CCSD series PLC

User manual［Hardware］

WUXI XINJE ELECTRIC CO., LTD.

No. PD01 20220307EN 1.1

XINJE

CCSD series PLC

User manual［hardware］

General descriptions

- Thank you for purchasing Xinje CCSD series PLC.
- This manual mainly introduces CCSD 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 statement

- 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.

- Tel: 0086 510-85134136 85123803
- Fax: 0086 510-85111290
- Address:
  No.816, Jianzhu West Road, Binhu District, Wuxi City, Jiangsu Province, China
- Code: 214072

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^2 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.

Catalog

Preface

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

Content Components

This manual includes CCSD series PLC types and system constitutions. It mainly introduces CCSD series PLC basic units' specification, I/O wiring, run and maintenance, and CCSD 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 CCSD series PLC specifications, types and descriptions.

2. Specifications

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

3. System constitutions

This chapter mainly introduces CCSD 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 CCSD series PLC power specifications, wiring methods.

5. Input specifications and wiring

This chapter mainly introduces CCSD series PLC input specifications, input wiring, high speed counting etc.

6. Output specifications and wiring

This chapter mainly introduces CCSD series PLC output specifications, relay output and transistor output etc.

7. Run, debug, maintenance

This chapter mainly introduces CCSD series PLC run, debug steps, daily maintenance etc.

8. Expansion devices

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 CCSD series PLC special function that free switch between input and output points.

Appendix 1．Special soft elements schedule

This chapter mainly introduces CCSD 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 CCSD series PLC support.

Appendix 3．PLC function configuration schedule

This chapter mainly introduces CCSD series PLC main function of each type for lectotype.

Appendix 4．Common questions A&Q

This chapter mainly introduces CCSD series PLC problems and solutions that may occur when using.

Manual scope of application

This manual is hardware manual of CCSD series PLC, contents are as follows:

1．CCSD series PLC basic units

type	series	model
basic unit	C series	CCSD-C32T-E, CCSD-C32T-C, CCSD-C60T-E, CCSD-C60T-C
	E series	CCSD-E30R-E, CCSD-E60R-E, CCSD-E30T-E, CCSD-E60T-E, CCSD-E30PT4-E, CCSD-E24R-C, CCSD-E30T4-C, CCSD-E60T4-C
	H series	CCSD-H30A16L-E, CCSD-H30A16L-C
extension module	I/O extension	CCSD-E16X16YR-E, CCSD-E16X16YR-C, CCSD-E16X16YT-E, CCSD-E16X16YT-C
	AD/DA extension	CCSD-E8AD, CCSD-E4AD2DA
	temperature extension	CCSD-E6PT-P, CCSD-E6TC-P
extension BD	communication	CCSD-NE-BD

2. Version requirements

- The CCSD series PLC requires the software version to be v3.2 and above.

- There are version requirements for some instructions. Please refer to each instruction for details.

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
CCSD series PLC	General name of CCSD series programmable logic controllers
Basic units or noumenon	Short name of CCSD series PLC basic units
Expansion devices or expansion units	General name of CCSD series PLC expansion modules and BD cards
Expansion modules	General name of CCSD series PLC all expansion modules.
Input and output expansion or I/O expansion	Short name of CCSD series PLC all input and output expansion modules
Analog expansions	Short name of CCSD series PLC all analog expansion modules
Peripheral units	General name of programming software, HMI and network modules
Programming software	General name of CCSD 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 CCSD series PLC hardware, about more application such as programming and instructions, please refer to relevant manuals.

Manual name	Manual introduction	Notes
Installation manual		
CCSD series PLC installation manual	Descript CCSD series basic units' specification, dimensions, installation, wiring etc.	Electronic version Need additional request
Programming software		

CCSD series PLC users' manual【software】	Introduce CCSD series PLC software XDPPro usage and skill etc.	Electronic version Need additional request
Instruction programming manual		
CCSD series PLC users' manual【instructions】	Introduce CCSD series PLC basic instructions, application instructions, communication, PID, C language, BLOCK etc.	Electronic version Need additional request
Expansion manual		
CCSD series analog temperature expansion manual	Introduce CCSD 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.

1 Summary of CCSD Series PLC

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

1-1. Product Specifications

1-1-1. CCSD series CPU units

1 Models

CCSD 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
CCSD-C (motion fieldbus)	Include 32, 60 points. With full functions. Support 2 axes pulse output, 20-axis X-NET fieldbus motion control, can connect expansion module, ED, BD.
CCSD-E (Ethernet model)	Include 30, 60 points model. With full functions. Support Ethernet communication, support 2~10 axes high speed pulse output, connect expansion module, ED and BD. CCSD-**E60T4 support online download function**.
XDH (motion control, Ethernet)	Contains 30, 60 points functions. It is compatible with most functions of CCSD-E, supports Ethernet communication and EtherCAT bus, supports motion control commands such as interpolation and servo, supports 4 axes high-speed pulse output, connects expansion module, extension ED and BD (30 points models cannot support).

※1: About special function of products, please refer to appendix 3.

2 Powerful functions

CCSD 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 1.5MB (CCSD-H can up to 4MB).
- **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 8000 processes S, 1000 retention processes HS, 70000 intermediate relays M, 12000 retention relays HM, 1280 input relays X, 1280 output relays Y, 5000 normal timers T, 2000 latched timers HT, 5000ounters C, 2000 retention counters HC, 70000 data registers D, 25000 retention data registers HD, 8192 registers FD.
- **Two programming types**
  CCSD 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**
  CCSD series PLC has built-in clock to control time.
- **Compact size, convenient to install**
  CCSD series PLC has DIN and screw two installation modes.

Enhanced special function

- **X-NET fieldbus**
  CCSD series PLC support X-NET fieldbus, which can fast communicate with CCSD series PLC and TG/TN series HMI. CCSD-C 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.
- **EtherCAT bus**
  CCSD-H series PLC supports EtherCAT bus, it can control up to 32 axes synchronously, and the control cycle is less than or equal to 1ms.
- **High-speed pulse counter, frequency up to 80KHz**

CCSD 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.**
  CCSD series PLC※1 usually have 2~10 pulse output terminals, pulse frequency up to 100KHz.
- **Interruption function**
  CCSD series PLC interruption functions include external interruption, timing interruption and high-speed counting interruption to meet different interruption demands.
- **I/O points switch freely**
  CCSD 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**
  CCSD series PLC※1 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**
  CCSD series PLC※1 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)**
  CCSD series PLC※1 PWM function can be used to control DC motor.
- **Frequency measure**
  CCSD series PLC※1 can measure frequency.
- **Precise time**
  CCSD series PLC※1can realize 1ms and 32bit precise timing.
- **Online download**
  CCSD-E some models PLC support online download function, which truly realizes PLC non-stop operation.

3	**Easy to program**

CCSD 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.

※1: Here, CCSD series PLC refers to the PLC that can realize the described functions, that is to say, not all CCSD series PLC can realize the described functions. Refer to Appendix 3 for specific functions of PLC.

※2: PLC can output high-speed pulse of 100kHz ~ 200kHz, but it can not guarantee the normal operation of all servo systems. Please connect a resistance of about 500 Ω between the output terminal and 24V power supply.

1-1-2. CCSD series Expansions

1 Expansion Modules

To meet control requirement better, CCSD-C, CCSD-E, CCSD-H can connect 16 modules.

- Rich variety

It includes I/O expansion module, analog processing module and temperature control module.

- I/O expansion module

Input 8~32 points; Output points: 8~32; Output type: transistor, relay; Power supply: DC24V.

- Analog quantity processing module

Type: AD, DA, AD/DA; Number of channels: AD 4~12, DA 2~4; Power supply: DC24V.

- Temperature control module

Type: PT100, thermocouple; Number of channels: 2~6; PID control: built-in, relay; Power supply: DC24V.

2 Expansion BD

CCSD 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, CCSD-NE-BD

- Optical fiber BD: X-NET optical fiber interface, filedbus communication function, CCSD-NO-BD
- RS232 communication BD: CCSD-NS-BD
- Precise clock BD: CCSD-RTC-BD provides more accurate clock function than PLC itself, and the error is less than 13 seconds per month.

1-2. Model list

1-2-1. CCSD series basic unit model and list

1	Basic unit model

CCSD series PLC basic unit model constitute:

CC SD − H ① 30 ② A16 ③ T4 ④ − E ⑤

1	Series type	E: Ethernet type C: motion fieldbus control type H: EtherCAT bus type
2	I/O points	30: 18 input/12 output 32: 18 input/ 14 output (or 16 input/16 output) 60: 36 input/ 24 output
3	EtherCAT motion control function	A16: Control 16 axes EtherCAT slave station A16L: simple configuration of motion control function, which controls 16 axes EtherCAT slave station and does not support electronic cam A32: control 32 axes EtherCAT slave station
4	Output point type	R: Relay output T: Transistor output, 2-channel pulse output T4: transistor output, 4-channel pulse output T4L: transistor output, 4-channel pulse output, program capacity expansion type T6: transistor output, 6-channel pulse output T10: transistor output, 10 channel pulse output RT: relay transistor mixed output, 2-channel pulse output
5	Power supply	E: AC power supply (220V) C: DC power supply (24V)

2 Basic unit model list

CCSD-C 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	-	CCSD-C32T-E	-	-	CCSD-C32T-C	-	18	14
	-	CCSD-C60T-E	-	-	CCSD-C60T-C	-	36	24

CCSD-E 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	CCSD-E30R-E	CCSD-E30T-E	-	-	-	-	16	14
	-		-	-	CCSD-E30T4-C	-	16	14
	CCSD-E60R-E	CCSD-E60T-E	-	CCSD5E-60R-C	-	-	36	24
	-		-	-	CCSD-E60T4-C	-	36	24
PNP	-	CCSD-E30PT4-E	-	-	-	-	16	14

CCSD-H 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	-	CCSD-H30A16-E	-	-	-	-	16	14
					CCSD-H30A16L-C		16	14

1-2-2. CCSD expansion module list

1 I/O expansion

I/O expansion modules name constitute:

CCSD－E 8 X 8 Y－E
1 2 3 4 5 6 7

1	Series name	CCSD
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	-	CCSD-E16X16YR-E	CCSD-E16X16YT-E	32	16	16
	-	CCSD-E16X16YR-C	CCSD-E16X16YT-C	32	16	16

2 Analog temperature modules

Analog, temperature model constitute:

CCSD－E 4AD 2DA 6PT 6TC－P
① ② ③ ④ ⑤ ⑥

1	Expansion module	E: expansion module
2	Analog input	4AD: 4 channels analog input 8AD: 8 channels analog input
3	Analog output	2DA: 2 channels analog output
4	Temperature input	6PT: 6 channels PT100 sensor input

5	Temperature input	6TC: 6 channels thermocouple sensor input
6	Type	P: PID control

Analog, temperature expansion module type schedule

model		description
analog input	CCSD-E8AD	8 channels analog input, 4-channel voltage, 4-channel current
analog I/O	CCSD-E4AD2DA	4 channels analog input, 2 channels analog output
temperature measurement	CCSD-E6PT-P	6 channels PT100 temperature input, with PID control function

3	**Extension BD board**

The naming rule of extension BD board:

$$\text{CCSD}-\underset{①}{\text{NE}}-\underset{②}{\text{BD}}$$

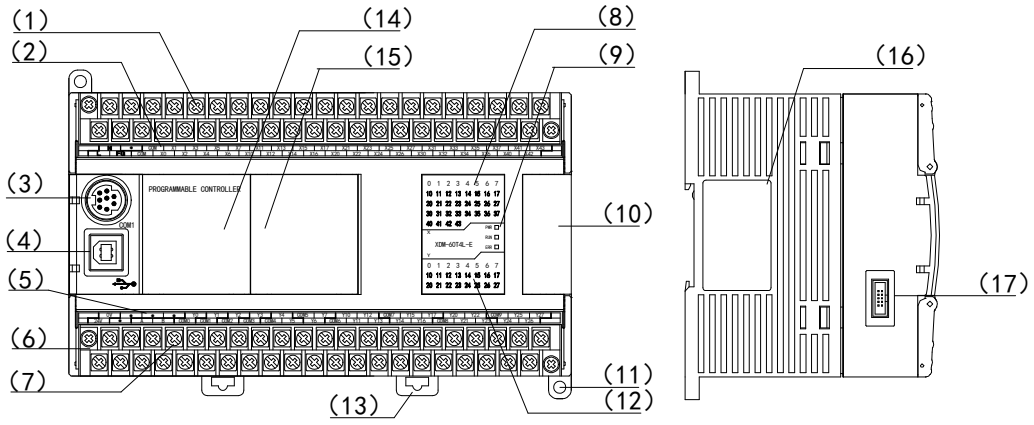
①： BD type NE：RS485 port
②： product type BD：extension BD board

- Extension BD board model list

Model		Description
communication	CCSD-NE-BD	RS485 communication, X-NET protocol, bus communication function

1-3. Each Part's Description

1-3-1. CCSD series structure

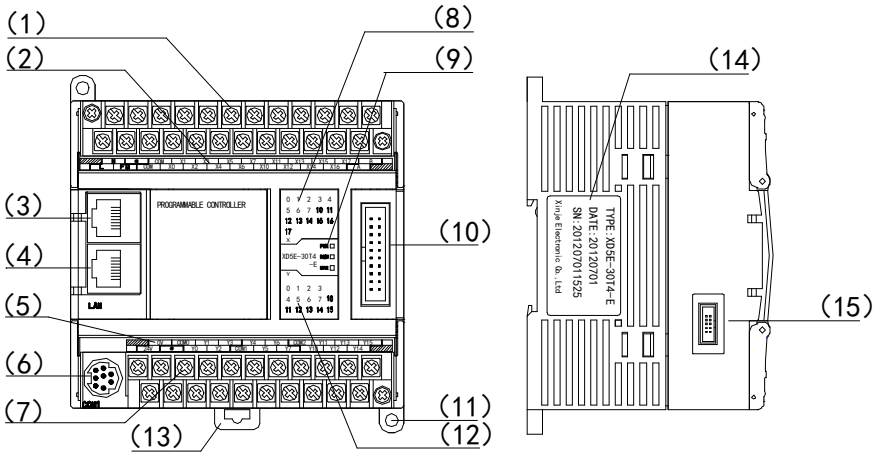


Each part's name is listed below:

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

Note: (1) for the PLC hardware version below 3.2, position 4 is RS232 port.
(2) for CCSD-C series PLC, position 4 is RS232 port.
(3) for CCSD-C 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.

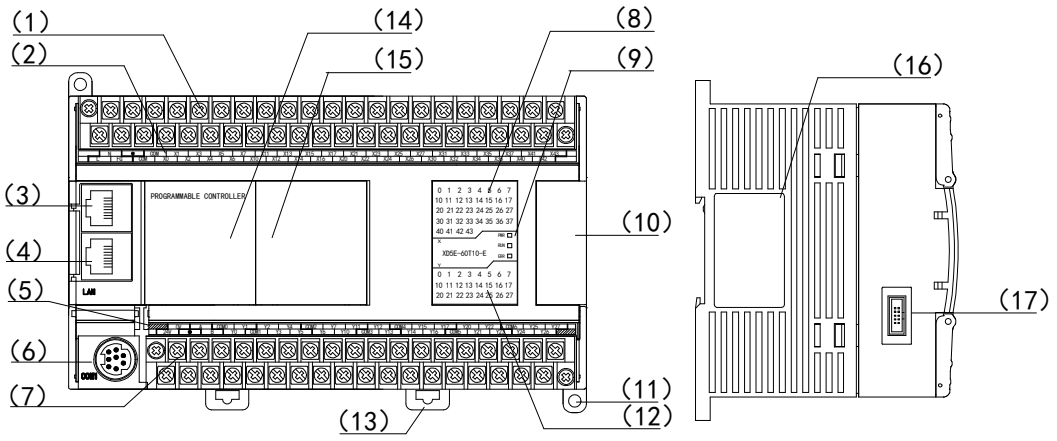
1-3-2. CCSD-E24/30, CCSD-H30 structure



Each part's name is listed below:

（1）: input terminal, power supply input, RS485 (COM2)
（2）: input label
（3）: RJ45 port1
（4）: RJ45 port2
（5）: output label
（6）: RS232 (COM1)
（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）: left extension ED module interface (COM3)

1-3-3. CCSD-E48/60, CCSD-H60 structure



Each part's name is listed below:

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

Note: CCSD-H60T4 (version lower than v3.7.1) series cannot support extension BD and ED module.

2 Specifications and parameters of CPU

This chapter mainly introduces CCSD CPU's general specifications, performance, dimensions, terminals arrangement and communication interfaces.
The Expansions' description, please refer to CCSD series expansion module manual.

2-1. Specifications and Parameters

2-1-1. General Specifications

This specification is fit for CCSD series PLC.

Items	Specifications
Isolation voltage	Above DC 500V 2MΩ
Anti-noise	Noise voltage 1000Vp-p 1us pulse per 1minute
Atmosphere	No corrosive, flammable gas
Ambient temperature	0℃~60℃ 0℃~50℃ (CCSD-H series)
Ambient humidity	5%~95% (NO condensation)
Altitude	Within 2000 meter
USB port	USB download port, connect PC to upload/download/online monitoring
COM0	RS-232, to connect upper computer, HMI for program or debug.
COM1	RS-232, to connect upper computer, HMI for program or debug.
COM2	RS-485, to connect intelligent instruments or inverters.
COM3	To connect left extension ED module
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)

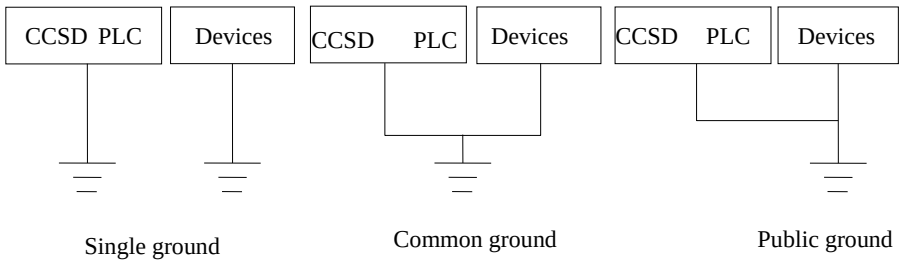
※ 1: CCSD-C, CCSD-E, CCSD-H series models do not have USB ports.

※ 4: For CCSD-C series PLC, COM2 port is divided into RS232 and RS485 communication interfaces, and the two communication interfaces cannot be used at the same time.

※ 6: Ethernet port is only available for CCSD-E, CCSD-H series PLCs.

※ 7: The specification of the guide rail is DIN46277, and the width is 35mm. XL series PLC only supports the installation of the guide rail.

※ 8: Separate grounding or common grounding should be used instead of public grounding.



Single ground Common ground Public ground

2-1-2. Performance and Specifications

CCSD series PLC specifications:

Item		Specification							
Program execution mode		Cyclic scanning mode							
Programming mode		Command, ladder chart							
Processing speed		CCSD-C/CCSD-H30: 0.02~0.05us CCSD-E/CCSD-H60: 0.01~0.03us							
Power-off holding		General PLC uses FlashROM and lithium battery (3V button battery)							
User program capacity ※1		CCSD-C: 384KB							
		CCSD-E; 1MB							
		CCSD-H：2MB (30 points) / 4MB (60 points)							
I/O ※2	Total	10	16	24	30	32	42	48	60
	Input points	5	8	14 or 12	16	18 or 16	24	28	36
		X0~X4	X0~X7	X0~X15 or X0-X13	X0~X17	X0~X21 or X0~X17	X0~X27	X0~X33	X0~X43
	Output points	5	8	10 or 12	14	14 or 16	18	20	24
		Y0~Y4	Y0~Y7	Y0~Y11 or Y0-Y13	Y0~Y15	Y0~Y15 or Y0~Y17	Y0~Y21	Y0~Y23	Y0~Y27
Internal coil（X）※3		1280 points: X0~X77, X10000~X11777, X20000~X20177, X30000~X30077							
Internal coil（Y）※4		1280 points: Y0~Y77, Y10000~Y11777, Y20000~Y20177, Y30000~Y30077							
Internal coil	General use M	70000 points	CCSD-C/CCSD-E：M0~M69999						
		200000 points	CCSD-H：M0~M199999						
	Power-off holding HM※5	12000 points	CCSDC/CCSD5E：HM0~HM11999						
		20000 points	CCSD-H：HM0~HM19999						
	Special use SM※6	5000 points	CCSD-C/CCSD-E：SM0~SM4999						
		50000 points	CCSD-H：SM0~SM49999						
Flow	General use S	8000 points	CCSD-C/CCSD-E：S0~S7999						
		20000 points	CCSD-H：S0~S19999						
	Power-off holding HS※5	1000 points	CCSD-C/CCSD-E：HS0~HS999						
		2000 points	CCSD-H：HS0~HS1999						
Timer	General use T	5000 points	CCSD-C/CCSD-E：T0~T4999						
		20000 points	CCSD-H：T0~T19999						
	Power-off holding HT※5	2000 points	CCSD-C/CCSD-E/CCSD-H： HT0~HT1999						

Item		Specification	
	Precise timing ET	26 points	ET0~ET25
	Specification	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	general use C	5000 points	CCSD-C/CCSD-E：C0~C4999
		20000 points	CCSD-H：C0~C19999
	Power-off holding HC※5	2000 points	CCSD-C/CCSD-E/CCSDH：HC0~HC1999
	High speed counter	40 points	HSC0~HSC39
	Specification	16-bit counter: K0~32,767 32-bit counter: -2147483648~＋2147483647	
Data register	general use D	70000 points	CCSD-C/CCSD-E：D0~D69999※7
		500000 points	CCSD-H：D0~D499999
	power-off holding HD※5	25000 points	CCSD-C/CCSD-E：HD0~HD24999
		50000 points	CCSD-H：HD0~HD49999
	Special use SD※6	5000 points	CCSD-C/CCSD-E：SD0~SD4999
		65488 points	CCSD-H：SD0~SD65487
	Special power-off holding HSD	1024 points	CCSD-C/CCSD-E：HSD0~HSD1023
		50000 points	CCSD-H：HSD0~HSD49999
Flash ROM register	power-off holdingFD※5	8192 points	CCSD-C/CCSD-E：FD0~FD8191
		65536 points	CCSD-H：FD0~FD65535
	special use SFD※6	6000 points	CCSD-C/CCSD-E：SFD0~SFD5999
		50000 points	CCSD-H：SFD0~SFD49999
	Special secret register FS	48 points	FS0~FS47
WAIT command special coil		32 points	SEM0~SEM31
High speed processing ability		High speed counting, pulse output, external interrupt	
Password protection		6-bit ASCII	
Self diagnosis function		Power on self-test, monitoring timer, syntax check	

Note:

※ 1: User program capacity refers to the maximum program capacity during confidential downloading.

※ 2: I/O points refer to the number of terminals that users can input and output signals from outside.

※ 3: X refers to the internal input relay. X beyond I points can be used as an intermediate relay.

※ 4: Y refers to the internal output relay. Y exceeding the number of O points can be used as an intermediate relay.

※ 5: [ ] mark is the default power-off holding area and cannot be changed.

※ 6: Special purpose refers to the special purpose register occupied by the system, which cannot be used for other purposes. See Appendix 1 for details.

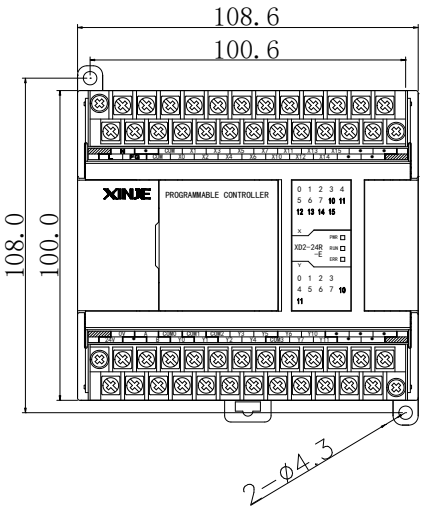
※ 8: The numbers of input coils, output relays/transistors are octal numbers, and the numbers of other memories are decimal numbers.

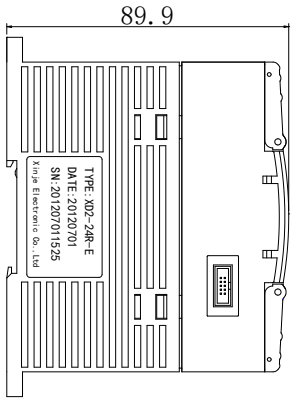
※ 9: The I/O not connected to the peripheral equipment can be used as a fast internal relay.

※ 10: CCSD-H does not support accurate timing temporarily.

2-2. Dimensions

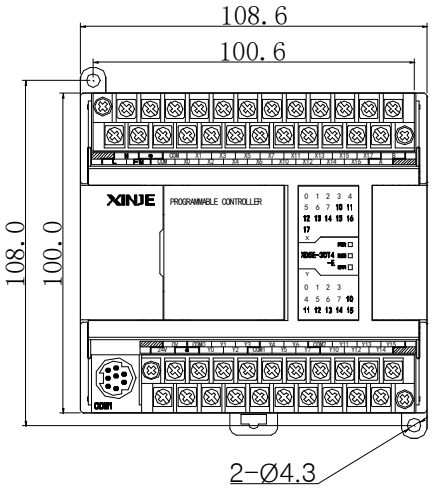
2-2-1. CCSD series dimensions

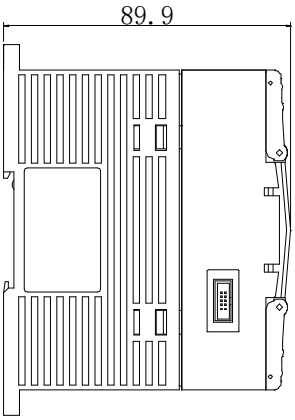




Suitable Model:

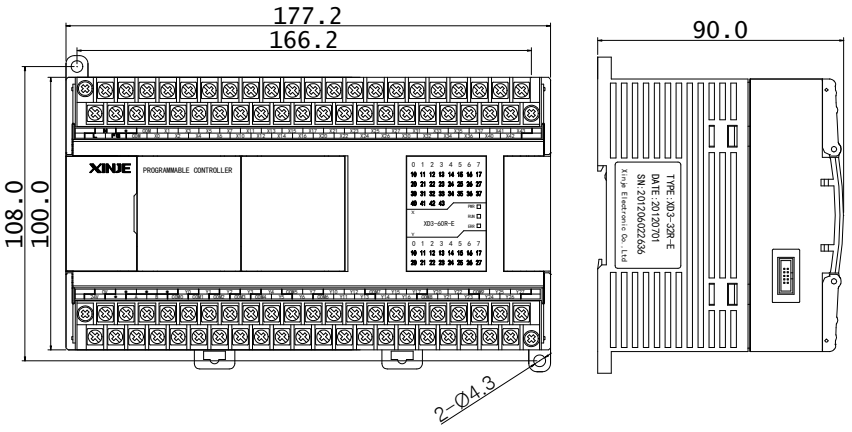
Series	Points
CCSD-C	32





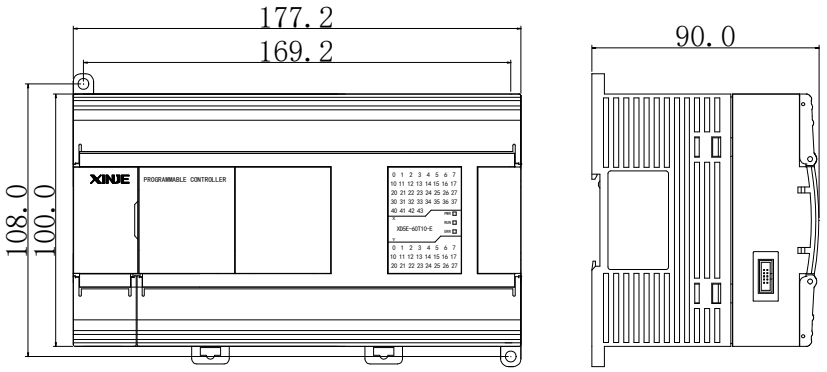
Suitable Model:

Series	Points
CCSD-E	24/30
CCSD-H	30



Suitable Model:

Series	Points
CCSD-C	60



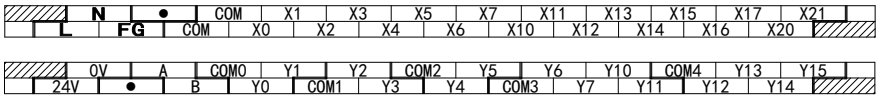
Suitable model:

Series	Points
CCSD-E	60
CCSD-H	60

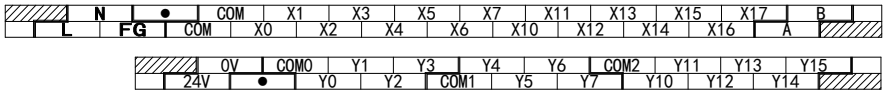
2-3. Terminal arrangement

2-3-1. CCSD series terminal arrangement

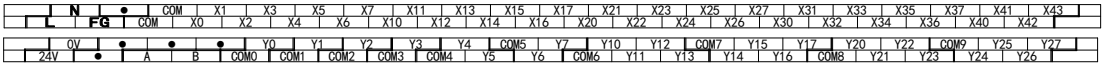
- Diagram1



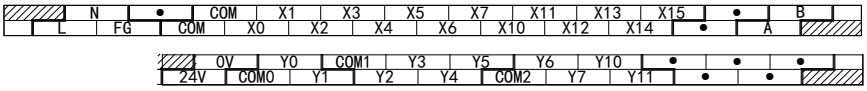
- Diagram 2



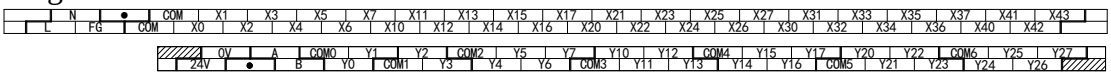
- Diagram 3



- Diagram 4



- Diagram 5



The graph for the model:

Diagram	Suitable model	Note
Diagram1	CCSD-C32T	18 input/14 output
Diagram2	CCSD-E30T, CCSD-E30T4, CCSD-H30A16, CCSD-H30A16L	16 input/14 output
Diagram3	CCSD-C60	36 input/24 output
Diagram4	CCSD-E24R	14 input/10 output
Diagram5	CCSD-E60T, CCSD-E60T4	36 input/24 output

Note:

※ 1: The above terminal arrangement diagram is -E type PLC (power input terminals are L, N). L and N of -C type PLC are power input terminals 24V+ and 24 - respectively.

※ 2: 24V and 0V on the output terminal block are external output terminals, which can supply power to the module or sensor, but must not exceed its maximum output current. See Section 4-1 for details.

※ 3: FG is a grounding terminal, which is used to shield interference and can be grounded separately as required.

※ 4: Common terminal COM of input terminal corresponds to all input points; COM on the output terminal block corresponds to different Y output points. When using, please wire according to the actual division on the PLC output label.

※ 5: Terminals A and B on the terminal block are RS485 communication interfaces, A is RS485+, B is RS485 -.

※ 6: The above terminal arrangement diagram is applicable to both NPN type and PNP type.

2-4. Communication Ports

CCSD series generally has USB port (not available for individual models), COM1 (RS232), COM2 (RS485, CCSD-C RS485/RS232), and Ethernet port (supported by CCSD-E/CCSD-H).

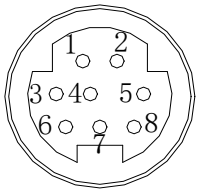
The main functions of each communication port are as follows:

- The USB port can be used to download programs and data at high speed;
- The COM1 and COM2 ports are mainly used for communication and can also be used to download programs;

- The Ethernet port can be used to download programs, monitor, and communicate with other devices in the LAN. The LAN2 port of CCSD-H is used for EtherCAT bus control, which can control up to 32 axes at the same time.

1	**RS232 port**

RS232 port can upload, download program and communication. COM1 support X-NET and Modbus mode. The pin diagram of COM1, COM2 (only for CCSD-C series) are shown as below:

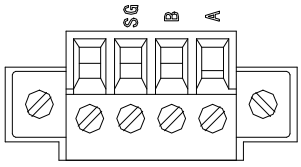


4: RxD
5: TxD
8: GND

Mini Din 8-core plug-in (holes)

2	**RS485 port**

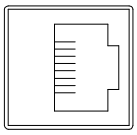
The COM2 of CCSD series PLC are the terminal A and B. A is RS485+, B is RS485-.



3	**Ethernet port**

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

In addition, the LAN2 port of CCSD-H can be used for EtherCAT bus control, which can control up to 32 axes at the same time, and the control cycle is less than 1ms.



4 Program Cable

download program via RS232 port must use XINJE DVP cable.

Program cables are as below:

Mini Din 8-pin (pins) DB9-pin (holes)

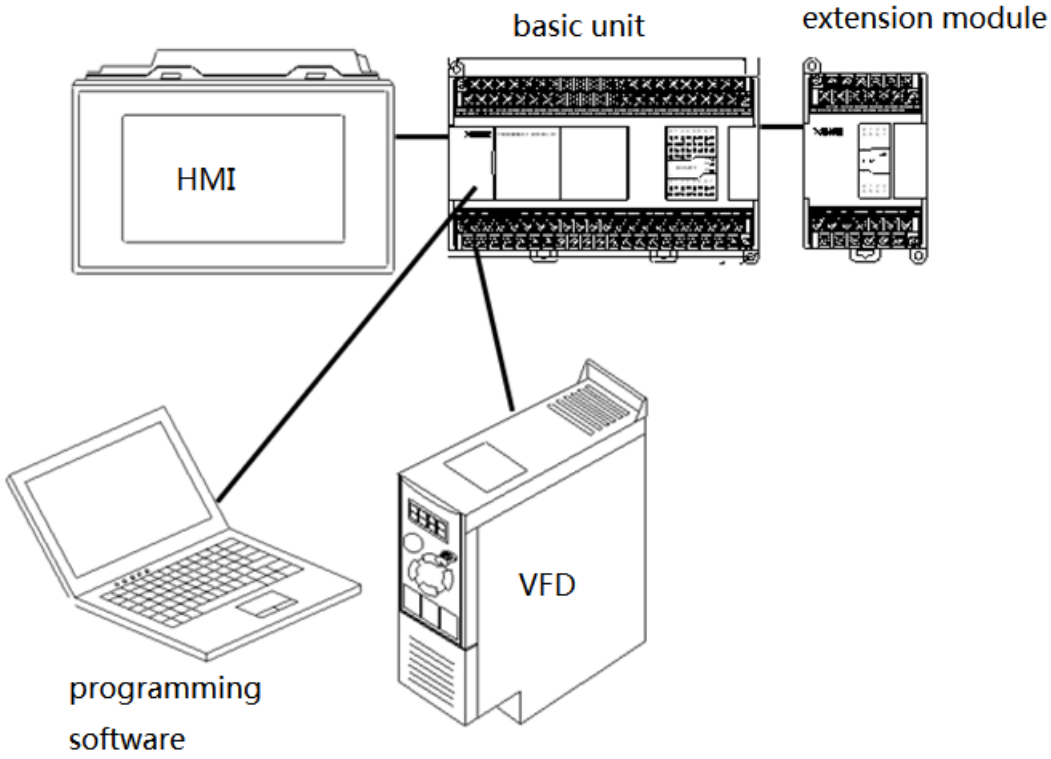
Note: above diagram is for DVP cable. If it is XVP cable, please connect pin1 of Mini Din8 and pin7 of DB9 based on above diagram.

3 System Structure

As the controllers, CCSD 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.

3-1. System Structure

According to CCSD 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.



Note: 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

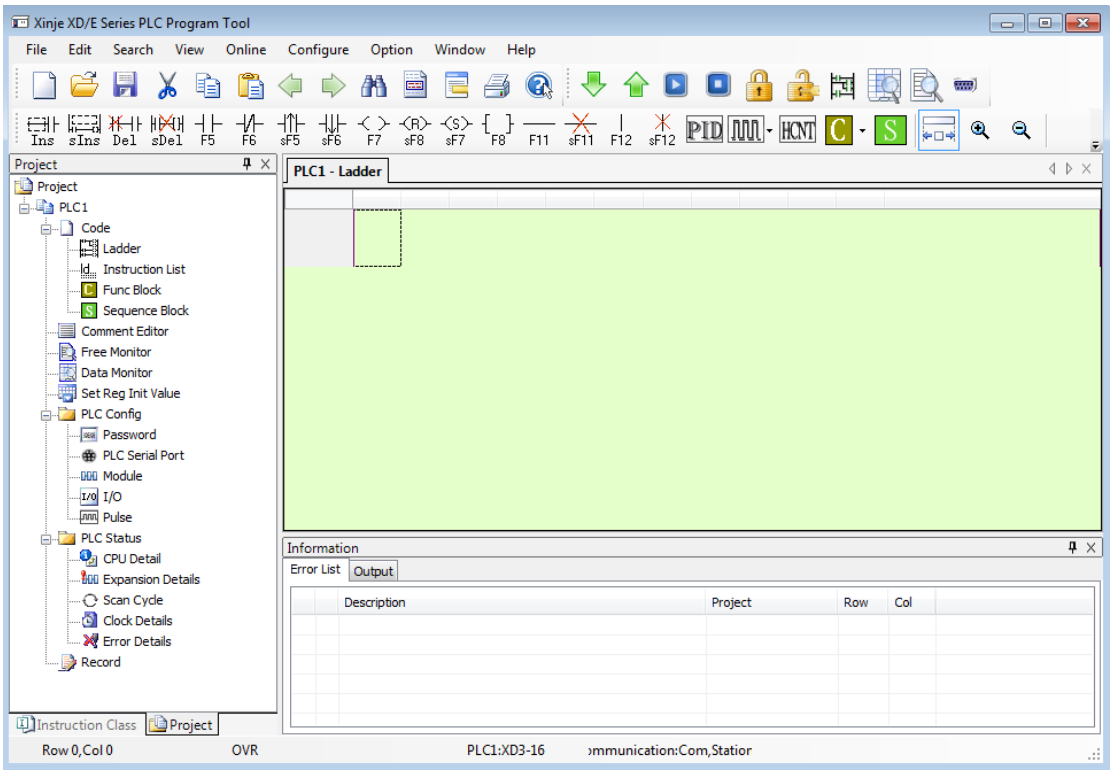
CCSD series PLC basic units can work with many kinds of peripheral devices.

3-2-1. Program Software

In the programming software, it can write or upload programs to PLC, monitor the operation of PLC in real time, configure PLC and other functions. After the programming software "Xinje PLC programming tool software" is installed on the

personal PC, the connection between PLC and programming software can be realized by using USB download cable or programming cable through the USB port, COM0, COM1 port or RJ45 port of the basic unit.
Please use the special download cable for PLC provided by Xinje Company, or you can make your own cable. Please refer to Section 2-4 for the connection method.

- Program Interface



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.
CCSD 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	**TG, TH series**

- Size 4.3”, 7”, 8”, 10.1”, 10.4”, 15.6’’
- Display 16 million color,65536 color
- Operation touch screen
- Interface RS232, RS422, RS485, USB, Internet port
- Communication Work with many PLC brands, inverters, instruments etc.
  Drive panel printer directly, support multiple printer.
  Dual COM ports make it possible that work with 2 different devices at the same time.
  Support free format protocol, users can write the driver program freely
- Recipe input different group of data in the table
- Picture Rich stereoscopic 3D gallery, font effects, data collect, data backup etc.
- Password nine-level setting
- Advanced function animation design and so on

2	**OP Series**

- Size 3.7’’
- Display Blue LCD, 256 true color
- Buttons Nr. 7, 20 not touch screen
- Interface RS232, RS422, RS485
- Communication work with many PLC brands.
  Communicate with Xinje Inverters
- RTC Built-in

3-2-3 Downloader

Downloader JD-P03 is suitable for data and program copy without PC.

(1) Suitable PLC

CCSD series PLC (CCSD-H cannot support) or ZG/ZP series integrated controller.

(2) Version

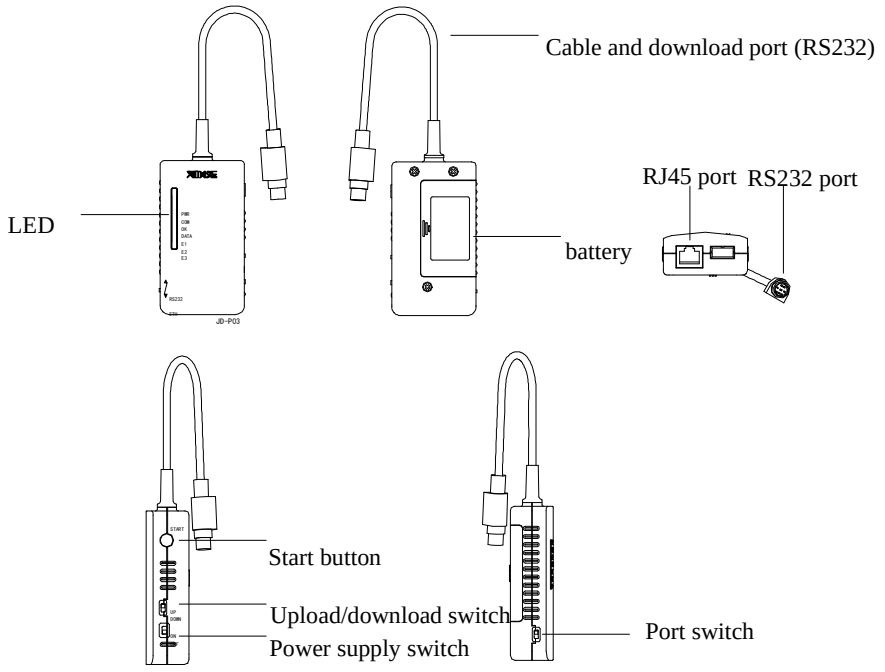
Model	Upload (PLC→downloader)	Download (downloader→PLC)

PLC without Ethernet port	PLC firmware V3.4.6 and up	PLC firmware V3.4 and up
PLC with Ethernet port	PLC firmware V3.5.3 and up	PLC firmware V3.5 and up

(3) Basic specification

Item	Specification
Dimension	94.8mm×52.0mm×26.5mm
Using environment	No corrosive gas
Environment temperature	0℃~60℃
Environment humidity	5~95%

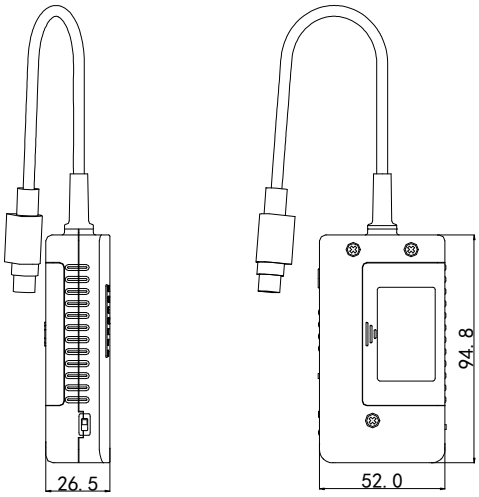
(4) Structure



Name		Function
LED	POWER	After the Downloader is powered on, the PWR is always on
	COM	When RS232 port has data receiving and sending, the COM flashes
	OK	After the downloader completes the power on stop action to PLC, the OK light is always on, waiting for the user to press start button; then the downloader starts the upload / download action, and the OK light is off; when the upload / download is completed, the OK light will slowly flash

	DATA	DATA light flashes in upload mode, DATA light is always ON in download mode
	E1	Error light 1
	E2	Error ilght 2
	E3	Error light 3
Start button	START	Press this button to perform the upload or download operation; after the download is completed, this button can be used to run / stop the PLC, press this button to run PLC once, press again to stop PLC (state alternation). During the process, the connection cannot be disconnected, otherwise the operation will be invalid
Upload/ download switch	UP	Program upload mode, PLC program upload to the downloader
	DOWN	Program download mode, download program to PLC
Power supply switch	ON	The downloader is powered by self generated battery (PLC is not necessary to connect power supply)
	OFF	The downloader is supplied by RS232 port (PLC must be connected to power supply)
Port switch	RS232	Download / upload the program through RS232 port
	ETH	Download / upload the program through Ethernet port
Battery		It can put two No.5 batteries to supply power to the downloader; it can supply power to the PLC through 232 port, so that the PLC can also use the downloader to download the program when the power is not connected
RS232 port		① It is used for program upload / download; ② power supply for downloader (PLC needs to be powered on) or PLC (battery power supply for downloader) through 232 port
Ethernet port		It is suitable for PLC download and upload with Ethernet port, but the firmware version cannot be updated
Cable and download port (RS232)		RS232 serial port, used to connect downloader and PLC

(5) Dimension unit: mm



(6) Preparation before uploading / downloading

- Communication port selection

Determine the communication interface to be used (RS232 / Ethernet port), and turn the "communication switch" to the corresponding interface.

- Mode selection

Determine the program upload and download mode, and turn the "upload / download switch" to the corresponding mode.

- Hardware connection

If RS232 port is used, only RS232 port needs to be connected with RS232 port of PLC; if Ethernet port is used, Ethernet port and RS232 port need to be connected with Ethernet port and RS232 port of PLC at the same time.

- Power on

After connection, power on the PLC and downloader; after power on, the OK light of the Downloader is always on, and the COM light flashes for 2s and then goes out. At this time, it enters the pre-download / upload state.

Note:

*1: There are two power supply modes for the downloader: one is to install two batteries (No. 5 batteries are installed); the other is to supply power from PLC through download cable.

* 2: Connect the downloader to the PLC correctly and then power on to enter the pre-download / upload state; the modification mode is invalid after power on.

(7) Upload

- RS232 mode

When the downloader is in the upload mode, it is connected with the source PLC through the download cable and RS232 port, and then it is powered on. The downloader enters the pre-upload state, and press the start button to start uploading the program of the source PLC to the downloader. At this time, the data light and com light flash rapidly; after the upload is completed, the com light is off, the data and OK lights flash slowly at the frequency of 1Hz.

- Ethernet mode

When the downloader is in the upload mode, after connecting with the source PLC through the Ethernet port, download cable and RS232 port, the downloader enters the pre-upload state. Press the start button to start uploading the program of the source PLC to the downloader. At this time, the data light and act light (the yellow light above the Ethernet port) flash rapidly; after the upload is completed, the data light and OK light slowly flash at the frequency of 1Hz.

Note: The parameters of COM1 will be modified in the process of uploading, and the original parameters will be restored after power on again after uploading. Do not disconnect the power supply or disconnect the connection during the upload process, otherwise the parameters of COM1 will not be restored.

(8) Download

After uploading the program, turn the "upload / download switch" to down and power on again.

After the downloader enters the pre-download state, you can choose whether to download PLC data (HM, HD, FD and other power-off holding registers, serial port parameters, pulse configuration, etc.), and the specific operation is shown in the following table:

Port	Need download data	Operation method	Indicator status
RS232	No	Press STRAT button once	The com light flashes quickly to start the download; after the download is completed, the com light is off, the OK light is flashing slowly at 1Hz, and the data light is always on
	Yes	Keep press START until DATA is always ON	
Ethernet	No	Press STRAT button once	After the com light flashes twice, it goes out, and the act light (the yellow light above the Ethernet port) flashes quickly, that is, the download starts; after the download is completed, the OK light flashes slowly at 1Hz, and the data is always on
	Yes	Keep press START until DATA is always ON	

In the download process, after the com light is off, sometimes the data light is not on (the probability of this situation is very small), which is also a normal situation. After the com lamp is off, the com lamp will flicker intermittently in the download process, which is also normal.

Note:

*1: The status of the data light is not used as the sign of whether the download is completed or not. The OK light 1Hz slow flashing is taken as the completion mark of the download.

* 2: If you choose not to download data, if it is an Ethernet PLC, you must ensure that the firmware version of the uploaded PLC is the same as that of the downloaded PLC, otherwise the data may be lost.

(9) Password protection function

If the source PLC contains a password, the downloader will compare and verify the password read in the internal with that of the PLC. If the verification is successful, the upload action can be carried out. The operation method for the downloader to read the password is as follows:

- Find a PLC that supports the downloader (the model does not need to be consistent with the source PLC), and write the password to HD0 ~ HD2 registers in ASCII code monitoring mode.
- Connect the PLC with the downloader through RS232 port. Select the downloader mode as "up". Press and hold start to power on, and the OK light and data light flash alternately, which indicates that the password is read successfully.
- Then according to the normal upload mode, the program and data in the source PLC can be uploaded to the downloader.

Note:

*1: If the uploaded program contains a password, the program downloaded by the downloader also contains the same password; if the downloader reads the new password again, the program downloaded by the downloader will change to the new password.

* 2: If the uploaded program does not contain a password, the program downloaded by the downloader does not contain a password, and the function of reading the password is invalid.

(10) PLC firmware update

When downloading, E1 and E3 lights flash alternately, indicating that the target PLC version is not supported. At this time, the PLC firmware version can be updated by forced download.

Operation method: press and hold the start button to power on, the ERR indicator light of PLC will flash rapidly, that is to say, the firmware will be updated. After the update, the data light will flash. Please do not power on again at this time. Press start or long press start to download normally.

Note:

The forced download function must be used when E1 and E3 indicator lights flash alternately and error is reported; if forced download is used, the parameters of COM1 port will be restored to the factory value, and the data of Ethernet PLC may be lost. It is recommended to download the data while downloading the program.

(11) Battery

When the battery is used as the power supply for PLC, due to the different power consumption of PLC of different models, the working time of battery is also different (the power consumption of Ethernet model is larger, and the more the number of points, the greater the power consumption). The following table lists the duration of continuous operation of some models powered by battery. The data is for reference only.

PLC model	Normal battery	Panasonic rechargeable battery (2450mAh)
CCSD-E30T4-E	about 30min	2h 40min
CCSD-E60T-E	about 30min	2h 20min

(12) Error indicator description

Error dicator status	Description	Measures
E1 flash	PLC locked	Check that the password read is correct
E3 flash	The value in SD200~SD230 are changed	Check whether the SD register has been modified
E1 and E2 flash at the same time	The source PLC version is older and does not support uploading	Update the source PLC firmware to the latest version
E1 and E3 flash at the same time	Failed to read password or PLC firmware error, upload failed	Check whether the source PLC can be used normally
E1 and E2 flash alternately	Upload incomplete	Please upload the program again
E1 and E3 flash alternately	The target PLC version is older and does not support downloading	Update firmware version by force download
E2 and E3 flash alternately	The upload program is inconsistent with the download model	The upload program must be consistent with the download model
E1, E2 and E3 light up at 500ms frequency in turn	PLC firmware error during download, unable to connect	Check whether the PLC can use the target normally
E1, E2 and E3 extinguished at 500ms frequency in turn	Wrong selection of communication port	Check whether the communication port selection switch is consistent with the communication port

3-3. Configuration Principle

COM port

- CCSD series PLC (CPU units) are usually equipped with COM1, COM2 and USB port.
- 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.
- COM1 is equipped with RS232. COM2 is RS485. The two ports are independent.
- The USB port is generally used for programming download and online monitoring, and the download speed is faster than COM1 and COM2.

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.
- CCSD-C/CCSD-E/CCSD-H can connect 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

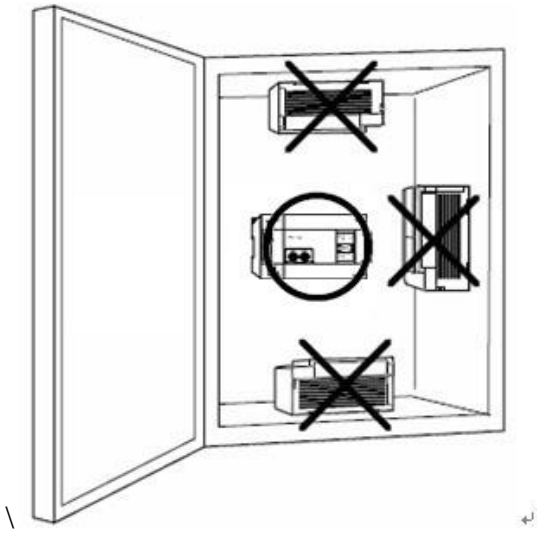
Basic Unit CCSD3-32R-E (18I/14O) connect with 5 CCSD-E8X8Y expansions, then the total I/O points should be:
Input Points: 18 + 8 *5 = 58
Output points: 14 + 8 *5= 54
Total points: Input+ Output = 58+54=112

3-4. ID Assignment of Expansions

Sign	Name	Range		points
X	Input points	CCSD	X10000～X10077（#1 extension module） …… X11100～X11177（#10 extension module） …… X11700～X11777（#16 extension module）	1024
		CCSD	X20000～X20077（#1 extension BD） X20100～X20177（#2 extension BD）	128
		CCSD	X30000～X30077（#1 extension ED）	64
Y	Output points	CCSD	Y10000～Y10077（#1 extension module） …… Y11100～Y11177（#10 extension module） …… Y11700～Y11777（#16 extension module）	1024
		CCSD	Y20000～Y20077（#1 extension BD） Y20100～Y20177（#2 extension BD）	128
		CCSD	Y30000～Y30077（#1 extension ED）	64
ID	extension module	CCSD	ID10000～ID10099（#1 extension module） …… ID10900～ID10999（#10 extension module） …… ID11500～ID11599（#16 extension module）	1600
	extension BD	CCSD	ID20000～ID20099（#1 extension BD） ID20100～ID20199（#2 extension BD）	200
	extension ED	CCSD	ID30000～ID30099（#1 extension ED）	100
QD	extension module	CCSD	QD10000～QD10099（#1 extension module） …… QD10900～QD10999（#10 extension module） …… QD11500～QD11599（#16 extension module）	1600
	extension BD	CCSD	QD20000～QD20099（#1 extension BD） QD20100～QD20199（#2 extension BD）	200
	extension ED	CCSD	QD30000～QD30099（#1 extension ED）	100

3-5. Install The Products

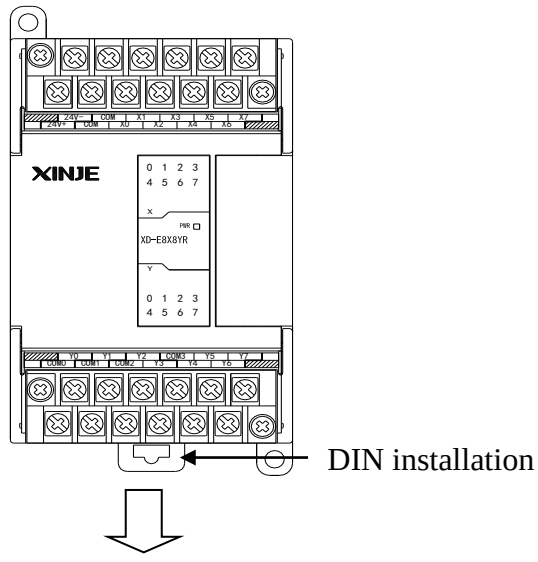
1 Installation Position



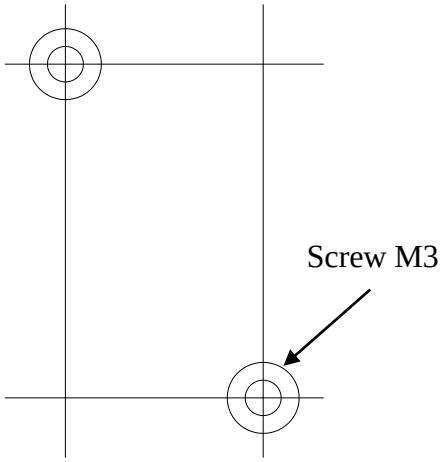
2 Installation Method

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

- DIN46277



- Directly install by screws



Basic units or expansion modules install on DIN46277 rail (width 35mm). Pull down the hook on DIN rail and take down the product.
XL series PLC only supports rail installation.

3 Installation Environment

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

4 Power Supply Specification and Wiring Method

In this chapter, we tell the structure, specification and external wiring of CCSD 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 Specifications

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

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≤0.5 AC cycle, interval≥ 1second
Impulse Current	Max 40A below 5ms/AC100V max 60A below 5ms/AC200V
Maximum Power Consumption	15W (16 points and below)/30W (24 points and above)
Power Supply for Sensor	24VDC±10% 16 points max is 200mA, 32 points max is 400mA

※1: Please use the wire cable more than $2mm^2$ 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	15W (16 points and below)/30W (24 points and above)
Power Supply for Sensor	24VDC±10% 16 points max is 200 mA, 32 points max is 400mA

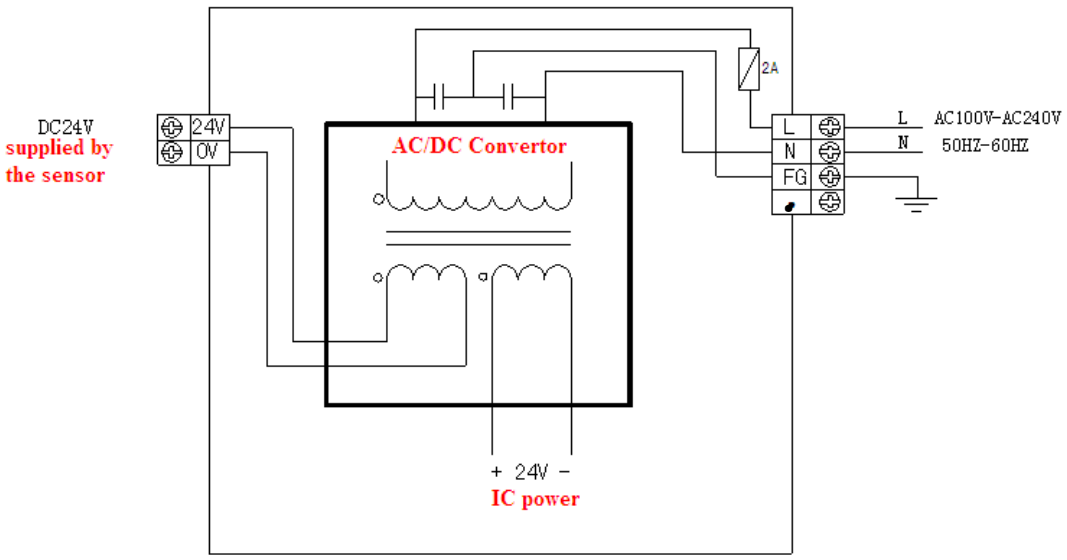
※1: CCSD series PLC provides DC24V power supply (terminal 24V, 0V), it can be power supply for sensor, 10~16 points PLC DC24V is 200mA, 24/32/48/60 points PLC DC24V is 400mA. This terminal cannot connect to external power supply.

※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: The 24 V and 0 V terminals can be used as the power supply for the sensor. The 10 / 16 points is 200 mA / DC24 V, and 24 points and above is 400 mA / DC 24V. In addition, this terminal cannot be powered by an external power supply.

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

※4: Please connect the [COM] 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 CCSD 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

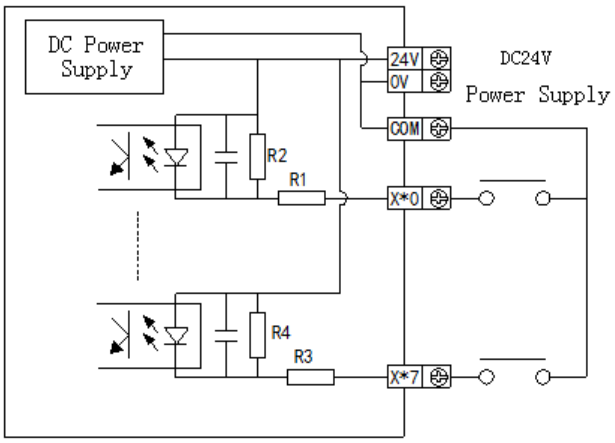
5-1-1. CCSD series input specification

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

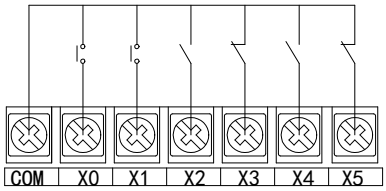
1	Basic Units

- NPN mode

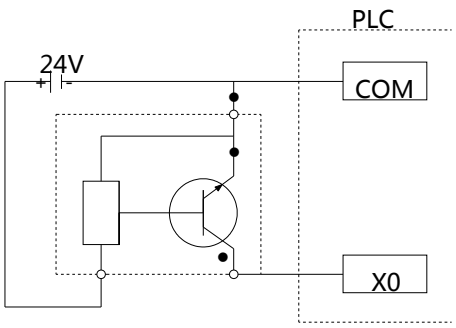
Input signal's voltage	DC24V±10%
Input signal's current	7mA/DC24V
Input ON current	Above 4.5mA
Input OFF current	Under 1.5mA
Input response time	About 10ms
Input signal's form	Contact input or NPN open collector transistor
Circuit insulation	Photo-electricity coupling insulation
Input action's display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



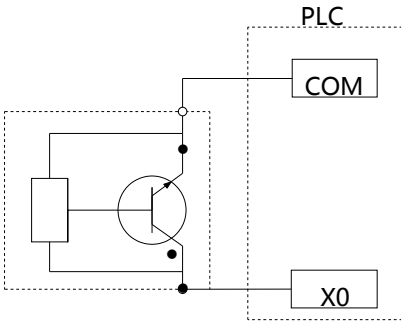
NPN wiring example



Switch button wiring diagram



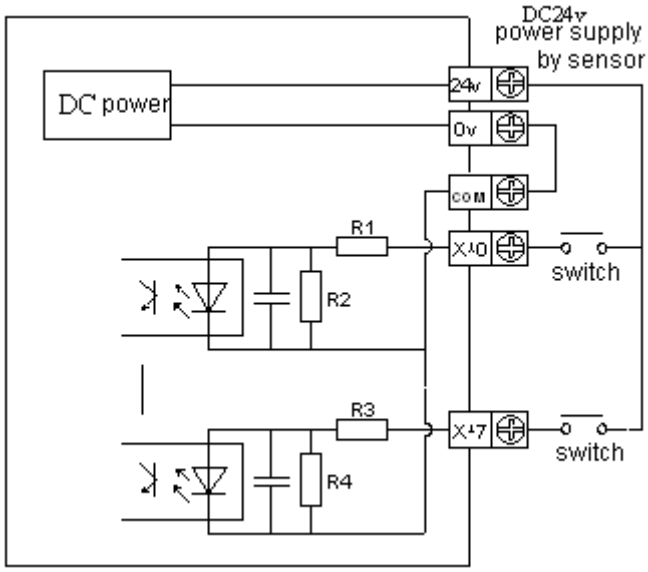
3-wire (NPN) proximity switch wiring diagram



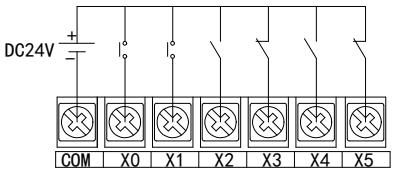
2-wire (NPN) proximity switch wiring diagram

- PNP mode

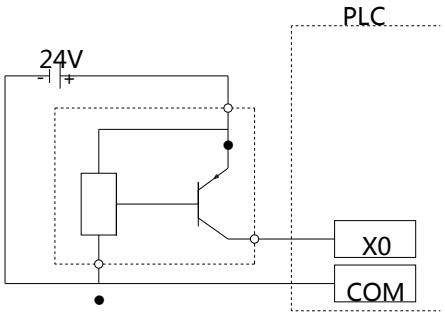
Input signal's voltage	DC24V±10%
Input signal's current	7mA/DC24V
Input ON current	Above 4.5mA
Input OFF current	Under 1.5mA
Input response time	About 10ms
Input signal's form	Contact input or PNP open collector transistor
Circuit insulation	Photo-electricity coupling insulation
Input action's display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



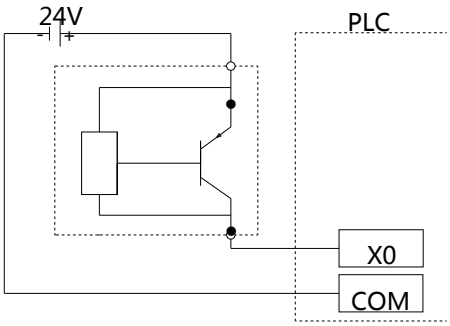
PNP wiring example:



Switch button wiring diagram



3-wire (PNP) proximity switch wiring diagram



2-wire (PNP) proximity switch wiring diagram

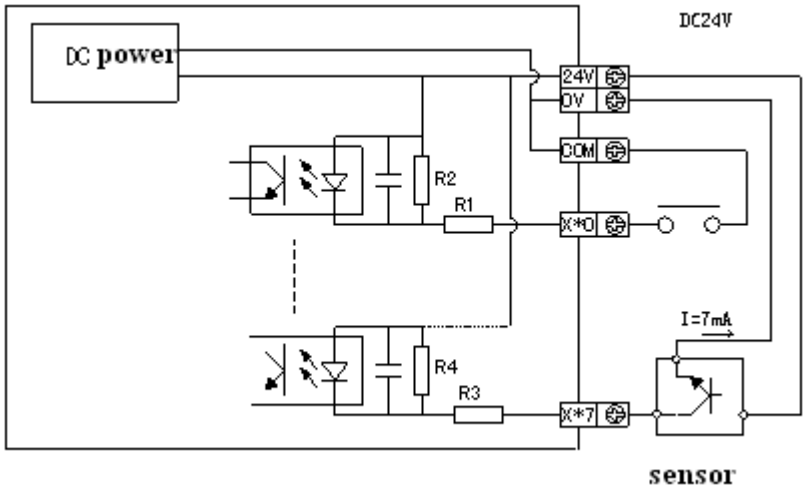
Note: the DC24V is provided by the PLC, no need to cnonect DC0V to com of input terminal. If using external power supply, it needs to connect it.

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

Below contents are only fit for CCSD series PLC.

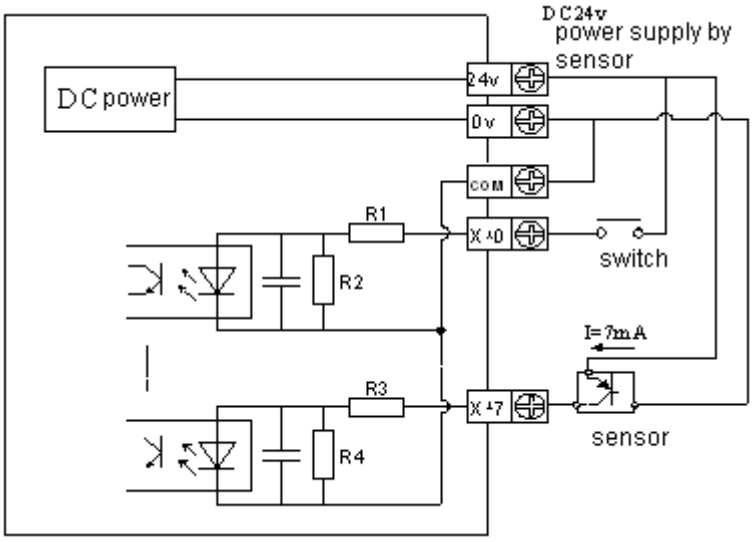
1	DC Input Signal

- NPN mode



- Input terminals
  When connect input terminals and terminal COM with contact without voltage 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 6ms 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.

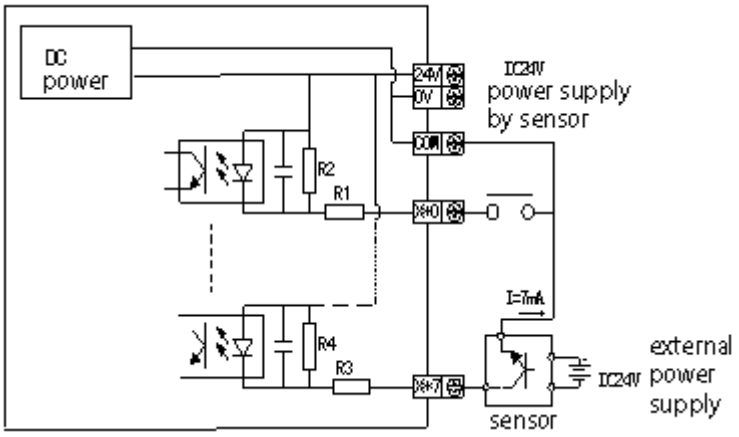
- PNP mode



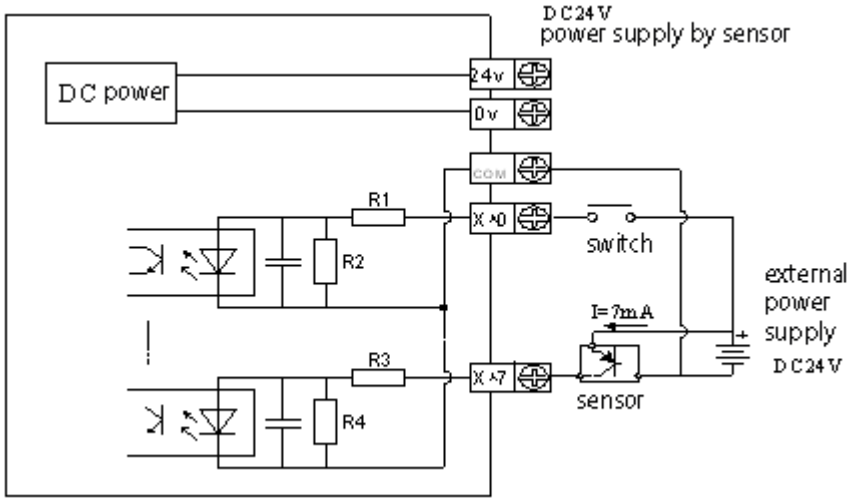
- Input terminals
  When connect input terminals and terminal COM with DC24V contact or NPN open collector transistor, if input is ON, LED lamp will light which indicates input is ON. There are many input terminals COM to connect in PLC.
- Input circuits
  Photo-electricity coupling is used to insulate 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 for sensors**

- NPN mode
  CCSD 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.

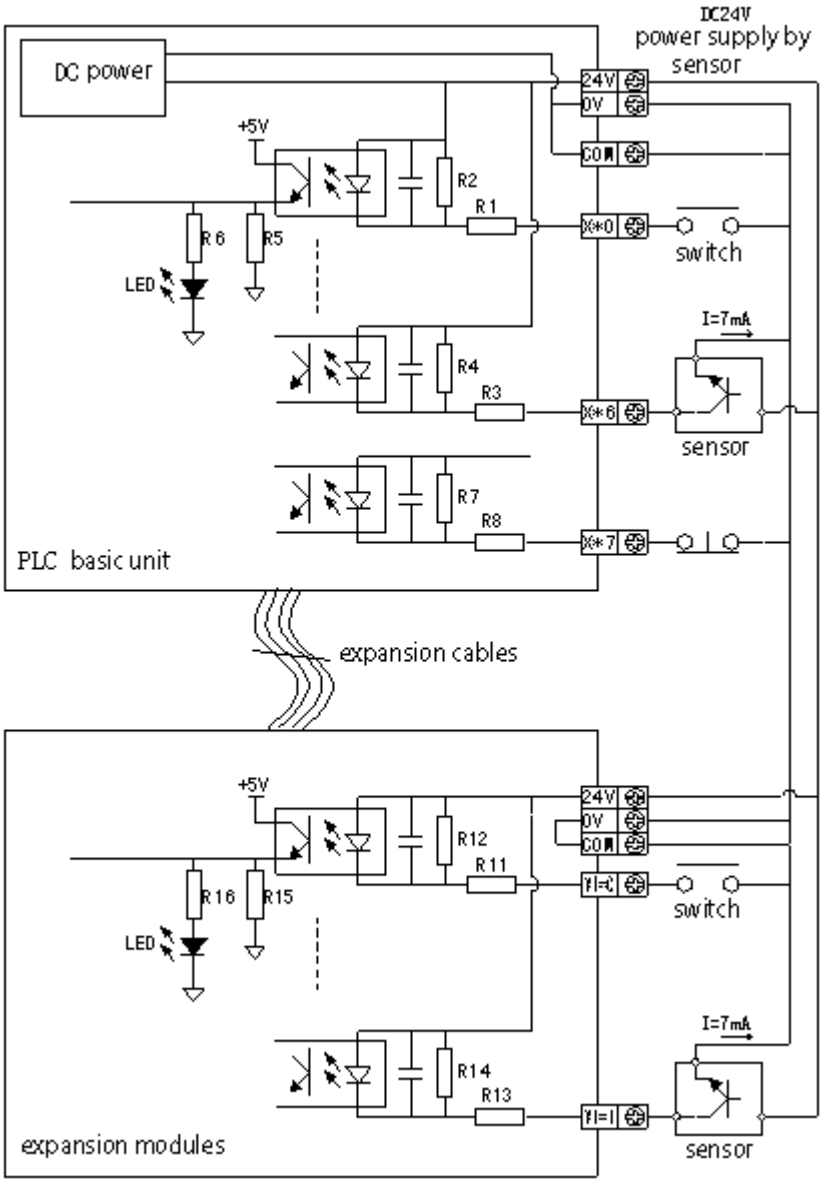


- PNP mode
  CCSD series PLC input current is supplied by its interior 24V power, so if use exterior power to drive sensor like photo electricity switch, the exterior power should be DC24V±4V, please use PNP open collector type for sensor's output transistor.

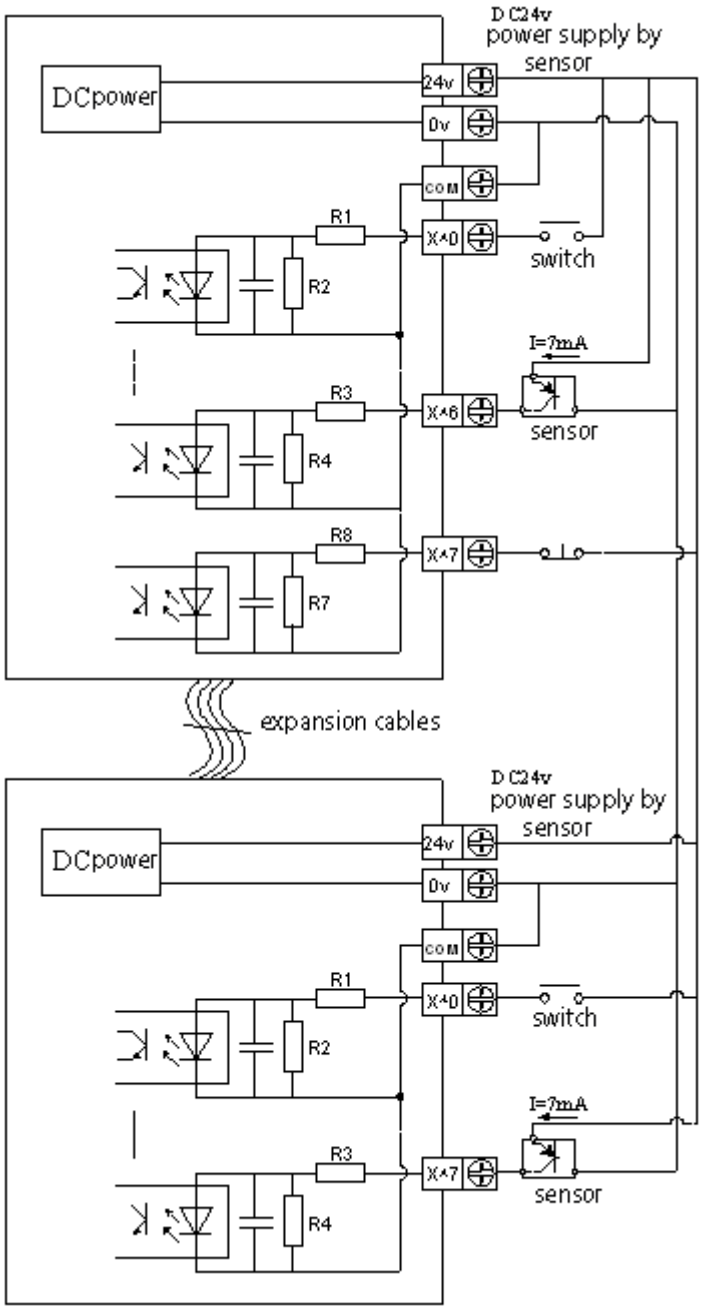


3 Input Wiring

- NPN mode



- PNP mode

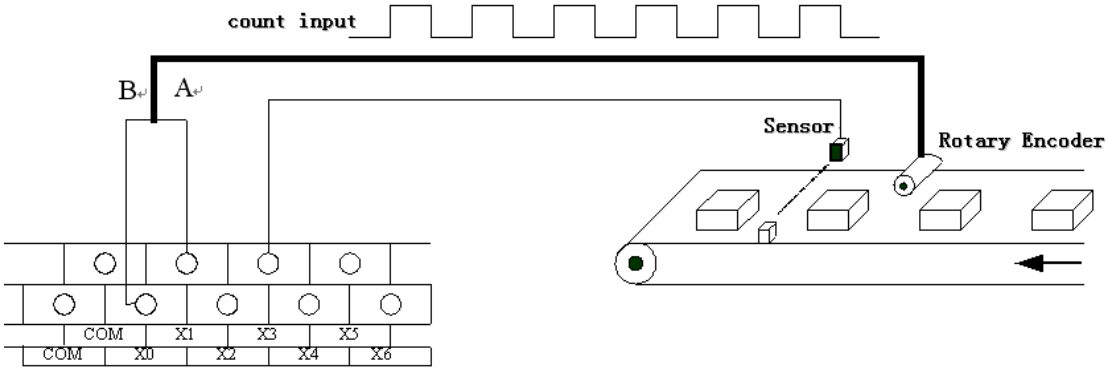

DC24v
power supply by
sensor
DCpower
24v
0v
com
R1
X^0
switch
R2
I=7mA
R3
X^6
sensor
R4
R8
X^7
R7
expansion cables
DC24v
power supply by
sensor
DCpower
24v
0v
com
R1
X^0
switch
R2
I=7mA
R3
X^7
sensor
R4

5-3. High Speed Counter Input

CCSD 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 (differential model can up to 1MHz).

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.



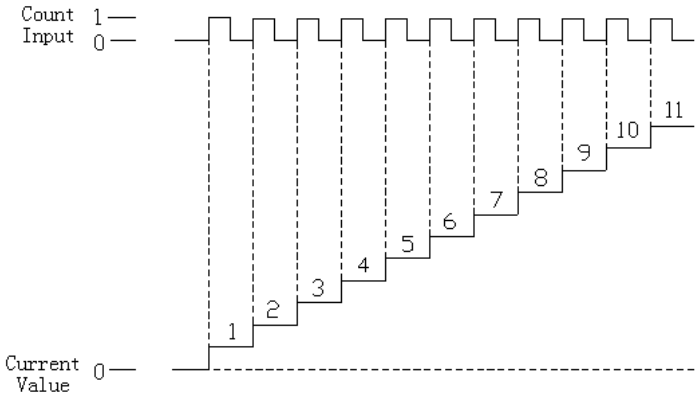
(2) When the input frequency is above 25Hz, please use high speed counter.

5-3-1. Counting mode

CCSD series HSC function has two counting modes: Increment mode and AB-phase mode.

1	Increment mode

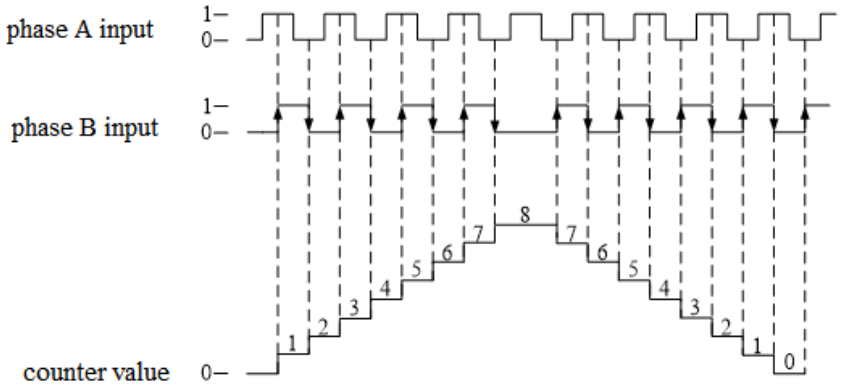
Under this mode, if counting input pulse signal, the counting value will increase one along with the rising edge of every pulse signal.



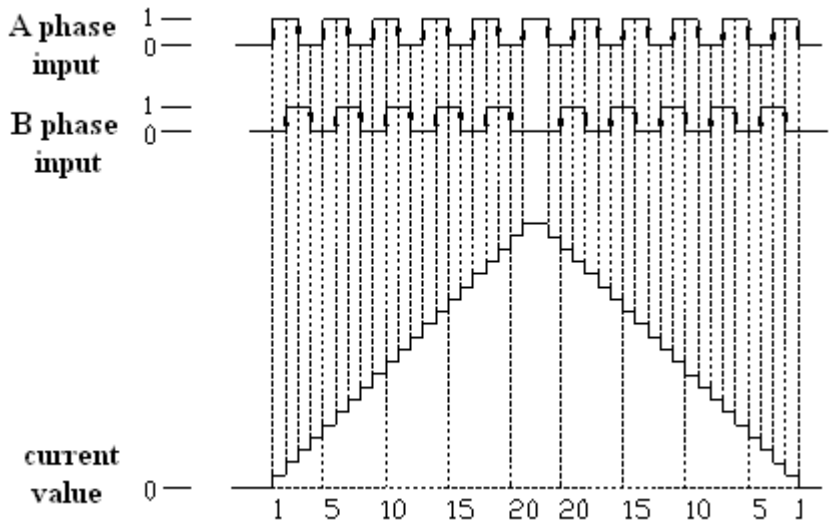
2	AB-phase

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



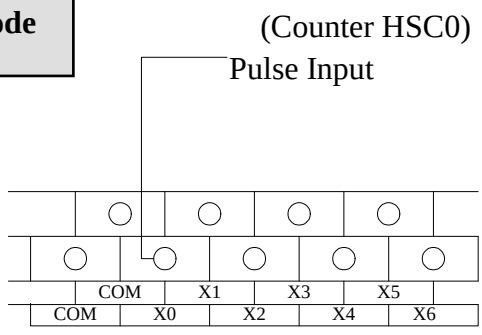
5-3-2. High Speed Counting Range

The HSC's counting range is: K-2,147,483,648 ~ 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.

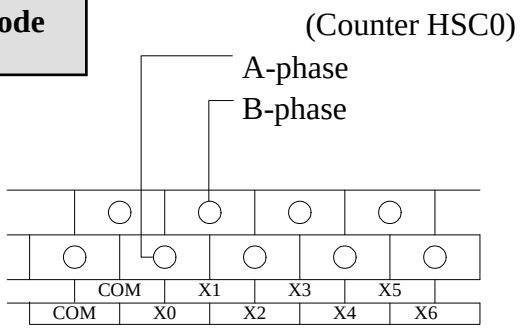
5-3-3. The Input Wiring Of HSC

For input terminal wiring of pulse counting, it differs according to PLC types and counting modes. Some typical wiring methods are as below (take CCSD3-32 PLC as an example):

1	**Increment Mode**



2	**AB-phase Mode**



5-3-4. Input Terminals Assignment

1. High Speed Counters assignment of CCSD series PLC:

PLC model		HSC channel number	
		Increment mode	AB-phase mode
CCSD-C	24/32/48/60	10	10
CCSD-E	24/30/60	4	4
	30T4	3	3
	60T4	4	4
CCSD-H	30A16/30A16L	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

Note: Z phase function is in developping.

Normally, the input frequency of terminal X0, X1can 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:

CCSD-E-24/30/60												
	Increment Mode							AB phase mode				
	HSC0	HSC2	HSC4	HSC6	HSC8	HSC10	HSC12	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		

CCSD-C32/60T												
	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		

CCSD-H30A16/30A16L												
	Increment Mode						AB phase mode					
	HSC0	HSC2	HSC4	HSC6	HSC8	HSC10	HSC0	HSC2	HSC4	HSC6	HSC8	HSC10
Highest frequency	200K	200K	200K	200K			100K	100K	100K	100K		
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		

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
		2	4 times
SFD322	Frequency Multiplication of HSC4	2	2 times
		2	4 times
SFD323	Frequency Multiplication of HSC6	2	2 times
		4	4 times
SFD324	Frequency Multiplication of	2	2 times

	HSC8	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 CCSD 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.

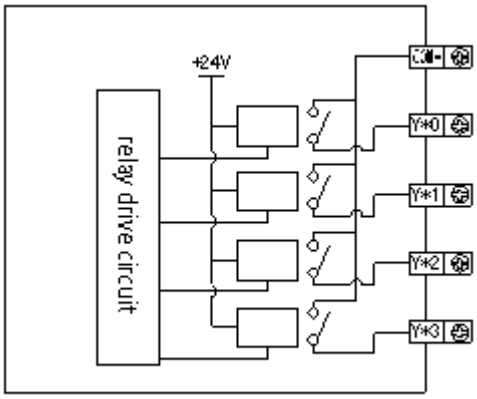
6 Output Specification and Wiring Methods

In this chapter we mainly introduce the output specification and external wiring methods of CCSD 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 Specification

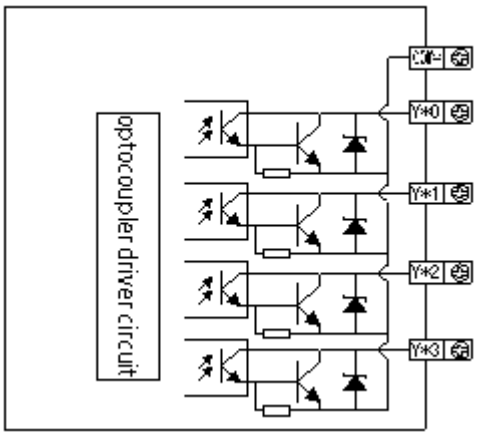
1 Relay Output

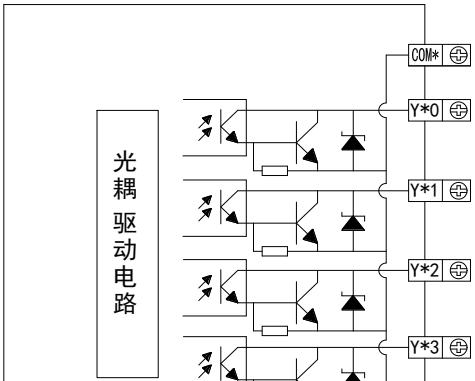
External power		Below AC250V, DC30V
Circuit insulation		Mechanical insulation
Action indicator		LED
Max load	Resistant load	3A
	Inductive load	80VA
	Lamp load	100W
Mini load		DC5V 2mA
Response time	OFF→ ON	10ms
	ON→ OFF	10ms



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	7.2W/DC24V
	Lamp load	1.5W/DC24V
Mini load		DC5V 2mA
Respon se time	OFF→ ON	Below 0.2ms
	ON→ OFF	Below 0.2ms





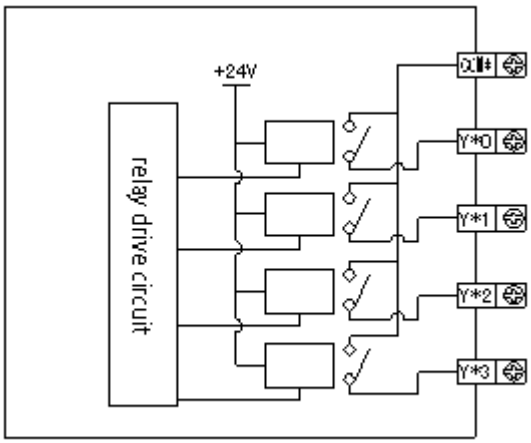
3 High Speed Pulse Output

Model	RT, T, Tn models						
High speed pulse output terminals	None	Y0, Y1	Y4, Y6	Y0~Y3	Y0~Y5	Y0~Y11	Y10, Y12, Y14, Y16
	-	Normal models	-	CCSD-E-30T4 CCSD-E-60T4 CCSD-H-30A16 CCSD-H-30A16L	CCSD5E-60T6	-	-
External power supply	Below DC5~30V						
Action indicator	LED indicator						
Max current	50mA						
Max output frequency	100KHz (The maximum output frequency of Y2 and Y3 of CCSD3-24T4/32T4 is 20KHz)						

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. PNP and NPN high-speed pulse output terminals are the same.

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 AC250Vcan drive the load made up of resistance is 3A per point, inductive load below 80VA (AC100V or AC200V) and lamp load below100W (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.

- **Inductive load**

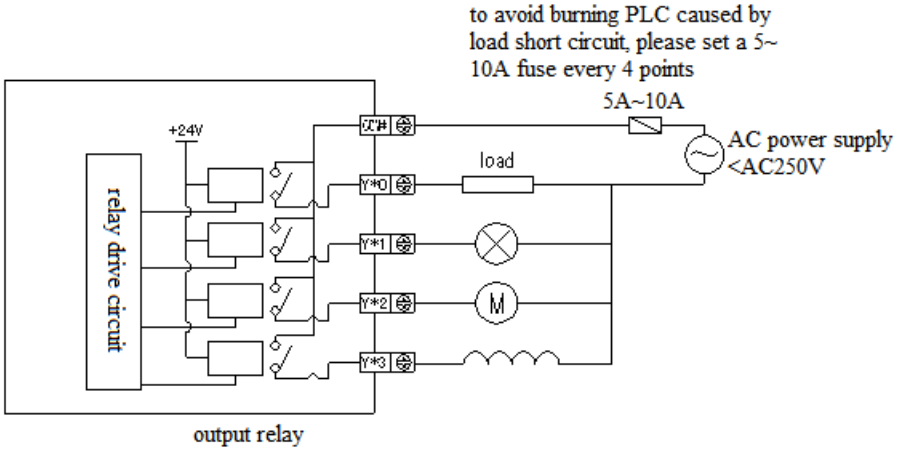
When the inductive load stops, there will be a large directional electromotive force between the load and the contact, and there will be arc discharge in this process.

- **Capacity load**

During the use of capacitive load, the instantaneous impact current is about 20~40 times of the conventional current. Please note that the impact current should conform to the current value in the resistance load specification.

[Note]: Capacity load may also exist when the load is composed of a circuit such as a frequency converter.

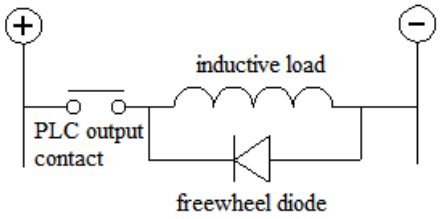
2 Output Connection Example



3 Constitution of output circuit

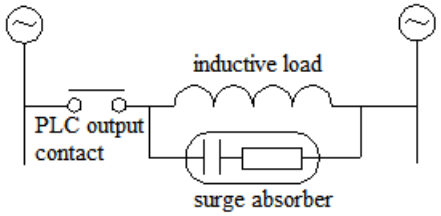
- For DC inductive load, please parallel connect with freewheel diode. Otherwise, contactor useful life will greatly decrease. Please select freewheel diode that can stand inverse voltage over 5~10 times of load voltage and forward current over load current.
- Parallel connection AC inductive load with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

4 DC Load



Note:
The freewheeling diode shall meet the following requirements:
1. Reverse voltage ≈ (5~10) * load voltage.
2. Forward current ＞ load current.

5 AC Load



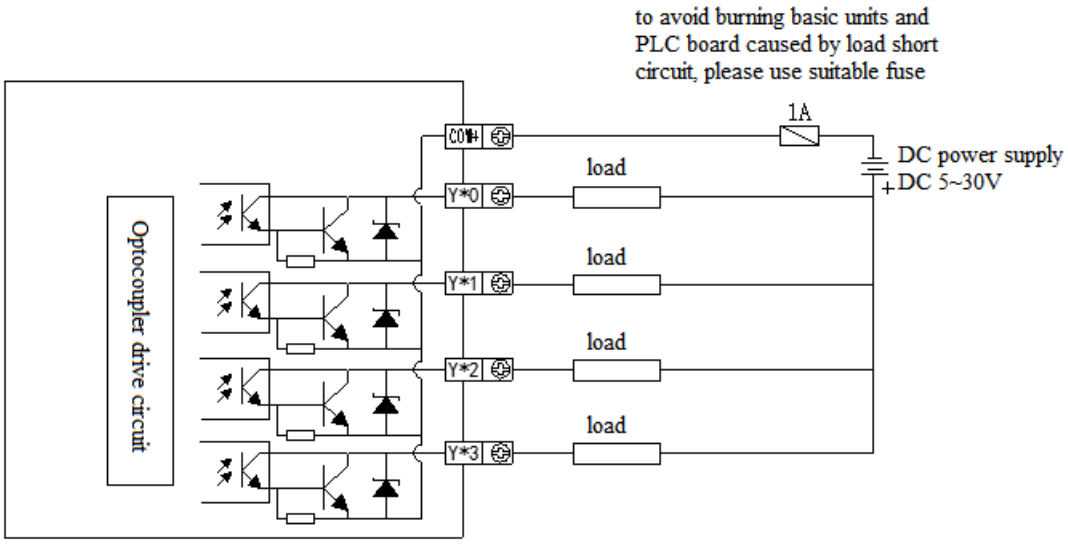
Note:
The surge absorber shall meet the following requirements:
1. The rated voltage matches the load.
2. Electrostatic capacity ≈ 0.1uf.
3. Resistance value ≈ 100~200Ω.

6-3. Transistor Output Type

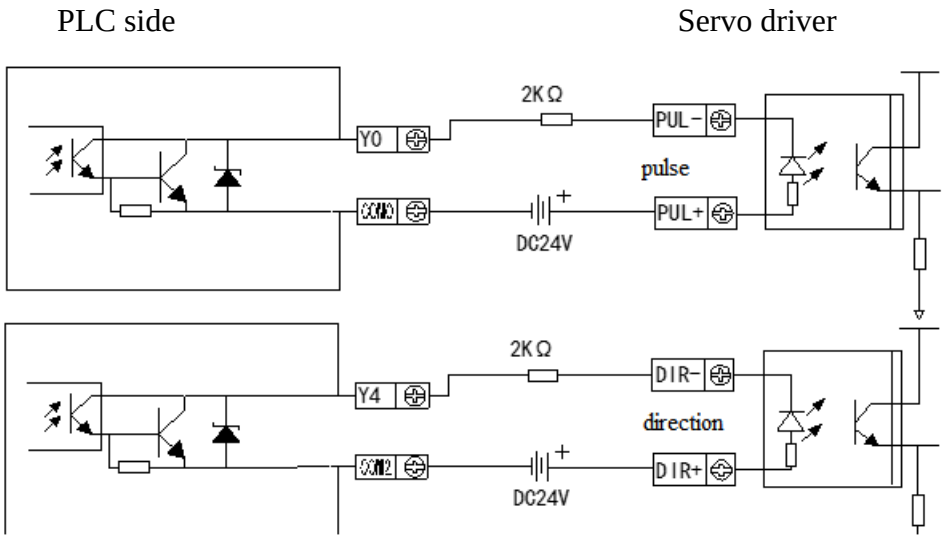
Transistor (NPN) output can support high speed pulse output and normal transistor two types.

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

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

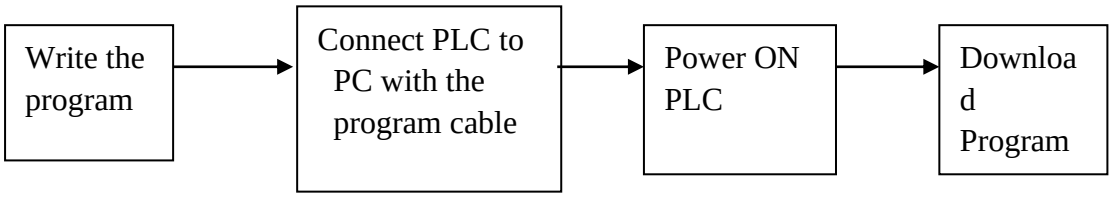
7-1. Run and Debug

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.

8 Switch between Soft Components

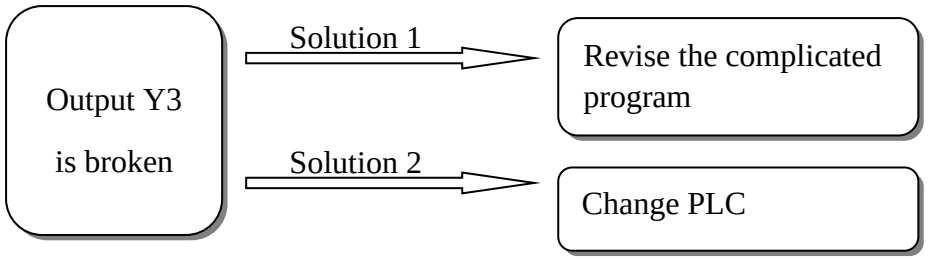
This chapter focuses on a special function of CCSD series PLC, switch between soft components. This special function simplifies the PLC daily maintenance greatly. To the maintenance person, they will not bother any more if the terminals are damaged.

8-1. Function Summary

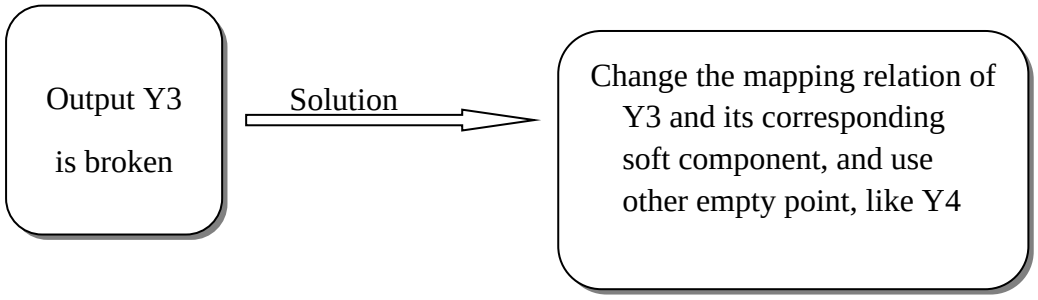
When the internal lighting coupling, relays or transistor are damaged, the corresponding input/output terminals will be out of use. Users either revise the program or ask the manufactures for help, which is very troublesome and affects the users' normal work schedule.

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 X**
SFD11	I01 correspond to X**	
SFD12	I02 correspond to X**	
……	……	
SFD87	I77 correspond to X**	Default is 77 (octal number)

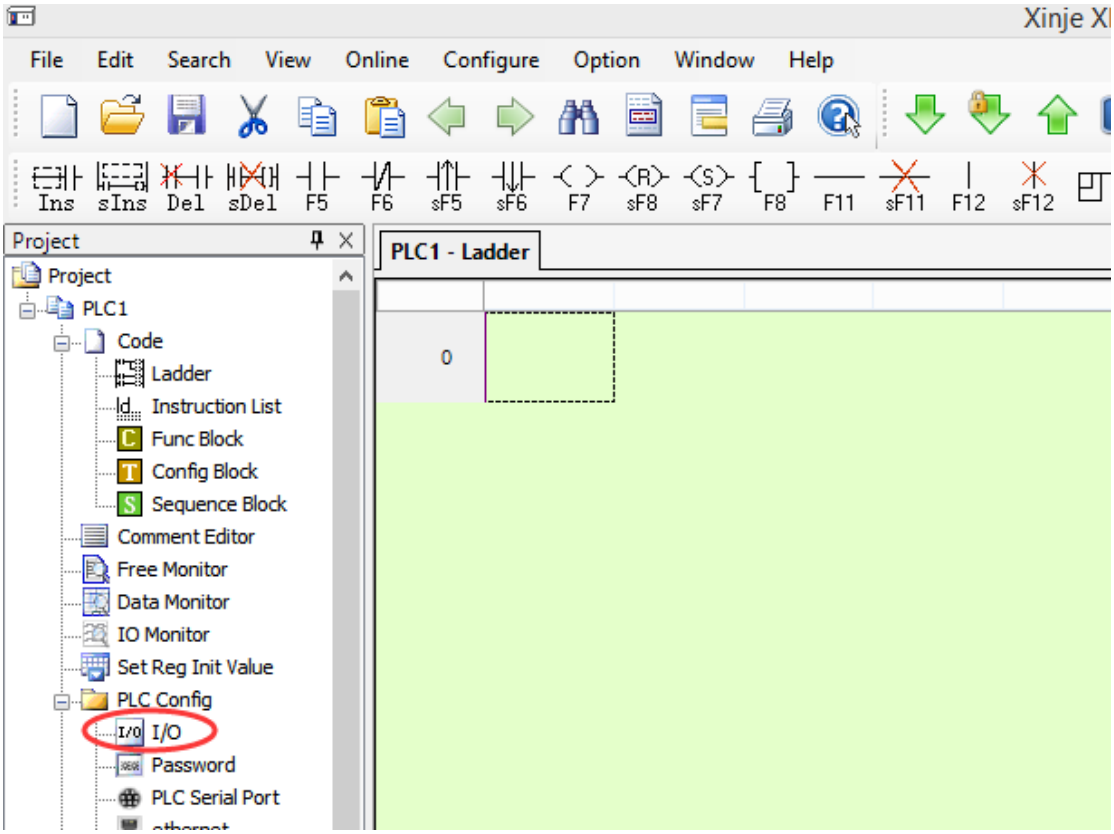
Table2 mapping relation of the output and soft component

ID	Function	Description
SFD110	O00 correspond to Y**	0 of output corresponds to the number of Y**
SFD111	O01 correspond to Y**	
SFD112	O02 correspond to Y**	
……	……	
SFD187	O77 correspond to Y**	Default is 77 (octal number)

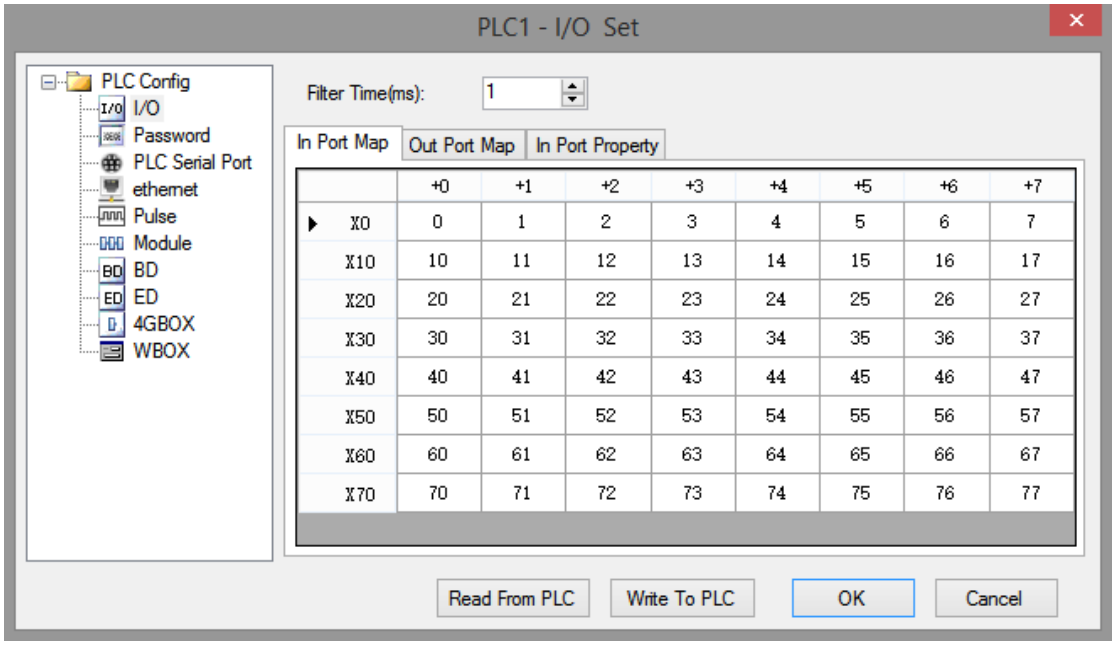
As show in the table above, the default value in SFD10 is 0. If we replace it with value '7',then all X0 in the program will correspond to external input X7. But meantime you should replace the value in SFD17 with 0, to realize exchange. Then original X0 will correspond to X7, and original X7 will correspond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

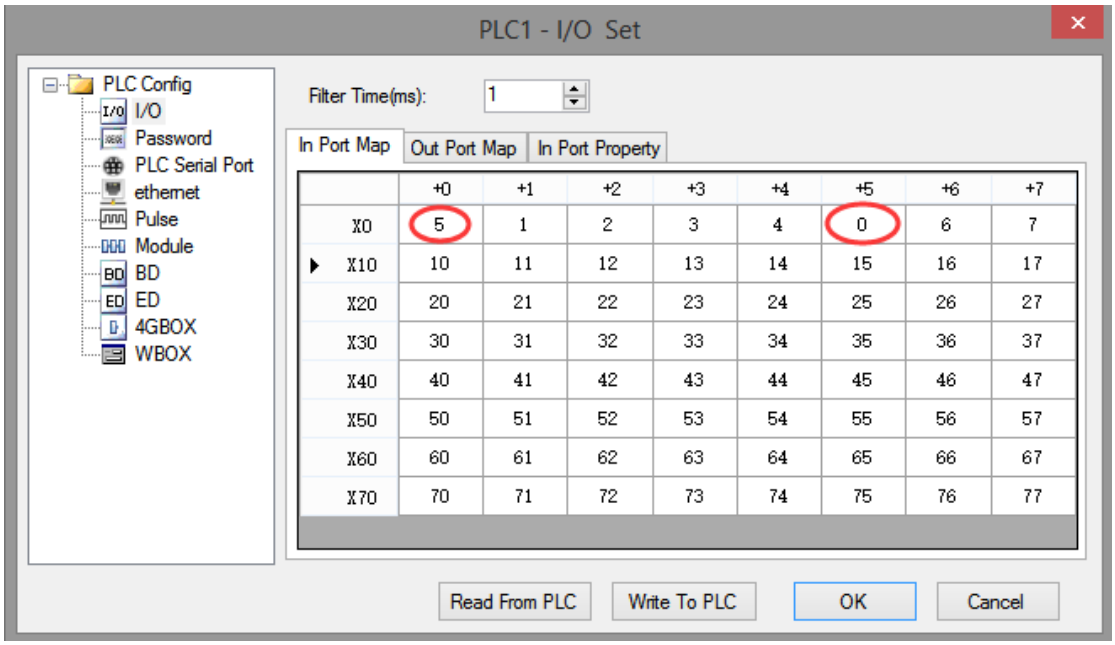
Method 2: modify in the software directly. Click the project bar/PLC config/I/O.



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.

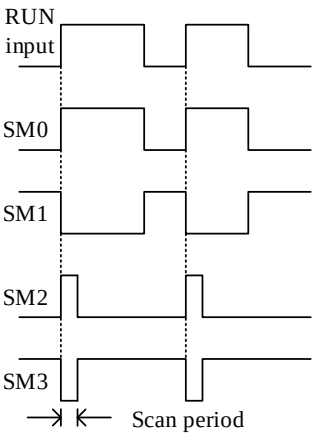

PLC1 - I/O Set
PLC Config
I/O
Password
PLC Serial Port
ethernet
Pulse
Module
BD
ED
4GBOX
WBOX
Filter Time(ms):
1
In Port Map
Out Port Map
In Port Property
+0 +1 +2 +3 +4 +5 +6 +7
X0 5 1 2 3 4 0 6 7
X10 10 11 12 13 14 15 16 17
X20 20 21 22 23 24 25 26 27
X30 30 31 32 33 34 35 36 37
X40 40 41 42 43 44 45 46 47
X50 50 51 52 53 54 55 56 57
X60 60 61 62 63 64 65 66 67
X70 70 71 72 73 74 75 76 77
Read From PLC
Write To PLC
OK
Cancel

Appendix 1 Special Soft Element Schedules

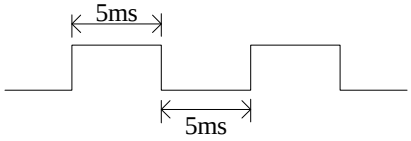
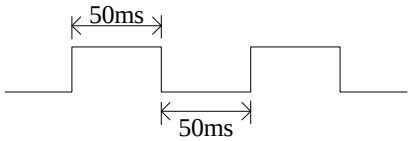
Appendix 1 mainly introduces the functions of CCSD series PLC special soft element, data register, FlashROM and the address distribution of expansions for users to search.

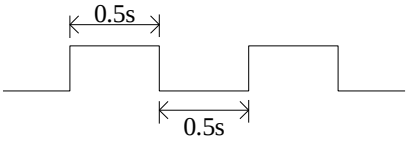
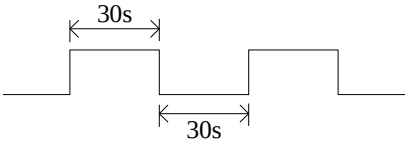
Appendix 1-1. Special Auxiliary Relay Schedule

Initial Status（SM0-SM7）

ID	Function	Description	
SM000	Normally ON coil when operation		SM000 keeps ON when PLC running
SM001	Normally OFF coil when operation		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)	

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
SM050	I0000/I0001	Forbid input interruption 0	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.
SM051	I0100/I0101	Forbid input interruption 1	
SM052	I0200/I0201	Forbid input interruption 2	
SM053	I0300/I0301	Forbid input interruption 3	
SM054	I0400/I0401	Forbid input interruption 4	
……	……	……	
SM069	I1900/I1901	Forbid input interruption 19	
SM070	I40**	Forbid timing interruption 0	After executing EI instruction, the timing interruption couldn't act independently when M acts, even if the interruption is allowed.
SM071	I41**	Forbid timing interruption 1	
SM072	I42**	Forbid timing interruption 2	
SM073	I43**	Forbid timing interruption 3	
SM074	I44**	Forbid timing interruption 4	
……	……	……	
SM089	I59**	Forbid timing interruption 19	
SM090		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）

Address	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）

Address	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）

address	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	

High speed counter overflow（SM130-SM139）

Address	Function	Note
SM130	HSC0 overflow flag	
SM131	HSC2 overflow flag	
SM132	HSC4 overflow flag	
SM133	HSC6 overflow flag	
SM134	HSC8 overflow flag	
SM135	HSC10 overflow flag	
SM136	HSC12 overflow flag	
SM137	HSC14 overflow flag	
SM138	HSC16 overflow flag	

SM139	HSC18 overflow 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
	SM153	Free format communication receive complete flag	Same to SM143
Serial port 2	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
	SM163	Free format communication receive complete flag	Same to SM143
Serial port 3	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
	SM173	Free format communication receive complete flag	Same to SM143
Serial port 4	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
	SM183	Free format communication receive complete flag	Same to SM143
Serial port 5	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（SM300-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 block97is 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-SM414）

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
SM413	Encryption check error	
SM414	Flash register data error	

Error Message（SM450-SM465）

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	
SM464	Extension module communication data overflow	
SM465	BD/ED module communication data overflow	

Expansion Modules, BD Status（SM500）

ID	Function	Description
SM500	Module status read is finished	

Appendix 1-2．Special Data Register Schedule

Battery （SD5）

ID	Function	Description
SD005	Battery register	It will display 100 when the battery voltage is 3.1V, if the battery voltaeg 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.

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	Compatiable system version（low）system version（high）	
SD023	Compatiable 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 loop counter（SD99）

ID	Function	Description
SD099	High speed loop counter	When SM99 is ON< SD99 add 1 every 0.1ms, cycle from 0 to 32767

High Speed Counting（SD100-SD109）

ID	Function	Description	Note
SD100	Current segment (No. n segment)		HSC00
SD101	Current segment (No. n segment)		HSC02
SD102	Current segment (No. n segment)		HSC04
SD103	Current segment (No. n segment)		HSC06
SD104	Current segment (No. n segment)		HSC08
SD105	Current segment (No. n segment)		HSC10
SD106	Current segment (No. n segment)		HSC12
SD107	Current segment (No. n segment)		HSC14
SD108	Current segment (No. n segment)		HSC16
SD109	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）
	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

Serial port 1			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, not include 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	The value will be used when BLOCK

	BLOCK97	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-SD414）

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)	
SD414	Flash register data error type	

Error Check（SD450-SD465）

ID	Function	Description
SD450	1：Watchdog act (Default 200ms) 2：Control block application fail 3：Visit illegal address	
SD451	Firmware 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	
SD464	Extension module communication data overflow	
SD465	BD/ED module communication data overflow	

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	Note
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	

Special function（HSD50~HSD55）

ID	Function	Note
HSD50	FLASH erasure count	Check the data changing if the value of SFD, FD is abnormal
HSD51	Power failure detection	CPU working time after power failure, unit: 100us
HSD52	Last PLC run time (low 16-bit)	Double word, unit: 1s
HSD53	Last PLC run time (high 16-bit)	
HSD54	Current PLC run time (low 16-bit)	Double word, unit: 1s
HSD55	Current PLC run time (high 16-bit)	

Note: PLC firmware version v3.4.6 and above support this function.

Error history record（HSD80~HSD179）

ID	Function	Note
HSD79	Error list index value	(1) CCSD-C series PLC only supports to store 4 error history information; (2) This function requires the programming software version v3.5.3 and above.
HSD80~HSD84	Error information 1	
HSD85~HSD89	Error information 2	
HSD90~HSD94	Error information 3	
HSD95~HSD99	Error information 4	
HSD100~HSD104	Error information 5	
HSD105~HSD109	Error information 6	
HSD110~HSD114	Error information 7	
HSD115~HSD119	Error information 8	
HSD120~HSD124	Error information 9	
HSD125~HSD129	Error information 10	
HSD130~HSD134	Error information 11	
HSD135~HSD139	Error information 12	
HSD140~HSD144	Error information 13	
HSD145~HSD149	Error information 14	
HSD150~HSD154	Error information 15	
HSD155~HSD159	Error information 16	
HSD160~HSD164	Error information 17	
HSD165~HSD169	Error information 18	
HSD170~HSD174	Error information 19	
HSD175~HSD179	Error information 20	

Note: PLC firmware version v3.4.6 and above support this function.

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	

Special function configuration (firmware version v3.4.6b and above)

ID	Function	Note
SFD3*	Special function configuration (default value is 0x0000)	Bit0: power down memory register fault handling. 0: the system will clear it; 1: it will not be processed. Bit1: execute user program in external interrupt program. 0: execute in task; 1: execute in interrupt (in this mode, user interrupt program cannot contain C language function block). This mode is usually used in the situation where the real-time performance of external signal is very high. Bit2: whether to raise the external interrupt priority, 0: no promotion, 1: promotion (to the highest).

Testing mode configuration (firmware version v3.4.6b and above)

ID	Function	Note
SFD4*	Testing mode configuration (default value is 0x0000)	It is generally used to diagnose problems when PLC crashes. Bit0: enable test mode. 0: not enabled; 1: enabled (ERR light will continue to flash). Bit1: ERR light flashing state. 0:1ms task flicker (1Hz); 1:100us interrupt blink (10Hz). Bit2: whether to increase 100us interrupt priority. 0: no increase; 1: increase (to the highest).

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	
……	……		
SFD137*	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	bit0 corresponds to HSC0，bit1corresponds to HSC2，and so on, bit9 corresponds to

	segment）	HSC18 0：relative 1：absolute
SFD331	Interrupt circulating of 24 segments high speed counting	bit0 corresponds to HSC0，bit1corresponds to HSC2, and so on, bit9 corresponds to HSC18 0：single 1：loop
SFD332	CAM function	bit0 corresponds to HSC0，bit1corresponds 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	Configuration of Extension Module 1
:		
SFD359		
SFD360	Extension module configuration	Configuration of Extension Module 2
:		
SFD369		
:	:	
SFD500	Extension module configuration	Configuration of Extension Module 16
:		
SFD509		
SFD510	BD module configuration	Configuration of BD Module 1
:		
SFD519		
SFD520	BD module configuration	Configuration of BD Module 2
:		
SFD529		

SFD530	ED module configuration	Configuration of ED Module 1
:		
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 CCSD 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 CCSD Series Programmable Controller【 Instruction Part】.

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
	QCMP	64-bit 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

	EDMOV	Double precision floating point number transmission
	FWRT※1	FlashROM written
	MSET	Multi data set
	ZRST	Zone reset
	SWAP	Switch high bytes and low bytes
	XCH※1	Exchange data
	QMOV	64-bit move
	QFWRT	64-bit FlashROM write in
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※1	Complement
	NEG※1	Negative
	QADD	64-bit addition
	QMUL	64-bit multiplication
	QINC	64-bit increase 1
	QSUB	64-bit subtraction
	QDIV	64-bit division
	QDEC	64-bit decrease 1
Data shift	SHL※1	Arithmetic shift left
	SHR※1	Arithmetic shift right
	LSL※1	Logic shift left
	LSR※1	Logic shift right
	ROL※1	Rotation shift left
	ROR※1	Rotation shift right
	SFTL※1	Bit shift left
	SFTR※1	Bit shift right
	WSFL	Word shift left
	WSFR	Word shift right
Data switch	WTD	Single word integer convert to double word integer
	FLT※1	16 bits integer convert to float
	FLTD※1	64 bits integer convert to float
	INT※1	Float convert to integer

	BIN	BCD convert to binary
	BCD	Binary convert to BCD
	ASCI	Hex convert to ASCⅡ
	HEX	ASCⅡ convert to Hex
	DECO	Coding
	ENCO	High bit coding
	ENCOL	Low bit coding
	QFLTD	64 bits integer to double precision floating-point number
	QINTD	double precision floating-point number to 64 bits integer
	DFLTD	Convert doubleword integer to double precision floating-point number
	DINTD	Convert double precision floating point number to doubleword integer

Sort	Mnemonic	Function
Float Operation	ECMP※2	Float compare
	EZCP※2	Float zone compare
	EADD※2	Float addition
	ESUB※2	Float subtraction
	EMUL※2	Float multiplication
	EDIV※2	Float division
	ESQR※2	Float square root
	SIN※2	Sine
	COS※2	Cosine
	TAN※2	tangent
	ASIN※2	Float arcsin
	ACOS※2	Float arccos
	ATAN※2	Float arctan
	EDADD	Double precision addition
	EDMUL	Double precision multiplication
	EDCMP	Double precision compare
	EDSUB	Double precision subtraction
	EDDIV	Double precision division
Clock	TRD	Read RTC data
	TWR	Write RTC data
	MOV	Precise RTC BD board data reading
	TO	Precise RTC BD board data writing
	TADD	Clock data add
	TSUB	Clock data substraction
	HTOS	Hour, minute, second convert to

		second
	STOH	Second convert to hour, minute, second
	TCMP	Time (hour, minute, second) comparison
	DACMP	Date (year, month, day) comparison

※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※1	multi-segment pulse output
	PLSF※1	variable frequency pulse output
	DRVI※2	Relative single segment pulse output
	DRVA※2	Absolute single segment pulse output
	STOP	Pulse stop
	GOON	Pulse continue
	ZRN※1	Mechanical origin return
High speed count	CNT※2	Single-phase high speed count
	CNT_AB※2	AB phase high speed count
	RST	High speed counter reset
	DMOV※2	Read and write the high speed counter
High speed counter interruption	CNT※2	Single-phase 100 segments high speed counter(with interruption)
	CNT_AB※2	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※2	Precision timing
	DMOV※1	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
	WAIT	Wait
	FROM/TO	Read/write module
Others	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.

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	232	485	Ethernet	Extension module	BD	ED	HSC		Pulse output		External interrupt
								OC	Differential	normal	Differential	
CCSD-C series												
CCSD-C32	×	2	1	×	16	1	1	4	×	2	×	10
CCSD-C60	×	2	1	×	16	2	1	4	×	2	×	10
CCSD-E series												
CCSD-E24	×	1	1	2	16	1	1	3	×	2	×	10
CCSD-E30	×	1	1	2	16	1	1	3	×	2	×	10
CCSD-E30T4	×	1	1	2	16	1	1	4	×	4	×	10
CCSD-E60	×	1	1	2	16	2	1	3	×	2	×	10
CCSD-E60T4	×	1	1	2	16	2	1	4	×	4	×	10
CCSD-H series												
CCSDH-30A16	×	1	1	2	16	×	1	4	×	4	×	10
CCSDH-30A16L	×	1	1	2	16	×	1	4	×	4	×	10

Note:

1: All models are equipped with clock function as standard.

2: Only models with transistor output support the pulse output function.

Appendix 4 Common Questions Q&A

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 2~3 years.

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