



XD3-22T4TC-E programmable controller

User manual

Wuxi Xinjie Electric Co., Ltd.

Data No. PD10 20191202 3.5

Table of contents

1. Product Overview.....	1	
1-1. Product features.....		1
2. Specifications and parameters of the main body.....		1
2-1. Specifications.....	2-1-1	General
Specifications.....	2-1-2	Performance
Specifications	2-2	Overall
dimensions.....		3
2-3. Terminal arrangement.....		3
2-4. Communication interface.....		3
3. System composition.....		4
3-1. System configuration.....		4
3-2. Peripheral equipment.....		4
3-2-1. Programming software.....		5
3-2-2. Human-machine interface.....		5
3-3. Composition Principles.....		6
3-4. Product installation.....		6
4. Power supply specifications and wiring methods.....		8
4-1. Power supply specifications.....		8
4-2. AC power supply DC input type.....		8
5. Input specifications and wiring methods.....		9
5-1. Switch input specifications.....		9
5-2. Thermocouple input specifications.....		9
5-3. High-speed counting input.....		10
5-3-1. Counting mode.....		11
5-3-2. High-speed counting range.....		12
5-3-3. High-speed counter input wiring.....		12
5-3-4. Input port assignment.....		12
6. Output specifications and wiring methods.....		13
6-1. Output specifications.....		13
6-2. Transistor output processing.....		14
7. Programming and Application.....		15
7-1 Programming instructions.....		15
7-2 Use of temperature acquisition function.....		15
7-2-1. Input definition number allocation.....		15
7-2-2. Flash register configuration.....		15
7-2-3. List of related special auxiliary relays.....		16

1. Product Overview

1-1. Product features

- Integrate logic control and thermocouple input into one
 - Switching input: 8 points (NPN type photocoupler isolation)
 - Switching output: 14 points (transistor type)
 - Thermocouple signal input: 4 points
- Support 2 AB phase inputs
- Support 2 channels of high-speed counting (10KHz)
- Simple structure, simple and elegant appearance
- High cost performance, greatly saving space

2. Specifications and parameters of the body

2-1. Specifications

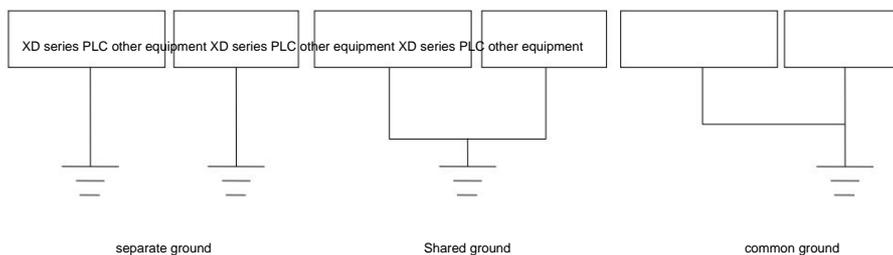
2-1-1 General specifications

Project	Specification
Insulation Voltage	DC 500V 2M Ω or more
Anti-Noise	Noise voltage 1000Vp-p 1us pulse 1 minute
Air	No corrosive or flammable gas
Ambient	0 y -60 y
Temperature Ambient Humidity	5%-95% (no condensation)
COM0 port	RS232 (factory default X-NET protocol), connect to PC for download/upload/monitoring
COM1 port	RS232 (factory default MODBUS protocol, connected to host computer, human-machine interface programming or debugging)
COM2 port	RS485, connect smart instruments, frequency converters, etc.
	Can be fixed with M3 screws or installed directly on the guide rail
Installation y 1	The third type of grounding (cannot be shared with the strong current system)

Grounding (FG) y 2 [Note]:

y 1: The guide rail specification is DIN46277, 35mm wide.

y 2: Individual grounding or shared grounding should be used for grounding. Public grounding cannot be used.



2-1-2. Performance specifications

Project		
program execution		Specification cycle scan mode
method		instructions and ladder diagram are used together
Programming		0.02~0.05us;
method		using FlashROM and lithium battery (3V button battery)
Processing speed		256KB
I/O points y ²	Power	22
	failure	points 8 points
	retention	X0~X7 14 points
User program y ³		Y0~Y15 1280 points: X0~X77, X10000~X11777, X20000~X20177, 00~Y30077
capacity y ¹ Total y ⁴		
points Input points Output points Internal coil (X) Internal coil (Y) Internal coil (M, HM, SM) 11008 points M0~M7999 [HM0~HM959]		y ⁵
Process (S, HS)		1152 points S0~S1023 y ⁵ HS0~HS127 y ⁵
timer (T, HT, ET)	Points 712 points	T0~T575 y ⁵ HT0~HT95 y ⁵ Precise timing ET0~ET39
	Specification	100ms timer: set time 0.1~3276.7 seconds 10ms timer: set time 0.01~327.67 seconds 1ms timer: set time 0.001~32.767 seconds
counter (C, HC, HSC)	Points 712 points	C0~C575 y ⁵ HC0~HC95 y ⁵ High-speed counter HSC0~HSC39 16-
	Specification	bit counter: setting value K0~32,767 32-bit counter: setting value -2147483648~y ⁵ 2147483647
Data register (D, HD, HSD) 11548 words		D0~D7999 y ⁵ HD0~HD999 y ⁵ Special use y ⁶ : SD0~SD2047 y ⁵ HSD0~HSD499 y ⁵ 8192 words
FlashROM register (FD, SFD)		FD0~FD6143 Special use y ⁶ : SFD0~SFD1999 Special security register FS0~FS47
WAIT instruction dedicated coil 32 points SEM0~SEM31		
High-speed processing functions:		high-speed counting, pulse output, external interrupt
Password protection 6-digit length ASCII Self-diagnosis		
function Power-on self-test, monitoring timer, syntax check [Note]: y ¹ : User program capacity		

refers to

the maximum program capacity during confidential downloading. y²: The number of I/

O points refers to the number of terminals that users can access and output signals from the

outside. y³: X refers to the internal input relay. X points exceeding I can be used as intermediate relays. y⁴:

Y refers to the internal output relay. Y points exceeding O can be used as intermediate relays. y⁵: [] mark is

the default power-off retention area and cannot be changed. y⁶: Special use refers

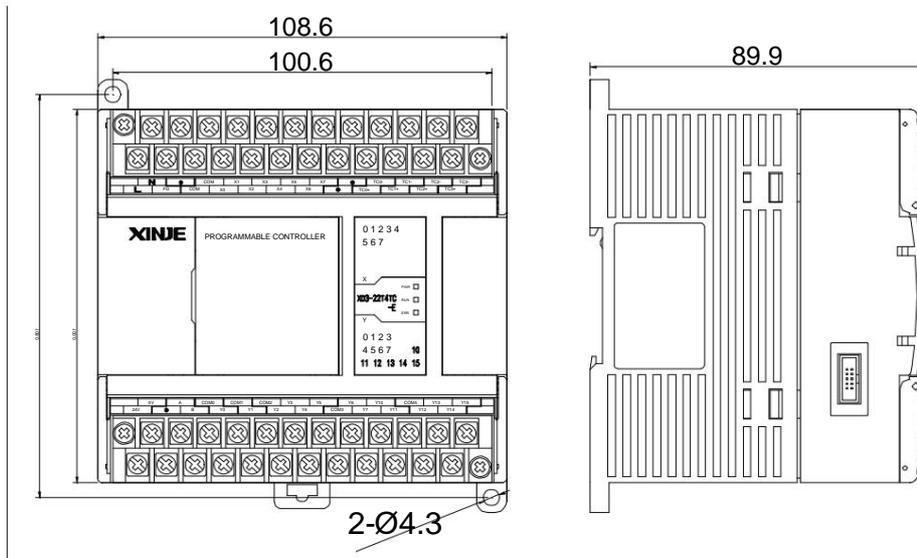
to special-purpose registers occupied by the system and cannot be used for other purposes. For details, please refer to "XD/XL Series Programmable Controllers"

User Manual [Basic Instructions] Appendix 1. y⁷: The

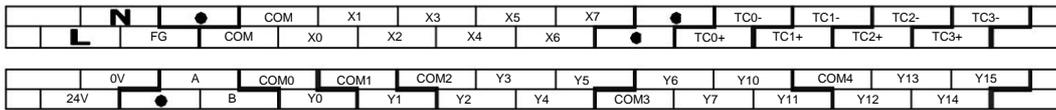
numbers of input coils and output relays/transistors are octal numbers, and the numbers of other memories are decimal numbers. y⁸: I/O that is not

actually connected to peripherals can be used as fast internal relays.

2-2. Overall dimensions



2-3. Terminal arrangement



2-4. Communication interface

XD3-22T4TC-E has COM0 (RS232), COM1 (RS232), and COM2 (RS485).

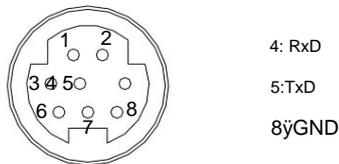
The main functions of each communication port are as follows:

- COM0 is mainly used to connect to PC for download/upload/monitoring;
- COM1 and COM2 are mainly used for communication and can also be used to download programs;

1) RS232 port

The RS232 communication port is used for program downloading and communication. The COM0 and COM1 ports support MODBUS and X-NET communication modes. lead

The foot diagram is as follows:



Mini Din 8-core socket (hole)

3) RS485 port

The pins of COM2 of XD3-22T4TC-E are A and B terminals on the output or input terminal strip. A is RS485+ and B is RS485-.

The COM2 port supports MODBUS communication, X-NET communication, and free-format communication.

4) Programming cable

If you want to use the RS232 port to download the program, you can connect it to the PC through Xinjie's DVP cable. If you don't have one, you can also make your own cable.

The connection method is shown in the figure below:



[Note]:

(1) The above picture is the DVP cable wiring diagram. The colors of the 2, 3, and 5-pin inner wires on the DB9 plug (hole) side are brown, red, and black respectively.

(2) The XVP line needs to be connected to another line on the basis of the DVP line in the above figure, that is, terminal 1 on the front (Mini Din8) and terminal 1 on the back (DB9)

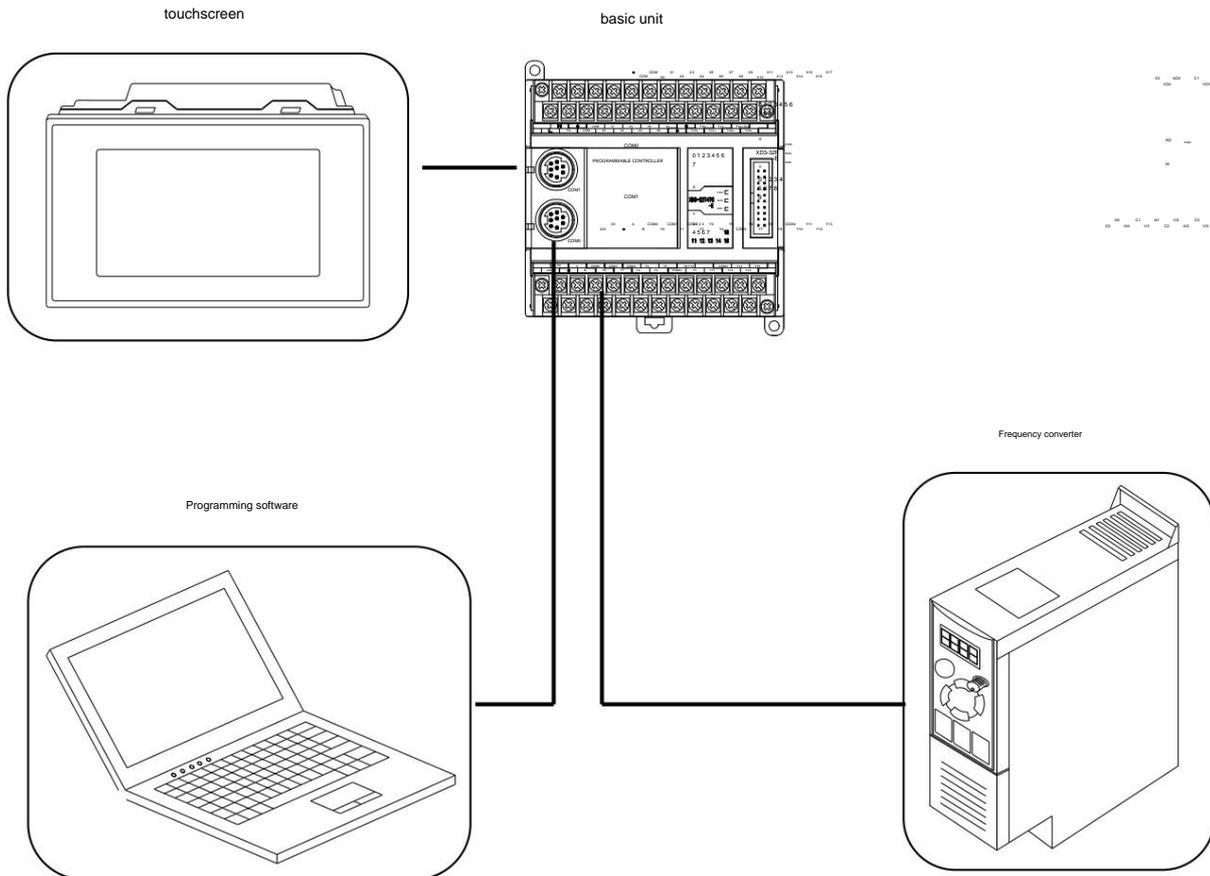
Connect to terminal 7.



3. System configuration

3-1. System configuration

The following figure is a system structure diagram based on the basic configuration of XD3-22T4TC-E. Through this figure, you can roughly understand the PLC and peripheral equipment, The connection conditions of expansion equipment, etc., and the typical applications of PLC communication port connections.



[Note]: The connection devices of each communication port above are for example only. The actual communication port can connect to a variety of devices.

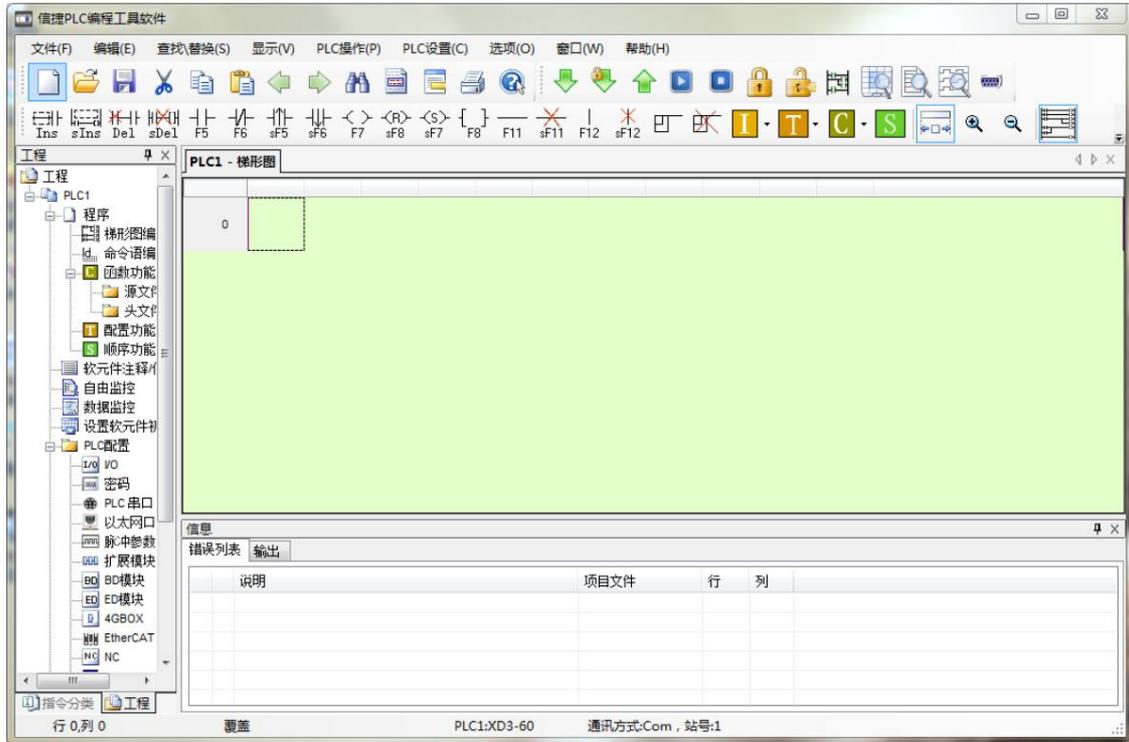
3-2. Peripheral equipment

XD3-22T4TC-E involves a variety of peripheral devices.

3-2-1. Programming software

In the programming software, functions such as writing or uploading programs to the PLC, real-time monitoring of the operation of the PLC, and configuring the PLC can be realized. After installing the programming software "Xinjie PLC Programming Tool Software" on your personal PC, use the programming cable $\bar{y}1$ to connect the PLC to the programming software through the COM0 and COM1 ports of the basic unit.

\bar{y} Software interface



$\bar{y}1$: Please use the PLC special download cable provided by Xinjie Company, or you can make your own cable. For the connection method, please refer to Section 2-4.

3-2-2. Human-machine interface

The human-machine interface is an interface that realizes interactivity between PLC and operators. The human-machine interface can quickly and easily convey the operator's actions PLC, PLC then executes this action.

The basic unit of the XD/XL series PLC supports the connection of various human-machine interfaces. The connection is based on a consistent communication protocol, generally through the Modbus protocol. The specific parameters depend on the specific connected human-machine interface.

Xinjie's human-machine interface can directly communicate with the basic unit (the communication parameters have been consistent). Currently, Xinjie's human-machine interface products It is divided into touch screen TG, TH series, and text display OP series.

1) TG, TH series

\bar{y} Sizes 4.3", 7", 8", 10.1", 15.6" \bar{y} Display 16.77 million colors, 65536 colors

\bar{y} Touch operation in the operation display area \bar{y} Interface

RS232, RS422, RS485, USB, Ethernet interface \bar{y}

Communication can be directly with Xinjie frequency conversion Devices, various PLCs, frequency converters, and instrument communications directly drive panel printers, supporting a variety of printers

Equipped with dual ports, it can connect to 2 different devices at the same time. It supports free format protocols and allows users to freely write drivers.

• Recipe Chinese character configuration, you can directly input Chinese
• Rich three-dimensional 3D gallery, text effects, data collection, data backup, etc.
• Nine-level password permission settings
• Advanced open advanced functions, animation trajectory design, etc.

2) OP series

• Size 3.7" • Display STN-LCD • 7 or 20 buttons, the screen cannot be touched
• Interface RS232, RS485, RS422
• Communication directly communicates with various PLCs

Communicate directly with Xinjie inverter

• Clock can be built-in

3-3. Composition principles

1) About the communication port

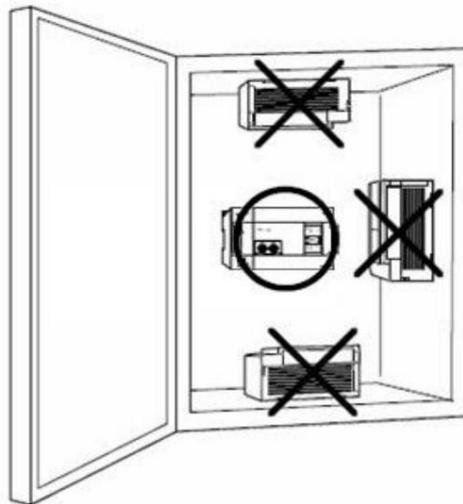
• XD3-22T4TC-E is equipped with COM0 port, COM1 port and COM2 port. • Both COM1 and COM2 communication ports can be used for programming download and communication. COM1 is generally in RS232 mode, COM2 is generally in RS485 mode, and the two ports are independent of each other.

2) About expansion equipment

• **XD3-22T4TC-E does not support any form of expansion modules.**

3-4. Product installation

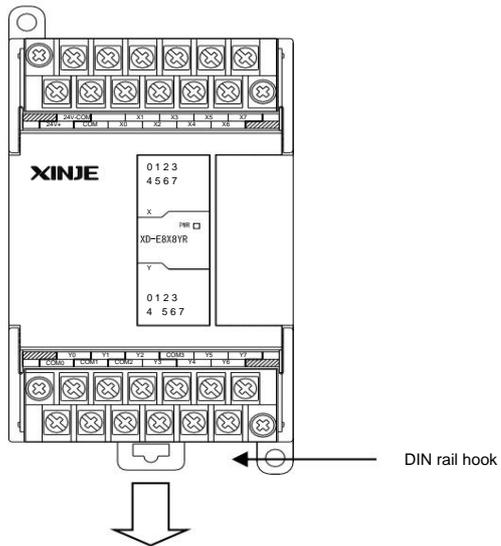
1) Installation location



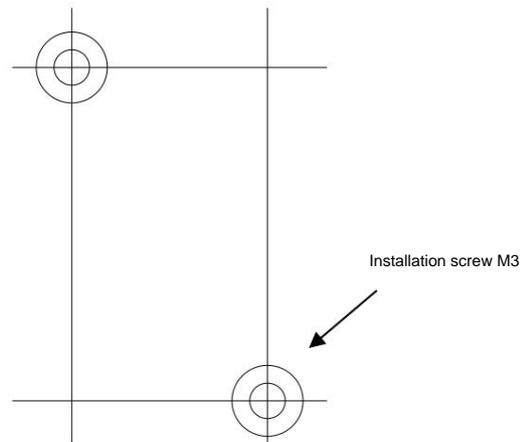
2) Installation method

Optional guide rail installation or direct screw installation.

ÿ Use DIN46277 rail mounting



ÿ Direct installation with screws



Installed on DIN46277 guide rail (35mm wide). When dismantling, just pull down the assembly hook of the DIN rail and remove the product.

3) Installation environment

Please install the product under the environmental conditions specified in Section 2-1-1.

4. Power supply specifications and wiring methods

The power supply specification of XD3-22T4TC-E supports AC power supply.

4-1. Power supply specifications

1) AC power type

Item	content
Rated voltage	AC100V~240V
Voltage allowable range	AC100V~240V
Rated frequency	50/60Hz
Allowed instantaneous power	Interruption time \dot{y} 0.5 AC cycles, interval \dot{y} 1 second
outage time	Maximum 40A below 5ms/AC100V Maximum 60A below 5ms/AC200V
Impact current Maximum	15W (16 points)/30W (24 points and above)
power consumption Power supply for sensors	24VDC \pm 10% 16 points maximum 200mA, 32 points maximum 400mA

[Note]:

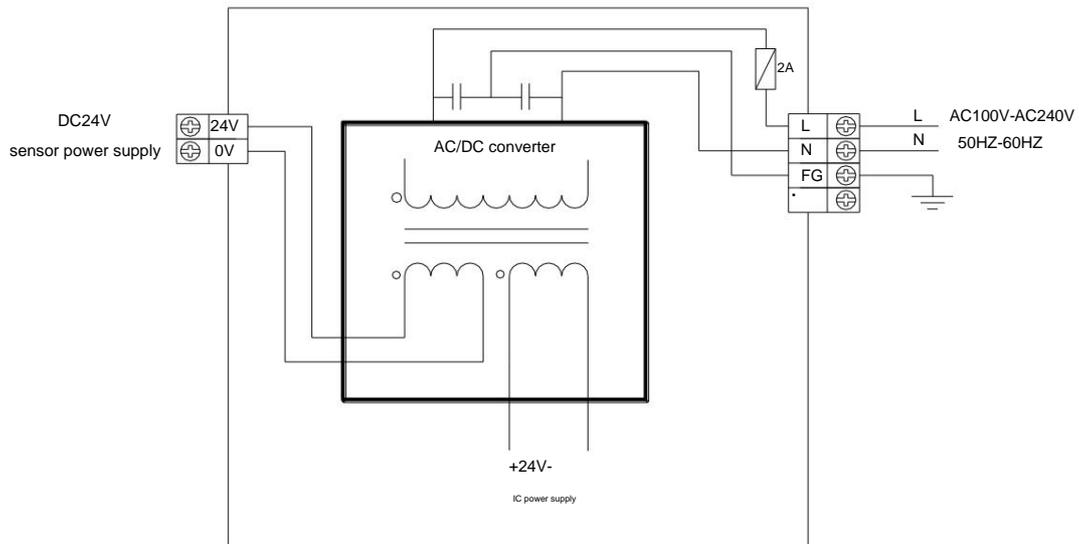
\dot{y} 1: Please use a wire of 2mm² or more for the power cord to prevent voltage drop. \dot{y} 2: Even if there

is a power outage within 10ms, the programmable controller can still continue to work. When there is a long-term power outage or abnormal voltage drop, the programmable controller will stop working and the output will be in the OFF state. When the power supply is restored, the programmable controller will automatically start running.

\dot{y} 3: The ground terminals FG of the basic unit and expansion module are connected to each other and reliably grounded (the third type of grounding).

4-2. AC power supply DC input type

Make up wiring



\dot{y} Note \dot{y} :

\dot{y} 1: The power supply is connected between L and N

terminals. \dot{y} 2: The 24V and 0V terminals can be used as power supply for the sensor. This model is used for 400mA/DC24V . In addition, this terminal cannot be connected by external

Powered by external power supply.

\dot{y} 3: • The terminal is an empty terminal, please do not conduct external wiring or use it as a relay terminal.

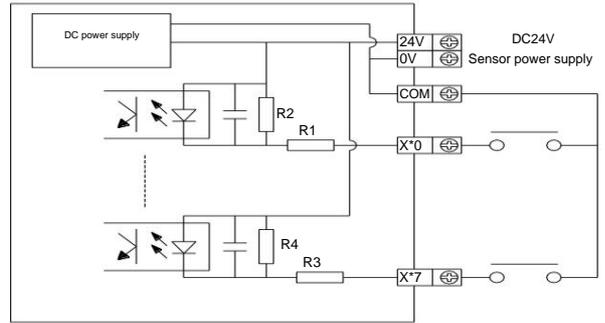
5. Input specifications and wiring methods

5-1. Switch input specifications

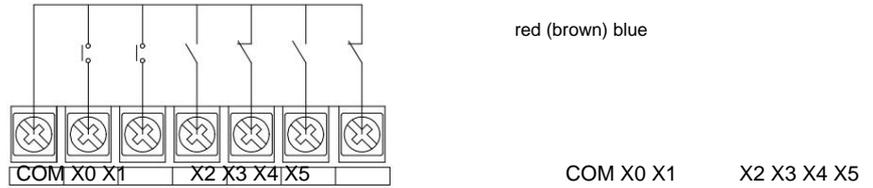
XD3-22T4TC-E switch input is NPN mode. The following introduces the internal structure and wiring method of the mode:

•NPN mode _

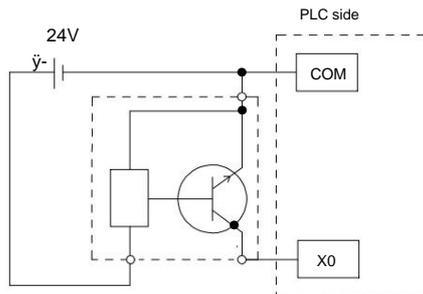
Input signal voltage	DC24V±10%
Input signal current	7mA/DC24V
Input ON current	4.5mA or more
Input OFF current	1.5mA or less
Input response time	is about 10ms
Input signal format	contact input or NPN open collector transistor
Circuit Insulation	Photocoupling Insulation
The input action shows that the LED lights up when the input is ON.	



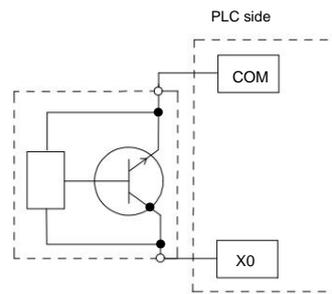
NPN wiring example:



Switch button wiring diagram example



Three-wire (NPN type) proximity switch wiring diagram example



Two-wire (NPN type) proximity switch wiring diagram example

5-2. Thermocouple input specifications

XD3-22T4TC-E supports 4-channel thermocouple temperature acquisition. The following introduces the specifications of thermocouple input:

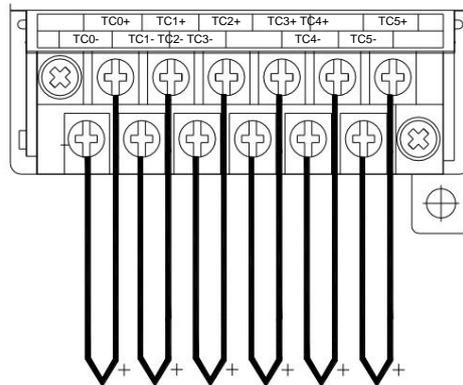
Project	content	
analog input signal	K, S, E, N, B, T, J, R type thermocouples	
Measuring temperature range	Type K	0~1300
	S type	0~1700
	Type E	0~600
	N type	0~1200
	Type B	0~1800 (0 will be displayed below 250)
	T type	0~400
	J type	0~800
	Type R	0~1700

project	content
Digital output range	0~maximum temperature measurement value $\times 10$ (taking K type as an example, the digital output range is 0~13000) 16 bits signed, binary
Control accuracy	$\pm 0.5\dot{y}$
resolution,	0.1 \dot{y}
comprehensive	1% (relative maximum)
accuracy	80ms/1 channel

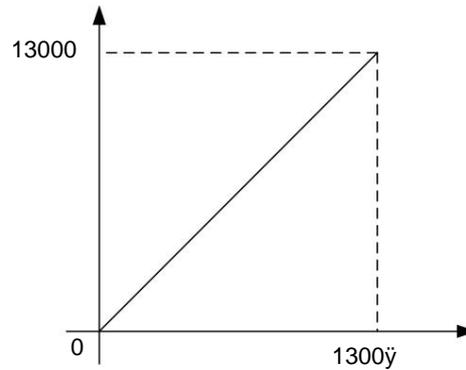
conversion speed [Note]:

- (1) When there is no signal input, the channel data is -1.
- (2) Connect the thermocouple according to actual needs.
- (3) The shell of the equipment where the thermocouple is installed must be grounded.

Enter the wiring diagram:



Type K thermocouple characteristic curve:



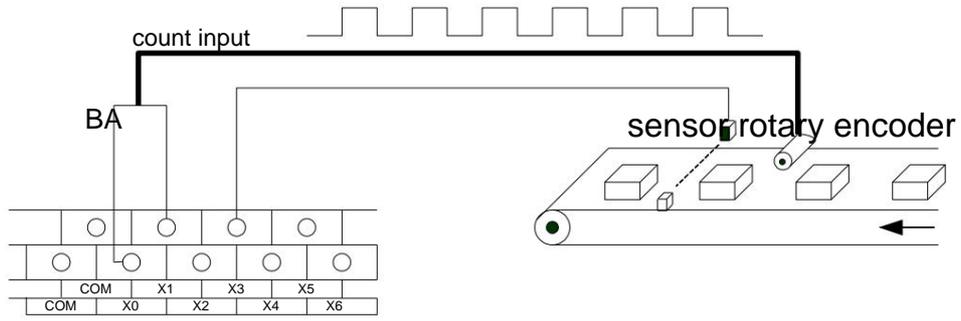
5-3. High-speed counting input

XD3-22T4TC has a high-speed counting function that is independent of the scan cycle of the programmable controller. By selecting different counters, it can achieve It can measure high-speed input signals such as quantitative sensors and rotary encoders, and **its maximum measurement frequency can reach 10KHz.**

Note:

y1: Please use DC24V NPN open collector output (OC) encoder for input.

y2: **When the counting frequency is higher than 25Hz, please use a high-speed counter.**

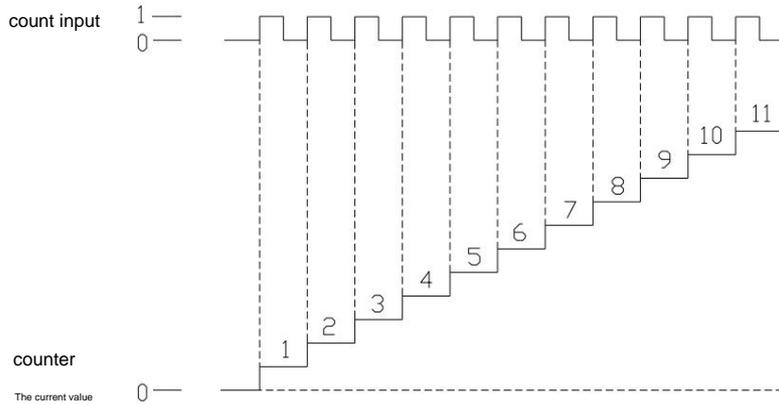


5-3-1. Counting mode

The XD/XL series high-speed counting function has two counting modes, namely incremental mode and AB phase mode.

1) Incremental mode

In this mode, the counting input pulse signal, the counting value increases with the rising edge of each pulse signal.

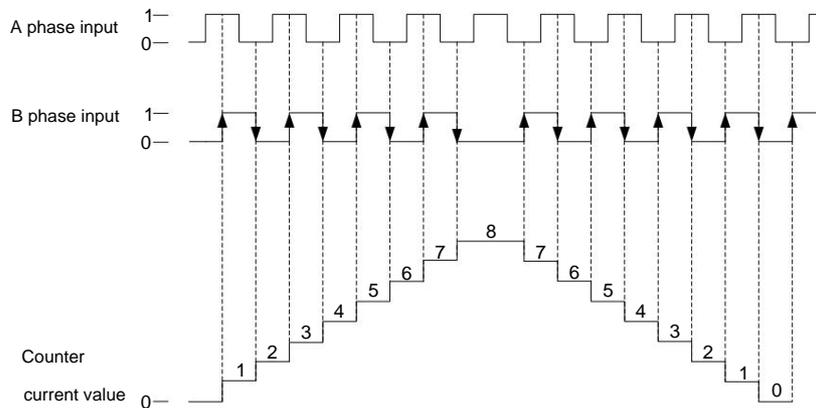


2) AB phase mode

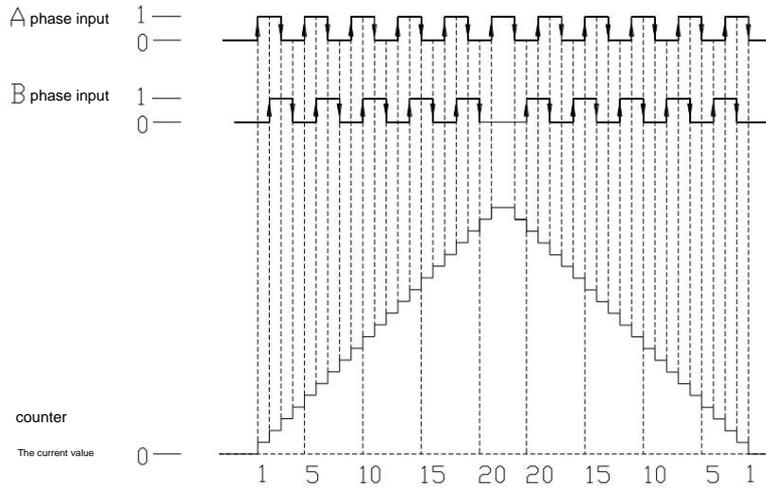
In this mode, the high-speed counting value counts up or down according to two differential signals (A phase and B phase). According to the frequency multiplication number, it can be divided into

There are two modes: double frequency and quadruple frequency, but its default counting mode is quadruple frequency mode.

• Double frequency mode



• Quadruple frequency mode



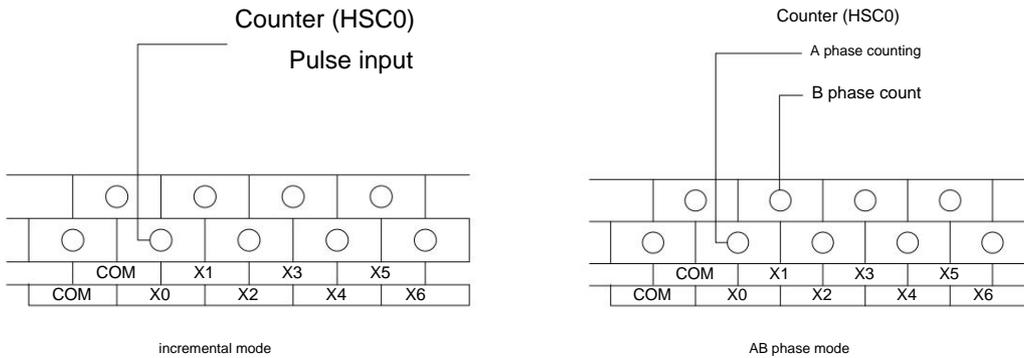
5-3-2. High-speed counting range

The counting range of the high-speed counter is: **K+2,147,483,648 - K+2,147,483,647**. When the count value exceeds this range, an overflow or Underflow phenomenon.

The so-called overflow occurs when the count value jumps from K+2,147,483,647 to K+2,147,483,648 and continues counting; when an underflow occurs, the count value jumps from K-2,147,483,648 to K+2,147,483,647, and continues counting.

5-3-3. High-speed counter input wiring

The wiring of the counting pulse input terminal is slightly different according to the programmable controller type and counter model. The typical input terminals are The sub-wiring method is shown in the figure below:



5-3-4. Input port assignment

The meaning of each letter is:

U	A	B	Z
Count pulse input	A phase input	B phase input	Z phase pulse capture

•Note: The Z phase function is still under development.

When the X input terminal is not used as a high-speed input port, it can be used as an ordinary input terminal. In the frequency octave item in the table: "2" means solid Fixed 2 multiplier, "4" means fixed 4 multiplier, "2/4" means adjustable 2 and 4 multiplier. The specific port allocation and functions are shown in the following table:

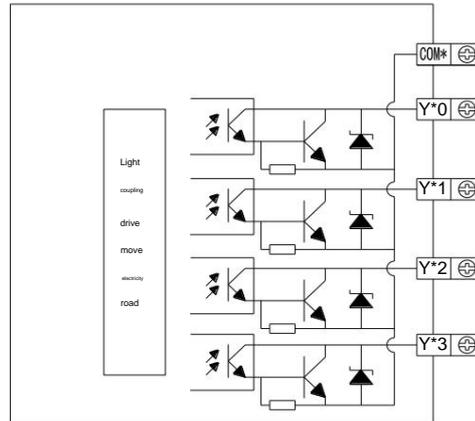
XD3-22T4TC-E													
	Single phase incremental mode								AB phase mode				
	HSC0	HSC2	HSC4	HSC6	HSC8	HSC10	HSC12	HSC0		HSC2	HSC4	HSC6	HSC8
Maximum frequency	10K	10K								10K	10K		
4 times frequency										2/4	2/4		
Counting interrupt		ÿ								ÿ	ÿ		
X000	U									A			
X001										B			
X002										Z			
X003		U								A			
X004										B			
X005										Z			
X006													
X007													

6. Output specifications and wiring methods

6-1. Output specifications

1) Ordinary transistor output

External power		DC5~30V or less
circuit insulation		Optocoupler insulation
action indication		LED indicator
maximum load	resistive load	0.3A
	Inductive load	7.2W/DC24V
	lamp load	1.5W/DC24V
minimum load		DC5V 2mA
open circuit leakage		0.1mA or less
current response time	OFF→ON	0.2ms or less
	ON→OFF	0.2ms or less



2) High-speed pulse output

Model	T type
High-speed pulse output bit	Y0, Y1
External power	DC5~30V or less
supply action	LED indicator
indication	50mA
Maximum current Maximum output frequency	100kHz

[Note]: When using the high-speed pulse output function, the PLC can output 100kHz~200kHz pulses, but there is no guarantee that all servo will operate normally.

Please connect a resistor of about 500 ohms between the output terminal and the 24V power supply.

6-2. Transistor output processing

Transistor (NPN) output types can be divided into two types: high-speed pulse output and ordinary transistor.

Ordinary transistor output

• The transistor output of

the output terminal basic unit has 1~4 common terminal outputs.

• External power supply

Please use a DC5~30V regulated power supply for load driving power supply. • Circuit

insulation

The internal circuit of the programmable controller and the output transistor are insulated and isolated by a photocoupler; in addition, the common terminal blocks are also separated from each other. • Action

expression

When driving the optical coupling, the LED light is on and the output transistor is ON.

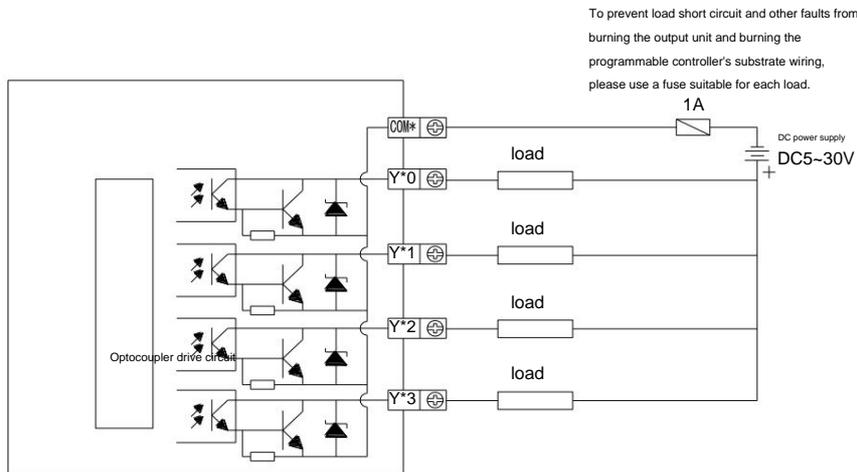
• Response time

The time it takes for the programmable controller to drive (or cut off) the photocoupler to turn on (or turn off) the transistor is less than 0.2ms. • Output current

The current per output point is 0.3A. However, due to the temperature rise limit, the total current of each output 4 points is 0.5A.

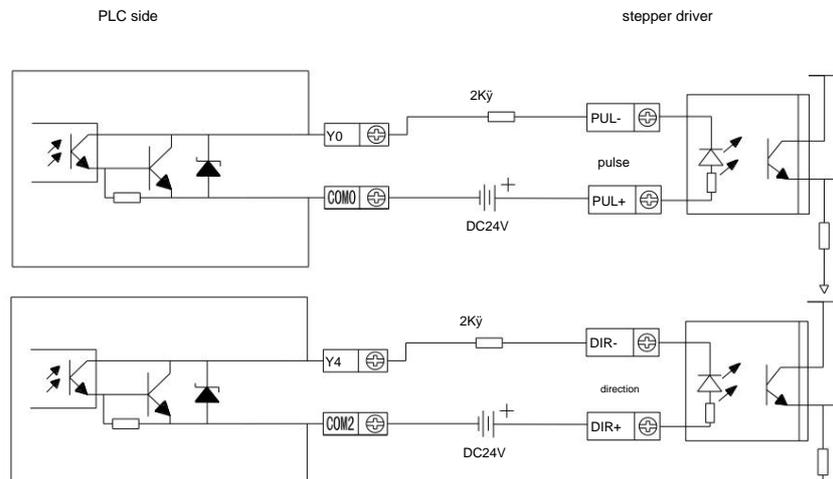
• Open circuit current is

less than 0.1mA.



To prevent load short circuit and other faults from burning the output unit and burning the programmable controller's substrate wiring, please use a fuse suitable for each load.

Example: The following is the wiring diagram of RT type/T type PLC and stepper motor driver.



(Guarantee reliable operating current of 8~15mA at the driver's optocoupler input terminal)

7. Programming and Application

7-1. Programming instructions

Programming software: XDPro programming software.

XD3-22T4TC supports basic instructions, application instructions and positioning control instructions. For specific usage of each instruction, please refer to "XD/XL Series Programmable Program Controller User Manual [Basic Instructions]", "XD/XL Series Programmable Controller User Manual [Positioning Control]".

Note that when using special function instructions, you need to use the corresponding function terminals. The configuration ports of each special instruction are as follows:

(1) Pulse width modulation function configuration port:

PWM configuration port	Y0, Y1
------------------------	--------

(2) X number corresponding to the pulse input of frequency measurement:

Frequency measurement port	X0, X3 (up to 10K)
----------------------------	--------------------

(3) External interrupt port definition:

Input terminal	Pointer number is prohibited		instruction
	rising interrupt	falling interrupt	
X2	I0000	I0001	SM050
X3	I0100	I0101	SM051
X4	I0200	I0201	SM052
X5	I0300	I0301	SM053
X6	I0400	I0401	SM054
X7	I0500	I0501	SM055

7-2. Use of temperature acquisition function

7-2-1. Input definition number allocation

The XD series analog channels do not occupy I/O units, and the converted values are directly sent to the PLC registers. The corresponding PLC register definition of the channel

The numbers are as follows:

Related parameters	Notes and explanations			
	Ch0	Ch1	Ch2	Ch3
Channel displays temperature value (unit 0.1 \dot{y})	ID0	ID1	ID2	ID3

7-2-2. Flash register configuration

The 0CH~3CH channels of XD-22T4TC can set the thermocouple type and perform temperature alarm and other functions. Through the special function inside the PLC, FLASH data register FD to set. As follows:

register		Notes and explanations								
		Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	illustrate
SFD700	Byte0	TC1 channel				TC0 channel				Used to configure each channel Thermocouple used Type and enable bit With selection, each pass Daozhan 4Bit
		K \dot{y} 0000				K \dot{y} 0000				
		S:0001				S:0001				
		R:0010				R:0010				
		B \dot{y} 0011				B \dot{y} 0011				

		N \ddot{y} 0100 E \ddot{y} 0101 J \ddot{y} 0110 T \ddot{y} 0111	N \ddot{y} 0100 E \ddot{y} 0101 J \ddot{y} 0110 T \ddot{y} 0111	
	Byte1	TC3 channel K \ddot{y} 0000 S:0001 R:0010 B \ddot{y} 0011 N \ddot{y} 0100 E \ddot{y} 0101 J \ddot{y} 0110 T \ddot{y} 0111	TC2 channel K \ddot{y} 0000 S:0001 R:0010 B \ddot{y} 0011 N \ddot{y} 0100 E \ddot{y} 0101 J \ddot{y} 0110 T \ddot{y} 0111	
SFD704	Temperature deviation value: (sampling temperature value + temperature deviation value)/10 = displayed temperature value. At this time, the channel temperature display value can be equal to or as close as possible to the actual temperature. This parameter is a signed number, the unit is 0.1 \ddot{y} , it is maintained during power outage, and the factory			
SFD710	default value is 0. Temperature alarm value: When the channel displays temperature value \ddot{y} temperature alarm value. At this time, the temperature out-of-range alarm flag SM710 is turned ON. This parameter is a signed number, the unit is 0.1 \ddot{y} , it is maintained during power outage, and the factory default value is 0.			

7-2-3. List of related special auxiliary relays

Address number	Function	illustrate
SM700 open	circuit detection bit	When the temperature acquisition channel is not connected to a thermocouple, this flag is ON.
SM710	Temperature out-of-range alarm flag	When the channel display temperature value \ddot{y} temperature alarm value SFD710, the temperature out-of-range alarm flag SM710 is turned ON.

XINJE



Scan and follow us on WeChat

Wuxi Xinjie Electric Co., Ltd.

No. 100, Dicui Road, Liyuan Development Zone, Wuxi City, Jiangsu Province

Fourth floor, Building 7, Creative Industrial Park

Postal code: 214072

Phone: 400-885-0136

Fax: (0510) 85111290

Website: www.xinje.com

WUXI XINJE ELECTRIC CO., LTD.

4th Floor Building 7,Originality Industry park, Liyuan
Development Zone, Wuxi City, Jiangsu Province

214072

Tel: (510) 85134136

Fax: (510) 85111290