

XL series PLC power supply only supports DC type.

1	AC power	Items	Content
		Rated Voltage	AC100V~240V
		Allowed Voltage Range	AC100V~240V
		Rated Frequency	50/60Hz
		Allow momentary power off time	Interruption Time $\leq 0.5$ AC cycle, interval $\geq 1$ second
		Impulse Current	Max 40A below 5ms/AC100V max 60A below 5ms/AC200V
		Maximum Power Consumption	12W
		Power Supply for Sensor	24VDC $\pm 10\%$ 16 points max is 200mA, 32 points max is 400mA

※1: Please use the wire cable more than 2mm<sup>2</sup> to avoid the decrease of voltage.

※2: Even power off in 10ms, the PLC can still keep working. But when power is off for long time or voltage abnormally decrease, the PLC will stop working, output will be OFF. When power is on again, the PLC will run automatically.

※3: The grounding terminals on basic units and expansions connect together, and use the third type grounding.

## 2 DC Power



Items	Content
Rated Voltage	DC24V
Allowed Voltage Range	DC21.6V~26.4V
Input Current (Only for basic unit)	120mA DC24V
Allow momentary power off time	10ms DC24V
Impulse Current	10A DC26.4V
Maximum Power Consumption	12W
Power Supply for Sensor	24VDC $\pm$ 10% 16 points max is 200 mA, 32 points max is 400mA

※1:  
XD

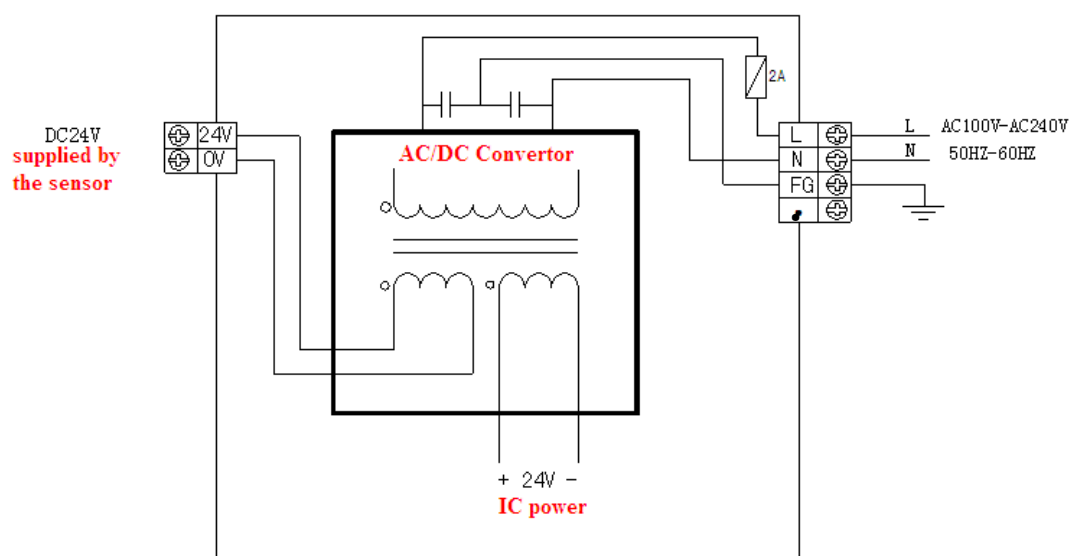
series PLC provides DC24V power supply (terminal 24V, 0V), it can be power supply for sensor, 16 points PLC DC24V is 200mA, 24/32/48/60 points PLC DC24V is 400mA. This terminal cannot connect to external power supply.

※2:  is empty terminal, do not use it.

※3: Please connect the com terminal for basic unit and expansion module.

## 4-2. AC Power Supply and DC Input

### 1 Connection



---

※1: Connect the power supply to L, N terminals.

※2: 24V, 0V terminals can supply power 200mA/DC24V for 16 points, and power 400 mA/DC24V for 32 points by sensor. Besides, the terminals power can not be supplied by outside power.

※3: ☐ terminal is idle, do not wire outside or work as middle relay terminals.

※4: Please connect the  terminals on basic units and expansions together.

---

## 5 Input Specifications and Wiring Methods

---

In this chapter we will introduce the input specification and external wiring methods of XD/XL series PLC. The connection methods differ due to different models and the main difference is the terminals' arrangement. Each model's terminal arrangement, please refer to chapter 2-3.

5-1. Input Specification

5-2. DC Input Signal (AC power supply)

5-3. High Speed Counter Input

## 5-1. Input Specification

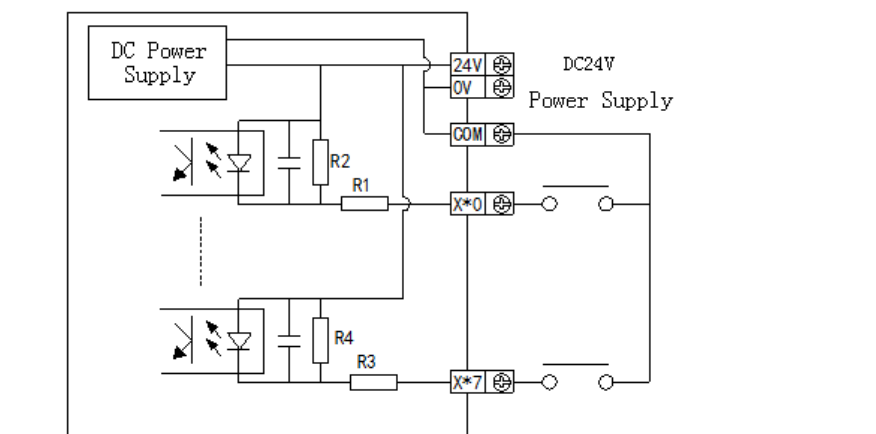
### 5-1-1. XD series input specification

XD series PLC input specification has NPN and PNP two modes, we will introduce the internal structure and wiring methods of the two modes as below:

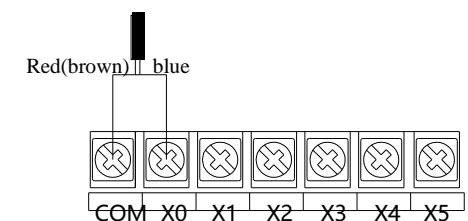
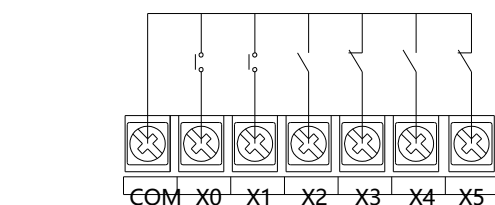
<b>1</b>	<b>Basic Units</b>
----------	--------------------

- NPN mode

Input signal's voltage	DC24V±10%
Input signal's current	7mA/DC24V
Input ON current	Above 4.5mA
Input OFF current	Under 1.5mA
Input response time	About 10ms
Input signal's form	Contact input or NPN open collector transistor
Circuit insulation	Photo-electricity coupling insulation
Input action's display	LED light when input ON

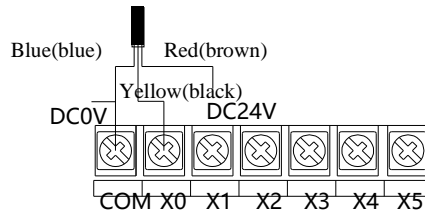


## NPN wiring example



Switch

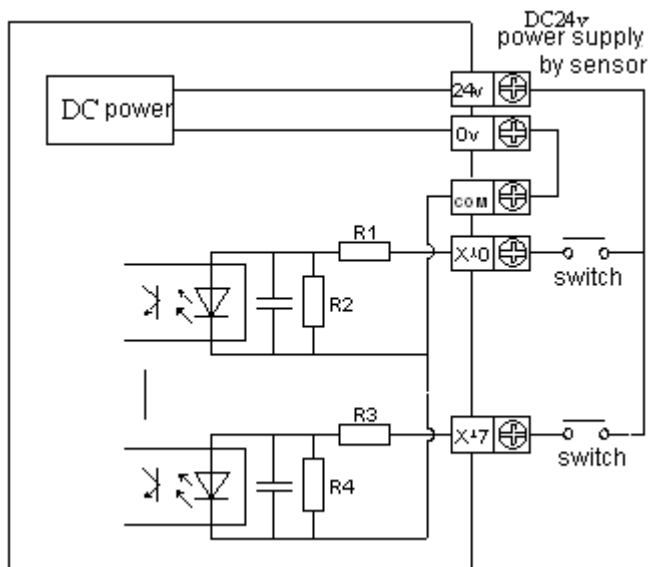
two-wire (NO, NC) proximity switch



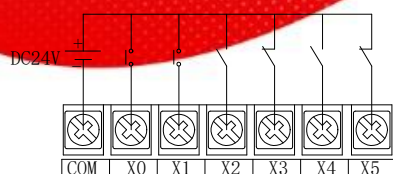
Three-wire(NPN) proximity switch

- PNP mode

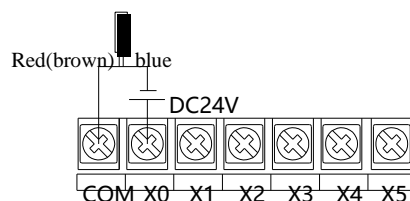
Input signal's voltage	DC24V $\pm$ 10%
Input signal's current	7mA/DC24V
Input ON current	Above 4.5mA
Input OFF current	Under 1.5mA
Input response time	About 10ms
Input signal's form	Contact input or PNP open collector transistor
Circuit insulation	Photo-electricity coupling insulation
Input action's display	LED light when input ON



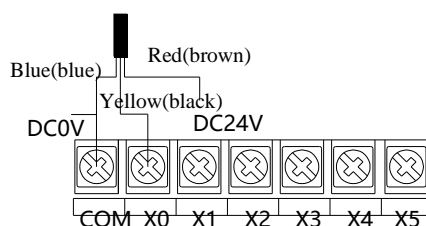
### PNP wiring example:



Switch



two-wire (NO, NC) proximity switch



three-wire (PNP) proximity switch

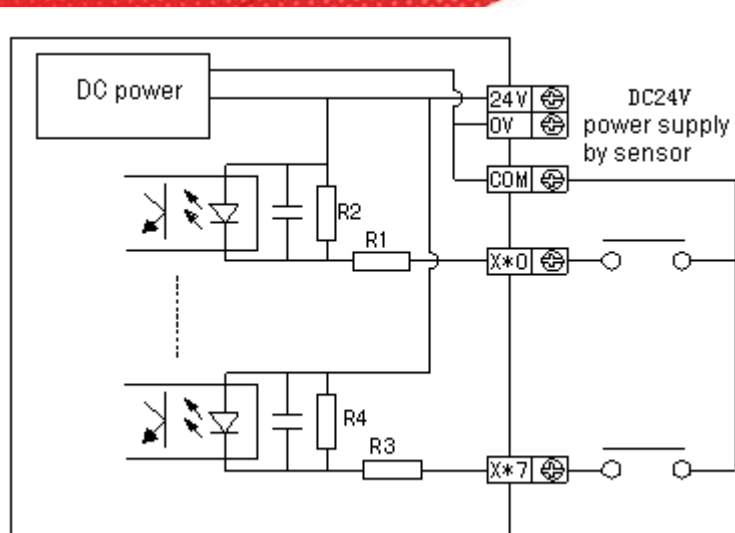
note: the DC24V is provided by the PLC, no need to connect DC0V to com of input terminal. If using external power supply, it needs to connect it.

## 2 Expansion modules

### ● NPN mode

Input signal's voltage	DC24V±10%
Input signal's current	7mA/DC24V
Input ON current	Above 4.5mA
Input OFF current	Under 1.5mA
Input response time	About 10ms
Input signal's form	Contact input or NPN open collector transistor
Circuit insulation	Photo-electricity coupling insulation
Input action's display	LED light when input ON





- PNP mode

Input signal's voltage	DC24V±10%
Input signal's current	7mA/DC24V
Input ON current	Above 4.5mA
Input OFF current	Under 1.5mA
Input response time	About 10ms
Input signal's form	Contact input or PNP open collector transistor
Circuit insulation	Photo-electricity coupling insulation
Input action's display	LED light when input ON

### 5-1-2. XL series input specification

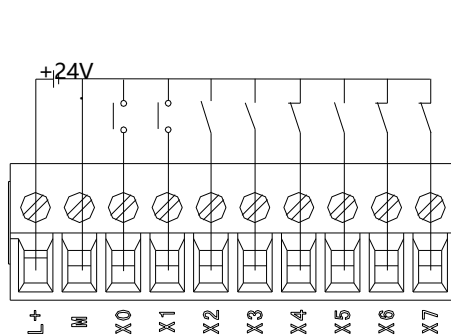
XL series PLC input is NPN mode, below is input specification and wiring method.

- Input specification of CPU unit and expansion module (NPN mode)

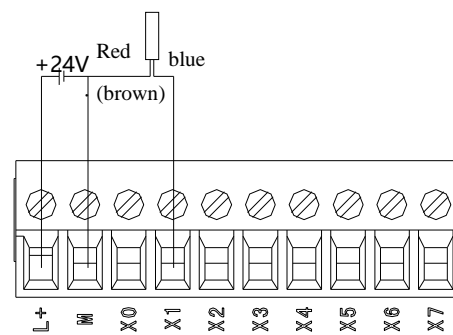
Input signal's voltage	DC24V±10%
Input signal's current	7mA/DC24V
Input ON current	Above 4.5mA

Input OFF current	Under 1.5mA
Input response time	About 10ms
Input signal's form	Contact input or NPN open collector transistor
Circuit insulation	Photo-electricity coupling insulation
Input action's display	LED light when input ON

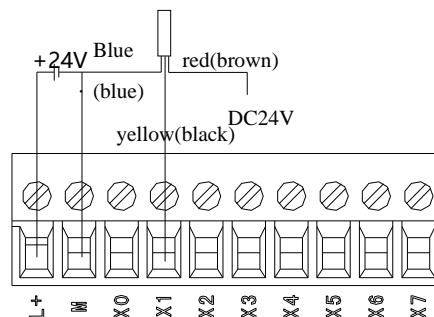
● **Wiring method of CPU unit and expansion module(NPN mode)**



**Switch wiring**



**2-wire(NO or NC) proximity switch wiring**



**3-wire(NPN mode) proximity switch wiring**

➤ **Input terminal**

It need to connect external DC24V power supply for PLC. Please connect 24V to L+, 0V to M. The input is ON when the input terminal and **M** pass through by connecting no voltage contactor or NPN open collector transistor, the related input light is ON.

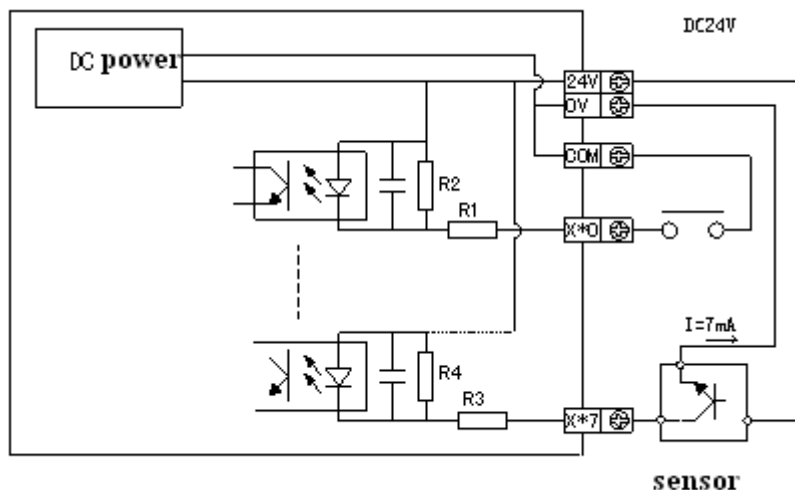
➤ **Input circuit**

The first circuit and secondary circuit is isolated by optical coupler, the C-R filter is installed in secondary circuit. It can prevent from error operation caused by input vibration or noise. For input ON to OFF or OFF to ON, the response time is about 6ms inside PLC. The input terminal has internal digital filter.

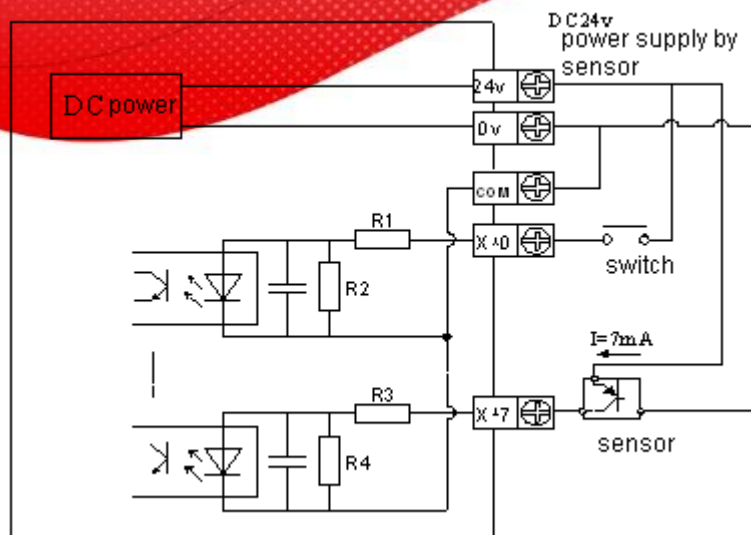
- The input current is 7mA, but for reliable action, the input ON current must be above 4.5mA, the input OFF current is below 1.5mA.

Below contents are only fit for XD series PLC.

- NPN mode



- 76

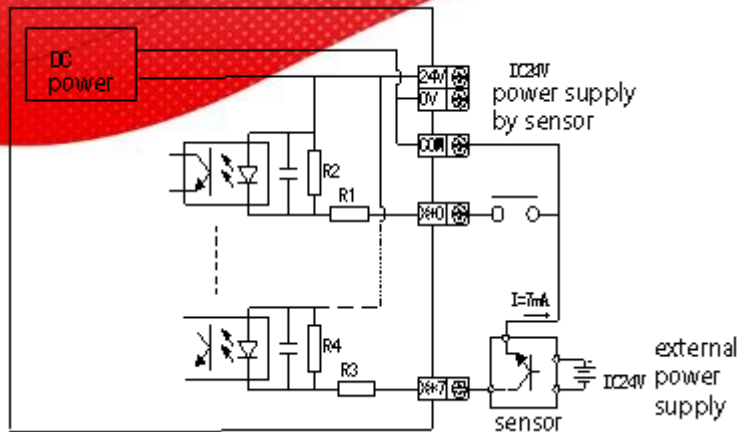


- **Input terminals**  
When connect input terminals and terminal **COM** with DC24V contact or NPN open collector transistor, if input is ON, LED lamp will light which indicates input is ON. There are many input terminals **COM** to connect in PLC.
- **Input circuits**  
Photo-electricity coupling is used to insulate between primary load circuit and secondary circuit. The secondary circuit with C-R filter is to avoid wrong operation caused by vibration of input contacts or noise along with input signal. For above-mentioned reasons, if input ON→OFF, OFF→ON, the response time delays about 10ms in PLC. There is a digital filter inside the input terminal.
- **Input sensitivity**
- The PLC input current is DC24V 7mA, but to act correctly, the current should be above 4.5mA when input is ON and under 1.5mA when input is OFF.

2

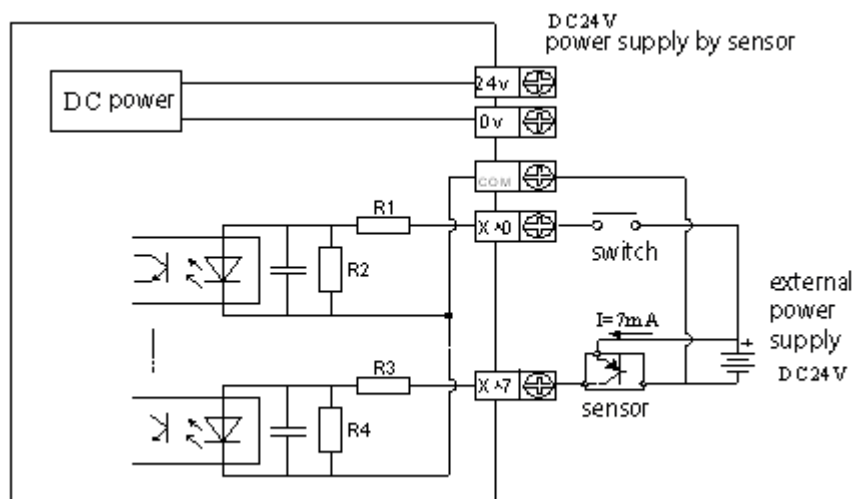
## External circuit used by sensors

- **NPN mode**  
XD series PLC input current is supplied by its interior 24V power, so if use exterior power to drive sensor like photo electricity switch, the exterior power should be DC24V±4V, please use NPN open collector type for sensor's output transistor.



- PNP mode

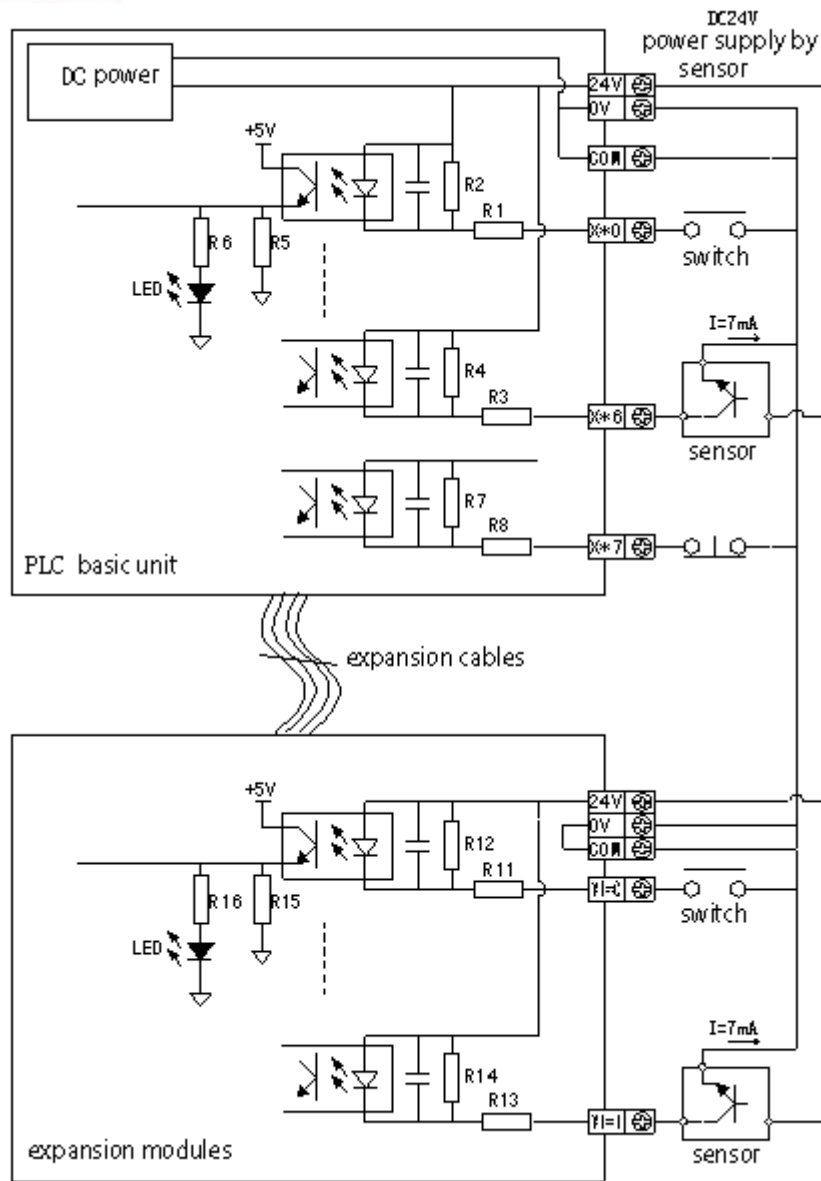
XD series PLC input current is supplied by its interior 24V power, so if use exterior power to drive sensor like photo electricity switch, the exterior power should be DC24V $\pm$ 4V, please use PNP open collector type for sensor's output transistor.



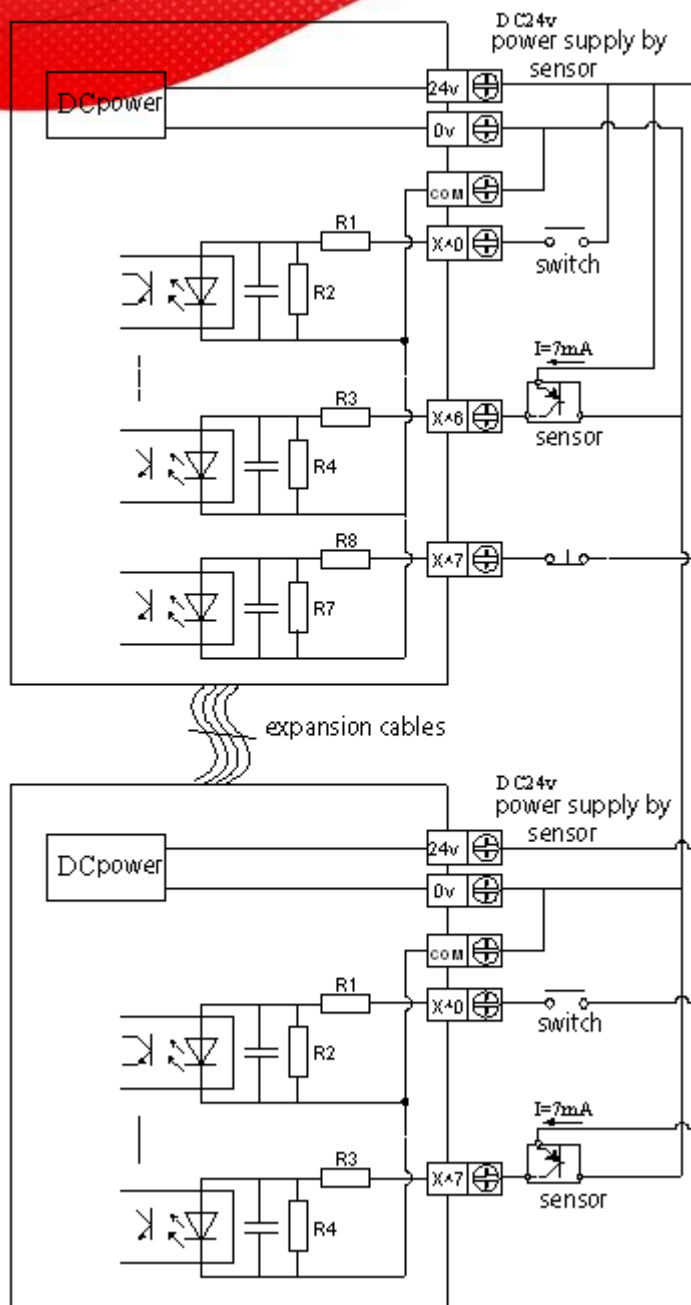
### 3 Input Wiring



- NPN mode



- PNP mode

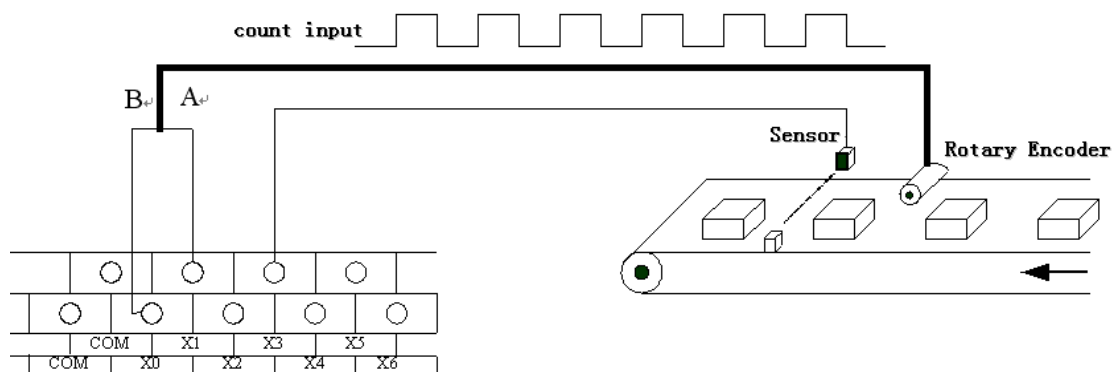


### 5-3. High Speed Counter Input

XD/XL series PLC support high speed count function which is irrelevant with the scan cycle and can test high speed input signal of measuring sensors and rotary encoders etc by selecting different counter, max measuring frequency can be up to 80KHz.

Note:

- (1) If PLC input is NPN type, please select NPN and DC24V collector open output encoder. If PLC input is PNP type, please select PNP and DC24V collector open output encoder.
- (2) When the input frequency is above 25Hz, please use high speed counter.

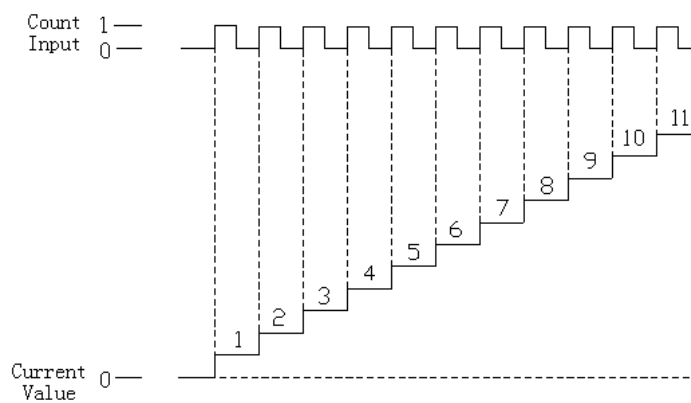


#### 5-3-1. Counting mode

XD/XL series HSC function has two counting modes: Increment mode and AB-phase mode.

##### 1 Increment mode

Under this mode, if counting input pulse signal, the counting value will increase one along with the rising edge of every pulse signal.

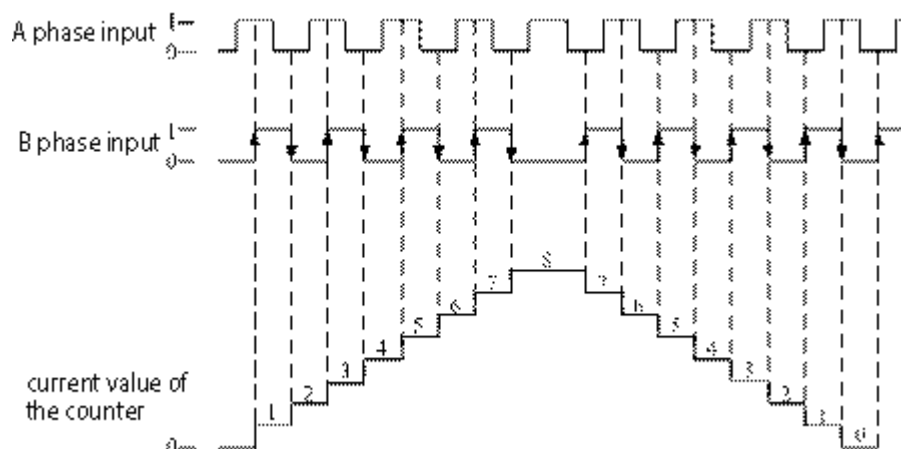


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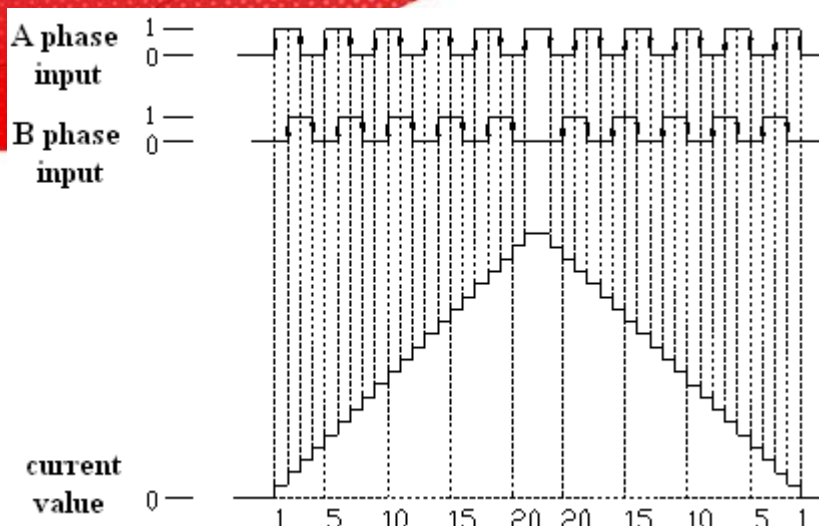
## AB-phase

In this mode, the HSC value increase or decrease according to the two differential signal (A phase or B phase). According to the times number, the mode still can be divided to two modes (two-time frequency mode and four-time frequency mode). The default mode is four-time frequency mode.

### Two-time Frequency Mode



### Four-time Frequency Mode



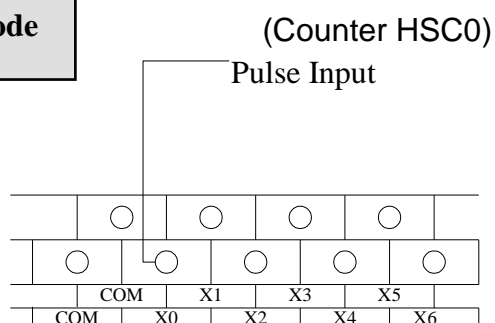
### 5-3-2. High Speed Counting Range

The HSC's counting range is:  $K-2,147,483,648 \sim K+2,147,483,647$ . If the counting value exceeds this range, up-flow or down-flow appears. The up-flow means the counting value jumps from  $K+2,147,483,647$  to  $K-2,147,483,648$  and then continue to count. The down-flow means the counting value jumps from  $K-2,147,483,648$  to  $K+2,147,483,647$  and then continue to count.

### 5-3-3. The Input Wiring Of HSC

For input terminal wiring of pulse counting, it differs according to PLC types and counting modes. Some typical wiring methods are as below (take XD3-32 PLC as an example):

#### 1 Increment Mode

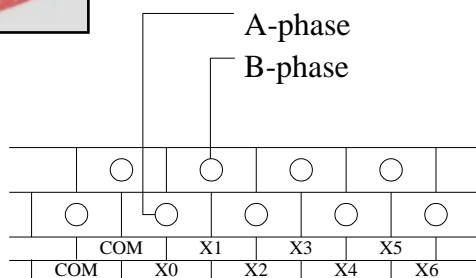




2

**AB-phase Mode**

(Counter HSC0)

**5-3-4. Input Terminals Assignment**

## 1. High Speed Counters assignment of XD series PLC:

PLC model		High speed counter channels	
		Increment mode	AB-phase mode
XD1	16/32	0	0
XD2/XD3	16/24/32/48/60	3	3
XD5	16/24/32/48/60	3	3
	24T4/32T4/48T4/60T4	4	4
	48T6/60T6	6	6
	60T10	10	10
XDM	24/32/48/60 4-axis	4	4
	60 points 10-axis	10	10
XDC	24/32/48/60	4	4
XD5E	30T4	4	4
	60T10	10	10
XDME	60T10	10	10
XL1	16	0	0
XL3	16	3	3
XL5	32	4	4
XL5E	32T4	4	4

## 2. Input Terminals definition of HSC:

Each letter's description:

U	A	B	Z
Counter's pulse input	A-phase input	B-phase input	Z-phase pulse capture

Normally, the input frequency of terminal X0, X1 can reach 80KHz and 50KHz separately under single-phase and AB-phase mode; while other input

terminals highest frequency can reach 10KHz under single-phase and 5KHz under AB phase mode. If X input terminals are not used as high speed input port, they can be used as common input terminals. Frequency times in the table: '2' stands for fixed 2 times frequency, '4' stands for fixed 4 times frequency, '2/4' stands for 2 or 4 times frequency adjustable. The detailed port assignment is shown as below:

XD2-16												
	Increment Mode							AB phase mode				
	HSC0	HSC2	HSC4	HSC6	HSC8	HSC1 0	HSC1 2	HSC0	HSC2	HSC4	HSC6	HSC8
Highest frequency	10K	10K	10K					5K	5K	5K		
4 times frequency								2/4	2/4	2/4		
Counter interruption	√	√	√					√	√	√		
X000	U							A				
X001								B				
X002								Z				
X003		U							A			
X004									B			
X005									Z			
X006			U							A		
X007										B		

XD2-24/32, XD3-16/24/32, XD5-16/24/32, XL3-16												
	Increment Mode							AB phase mode				
	HSC0	HSC2	HSC4	HSC6	HSC8	HSC10	HSC12	HSC0	HSC2	HSC4	HSC6	HSC8
Highest frequency	80K	10K	10K					50K	5K	5K		
4 times frequency								2/4	2/4	2/4		
Counter interruption	√	√	√					√	√	√		
X000	U							A				
X001								B				
X002								Z				
X003		U							A			
X004									B			
X005									Z			
X006			U							A		

X007										B		
X010										Z		
X011												

XD2-48/60, XD3-48/60, XD5-48/60												
	Increment Mode							AB phase mode				
	HSC0	HSC2	HSC4	HSC6	HSC8	HSC1 0	HSC1 2	HSC0	HSC2	HSC4	HSC6	HSC8
Highest frequency	80K	80K	10K					50K	50K	5K		
4 times frequency								2/4	2/4	2/4		
Counter interruption	√	√	√					√	√	√		
X000	U							A				
X001								B				
X002								Z				
X003		U							A			
X004									B			
X005									Z			
X006			U							A		
X007										B		
X010										Z		
X011												

XD5-24T4/32T4/48T4/60T4, XD5E-30T4, XDM-24T4/32T4/60T4/60T4L, XDC-24/32/48/60T XL5-32T4, XL5E-32T4, XLME-32T4												
	Increment Mode						AB phase mode					
	HSC0	HSC2	HSC4	HSC6	HSC8	HSC10	HSC0	HSC2	HSC4	HSC6	HSC8	HSC10
Highest frequency	80K	80K	80K	80K			50K	50K	50K	50K		
4 times frequency							2/4	2/4	2/4	2/4		
Counter interruption	√	√	√	√			√	√	√	√		
X000	U						A					
X001							B					
X002							Z					
X003		U						A				
X004								B				
X005								Z				

X006			U						A			
X007									B			
X010									Z			
X011				U						A		
X012										B		
X013										Z		
X014												
X015												
X016												
X017												
X020												
X021												

XD5-48T6/60T6												
	Increment Mode						AB phase mode					
	HSC0	HSC2	HSC4	HSC6	HSC8	HSC10	HSC0	HSC2	HSC4	HSC6	HSC8	HSC10
Highest frequency	80K	80K	80K	80K	80K	80K	50K	50K	50K	50K	50K	50K
4 times frequency							2/4	2/4	2/4	2/4	2/4	2/4
Counter interruption	√	√	√	√	√	√	√	√	√	√	√	√
X000	U						A					
X001							B					
X002							Z					
X003		U						A				
X004								B				
X005								Z				
X006			U						A			
X007									B			
X010									Z			
X011				U						A		
X012										B		
X013										Z		
X014					U						A	
X015											B	
X016											Z	
X017						U						A
X020												B
X021												Z

XD5-60T10, XDM-60T10, XD5E-60T10, XDME-60T10												
	Increment Mode											
	HSC0	HSC2	HSC4	HSC6	HSC8	HSC10	HSC12	HSC14	HSC16	HSC18	HSC20	HSC22
Highest frequency	80K	80K	80K	80K	80K	80K	80K	80K	80K	80K		
4 times frequency												
Counter interruption	√	√	√	√	√	√	√	√	√	√		
X000	U											
X001												
X002												
X003		U										
X004												
X005												
X006			U									
X007												
X010												
X011				U								
X012												
X013												
X014					U							
X015												
X016												
X017						U						
X020												
X021												
X022							U					
X023												
X024												
X025								U				
X026												
X027												
X030									U			
X031												



X032												
X033										U		
X034												

XD5-60T10, XDM-60T10, XD5E-60T10, XDME-60T10												
	AB phase mode											
	HSC0	HSC2	HSC4	HSC6	HSC8	HSC10	HSC12	HSC14	HSC16	HSC18	HSC20	HSC22
Highest frequency	50K	50K	50K	50K	50K	50K	50K	50K	50K	50K		
4 times frequency	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4		
Counter interruption	√	√	√	√	√	√	√	√	√	√		
X000	A											
X001	B											
X002	Z											
X003		A										
X004		B										
X005		Z										
X006			A									
X007			B									
X010			Z									
X011				A								
X012				B								
X013				Z								
X014					A							
X015					B							
X016					Z							
X017						A						
X020						B						
X021						Z						
X022							A					
X023							B					
X024							Z					
X025								A				
X026								B				
X027								Z				
X030									A			
X031									B			

X032									Z			
X033										A		
X034										B		
X035										Z		

### 5-3-5. AB Phase Counter's Frequency Multiplication Setting

To AB phase counter, users can modify the value in FLASH data registers SFD321, SFD322, SFD323.....SFD330 to set the frequency multiplication value. When the value is 1, it is 1 time frequency; when the value is 4, it is 4 times frequency.

Register	Function	Setting value	Content
SFD320	Frequency Multiplication of HSC0	2	2 times
		4	4 times
SFD321	Frequency Multiplication of HSC2	2	2 times
		4	4 times
SFD322	Frequency Multiplication of HSC4	2	2 times
		4	4 times
SFD323	Frequency Multiplication of HSC6	2	2 times
		4	4 times
SFD324	Frequency Multiplication of HSC8	2	2 times
		4	4 times
SFD325	Frequency Multiplication of HSC10	2	2 times
		4	4 times
SFD326	Frequency Multiplication of HSC12	2	2 times
		4	4 times
SFD327	Frequency Multiplication of HSC14	2	2 times
		4	4 times
SFD328	Frequency Multiplication of HSC16	2	2 times
		4	4 times
SFD329	Frequency Multiplication of HSC18	2	2 times
		4	4 times

※1: More about high speed counter application, please refer to XD/XL series PLC users' manual 【Instruction】.

※2: To some special models, only one axis can be set as 2 times frequency or 4 times frequency, the other two axis are separately 2 times frequency and 4 times frequency.

---

※3: after setting the SFD register, please restart the high speed counter (cut off the trigger condition and turn on again) to make the setting effective.

## 6 Output Specification and Wiring Methods

---

In this chapter we mainly introduce the output specification and external wiring methods of XD/XL series PLC. The connection methods differ due to different models; the main difference is the terminals' arrangement. For each model's terminals arrangement, please refer to chapter 2-3;

6-1. Output Specifications

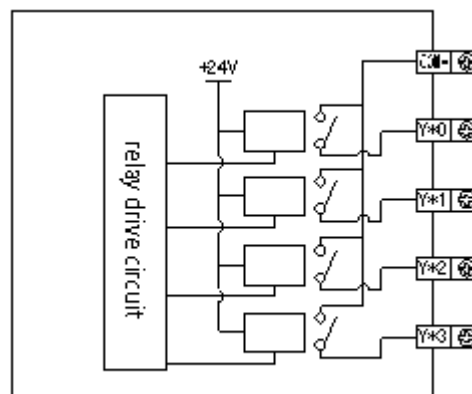
6-2. Relay Output Type

6-3. Transistor Output Type

## 6-1. Output Specification

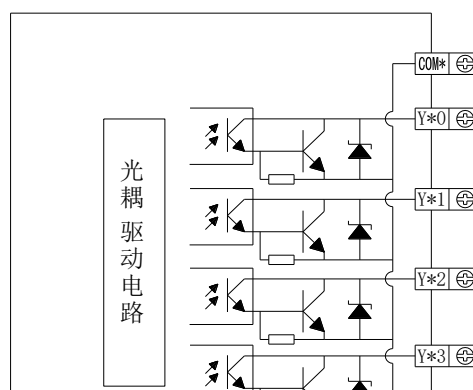
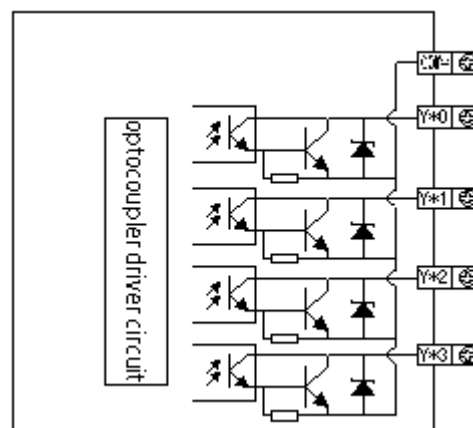
### 1 Relay Output

External power		Below AC250V, DC30V
Circuit insulation		Mechanical insulation
Action indicator		LED
Max load	Resistant load	3A
	Inductive load	80VA
	Lamp load	100W
Mini load		DC5V 2mA
Response time	OFF→ON	10ms
	ON→OFF	10ms



### 2 Normal Transistor Output

External power		Below DC5~30V
Circuit insulation		Light coupling insulation
Action indicator		LED
Max load	Resistant load	0.3A
	Inductive load	8W/DC24V
	Lamp load	1.5W/DC24V
Mini load		DC5V 2mA
Response time	OFF→ON	Below 0.2ms
	ON→OFF	Below 0.2ms



3	<b>High Speed Pulse Output</b>
---	--------------------------------

Model	RT or T				
High Speed Pulse Output Terminal External Power Supply	- XD1 XL1	Y0, Y1 General models	Y0~Y3 XD5-24T4 XD5-32T4 XDM-60T4 XDM-60T4L XD5E-30T4 XL5-32T4 XL5E-32T4 XLME-32T4	Y0~Y5 XD5-48T6 XD5-60T6	Y0~Y11 XDM-60T10 XD5E-60T10 XDME-60T10
Action Indicator	Below DC5~30V				
Maximum Current	LED indicator				
Max output frequency of pulse	50mA				
High Speed Pulse Output Terminal	100KHz				

**Note:**

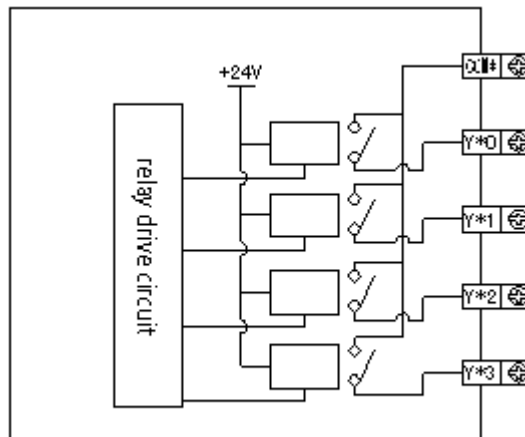
When using high-speed pulse output function, the PLC can output 100KHz ~ 200KHz pulse, but it can not guarantee the normal operation of all servos. Please connect about 500 ohms of resistance between the output and 24V power supply.



## 6-2. Relay Output Type

1

### Relay Output Circuit

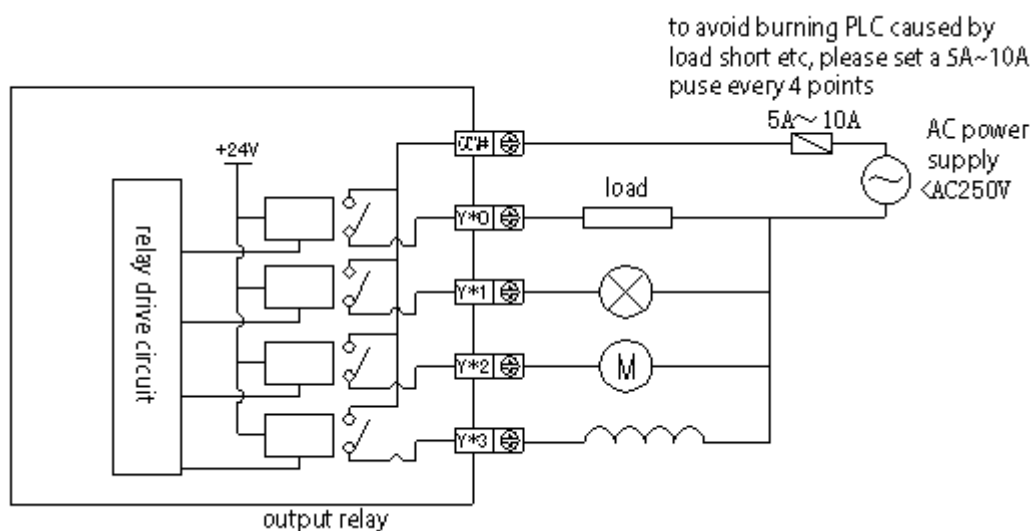


- **Output terminals**  
Relay output type has 2~4 public terminals. So each public-terminal unit can drive power system with different voltages (E.g.: AC200V, AC100V, DC24V etc.) load.
- **Circuit's insulation**  
Between the relay output coils and contacts, PLC's interior circuits and exterior load circuits are electrical insulating. Besides, each public terminal and block are separate from each other.
- **Action display**  
LED lamp lights when output relays' coils energize, output contacts are ON.
- **Response time**  
From the output relay energize (or cut off) to output contact ON (or OFF), the response time is about 10ms.
- **Output current**  
The output current that current and voltage 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).
- **Open circuit's leak current**  
When output contact is OFF, there will be no leak current and can directly drive Ne lamp etc.
- **The life of relay output contacts**  
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.

2

### Output Connection Example



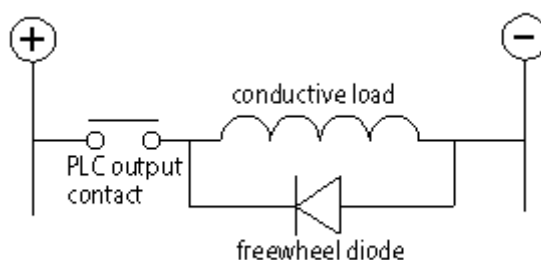
3

### Constitution of output circuit

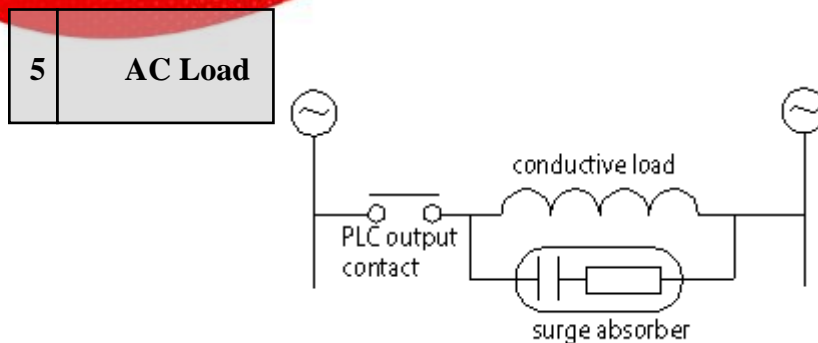
- For DC inductive load, please parallel connect with freewheel diode. Otherwise, contactor useful life will greatly decrease. Please select freewheel diode that can stand inverse voltage over 5~10 times of load voltage and forward current over load current.
- Parallel connection AC inductive load with surge absorber will decrease noise and increase service life of output delay.

4

### DC Load



Note: the freewheeling diode is EN4007.



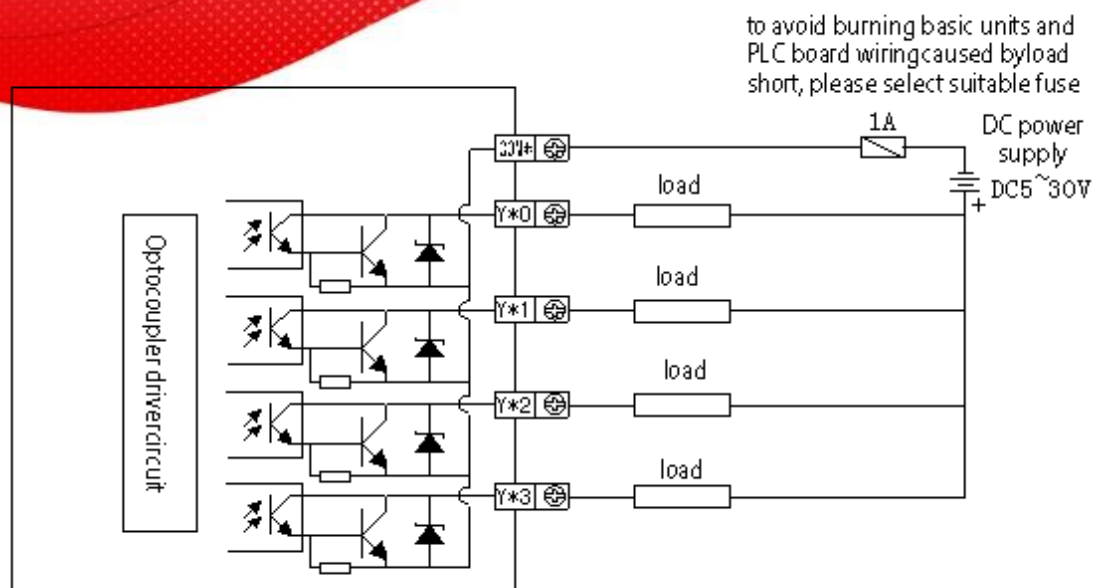
Note: the surge absorber is  $R=200\Omega$  2W,  $C=0.022\mu F$  250VAC.

### 6-3. Transistor Output Type

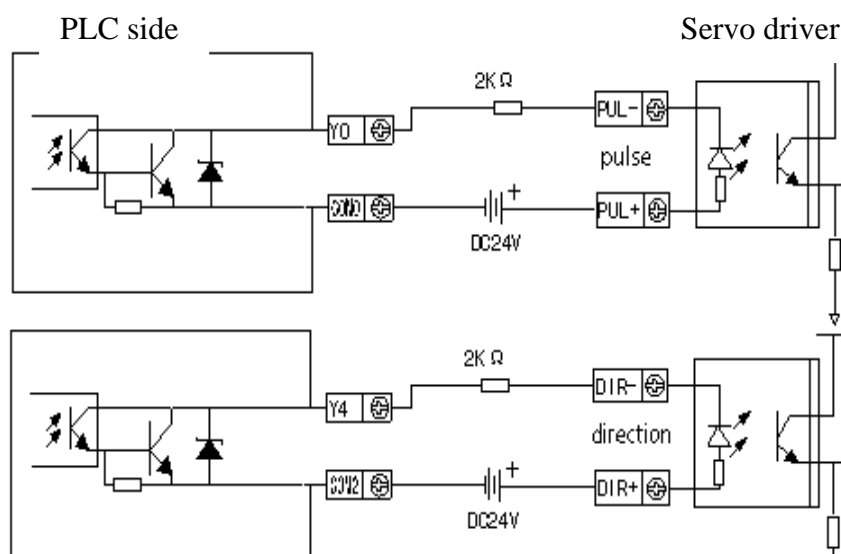
Transistor (NPN) output can support high speed pulse output and normal transistor two types.

#### 1 Normal Transistor Output

- Output Terminals  
There are 1~4 COM outputs of CPU unit transistor outputs.
- External Power Supply  
Please use DC5~30V power supply to drive the load.
- Circuit Isolation  
Inside PLC, we use photoelectric couplers to isolate between internal circuits and output transistors; besides, the COM terminal blocks are separate from each other.
- Action Display  
When photoelectric couplers drive, LED will be ON and the output transistors will be ON.
- Response Time  
The time interval that PLC from photoelectric couplers energizing (or cutting) to transistor ON (or OFF) is below 0.2ms.
- Output current  
The current it outputs is 0.3A per point. But limited by the temperature rising, every 4 points current add up to 0.5A.
- Open circuit current  
Below 0.1mA



E.g.: Below is the connection of RT/T type PLC and servo driver diagram:



(Make sure the driver's photoelectric coupling input terminal has 8~15mA reliable current)

---

## **7 Run, Debug, Maintenance**

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In this chapter, we introduce XD/XL PLC process of programming and using, which includes PLC run, debug and daily maintenance etc.

7-1. Run and Debug

7-2. Daily Maintenance



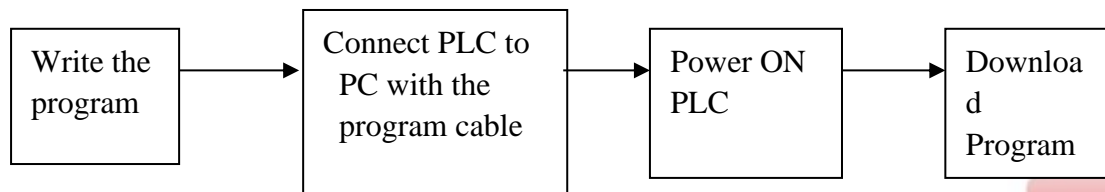
## 7-1. Run and Debug

### 1 Check the Products

Please check if the input/output terminals are correct and if there is any component missed when the users get the products. Generally, you can power on the PLC directly at this time and if products are normal, the PWR and RUN indicators will be ON.

### 2 Write and Download the Program

After confirming the products, write the program for PLC in your PC, and then download the program to PLC. The general operation steps are listed below:



※1: Please link the download cable before you power on the PLC. Otherwise, the COM port may be burned out! BD card and expansion connection is the same operation.

### 3 Debug the Products

In ideal condition, PLC is in running mode. But if you find some mistakes in the program and need modify, you should write program to the running PLC again.

- Connect PLC to PC with the program cable;
- Upload the program in PLC;
- Modify the uploaded program; and the modified program is suggested to save backup;
- Pause the running of PLC, and download the modified program to PLC;
- Use ladder monitor, free monitor to etc monitor PLC

- 
- If the program still can't fulfill your requirement, you can go on modify it and download to PLC.

4

#### LED on PLC

- When PLC is running correctly, the **PWR** and **RUN** LED should be ON;
- If **ERR** LED is ON, it indicates that PLC running is in error, please correct the program in time.
- If **PWR** LED is OFF, it indicates that the power supply is in error, please check your wiring.

## 7-2. Daily Maintenance

### 1 Regular Check on Products

Even the PLC has certain anti-interference ability and strong stability, you should check the PLC regularly.

The check items include:

- Check if the input/output terminals, power supply terminals are loosen;
- Check if the ports are correct;
- Check if the PWR LED, I/O LED can be ON;
- Clear the dusts on PLC to avoid the dusts falling into PLC
- Manage to make PLC running and storage environment fits the standards described in chapter 2-1-1.

### 2 About the battery

The PLC can keep working if there is not component that could short its service life. But if the PLC supports clock function, its battery should be changed regularly.

- Battery service life normally is 3~5 years.
- Please change the battery once you find the battery power down.
- Please power the PLC on immediately after changing the battery.

Otherwise, the battery power may run out.

### 3 Abandon

Abandon as industrial wast.

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## 8 Switch between Soft Components

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This chapter focuses on a special function of XD/XL series PLC, switch between soft components. This special function simplifies the PLC daily maintenance greatly. To the maintenance person, they will not bother any more if the terminals are damaged.

9-1. Function Summary
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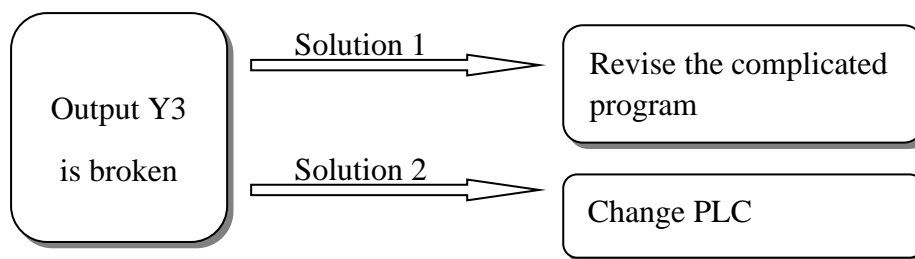
9-2. Operation Method
-----------------------

## 8-1. Function Summary

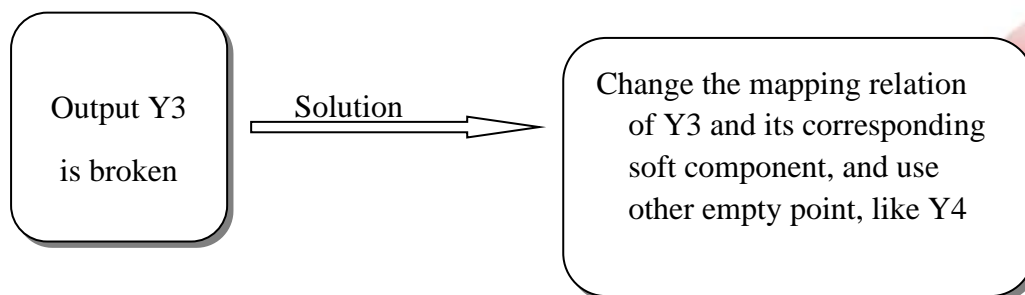
When the internal lighting coupling, relays or transistor are damaged, the corresponding input/output terminals will be out of use. Users either revise the program or ask the manufactures for help, which is very troublesome and affects the users' normal work schedule.

The new type PLC developed independently by Xinje can break the one-to-one correspondence, users only need to change the soft component's value by HMI, then the corresponding terminal will activate.

### Before(Complicated and not effective)



### Now (Simple, fast and effective)





## 8-2. Operation Method

It **no needs** to revise the program when we change the damaged input/output point mapping relation and replace the damaged point. In PLC special registers, we allocate certain address section for users to change the mapping relation. Users just need to find and revise the damaged input/output mapping register, and replace the value in this special register with value of replaced input/output.

Method 1: modify the FD register, below is the table for modifying the input/output points' mapping ID:

Table1 Mapping relation of the input and soft component

ID	Function	Description
SFD10	I00 correspond to X**	0 of input corresponds to the number of
SFD11	I01 correspond to X**	
SFD12	I02 correspond to X**	
.....	.....	
SFD87	I77 correspond to X**	Default is 77 (octal number)

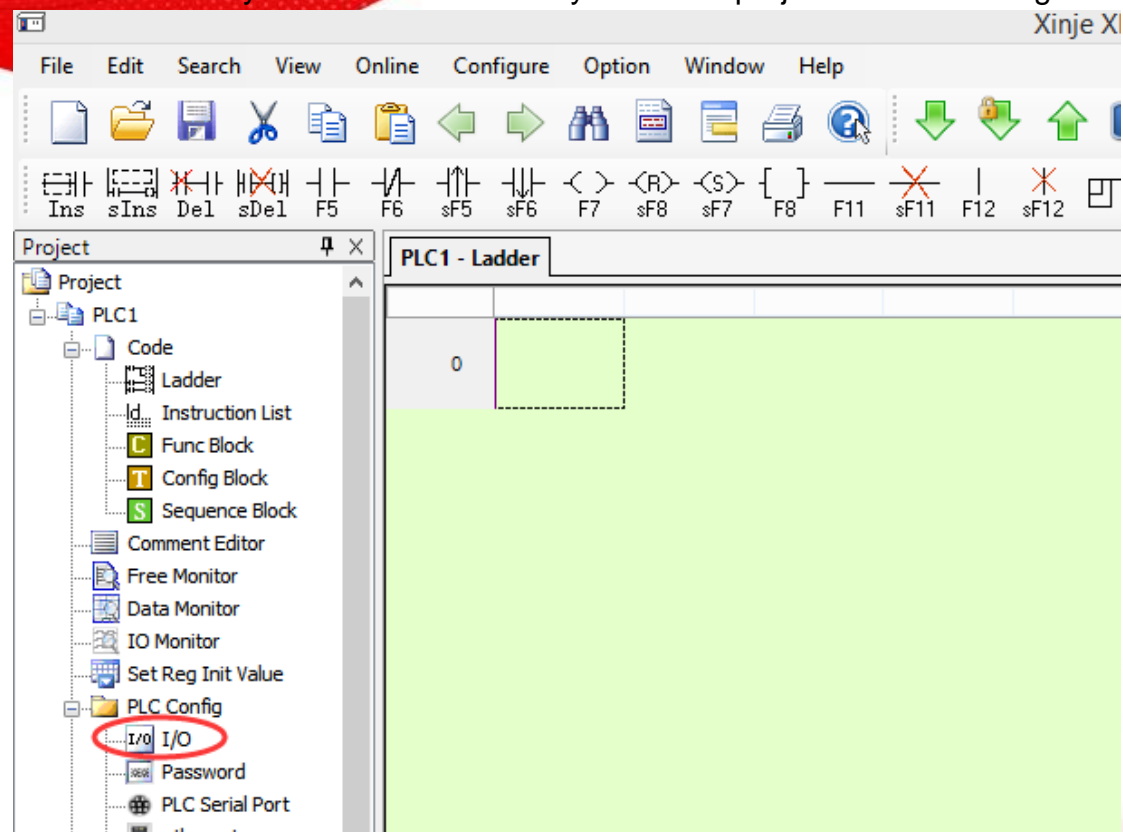
Table2 mapping relation of the output and soft component

ID	Function	Description
SFD11 0	O00 correspond to Y**	0 of output corresponds to the number of Y**
SFD11	O01 correspond to Y**	
SFD11	O02 correspond to Y**	
.....	.....	
SFD18	O77 correspond to Y**	Default is 77 (octal number)

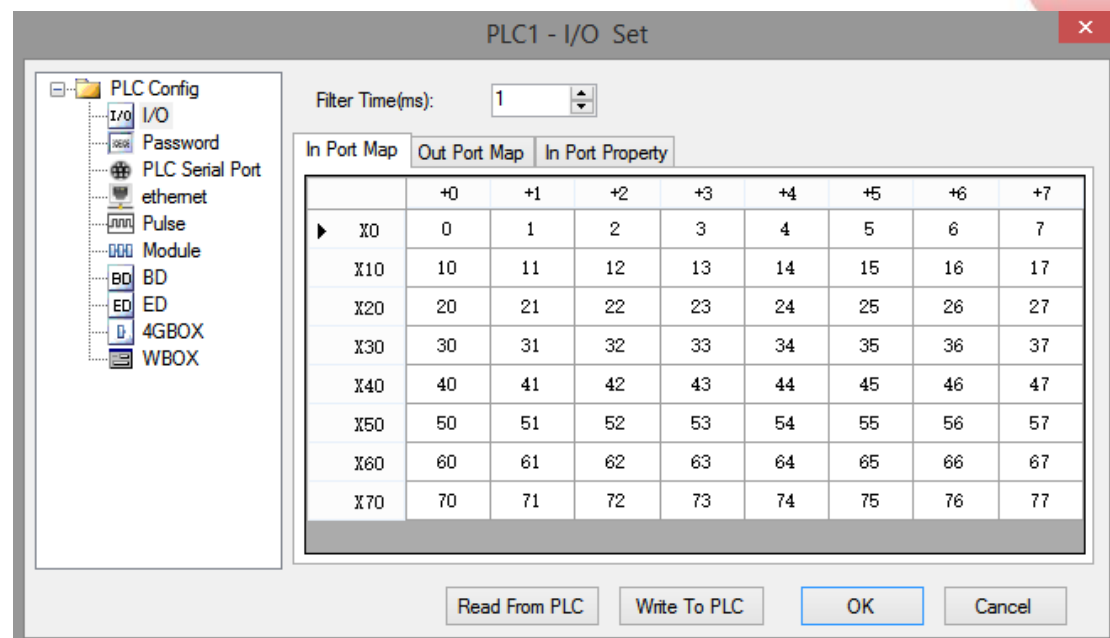
As show in the table above, the default value in SFD10 is 0. If we replace it with value '7', then all X0 in the program will correspond to external input X7. But meantime you should replace the value in SFD17 with 0, to realize exchange. Then original X0 will correspond to X7, and original X7 will correspond to external input X0.

- ※1: After changing the mapping relation, please power on PLC again.
- ※2: When change the mapping relation, please pay attention, input/output data is octal number while ID is decimal number.
- ※3: Exchange the mapping relation when change. i.e. if modify X0 ID to be 5, make sure to change X5 ID to be 0;
- ※4: Mapping relation, one terminal corresponds to one soft component.

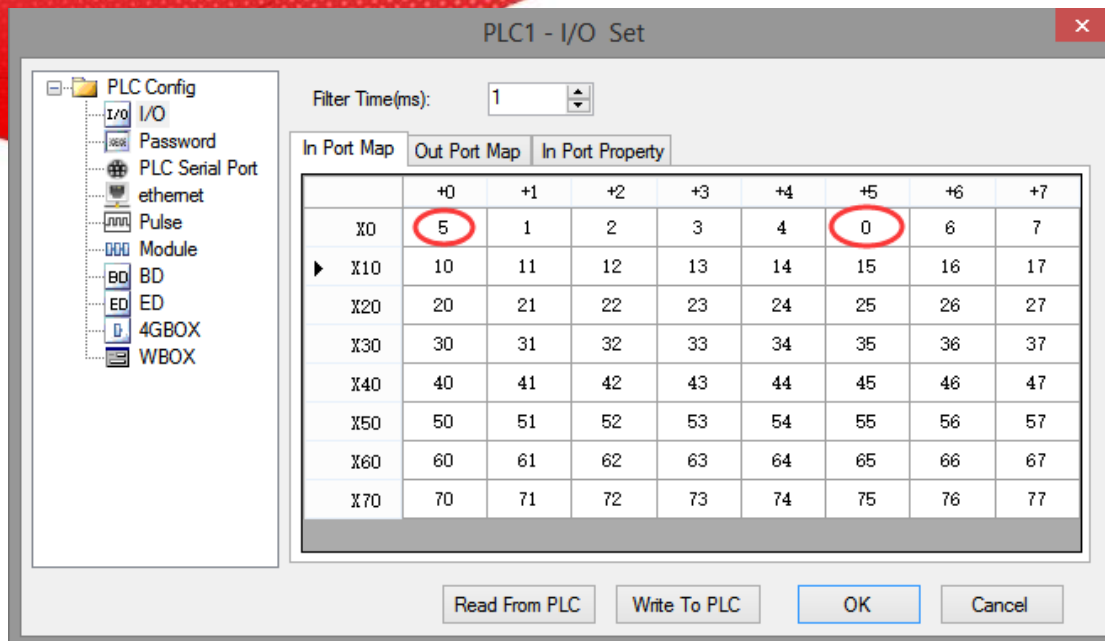
※5: Users can modify the SFD value in the software, please see method 2.  
Method 2: modify in the software directly. Click the project bar/PLC config/I/O.



Change it in below window:



For example, it needs to switch X0 and X5, please change the mapping value of X0 to 5, X5 to 0.



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## **Appendix 1 Special Soft Element Schedules**

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Appendix 1 mainly introduces the functions of XD/XL series PLC special soft element, data register, FlashROM and the address distribution of expansions for users to search.

Appendix 1-1. Special Auxiliary Relay Schedules

Appendix 1-2. Special Data Register Schedules

Appendix 1-3. Special Module ID Schedules

Appendix 1-4. Special Flash Register Schedules

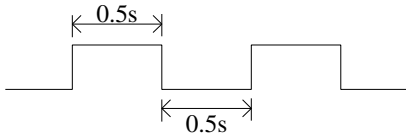
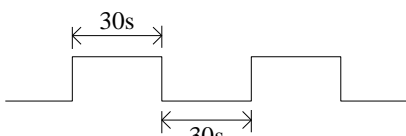
## Appendix 1-1. Special Auxiliary Relay Schedule

### Initial Status (SM0-SM7)

ID	Function	Description	
SM000	Coil ON when running		SM000 keeps ON when PLC running
SM001	Coil OFF when running		SM001 keeps OFF when PLC running
SM002	Initial positive pulse coil		SM002 is ON in first scan cycle
SM003	Initial negative pulse coil		SM003 is OFF in first scan cycle
SM004	PLC running error	When SM4 sets ON, it indicates that there is an error in the operation of PLC. (Firmware version V3.4.5 and above supports this function by PLC)	
SM005	Battery low alarm coil	When the battery voltage is less than 2.5V, SM5 will put ON (at this time, please replace the battery as soon as possible, otherwise the data will not be maintained)	
SM007	Power-off memory data error		

### Clock (SM11-SM14)

ID	Function	Description
SM011	10ms frequency cycle	
SM012	100ms frequency cycle	

SM013	1s frequency cycle	
SM014	1min frequency cycle	

### Mark (SM20-SM22)

ID	Function	Description
SM020	Zero bit	SM020 is ON when plus/minus operation result is 0
SM021	Borrow bit	SM021 is ON when minus operation overflows
SM022	Carry bit	SM022 is ON when plus operation overflows

### PC Mode (SM32-SM34)

ID	Function	Description
SM032	Retentive register reset	When SM032 is ON, ON/OFF mapping memory of HM、HS and current values of HT、HC、HD will be reset.
SM033	Clear user's program	When SM033 is ON, all PLC user's program will be cleared.
SM034	All output forbidden	When SM034 is ON, all PLC external contacts will be set OFF.

### Stepping Ladder

ID	Function	Description
SM040	The process is running	Set ON when the process is running



### **Interruption ban (SM50-SM90)**

ID	Address	Function	Description
SM05 0	I0000/I000 1	Forbid input interruption 0	<p>After executing EI instruction, the input interruption couldn't act independently when M acts, even if the interruption is allowed. E.g.: when SM050 is ON, I0000/I0001 is forbidden.</p>
SM05 1	I0100/I010 1	Forbid input interruption 1	
SM05 2	I0200/I020 1	Forbid input interruption 2	
SM05 3	I0300/I030 1	Forbid input interruption 3	
SM05 4	I0400/I040 1	Forbid input interruption 4	
.....	.....	.....	
SM06 9	I1900/I190 1	Forbid input interruption 19	<p>After executing EI instruction, the timing interruption couldn't act independently when M acts, even if the interruption is allowed.</p>
SM07 0	I40**	Forbid timing interruption 0	
SM07 1	I41**	Forbid timing interruption 1	
SM07 2	I42**	Forbid timing interruption 2	
SM07 3	I43**	Forbid timing interruption 3	
SM07 4	I44**	Forbid timing interruption 4	
.....	.....	.....	
SM08 9	I59**	Forbid timing interruption 19	
SM09 0		Forbid all interruptions	Forbid all interruptions

### **High Speed Ring Counter (SM99)**

address	Function	Note
SM099	High Speed Ring Counting enable	SM99 set ON, SD99 add one per 0.1ms, cycle between 0 and 32767

### High speed count complete (SM100-SM109)

Addresses	Function	Note
SM100	HSC0 count complete flag (100 segments)	
SM101	HSC2 count complete flag (100 segments)	
SM102	HSC4 count complete flag (100 segments)	
SM103	HSC6 count complete flag (100 segments)	
SM104	HSC8 count complete flag (100 segments)	
SM105	HSC10 count complete flag (100 segments)	
SM106	HSC12 count complete flag (100 segments)	
SM107	HSC14 count complete flag (100 segments)	
SM108	HSC16 count complete flag (100 segments)	
SM109	HSC18 count complete flag (100 segments)	

### High speed counter direction (SM110-SM119)

Addresses	Function	Note
SM110	HSC0 direction flag	
SM111	HSC2 direction flag	
SM112	HSC4 direction flag	
SM113	HSC6 direction flag	
SM114	HSC8 direction flag	
SM115	HSC10 direction flag	
SM116	HSC12 direction flag	
SM117	HSC14 direction flag	
SM118	HSC16 direction flag	
SM119	HSC18 direction flag	

### High speed counter error (SM120-SM129)

addresses	Function	Note
SM120	HSC0 error flag	
SM121	HSC2 error flag	
SM122	HSC4 error flag	
SM123	HSC6 error flag	
SM124	HSC8 error flag	
SM125	HSC10 error flag	
SM126	HSC12 error flag	
SM127	HSC14 error flag	
SM128	HSC16 error flag	
SM129	HSC18 error flag	

### Communication (SM140-SM193)

	Address	Function	Note
Serial port 0	SM140	Modbus instruction execution flag	When the instruction starts to execute, set ON When execution is complete, set OFF
	SM141	X-NET instruction execution flag	When the instruction starts to execute, set ON When execution is complete, set OFF
	SM142	Free format communication sending flag	When the instruction starts to execute, set ON When execution is complete, set OFF
	SM143	Free format communication receive complete flag	When receiving a frame of data or receiving data timeout, set ON. Require user program to set OFF
Serial port 1	SM150	Modbus instruction execution flag	Same to SM140
	SM151	X-NET instruction execution flag	Same to SM141
	SM152	Free format communication sending flag	Same to SM142

Serial port 2	SM153	Free format communication receive complete flag	Same to SM143
	SM160	Modbus instruction execution flag	Same to SM140
	SM161	X-NET instruction execution flag	Same to SM141
	SM162	Free format communication sending flag	Same to SM142
Serial port 3	SM163	Free format communication receive complete flag	Same to SM143
	SM170	Modbus instruction execution flag	Same to SM140
	SM171	X-NET instruction execution flag	Same to SM141
	SM172	Free format communication sending flag	Same to SM142
Serial port 4	SM173	Free format communication receive complete flag	Same to SM143
	SM180	Modbus instruction execution flag	Same to SM140
	SM181	X-NET instruction execution flag	Same to SM141
	SM182	Free format communication sending flag	Same to SM142
Serial port 5	SM183	Free format communication receive complete flag	Same to SM143
	SM190	Modbus instruction execution flag	Same to SM140
	SM191	X-NET instruction execution flag	Same to SM141
	SM192	Free format communication sending flag	Same to SM142
	SM193	Free format communication receive complete flag	Same to SM143

### Sequence Function BLOCK (SM240-SM399)

ID	Function	Description
SM300	BLOCK1 running flag	SM300 will be ON when block1 is running
SM301	BLOCK2 running flag	SM301 will be ON when block2 is running
SM302	BLOCK3 running flag	SM302 will be ON when block3 is running
SM303	BLOCK4 running flag	SM303 will be ON when block4 is running
SM304	BLOCK5 running flag	SM304 will be ON when block5 is running
SM305	BLOCK6 running flag	SM305 will be ON when block6 is running
.....	.....	
SM396	BLOCK97 running flag	SM396 will be ON when block97 is running
SM397	BLOCK98 running flag	SM397 will be ON when block98 is running
SM398	BLOCK99 running flag	SM398 will be ON when block99 is running
SM399	BLOCK100 running flag	SM399 will be ON when block100 is running

### Error check (SM400-SM412)

ID	Function	Description
SM400	I/O error	ERR LED keeps ON, PLC don not run and output, check when power on



SM401	Expansion module communication error	
SM402	BD communication error	
.....		
SM405	No user program	Internal code check wrong
SM406	User program error	Implement code or configuration table check wrong
SM407	SSFD check error	ERR LED keeps ON, PLC don not run and output, check when power on
SM408	Memory error	Can not erase or write Flash
SM409	Calculation error	
SM410	Offset overflow	Offset exceeds soft element range
SM411	FOR-NEXT overflow	Reset when power on or users can also reset by hand.
SM412	Invalid data fill	When offset of register overflows, the return value will be SM372 value

#### Error Message (SM450-SM463)

ID	Function	Description
SM450	System error check	
SM451	Hardfault interrupt flag	
SM452		
SM453	SD card error	
SM454	Power supply is cut off	
.....		
SM460	Extension module ID not match	
SM461	BD/ED module ID not match	
SM462	Extension module communication overtime	
SM463	BD/ED module communication overtime	

#### Expansion Modules, BD Status (SM500)



ID	Function	Description
SM500	Module status read is finished	

## Appendix 1-2. Special Data Register Schedule

### Battery (SD5~SD7)

ID	Function	Description
SD005	Battery register	It will display 100 when the battery voltage is 3V, if the battery voltage is lower than 2.5V, it will display 0, it means please change new battery at once, otherwise the data will lose when PLC power off.
SD007	Power-off memory data error type	

### Clock (SD10-SD019)

ID	Function	Description
SD010	Current scan cycle	100us, us is the unit
SD011	Min scan time	100us, us is the unit
SD012	Max scan time	100us, us is the unit
SD013	Second (clock)	0~59 (BCD code)
SD014	Minute (clock)	0~59 (BCD code)
SD015	Hour (clock)	0~23 (BCD code)
SD016	Day (clock)	0~31 (BCD code)
SD017	Month (clock)	0~12 (BCD code)
SD018	Year (clock)	2000~2099 (BCD code)
SD019	Week (clock)	0(Sunday)~6(Saturday)(BCD code)

### Flag (SD020-SD031)

ID	Function	Note
SD020	Model type	
SD021	model (low-8) series (high-8)	
SD022	Compatible system version (low) system version (high)	
SD023	Compatible model version (low) model version (high)	
SD024	Model info	
SD025	Model info	
SD026	Model info	
SD027	Model info	
SD028	Suitable software version	
SD029	Suitable software version	
SD030	Suitable software version	
SD031	Suitable software version	

### Step ladder (SD040)

ID	Function	Description
SD40	Flag of the executing process S	

### High Speed Counting (SD100-SD109)

ID	Function	Description	
SD10 0	Current segment (No. n segment)		HSC00
SD10 1	Current segment (No. n segment)		HSC02
SD10 2	Current segment (No. n segment)		HSC04
SD10 3	Current segment (No. n segment)		HSC06
SD10 4	Current segment (No. n segment)		HSC08
SD10 5	Current segment (No. n segment)		HSC10
SD10 6	Current segment (No. n segment)		HSC12

SD10 7	Current segment (No. n segment )		HSC14
SD10 8	Current segment (No. n segment)		HSC16
SD10 9	Current segment (No. n segment)		HSC18

### High speed counter error (SD120-SD129)

ID	Function	Note
SD120	HSC0 error info	
SD121	HSC2 error info	
SD122	HSC4 error info	
SD123	HSC6 error info	
SD124	HSC8 error info	
SD125	HSC10 error info	
SD126	HSC12 error info	
SD127	HSC14 error info	
SD128	HSC16 error info	
SD129	HSC18 error info	

### communication (SD140~SD199)

	ID	Function	Note
Serial port 0	SD140	Modbus read write instruction execution result	0: correct 100: receive error 101: receive overtime 180: CRC error 181: LRC error 182: station error 183: send buffer overflow 400: function code error 401: address error 402: length error 403: data error 404: slave station busy 405: memory error (erase FLASH)

Serial port 1	SD141	X-Net communication result	0: correct 1: communication overtime 2: memory error 3: receive CRC error
	SD142	Free format communication send result	0: correct 410: free format send buffer overflow
	SD143	Free format communication receive result	0: correct 410: send data length overflow 411: receive data short 412: receive data long 413: receive error 414: receive overtime 415: no start character 416: no end character
	SD144	Free format communication receive data numbers	In bytes, there are no start and stop characters
	.....		
	SD149		
	SD150	Modbus read write instruction execution result	0: correct 100: receive error 101: receive overtime 180: CRC error 181: LRC error 182: station error 183: send buffer overflow 400: function code error 401: address error 402: length error 403: data error 404: slave station busy 405: memory error (erase FLASH)
	SD151	X-Net communication result	0: correct 1: communication overtime 2: memory error 3: receive CRC error
	SD152	Free format communication send result	0: correct 410: free format send buffer overflow
	SD153	Free format communication receive result	0: correct 410: send data length overflow 411: receive data short

			412: receive data long 413: receive error 414: receive overtime 415: no start character 416: no end character
	SD154	Free format communication receive data numbers	In bytes, there are no start and stop characters
	.....		
	SD159		
Serial port 2	SD160	Modbus read write instruction execution result	0: correct 100: receive error 101: receive overtime 180: CRC error 181: LRC error 182: station error 183: send buffer overflow 400: function code error 401: address error 402: length error 403: data error 404: slave station busy 405: memory error (erase FLASH)
	SD161	X-Net communication result	0: correct 1: communication overtime 2: memory error 3: receive CRC error
	SD162	Free format communication send result	0: correct 410: free format send buffer overflow
	SD163	Free format communication receive result	0: correct 410: send data length overflow 411: receive data short 412: receive data long 413: receive error 414: receive overtime 415: no start character 416: no end character
	SD164	Free format communication receive data numbers	In bytes, there are no start and stop characters
	.....		
	SD169		



Serial port 3	SD170~SD179		
Serial port 4	SD180~SD189		
Serial port 5	SD190~SD199		

### Sequence Function Block (SD300-SD399)

ID	Function	Description
SD300	Executing instruction of BLOCK1	The value will be used when BLOCK monitors
SD301	Executing instruction of BLOCK2	The value will be used when BLOCK monitors
SD302	Executing instruction of BLOCK3	The value will be used when BLOCK monitors
SD303	Executing instruction of BLOCK4	The value will be used when BLOCK monitors
SD304	Executing instruction of BLOCK5	The value will be used when BLOCK monitors
SD305	Executing instruction of BLOCK6	The value will be used when BLOCK monitors
.....	.....	.....
SD396	Executing instruction of BLOCK97	The value will be used when BLOCK monitors
SD397	Executing instruction of BLOCK98	The value will be used when BLOCK monitors
SD398	Executing instruction of BLOCK99	The value will be used when BLOCK monitors
SD399	Executing instruction of BLOCK100	The value will be used when BLOCK monitors

### Error Check (SD400-SD413)



ID	Function	Note
SD400		
SD401	Extension module no. of communication error	Means module no.n is error
SD402	BD/ED module no. of communication error	
SD403	FROM/TO error type	
SD404	PID error type	
.....		
SD409	Calculation error code	1: divide by 0 error 2: MRST, MSET front operand address less than back operand 3: ENCO, DECO data bits of encoding and decoding instructions exceed the limit. 4: BDC code error 7: Radical sign error
SD410	The number of offset register D when offset crosses the boundary	
SD411		
SD412	Invalid data fill value (low 16 bits)	
SD413	Invalid data fill value (high 16 bits)	

#### Error Check (SD450-SD452)

ID	Function	Description
SD450	1: Watchdog act (Default 200ms) 2: Control block application fail 3: Visit illegal address	
SD451	Hardware error type: 1: Register error 2: Bus error 3: Usage error	
SD452	Hardware error	
SD453	SD card error	
SD454	Power-off time	
SD460	Extension module ID not match	

SD461	BD/ED module ID not match	
SD462	Extension module communication overtime	
SD463	BD/ED module communication overtime	

#### Expansion Modules, BD Status (SD500-SD516)

ID	Function	Description	
SD500	Module number Expansion modules: #10000~10015 BD: #20000~20001 ED: #30000		
SD501~516	Expansion module, BD /ED status		16 registers

#### Module info (SD520-SD823)

ID	Function	Explanation	Note
SD520~SD535	Extension module info	Extension module 1	Each extension module, BD, ED occupies 16 registers
.....	.....	.....	
SD760~SD775	Extension module info	Extension module 16	
SD776~SD791	BD module info	BD module 1	
SD792~SD807	BD module info	BD module 2	
SD808~SD823	ED module info	ED module 1	

#### Expansion Module Error Information

ID	Function	Description	
SD860	Error times of module read		Expansion module 1
SD861	Error types of module read	Module address error. Module accepted data length error. Module CRC parity error when PLC is accepting data. Module ID error. Module overtime error.	

SD862	Error times of module write		
SD863	Error types of module write		
SD864	Error times of module read		Expansion module 2
SD865	Error types of module read	Module address error. Module accepted data length error. Module CRC parity error when PLC is accepting data. Module ID error. Module overtime error.	
SD866	Error times of module write		
SD867	Error types of module write		
.....			
SD920	Error times of module read		Expansion module 16
SD921	Error types of module read	Module address error. Module accepted data length error. Module CRC parity error when PLC is accepting data. Module ID error. Module overtime error.	
SD922	Error times of module write		
SD923	Error types of module write		
SD924	Error times of module read		BD module 1
SD925	Error types of module read		
SD926	Error times of module write		
SD927	Error types of module write		
SD928	Error times of module read		BD module 2
SD929	Error types of module read		

SD930	Error times of module write		
SD931	Error types of module write		
SD932	Error times of module read		ED module 1
SD933	Error types of module read		
SD934	Error times of module write		
SD935	Error types of module write		

#### Version info (SD990~SD993)

ID	Function	Explanation	Note
SD990	Firmware version date	Low 16-bit	
SD991	Firmware version compilation date	High 16-bit	
SD992	FPGA version compilation date	Low 16-bit	
SD993	FPGA version compilation date	High 16-bit	

### Appendix 1-3. Special Flash Register schedule

#### Special FLASH data register SFD

\* means it works only after repower on the PLC

#### I filtering

ID	Function	Description
SFD0*	Input filter time	
SFD2*	Watchdog run-up time, default value is 200ms	

#### I Mapping

ID	Function	Description	
SFD10*	I00 corresponds to X**	Input terminal 0 corresponds to X** number	0xFF means terminal bad, 0xFE means terminal idle
SFD11*	I01 corresponds to X**		
SFD12*	I02 corresponds to X**		
.....	.....		
SFD73*	I77 corresponds to X**	Default value is 77 ( Octonary )	

### O Mapping

ID	Function	Description	
SFD74*	O00 corresponds to Y**	Output terminal 0 correspond to Y** number	0xFF means terminal bad, 0xFE means terminal idle
		Default value is 0	
.....	.....		
SFD134*	O77 corresponds to Y**	Default value is 77 ( Octonary )	

### I Attribute

ID	Function	Description	
SFD138*	I00 attribute	Attribute of input terminal 0	0: positive logic others: negative logic
SFD139*	I01 attribute		
.....	.....		
SFD201*	I77 attribute		

### High Speed Counting

ID	Function	Description
SFD320	HSC0 frequency times	2: 2 times frequency; 4: 4 times frequency(effective at AB phase counting mode)
SFD321	HSC2 frequency times	Ditto
SFD322	HSC4 frequency times	Ditto
SFD323	HSC6 frequency times	Ditto
SFD324	HSC8 frequency times	Ditto
SFD325	HSC10 frequency times	Ditto



SFD326	HSC12 frequency times	Ditto
SFD327	HSC14 frequency times	Ditto
SFD328	HSC16 frequency times	Ditto
SFD329	HSC18 frequency times	Ditto
SFD330	Bit selection of HSC absolute and relative ( 24 segment )	bit0 corresponds to HSC0, bit1 corresponds to HSC2, and so on, bit9 corresponds to HSC18 0: relative 1: absolute
SFD331	Interrupt circulating of 24 segments high speed counting	bit0 corresponds to HSC0, bit1 corresponds to HSC2, and so on, bit9 corresponds to HSC18 0: single 1: loop
SFD332	CAM function	bit0 corresponds to HSC0, bit1 corresponds to HSC2, and so on, bit9 corresponds to HSC18 0: do not support CAM function 1: support CAM function

#### Expansion Module Configuration

ID	Function	Explanation
SFD340	Extension module configuration status ( #1#2 )	Configuration Status of Extension Modules 1 and 2
SFD341	Extension module configuration status ( #3#4 )	Configuration Status of Extension Modules 3 and 4
.....	.....	.....
SFD347	Extension module configuration status ( #15#16 )	Configuration Status of Extension Modules 15 and 16
SFD348	BD module configuration status ( #1#2 )	Configuration Status of BD Modules 1 and 2
SFD349	ED module configuration status ( #1 )	Configuration Status of ED Module 1
SFD350	Extension module configuration : SFD359	Configuration of Extension Module 1
SFD360		
SFD369		
:	:	
SFD500	Extension module configuration : SFD509	Configuration of Extension Module 16
:		
SFD509		



SFD510	BD module configuration	Configuration of BD Module 1
:		
SFD519	BD module configuration	Configuration of BD Module 2
SFD520		
:		
SFD529	ED module configuration	Configuration of ED Module 1
SFD530		
:		
SFD539		

### Communication

ID	Function	Note
SFD600	COM1 free format communication buffer bit numbers	0: 8-bit    1: 16-bit
SFD610	COM2 free format communication buffer bit numbers	0: 8-bit    1: 16-bit
SFD620	COM3 free format communication buffer bit numbers	0: 8-bit    1: 16-bit
SFD630	COM4 free format communication buffer bit numbers	0: 8-bit    1: 16-bit
SFD640	COM5 free format communication buffer bit numbers	0: 8-bit    1: 16-bit

## Appendix 2 Instruction Schedule

In appendix 2 all instructions that XD/XL series PLC support will be listed, including basic instructions, application instructions, special function instructions and motion control instructions and all instructions' corresponding application range will also be listed.

This part helps the users refer to instruction functions quickly. More about instructions application, please refer to XD/XL Series Programmable Controller 【Instruction Part】 .

Appendix 2-1. Basic Instruction List

Appendix 2-2. Application Instruction List

Appendix 2-3. Special Function Instruction List

## Appendix 2-1. Basic Instruction List

Mnemonic	Function
LD	Initial logical operation contact type: NO(normally open)
LDI	Initial logical operation contact type: NC (normally closed)
OUT	Final logic operation type: coil drive
AND	Serial connection of NO
ANI	Serial connection of NC
OR	Parallel connection of NO
ORI	Parallel connection of NC
LDP	Operation start of pulse rising edge
LDF	Operation start of pulse falling edge
ANDP	Serial connection of pulse rising edge
ANDF	Serial connection of pulse falling edge

ORP	Parallel connection of pulse rising edge
ORF	Parallel connection of pulse rising edge
LDD	Read directly from the contact state
LDDI	Read directly NC
ANDD	Read directly from the contact state and connect serially
ANDDI	Read NC and connect serially
ORD	Read directly from the contact state and parallel connection
ORDI	Read NC and parallel connection
OUTD	Output the point directly
ORB	Parallel connection of serial circuit
ANB	Serial connection of parallel circuit
MCS	New bus line start
MCR	Bus line return
ALT	Alternate coil state
PLS	Connect on a scan cycle of pulse rising edge
PLF	Connect on a scan cycle of pulse falling edge
SET	Set coil on
RST	Set coil off
OUT	Drive counting coil
RST	Set coil off and current value rest to zero
END	I/O process and return to step 0
GROUP	Instruction block fold start
GROUPE	Instruction block fold end
TMR	Timing

## Appendix 2-2. Application Instruction List

Sort	Mnemonic	Function
Program flow	CJ	Condition jump
	CALL	Call subroutine
	SRET	Subroutine return
	STL	Flow start
	STLE	Flow end
	SET	Open the assigned flow and close the current flow
	ST	Open the assigned flow and do not close the current flow
	FOR	Start of a FOR-NEXT loop

	NEXT	END of a FOR-NEXT loop
	FEND	End of main program
Data compare	LD=*1	LD activate if (S1) = (S2)
	LD>*1	LD activate if (S1) > (S2)
	LD<*1	LD activate if (S1) < (S2)
	LD<>*1	LD activate if (S1) ≠ (S2)
	LD>=*1	LD activate if (S1) ≥ (S2)
	LD<=*1	LD activate if (S1) ≤ (S2)
	AND=*1	AND activate if (S1) = (S2)
	AND>*1	AND activate if (S1) > (S2)
	AND<*1	AND activate if (S1) < (S2)
	AND<>*1	AND activate if (S1) ≠ (S2)
	AND>=*1	AND activate if (S1) ≥ (S2)
	AND<=*1	AND activate if (S1) ≤ (S2)
	OR=*1	OR activate if (S1) = (S2)
	OR>*1	OR activate if (S1) > (S2)
	OR<*1	OR activate if (S1) < (S2)
	OR<>*1	OR activate if (S1) ≠ (S2)
	OR>=*1	OR activate if (S1) ≥ (S2)
	OR<=*1	OR activate if (S1) ≤ (S2)
Data move	CMP*1	Data compare
	ZCP*1	Data zone compare
	MOV*1	Move
	BMOV	Block move
	PMOV	Block move
	FMOV*1	Multi-bit data move
	EMOV	Float move
	FWRT*1	FlashROM written
	MSET	Multi data set
	ZRST	Zone reset
	SWAP	Switch high bytes and low bytes
	XCH*1	Exchange data
Data operation	ADD*1	Addition
	SUB*1	Subtraction
	MUL*1	Multiplication
	DIV*1	Division
	INC*1	Increase 1
	DEC*1	Decrease 1
	MEAN*1	Mean
	WAND*1	Logic and
	WOR*1	Logic or
	WXOR*1	Logic exclusive or

	CML <sup>※1</sup>	Complement
	NEG <sup>※1</sup>	Negative
Data shift	SHL <sup>※1</sup>	Arithmetic shift left
	SHR <sup>※1</sup>	Arithmetic shift right
	LSL <sup>※1</sup>	Logic shift left
	LSR <sup>※1</sup>	Logic shift right
	ROL <sup>※1</sup>	Rotation shift left
	ROR <sup>※1</sup>	Rotation shift right
	SFTL <sup>※1</sup>	Bit shift left
	SFTR <sup>※1</sup>	Bit shift right
	WSFL	Word shift left
	WSFR	Word shift right
	WTD	Single word integer convert to double word integer
Data switch	FLT <sup>※1</sup>	16 bits integer convert to float
	FLTD <sup>※1</sup>	64 bits integer convert to float
	INT <sup>※1</sup>	Float convert to integer
	BIN	BCD convert to binary
	BCD	Binary convert to BCD
	ASCI	Hex convert to ASC II
	HEX	ASC II convert to Hex
	DECO	Coding
	ENCO	High bit coding
	ENCOL	Low bit coding

Sort	Mnemonic	Function
Float Operation	ECMP <sup>※2</sup>	Float compare
	EZCP <sup>※2</sup>	Float zone compare
	EADD <sup>※2</sup>	Float addition
	ESUB <sup>※2</sup>	Float subtraction
	EMUL <sup>※2</sup>	Float multiplication
	EDIV <sup>※2</sup>	Float division
	ESQR <sup>※2</sup>	Float square root
	SIN <sup>※2</sup>	Sine
	COS <sup>※2</sup>	Cosine
	TAN <sup>※2</sup>	tangent
	ASIN <sup>※2</sup>	Float arcsin
	ACOS <sup>※2</sup>	Float arccos
	ATAN <sup>※2</sup>	Float arctan
Clock	TRD	Read RTC data
	TWR	Write RTC data

---

※1: All the instructions are 16 bits and no 32 bits format in general. ※1 has 32 bits. 32 bits instructions are added D in front of its 16 bits instruction. Such as ADD(16 bits) / DADD(32 bits).

※2: These instructions are 32 bits, and have no 16 bits format.

---



## Appendix 2-3. Special Instructions List

Sort	Mnemonic	Function
Pulse	PLSR <sup>*1</sup>	multi-segment pulse output
	PLSF <sup>*1</sup>	variable frequency pulse output
	DRVI <sup>*2</sup>	Relative single segment pulse output
	DRVA <sup>*2</sup>	Absolute single segment pulse output
	STOP	Pulse stop
	GOON	Pulse continue
	ZRN <sup>*1</sup>	Mechanical origin return
High speed count	CNT <sup>*2</sup>	Single-phase high speed count
	CNT_AB <sup>*2</sup>	AB phase high speed count
	RST	High speed counter reset
	DMOV <sup>*2</sup>	Read and write the high speed counter
High speed counter interruption	CNT <sup>*2</sup>	Single-phase 100 segments high speed counter(with interruption)
	CNT_AB <sup>*2</sup>	AB-phase 100 segments high speed counter(with interruption)
MODBUS communication	COLR	MODBUS coil read
	INPR	MODBUS input coil read
	COLW	MODBUS single coil write
	MCLW	MODBUS multi coil write
	REGR	MODBUS register read
	INRR	MODBUS input register read
	REGW	MODBUS single register write
	MRGW	MODBUS multi register write
Precision timing	STR <sup>*2</sup>	Precision timing
	DMOV <sup>*1</sup>	Read precise timing register
	STOP	Stop precise timing
Interrupt	EI	Enable interrupt
	DI	Disable interrupt
	IRET	Interrupt return
BLOCK	SBSTOP	BLOCK stop
	SBGOON	Carry on the suspensive BLOCK

---

Others	WAIT	Wait
	FROM/TO	Read/write module
	PWM	Pulse width modulation
	PID	PID operation control
	NAME_C	C function block

---

※1: All the instructions are 16 bits except the instructions with ※1 which has 32 bits. 32 bits instructions are added D in front of its 16bits instruction. Such as ADD(16bits) / DADD(32bits).

※2: The table doesn't include X-NET instructions, please refer to X-NET fieldbus manual.

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## Appendix 3 PLC Configuration List

This part is used to check each model's configurations. Via this table, we can judge products type easily.

○ Selectable    × Not support    √ Support

series	USB port	232 port	485 port	RJ 45	Ex module	BD	High speed counter		Pulse output Channel(T /RT)	External interruption
							Incremental mode	AB phase		
XD1										
XD1-16	×	2	×	×	×	×	×	×	×	6
XD1-32	×	2	√	×	×	×	×	×	×	10
XD2										
XD2-16	×	2	√	×	×	×	3	3	2	6
XD2-24	×	2	√	×	×	1	3	3	2	10
XD2-32	×	2	√	×	×	1	3	3	2	10
XD2-48	×	2	√	×	×	2	3	3	2	10
XD2-60	×	2	√	×	×	2	3	3	2	10
XD3										
XD3-16	1	1	√	×	10	×	3	3	2	6
XD3-24	1	1	√	×	10	1	3	3	2	10
XD3-32	1	1	√	×	10	1	3	3	2	10
XD3-48	1	1	√	×	10	2	3	3	2	10
XD3-60	1	1	√	×	10	2	3	3	2	10
XD5										
XD5-16	1	1	√	×	16	×	3	3	2	10
XD5-24	1	1	√	×	16	1	3	3	2	10
XD5-32	1	1	√	×	16	1	3	3	2	10
XD5-48	1	1	√	×	16	2	3	3	2	10
XD5-60	1	1	√	×	16	2	3	3	2	10
XD5-24T4	1	1	√	×	16	1	4	4	4	10
XD5-32T4	1	1	√	×	16	1	4	4	4	10
XD5-48T4	1	1	√	×	16	2	4	4	4	10
XD5-48T6	1	1	√	×	16	2	6	6	6	10
XD5-60T4	1	1	√	×	16	2	4	4	4	10
XD5-60T6	1	1	√	×	16	2	6	6	6	10
XD5-60T10	1	1	√	×	16	2	10	10	10	10
XDM										
XDM-24T4	1	1	√	×	16	1	4	4	4	10

XDM-32T4	1	1	√	×	16	1	4	4	4	10
XDM-60T4	1	1	√	×	16	2	4	4	4	10
XDM-60T4L	1	1	√	×	16	2	4	4	4	10

series	USB port	232 port	485 port	RJ 45	Ex module	BD	High speed counter		Pulse output Channel(T /RT)	External interruption
							Incremental	AB phase		
XDM										
XDM-60T10	1	1	√	×	16	2	10	10	10	10
XDC										
XDC-24	×	2	√	×	16	1	4	4	2	10
XDC-32	×	2	√	×	16	1	4	4	2	10
XDC-48	×	2	√	×	16	2	4	4	2	10
XDC-60	×	2	√	×	16	2	4	4	2	10
XD5E										
XD5E-30T4	1	1	√	1	16	1	4	4	4	10
XD5E-60T10	×	1	√	2	16	2	10	10	10	10
XDME										
XDME-60T10	×	1	√	2	16	2	10	10	10	10
XL1										
XL1-16	×	1	√	×	×	×	×	×	×	6
XL3										
XL3-16	1	1	√	×	10	×	3	3	2	6
XL5										
XL5-32T4	1	1	√	×	16	1	4	4	4	10
XL5E										
XL5E-32T4	×	1	√	2	16	1	4	4	4	10
XLME										
XLME-32T4	×	1	√	2	16	1	4	4	4	10

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## Appendix 4 Common Questions Q&A

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The following are the common questions may happen when using the PLC.

**Q1: Why the coil is not set when the condition is satisfied?**

**A1:** The possible reasons:

- (1) Users may use one coil for many times, which leads to double coils output. And at this time, the later coil has priority.
- (2) Coil may be reset, users can find the reset point by monitor function and modify the program.

**Q2: What's the difference between COM1 and COM2?**

**A2:** Both COM1 and COM2 support Modbus-RTU and Modbus-RTU/ASCII format. The difference is COM1 parameters can be set to default value by power on and off function of PLC.

**Q3: Why PLC can not communicate with other devices?**

**A3:** The possible reasons:

- (1) communication parameters: PLC com port and device parameters must be the same.
- (2) communication cable: Confirm connection correct and good and change cable to try again.
- (3) communication serial port: Check the port by downloading PLC program. Rule out this problem if download successfully.
- (4) contact manufacturer if all the above are ruled out.

**Q4: How long can the PLC battery be used?**

**A4:** Normally for 3~5 years.



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