XINJE

I^2C Industrial intelligent controller

User manual［Hardware］

Wuxi Xinje Electric Co., Ltd.

Data No. IC01 20221219EN 1.1

Basic Description

- Thank you for purchasing the Xinje I^2C Industrial Intelligent Controller.
- This manual mainly introduces the hardware characteristics of the I^2C industrial intelligent controller.
- Before using the product, please read this manual carefully and connect the wires with a full understanding of the manual content.
- For an introduction to software and programming, please refer to the relevant manuals.
- Please deliver this manual to the end user.

User Notice

- Only operators with certain electrical knowledge can perform wiring and other operations on the product. If there are any unclear areas of use, please consult our technical personnel.
- The examples listed in manuals and other technical materials are for user understanding and reference only, and do not guarantee certain actions.
- When combining this product with other products, please confirm whether it complies with relevant specifications, principles, etc.
- When using this product, please confirm for yourself whether it meets the requirements and is safe.
- Please set up backup and safety functions on your own to avoid machine malfunctions or losses that may occur due to product failures.

Responsibility Statement

- Although the content in the manual has been carefully checked, errors are inevitable, and we cannot guarantee complete consistency.
- We will regularly review the content of the manual and make corrections in subsequent versions. We welcome valuable feedback.
- The content described in the manual is subject to change without prior notice.

Contact us

If you have any questions about the use of this product, please contact the agent or office where you purchased the product, or you can directly contact Xinje Company.

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- Fax: 0510-85111290
- Address: 618 Jianzhu West Road, Wuxi City, Jiangsu Province
- Postal Code: 214072

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Safety precautions

Before using this product, please read this part carefully and operate after fully understanding the use, safety, precautions, etc. of the product. Please correctly conduct product wiring under the premise of paying great attention to safety.

The problems that may arise during the use of the product are basically included in the safety precautions, which are indicated in two levels of attention and danger. For other unfinished matters, please follow the basic electrical operation procedures.

Attension	When used incorrectly, it may cause danger, moderate injury or minor injury, and property damage.
Danger	When it is used incorrectly, it may cause danger, cause personal injury or serious injury, and may cause serious property damage.

- Confirmation upon receiving the product

Attension
Do not install damaged controllers, controllers with missing parts, or controllers with unqualified models. Danger of injury.

- Product system design

Danger
Please design a safety circuit outside the controller to ensure that the whole system can operate safely when the controller operates abnormally. There is a risk of misoperation and failure.

Attension
Do not tie the control wiring and power wiring together. In principle, they should be separated by 10cm. It may cause malfunction and product damage.

- Product installation

Danger
Before installing the controller, be sure to disconnect all external power supplies. Danger of electric shock.

Attension
1. Please install and use this product under the environmental conditions specified in the general specifications of the manual. Do not use in damp, high temperature, places with dust, smoke, conductive dust, corrosive gas, flammable gas, vibration and impact. It may cause electric shock, fire, misoperation, product damage, etc. 2. Do not directly touch the conductive part of the product. It may cause malfunction and fault. 3. Please use DIN46277 guide rail to fix the product and install it on a flat surface. Incorrect installation may cause malfunction and product damage. 4. When processing the screw hole, please do not let the cutting powder and wire debris fall into the product cover. It may cause malfunction and fault. 5. when connecting the expansion module with the expansion cable, please confirm that the connection is tight and the contact is good. It may lead to poor communication and misoperation. 6. when connecting peripheral devices, expansion devices, batteries and other devices, be sure to cut off power for operation. It may cause malfunction and fault.

- Product wiring

Danger
1. Before wiring the controller, be sure to disconnect all external power supplies. Danger of electric shock. 2. Please correctly connect the AC or DC power supply to the dedicated power terminal of the controller. If the power supply is connected incorrectly, the controller may be burned.

Attension
1. Please use 2mm^2 wire to carry out the third kind of grounding for the grounding terminal of the controller and expansion equipment, and do not share the grounding with the strong current system. It may cause failure, product damage, etc. 2. Do not make external wiring to the empty terminal. It may cause malfunction and product damage. 3. When processing the screw hole, please do not let the cutting powder and wire debris fall into the product cover. May cause malfunction, fault, etc. 4. When using wires to connect terminals, be sure to tighten them, and do not make conductive parts contact other wires or terminals. It may cause malfunction and product damage.

- Operation and maintenance of products

Danger
1. Do not touch the terminal after the controller is powered on. Danger of electric shock.

2. Do not connect or remove the terminal with electricity.
Danger of electric shock.
3. Please stop the program in the controller before changing it.
It may cause malfunction.

Attension

1. Do not disassemble or assemble this product without authorization.
It may cause damage to the product.
2. Please plug and unplug the connecting cable in case of power failure.
It may cause cable damage and malfunction.
3. Do not make external wiring to the empty terminal.
It may cause malfunction and product damage.
4. Please cut off the power before removing the expansion device, peripheral device and battery.
It may cause malfunction, fault, etc.
5. When the product is discarded, please treat it as industrial waste.

Catalog

Preface

- Application range of the manual

This manual is the hardware manual for the I²C industrial intelligent controller product XA310, which includes the following product information:

1. I²C Industrial intelligent controller

Type	Series
Basic unit	XA310 series

2. Version requirements

- The controller requires the XDPpro software version to be V3.7.14 or higher.
- Some instructions have version requirements, please refer to the instructions for details.

- The conventions in the manual

Due to space limitations, certain abbreviations may be used in the manual to replace the original names. These possible names are listed in the table below for reference.

Abbreviation	Explanation
XA310 series	XA310 series industrial intelligent controller
Peripheral unit	The general term for programming software, HMI, network modules, and other devices
Programming software	The abbreviation for Xinje Controller Editing Tool Software

- Related manuals

This manual only covers the hardware aspects of the I²C industrial intelligent controller. For other applications such as programming and instruction application, please refer to the relevant manual materials. The following manuals will be listed for users' reference.

Manual name	Introduction	Note
EtherCAT motion control manual	Introduce the functions and usage of EtherCAT motion control master station	PDF
XDH/XLH series PLC motion control manual	Introduce the EtherCAT motion control command function	PDF

1. Product overview

1-1. Product features

XA310 series industrial intelligent controller

The XA310 series is an industrial intelligent controller (I²C) based on the X86 platform, seamlessly integrating the Intel Apollo Lake and AMD Cortex-A8 processors. It can be integrated with motion control, machine vision, HMI, and information-based industrial automation applications, providing customers with integrated and intelligent system solutions.

The XA310 industrial controller uses the Xinje XDPPRO programming platform. Besides supporting LD programming, this platform also supports standard C language programming specifications. Users can reference numerous standard function functions, making it easy for controller manufacturers and users to develop their own proprietary function blocks, significantly improving user programming efficiency.

Features

■ Intel X86 + AMD heterogeneous architecture
■ Based on the Xinje XDPPRO programming platform, supporting LD and C language programming
■ Supports axis group motion (three-axis linear, circular, spiral interpolation) as well as complex motion control functions such as electronic cam, chasing cut, flying cut
■ Based on EtherCAT bus control, capable of connecting up to a 64-axis control system
■ IO expansion based on EtherCAT bus, allowing for DI/DO expansion and analog data acquisition expansion
■ Configured with multiple LAN ports, supporting various communication protocols like ModbusTCP, UDP, making it easy to form communication networks with different real-time requirements
■ Two independent communication interfaces RS485, RS232, facilitating operation with traditional equipment.

1-2. Model composition and model table

The general composition of I²C industrial intelligent controller is as follows:

XA 310
① ②

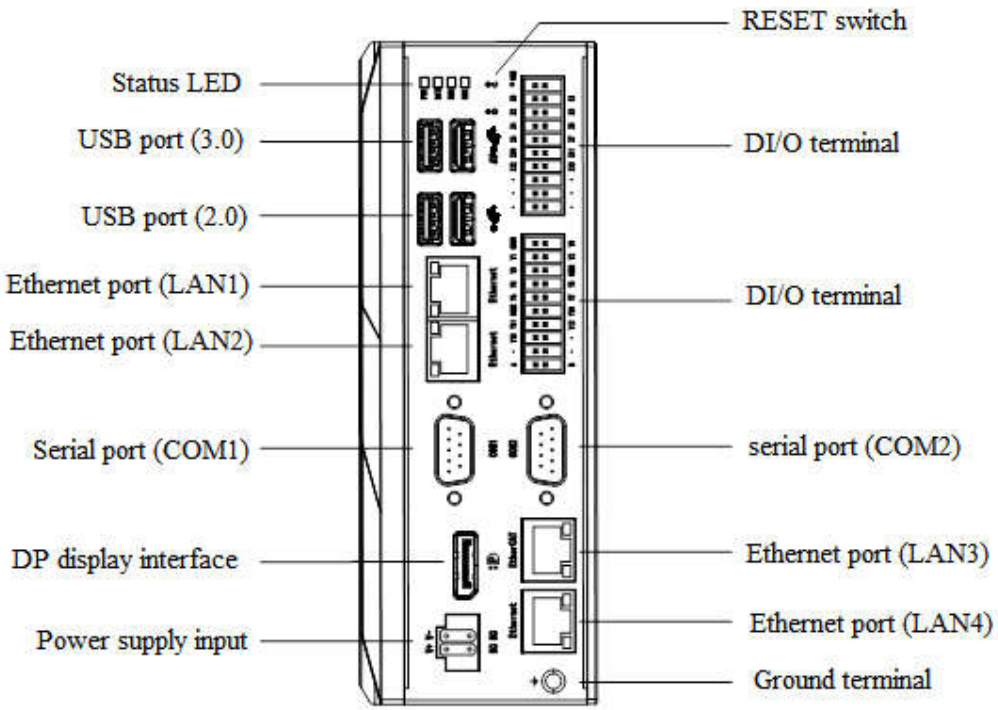
①: Product series XA: XA series industrial intelligent controller
②: Series 310: 310 series

Controller model list

Model	Description
XA310W	Intel® Celeron® J3355; 4GB memory; 128GB hard drive; 12X/12Y; 2-channel USB 2.0; 2-channel USB 3.0; 2-channel Ethernet communication; 2-channel EtherCAT communication; 1 RS232 channel; 1 DP interface; windows system

1-3. Explanation of each section

1-3-1. XA310 series structural composition



1-3-2. Status LED

Icon	Status	Description
PWR	Power switch	Shutdown: Blue constantly on System working normally: Green constantly on Not entering the system or experiencing system abnormalities: the red light remains on continuously
SATA	SATA Hard disk detection	Data interaction: Blue flashing No data: OFF
RUN	Run indicator light	PLC standby: OFF PLC working normally: green constantly on
ERR	Error indicator light	PLC error free: OFF PLC has an error: the red light is constantly on

1-3-3. Shutdown button

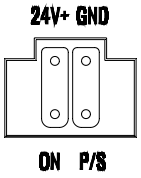
The industrial intelligent controller is equipped with one shutdown button (pinhole structure), which can be pressed and held for 4 seconds to forcibly shut down.

1-3-4. Reset button

The industrial intelligent controller is equipped with a Reset button (pinhole structure), which can be pressed to restart the system, as shown in the figure:

1-3-5. Power supply input

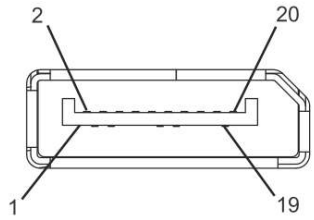
The industrial intelligent controller is equipped with one 24V 4PIN Phoenix terminal, as shown in the figure:



Please do not connect a power supply with a voltage exceeding 25.2V, otherwise it may cause the motherboard to overheat and burn out.

1-3-6. DP interface

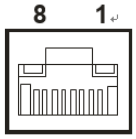
The industrial intelligent controller is equipped with one DP display interface, which can achieve high-definition transmission of signals at high speed, and also has good anti-interference ability. The interface is shown in the following figure.



DP display interface diagram

1-3-7. Ethernet port (LAN)

The industrial intelligent controller is equipped with 4 Ethernet/EtherCAT interfaces (XA310 series: 3*Ethernet+1*EtherCAT), as shown in Figure 2-5, supporting 10/100/1000Mbps and complying with IEEE 802.3az. The port adopts a standard RJ-45 jack with LED indicator lights to indicate connection and transmission status.



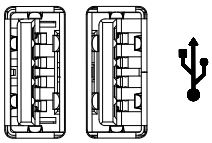
Ethernet port diagram

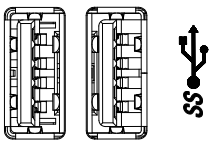
LED light	
Left LED	Right LED
Orange	Green
10/100/1000 Link	Transmission

<table>
<tr><th>RJ45 port</th><th>Function</th></tr>
<tr><td>Ethernet</td><td>Support Modbus-TCP, UDP and other communication protocols. It can be used to upload and download programs, online monitoring, remote monitoring,
etc.,and can communicate with other TCP IP devices in the LAN.
<table>
<tr><th>Item</th><th>Parameter</th></tr>
<tr><td>Communication protocol</td><td>MODBUS TCP</td></tr>
<tr><td>Communication speed</td><td>100Mbps</td></tr>
<tr><td>Max network nodes</td><td>30</td></tr>
<tr><td>Max station spacing</td><td>100m</td></tr>
<tr><td>Network topology</td><td>Linear</td></tr>
</table></td></tr>
<tr><td>EtherCAT</td><td>EtherCAT bus control, control cycle ≤ 1ms
<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Physical layer</td><td>100BASE-TX (IEEE802.3)</td></tr>
<tr><td>Baud rate</td><td>100[Mbps] (full duplex)</td></tr>
<tr><td>Topology</td><td>Line</td></tr>
<tr><td>Cable</td><td>JC-CB twisted pair (shielded twisted pair)</td></tr>
<tr><td>Cable length</td><td>Up to 100m between nodes</td></tr>
<tr><td>Com port</td><td>1Port (RJ45)</td></tr>
<tr><td>EtherCAT Indicators（LED）</td><td>[Run] RUN Indicator
[L/A IN] Port0 Link/Activity Indicator (Green)
[L/A OUT] Port1 Link/Activity Indicator (Green)</td></tr>
<tr><td>Station Alias（ID）</td><td>Range: 0~65535
Address: 2700h</td></tr>
<tr><td>Explicit Device ID</td><td>Not support</td></tr>
<tr><td>Mail protocol</td><td>COE (CANopen Over EtherCAT)</td></tr>
<tr><td>SyncManager</td><td>4</td></tr>
<tr><td>FMMU</td><td>3</td></tr>
<tr><td>Touch Probe</td><td>2 channels</td></tr>
<tr><td>Synchronization mode</td><td>DC (SYNCO event synchronization)
SM (SM event synchronization)</td></tr>
<tr><td>Cyclic time（DC communication cycle）</td><td>500,1000,2000,4000[μs]</td></tr>
<tr><td>Communication object</td><td>SDO[Service data object],
PDO[Process data object]</td></tr>
<tr><td>Max allocated number of single station PDO</td><td>TxPDO: 4 [pcs] RxPDO: 4 [pcs]</td></tr>
<tr><td>Mailbox communication interval in PreOP mode</td><td>1ms</td></tr>
<tr><td>E-mail</td><td>SDO request and SDO information</td></tr>
</table></td></tr>
</table>

1-3-8. USB port

The industrial intelligent controller has 2 USB 2.0 and 2 USB 3.0 interfaces. The USB interface supports plug and play functionality, allowing users to connect or disconnect devices at any time without having to turn off the controller. The USB interface complies with the USB EHCI, Rev. 2.0 standard. The definition of pins is as follows.

USB 2.0			
	Pin	Signal	Function
	1	VCC	Power supply
	2	DATA-	USB2.0 differential data signal
	3	DATA+	
	4	GND	Power supply ground

USB 3.0			
	Pin	Signal	Function
	1	VCC	Power supply
	2	DATA-	USB3.0 differential data signal
	3	DATA+	
	4	GND	Power supply ground
	5	SSRX-	High speed receiving differential data signal
	6	SSRX+	
	7	GND	Signal ground
	8	SSTX-	High speed sending differential signal
	9	SSTX+	

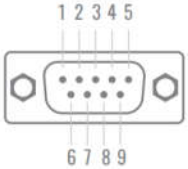
1-3-9. Serial port

The industrial intelligent controller I²C is equipped with corresponding RS232 and RS485 communication serial ports

Series	Default value	
	DB9 port (RS232)	AB terminal (RS485)
XA310	1	1

(1) DB9 communication port (RS232)

The pin definitions are as follows:

	Pin	RS232 (DB9)	Description
 RS232/RS485 port	1	DCD	Carrier detection
	2	RXD	Receive data
	3	TXD	Send data
	4	DTR	Data terminal ready
	5	GND	Signal ground
	6	DSR	Data ready
	7	RTS	Send request
	8	CTS	Clear send
	9	RI	Ringing prompt

(2) AB terminal (RS485)

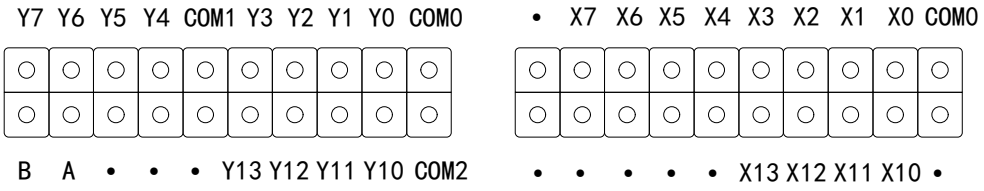
The XA310 series RS485 interface is located on the IO/communication terminal block. The terminals are A and B, where A is RS485+ and B is RS485-. It can be used to connect touch screens, communicate with some instruments and meters, and also to connect computer programming software and controllers.

Serial port RS232/RS485 communication specifications:

Item	Parameter
Communication mode	Half-duplex
Baud rate	4800bps, 9600bps, 19200bps(default), 38400bps, 57600bps, 115200bps
Data type	Data bits: 5, 6, 7, 8 (default), 9
	Stop bits: 1 (default), 1.5, 2
	Parity bit: none, odd, even(default)
Mode	RTU (default), ASCII, free-format
Station no.	1-255 (default 1)
Delay before sending	1~100ms (default 3ms)
Reply timeout	1~1000ms (default 300ms)
Retry count	1~20 times (default 3 times)

1-3-10. I/O terminals

The XA310 series is equipped with 12 sets of digital I/Os, which are used for functions such as data acquisition triggering, control, and counting.



Note:

※ 1: The COM on the input and output terminal blocks correspond to different Y output points. When using, please wire according to the actual division on the controller output label.

※ 2: The A and B terminals on the terminal block are RS485 communication interfaces, with A being RS485+ and B being RS485-.

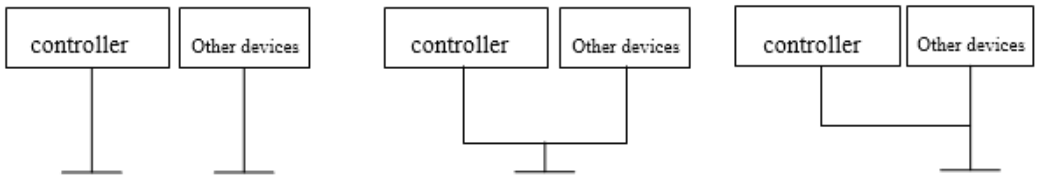
2. Controller specifications

2-1. Specifications

2-1-1. General specification

Item	Specification
Anti-noise	Noise voltage 1000Vp-p 1us pulse 1 minute
Air	No corrosive and combustible gas
Working temperature	-25℃~60℃
Storage temperature	-40~+80℃
Ambient humidity	5%~95% (no condensation)
Installation	DIN-Rail Mounting
Grounding (FG)	The third type of grounding (It shall not be grounded in common with strong current system)※

Note: Separate grounding or common grounding shall be adopted for grounding, and public grounding shall not be adopted.



Separate grounding　　Common grounding　　Public grounding

2-1-2. Performance specification

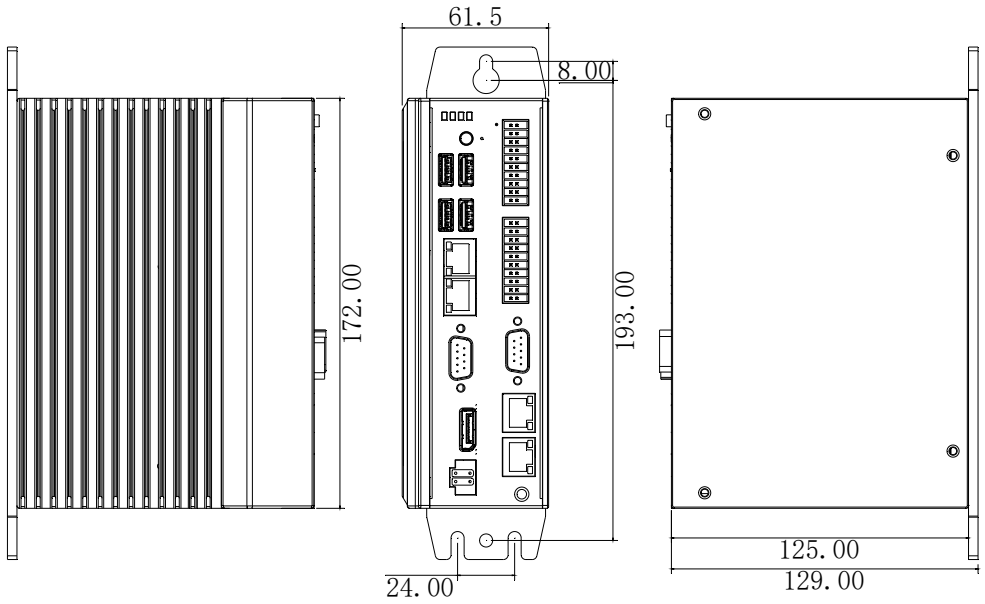
(1) XA310 series

Item	Definition
CPU	Intel® Celeron® J3455
Display	DP, the maximum resolution can reach 4096 x 2160@60Hz
Ethernet	2xIntel I211AT GbE (EtherCAT*1+Ethernet*3)
Memory	1 x M.2 2280 (128G)
External I/O	2x Intel I211-AT(10/100/100Mbps,Ethernet)
	2x USB2.0, 2x USB3.0
	1x RS-232/RS-485 BIOS control, 1x RS232, 1x485
	IO:12 inputs (NPN/PNP optional), 12 outputs
	4x LED (PWR\SATA\RUN\ERR)
Power supply	24V DC IN, 4PIN Phonix, ups management
Size	172x125x61.5mm
Weight	0.5kg
System	Windows
Installation	Rail installation

Working temperature	-20°C~ 60°C with 0.7m/s airflow
Storage temperature	-40°C~85°C 60° C @ 95% (non-condensing)
Relative humidity	10~95%@40°C (non-condensing)
Protection level	IP30

2-2. Dimension

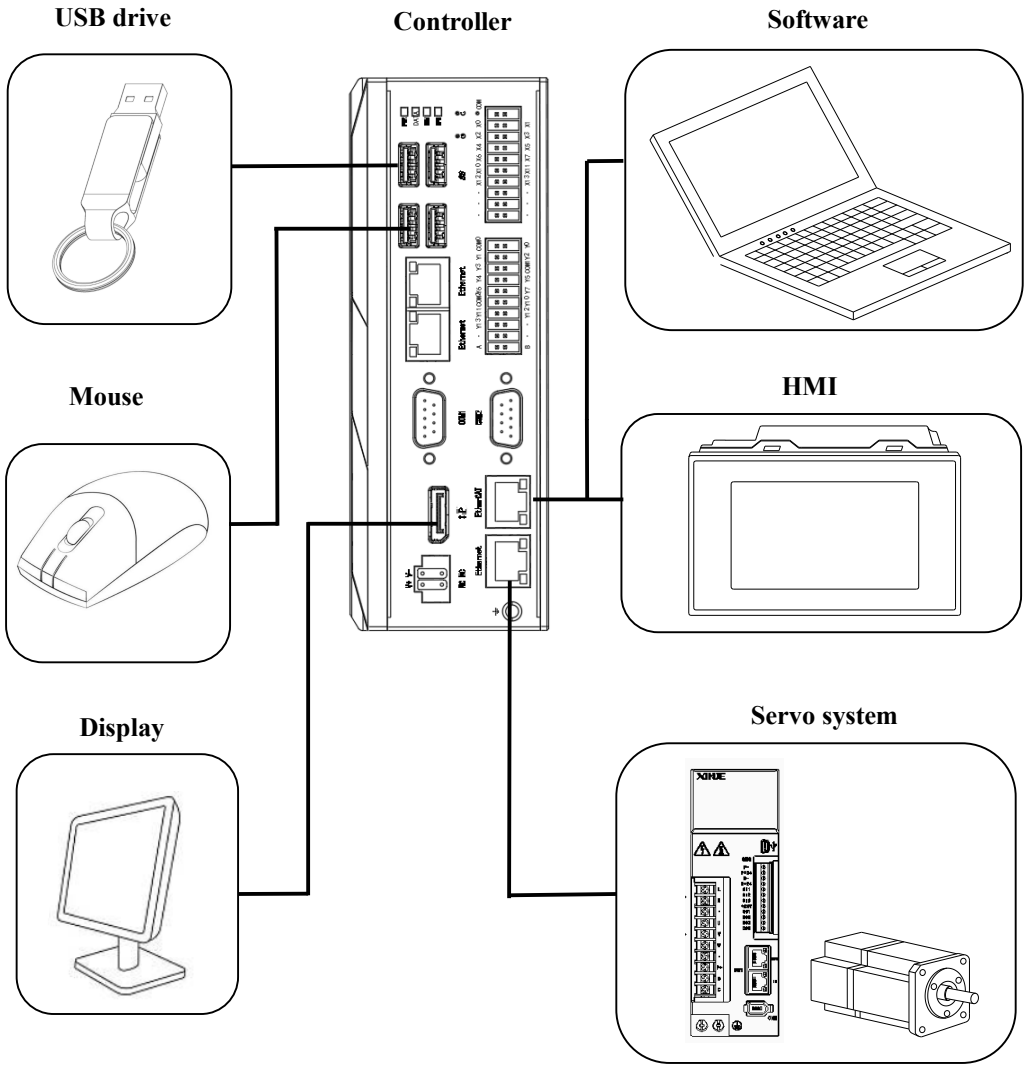
XA310 series:



3. System composition

3-1. System composition

The following diagram is a system architecture diagram constructed based on the basic configuration of industrial intelligent controllers (using the XA310 series as an example). Through this diagram, one can roughly understand the connection between the industrial intelligent controller I²C and peripheral devices, as well as the typical applications of various communication, connection, and expansion ports of each controller.



[Note]: The connection devices of the above communication ports are for example only, and the actual communication ports can connect multiple devices.

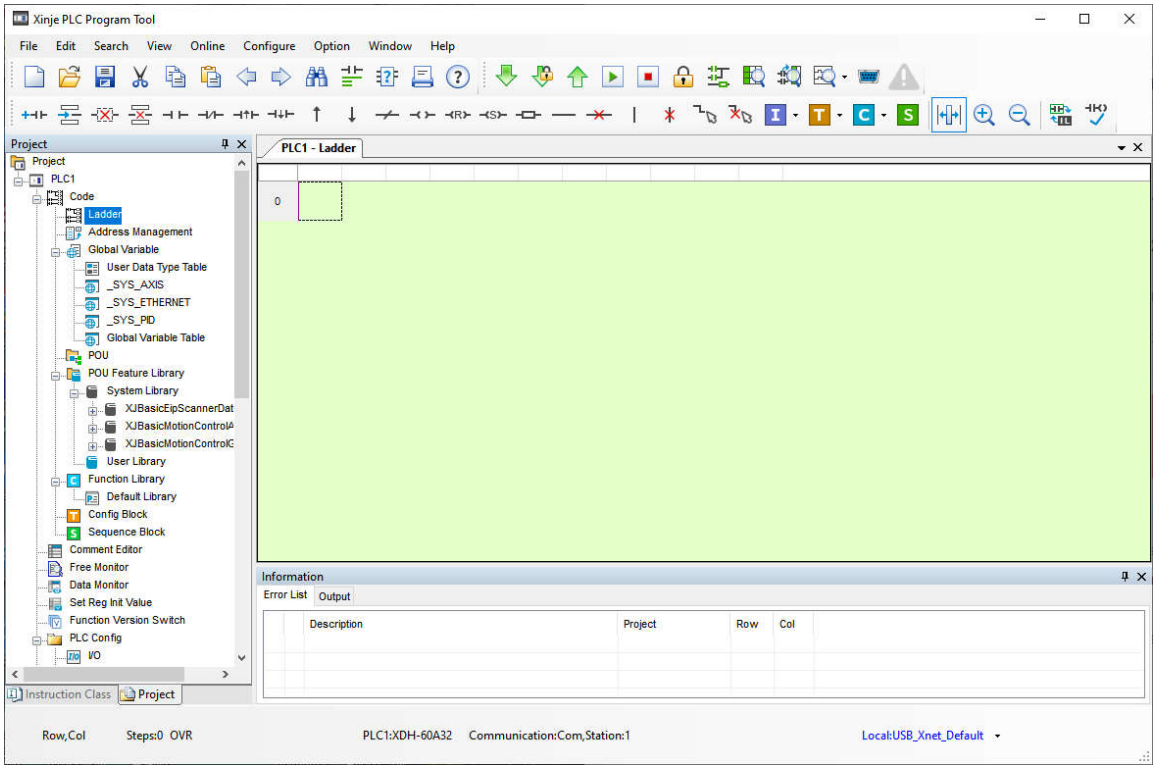
3-2. Peripheral unit

The industrial intelligent controller I²C involves various peripheral devices.

3-2-1. Programming software

In programming software, functions such as writing or uploading programs to the controller, real-time monitoring of the controller's operation, and configuring the controller can be implemented. After installing the programming software on a personal PC, the controller can be connected to the programming software through the RS232 or Ethernet port of the basic unit using an OP download cable or Ethernet cable.

- Interface of XDPPRO software (applicable to XA310 series)



3-2-2. HMI

The HMI is the interface that enables interaction between the industrial intelligent controller I²C and the operator. The HMI can conveniently and quickly transmit the operator's actions to the controller, which then executes the action.

The industrial intelligent controller I²C supports various HMI connections, which are established on the basis of consistent communication protocols, generally through Modbus protocol. The specific parameters depend on the specific connection HMI.

The HMI of Xinje Company can be directly connected to the basic unit for communication (communication parameters have been kept consistent). Currently, Xinje's HMI products are divided into touch screen TG/TS series and text display OP series.

(1) TG series

- Size: 4.3”, 7”, 8”, 10.1”, 15.6”
- Display: 16.77 million colors, 65536 colors
- Operation: touch operation in display area

- Interface: RS232, RS422, RS485, USB, RJ45
- Communication: it can communicate directly with Xinje frequency converter, various PLCs, frequency converters and instruments. Direct drive panel printer, supporting multiple printers.
  Equipped with two ports, which can connect two different devices at the same time.
  Support free format protocol, and users can freely write drivers.
- Recipe: multiple groups of recipe data can be input, to find the corresponding recipe group through the index number
- Screen: rich 3D image library, text effects, data collection, data backup, etc
- Password: nine level permission setting
- Advance: advanced functions, animation track design, etc

(2) TS series

- Size 7 ", 10.1 "
- Display 16.77 million colors
- Touch operation in the operation display area
- Interface RS232, RS422, RS485, USB-A, USB-B, Ethernet interface
- Communication can directly communicate with Xinje frequency converters, various PLCs, frequency converters, and instruments
  Directly drive panel printers, supporting multiple printers
  Equipped with dual ports, capable of connecting 2 different devices simultaneously
  Support for free format protocol, allowing users to freely write driver programs
  Supports OPCUA and PLChandler protocols, supports label communication
- Recipes are written directly through a recipe table
- 3D library with rich visuals, including text effects, data collection, and data backup
- Password permission list, supporting up to 30 types of permissions
- Advanced Multilingual Library, Address Label Library, Support Function Block

(3) OP series

- Size: 3.7”
- Display: STN-LCD
- Button: 7 or 20, screen cannot be touched
- Interface: RS232, RS485, RS422
- Communication: directly communicate with various PLC and Xinje frequency converter
- Clock: Built-in clock

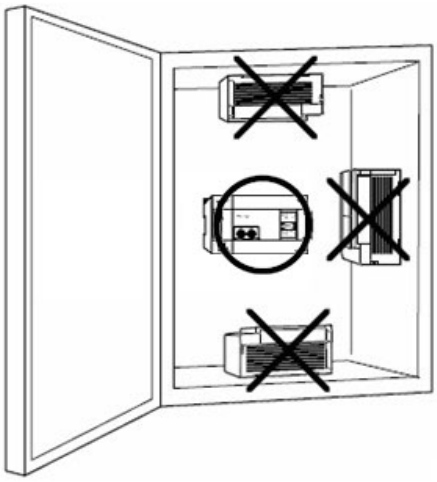
3-3. Unpacking inspection

Before opening the packaging, please check whether the product model indicated on the outer packaging is consistent with the product model ordered. After opening the packaging, please first inspect the surface of the industrial controller for mechanical damage, and then carefully check whether the accessories are complete according to the packing list or purchase contract. If the surface of the industrial controller is damaged or the product content does not match, please do not use it and contact the distributor immediately.

To prevent static electricity from damaging industrial controllers, please touch a grounded metal object before touching the controller circuit to release the static charge carried by your body, and wear anti-static gloves.

3-4. Product installation

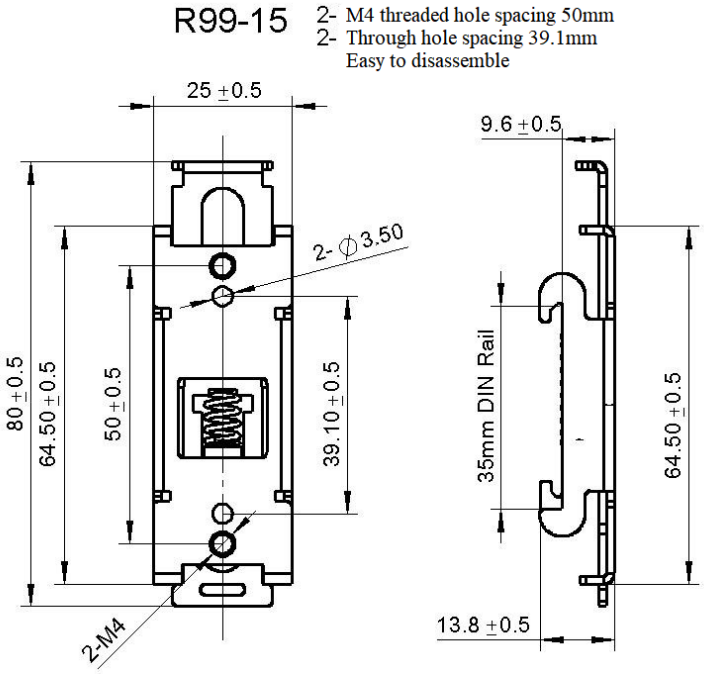
(1) Installation location



(2) Installation method

The installation of industrial intelligent controller I²C is carried out using matching guide rails.

- Use DIN46277 rail to install



Firstly, install the black guide rail buckle at the bottom of the controller with two screws. Then, fasten the end with a spring onto the top of the DIN46277 guide rail (35mm wide), and gently push it against one side of the spring to fasten the entire buckle onto the guide rail. When dismantling, gently push against one end of the spring to remove the product.

(3) Installation environment

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

4. Power supply specification

4-1. DC power supply specification

The industrial intelligent controller I²C only supports DC power supply type, with V+ connected to positive DC power supply and V- connected to negative DC power supply.

- DC power supply

Item	Content
Rated voltage	DC24V
Voltage allowable range	DC22.8V~25.2V
Input current (basic unit only)	120mA
Allowable instantaneous power off time	10ms DC24V
Impact current	10A DC26.4V
Maximum power consumption	30W

5. Input specification and wiring

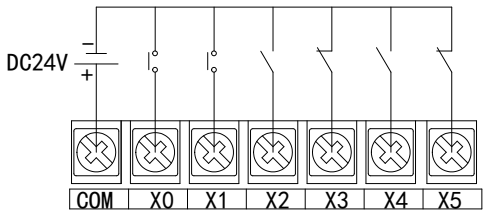
5-1. Input specification

The input of the industrial intelligent controller I²C is divided into two modes: NPN and PNP. The wiring methods for these two modes are introduced below:

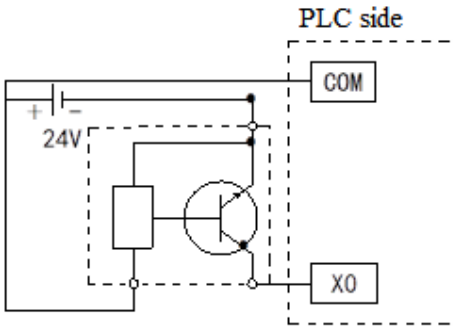
(1) Controller unit

Input signal voltage	DC24V±10%
Input signal current	7mA/DC24V
Input ON current	Below 4.5mA
Input OFF current	Below 1.5mA
Input response time	About 10ms
Input signal format	Contact input or NPN or PNP open collector transistor
Circuit insulation	Optoelectronic coupling insulation

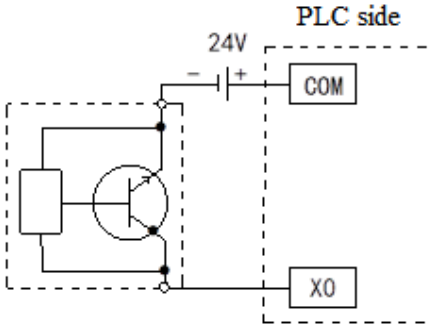
NPN wiring example:



switch button wiring diagram

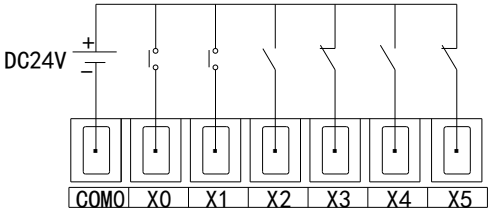


Example of 3-wire (NPN type) proximity switch

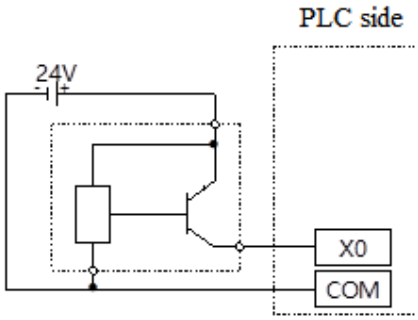


Example of 2-wire (NPN type) proximity switch

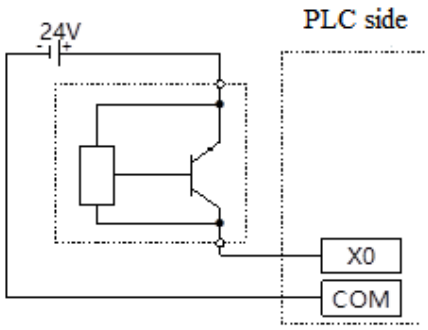
PNP wiring example:



switch button wiring diagram



Example of 3-wire (PNP type) proximity switch



Example of 2-wire (PNP type) proximity switch

- Input terminal

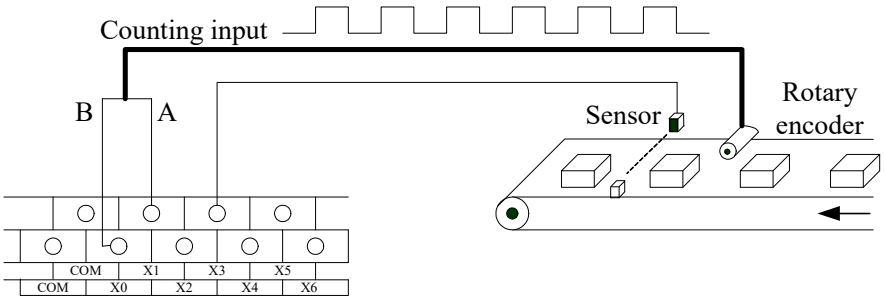
Due to the lack of a built-in DC24V power supply within the controller, an external DC24V power supply is required for input wiring.

- Input sensitivity

The input current of the controller is DC24V 7mA, but for reliable operation, when it needs to be turned on, the current is above 4.5mA, and when it is turned off, the current is below 1.5mA.

5-2. High speed counting input

The industrial intelligent controller I²C has a high-speed counting function that is independent of the scanning cycle of the programmable controller. By selecting different counters, it can measure high-speed input signals such as measurement sensors and rotary encoders. Its highest measurement frequency can reach 200KHz.



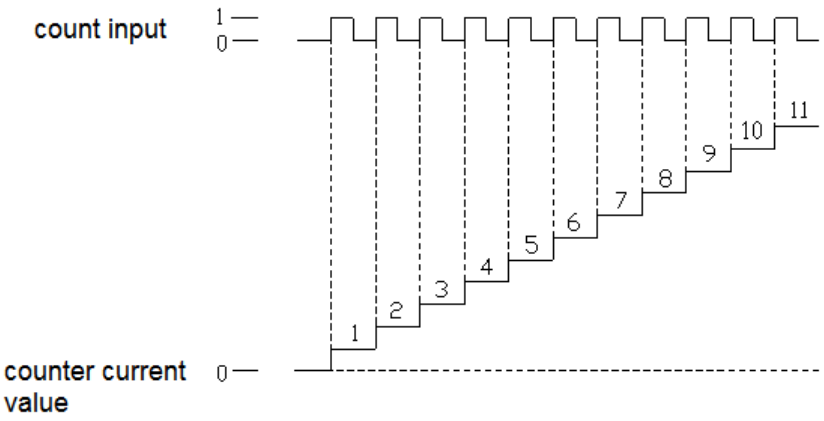
※ 1: When the counting frequency is higher than 25Hz, please use a high-speed counter.

5-2-1. Counting mode

The XA310 series high-speed counting function has two counting modes, namely incremental mode and AB phase mode.

(1) Incremental mode

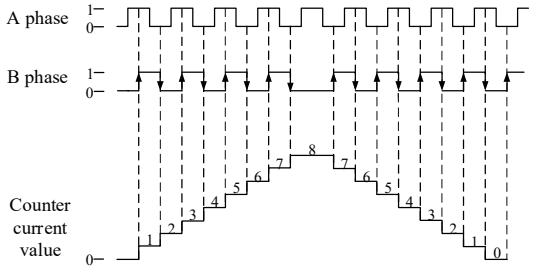
In this mode, the input pulse signal is counted, and the count value increases with the rising edge of each pulse signal.



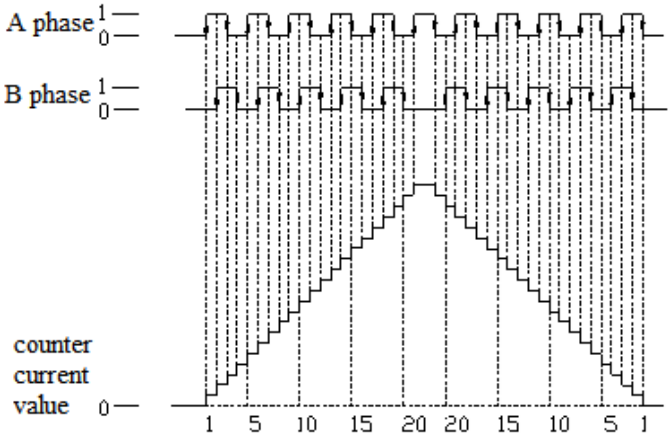
(2) AB phase mode

In this mode, the high-speed count value is incremented or decremented according to two differential signals (A phase and B phase), and can be divided into two modes: double frequency and quadruple frequency according to the frequency doubling. However, the default counting mode is quadruple frequency mode.

- **Double frequency mode**



- **Quadruple frequency mode**



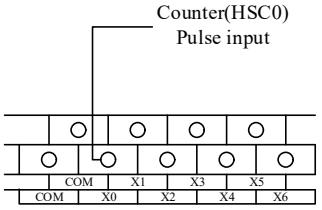
5-2-2. High speed counting range

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, overflow or underflow occurs.

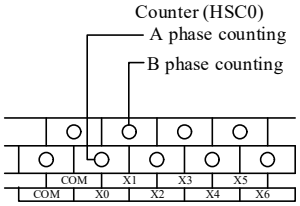
The so-called overflow occurs when the count value jumps from K+2,147,483,647 to K-2,147,483,648 and continues to count; When an underflow occurs, the count value jumps from K-2,147,483,648 to K+2,147,483,647 and continues counting.

5-2-3. High speed counter input wiring

For the wiring of the counting pulse input terminal, there are slight differences depending on the type of programmable controller and the type of counter. The typical input terminal wiring methods are shown in the following figure (taking the XA310 series as an example):



Incremental mode



AB phase mode

5-2-4. Input terminal allocation

(1) The high-speed counting channels of the XA310 series controller are shown in the following table:

Controller model	High speed counting channel	
	Incremental mode	AB phase mode
XA310	4	4

(2) Definition of high-speed encoder counting input terminal:
The meanings of each letter are:

U	A+, A-	B+, B-	Z+, Z-
Counting pulse input	A phase input	B phase input	Z-phase pulse capture

[Note]: The Z-phase function is still under development.

Under normal circumstances, the input frequencies of X0 and X1 terminals can reach 200KHz and 100KHz respectively in single-phase and AB phase modes. When the X input terminal is not used as a high-speed input port, it can be used as a regular input terminal. In the frequency doubling term in the table, "2" represents a fixed double frequency, "4" represents a fixed 4 frequency doubling, and "2/4" represents 2 frequency doubling or 4 frequency doubling optional. The specific port allocation and functions are shown in the table below:

XA310 series												
	Single phase incremental mode						AB phase mode					
	HSC0	HSC2	HSC4	HSC6	HSC8	HSC10	HSC0	HSC2	HSC4	HSC6	HSC8	HSC10
Max frequency	200K	200K	200K	200K			100K	100K	100K	100K		
4 frequency doubling							2/4	2/4	2/4	2/4		
Counting interruption	√	√	√	√			√	√	√	√		
X000	U						A					
X001							B					
X002							Z					
X003		U						A				
X004								B				
X005								Z				
X006			U						A			
X007									B			

XA310 series												
	Single phase incremental mode						AB phase mode					
	HSC0	HSC2	HSC4	HSC6	HSC8	HSC10	HSC0	HSC2	HSC4	HSC6	HSC8	HSC10
X010									Z			
X011				U						A		
X012										B		
X013										Z		

5-3-5. AB phase counting frequency doubling setting mode

For AB phase counting, the frequency doubling can be set by modifying the data in the special FLASH data registers SFD321, SFD322, SFD323... SFD330. When the value is 2, it is 2 frequency doubling, and when the value is 4, it is 4 frequency doubling.

Register	Function	Setting value	Meaning
SFD320	HSC0 frequency doubling	2	2 frequency doubling
		4	4 frequency doubling
SFD321	HSC2 frequency doubling	2	2 frequency doubling
		2	4 frequency doubling
SFD322	HSC4 frequency doubling	2	2 frequency doubling
		2	4 frequency doubling
SFD323	HSC6 frequency doubling	2	2 frequency doubling
		4	4 frequency doubling
SFD324	HSC8 frequency doubling	2	2 frequency doubling
		4	4 frequency doubling
SFD325	HSC10 frequency doubling	2	2 frequency doubling
		4	4 frequency doubling
SFD326	HSC12 frequency doubling	2	2 frequency doubling
		4	4 frequency doubling
SFD327	HSC14 frequency doubling	2	2 frequency doubling
		4	4 frequency doubling
SFD328	HSC16 frequency doubling	2	2 frequency doubling
		4	4 frequency doubling
SFD329	HSC18 frequency doubling	2	2 frequency doubling
		4	4 frequency doubling

[Note]:

※ 1: For more information on high-speed counting applications, please refer to the "XD/XL Series Controller User Manual [Basic Instructions]".

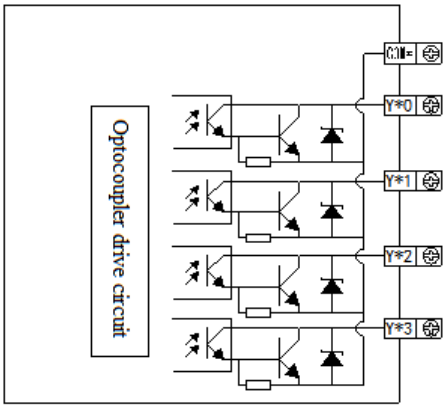
※ 2: After modifying the SFD register, it is necessary to restart the high-speed counter (i.e. disconnect and then reconnect the driving conditions) in order for the new configuration to take effect!

6. Output specification and wiring

6-1. Output specification

(1) Normal transistor output

External power supply		Below DC5~30V
Circuit insulation		Optocoupler insulation
Action indicator		LED light
Max load	Resistive load	0.3A
	inductive load	7.2W/DC24V
	Light load	1.5W/DC24V
Min load		DC5V 2mA
Open circuit leakage current		< 0.1mA
Response time	OFF→ON	< 0.2ms
	ON→OFF	< 0.2ms



(2) Transistor high speed pulse output

Model	XA310 series
High speed pulse output terminals	Y0~Y3
External power supply	Below DC5~30V
Action display	LED light
Max current	50mA
Max output frequency	100KHz

[Note]: When using the high-speed pulse output function, the controller can output 100KHz~200KHz pulses, but it cannot guarantee that all servos are running normally. Please connect a resistor of about 500 ohms between the output terminal and the 24V power supply.

6-2. Transistor output

General transistor output

- Output terminal
  The transistor output of the controller unit has 2-3 common terminals.
- External power supply
  Please use DC5~30V power supply to drive the load.
- Circuit isolation

The internal circuit of the programmable controller is insulated and isolated from the output transistor using a optocoupler; In addition, the common blocks are also separated from each other.

- Response Time

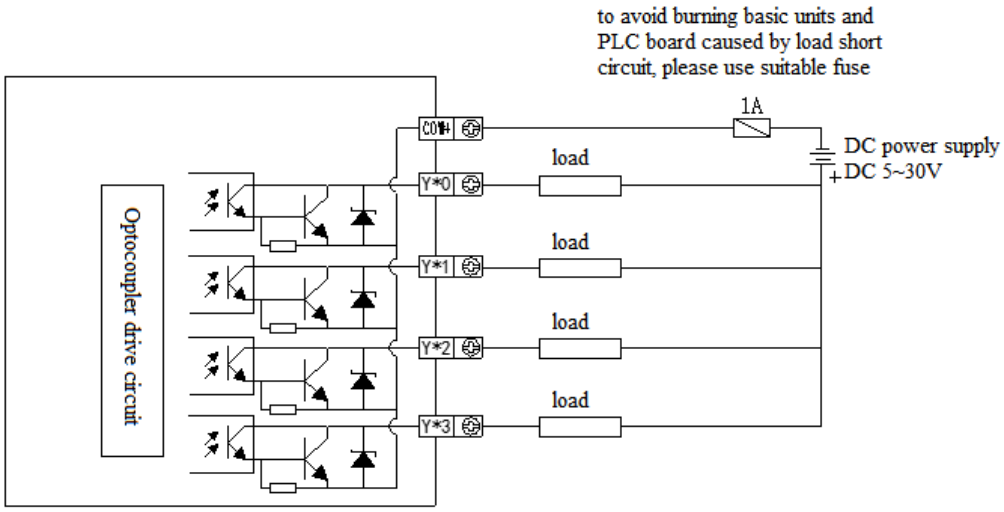
The time interval that PLC from photoelectric couplers energizing (or cutting) to transistor ON (or OFF) is below 0.2ms.

- Output current

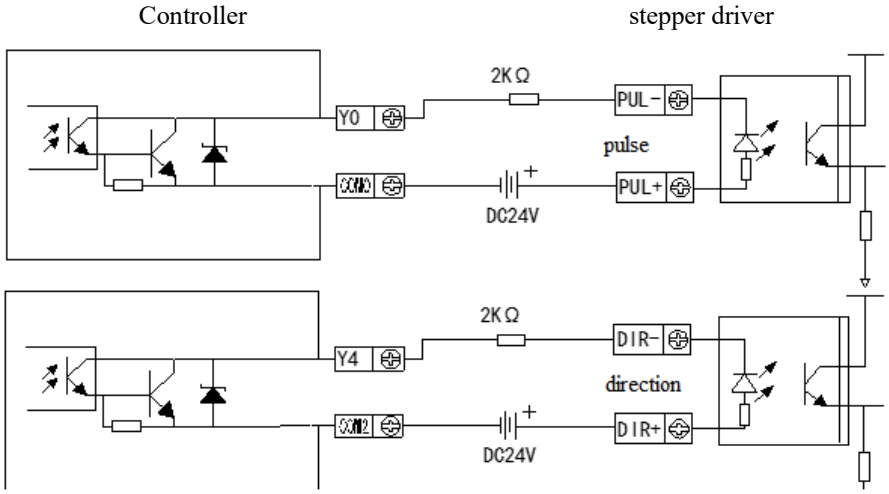
The current it outputs is 0.3A per point. But limited by the temperature rising, every 4 points current add up to 0.5A.

- Open circuit current

Below 0.1mA.



Example: The following is a schematic diagram of the wiring between the controller and the stepper motor driver.



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

7. BIOS setting

7-1. BIOS explanation

BIOS is a basic input/output control program stored in Flash Memory. This program is a bridge between the motherboard and the operating system, responsible for managing the relevant parameter settings between the motherboard and the expansion card. When the controller is activated, it will be controlled by the BIOS program. First, it will execute a POST self-test, which will detect all hardware devices and confirm the synchronization of hardware parameters. When all tests are completed, it transfers control of the system to the operating system (OS). Since BIOS is the only channel between hardware and software, how to properly set the parameters in BIOS will determine whether your computer runs stably and works in the best state. Therefore, the correct setting of BIOS is a key factor for system stability, thus ensuring that the system performance can reach the best state.

CMOS Setup will store the set data in the CMOS SRAM built in the motherboard. When the power is off, the lithium battery on the motherboard continues to power the CMOS SRAM. The BIOS setup utility allows you to configure.

(1) Hard disk drives and peripherals

(2) Video display types and display options

(3) Password protection

(4) Power management function

 ***Note***	As the BIOS version of the motherboard is constantly upgraded, the BIOS description in this manual is for reference only. We can not guarantee that the relevant contents in this manual are consistent with the information you have obtained.

7-1-1. CMOS Setup

When the controller starts, the BIOS enters the power on self-test (Post) program. The self-test program is a series of diagnostic programs fixed in the BIOS. When the self-test program is completed, no errors are encountered. If you want to enter the BIOS, press DEL or ESC until you enter the BIOS interface. If this information disappears before you respond, you can shut down and restart your computer, or press<Ctrl>+<Alt>+<Delete>at the same time to restart the computer.

7-1-2. Function keys and auxiliary instructions

↑ (Up button)	Move to the previous item
↓ (Down button)	Move to the next item
← (Left button)	Move to the left item
→ (Right button)	Move to the right item
ESC	Exit the present interface
Enter	To confirm
＋	Change the setting state or increase the value
－	Change the setting state or decrease the value
F1	To show the help document
F2	To load the last setting value
F3	To load the optimized value
F4	Store the set value and leave the CMOS SETUP program

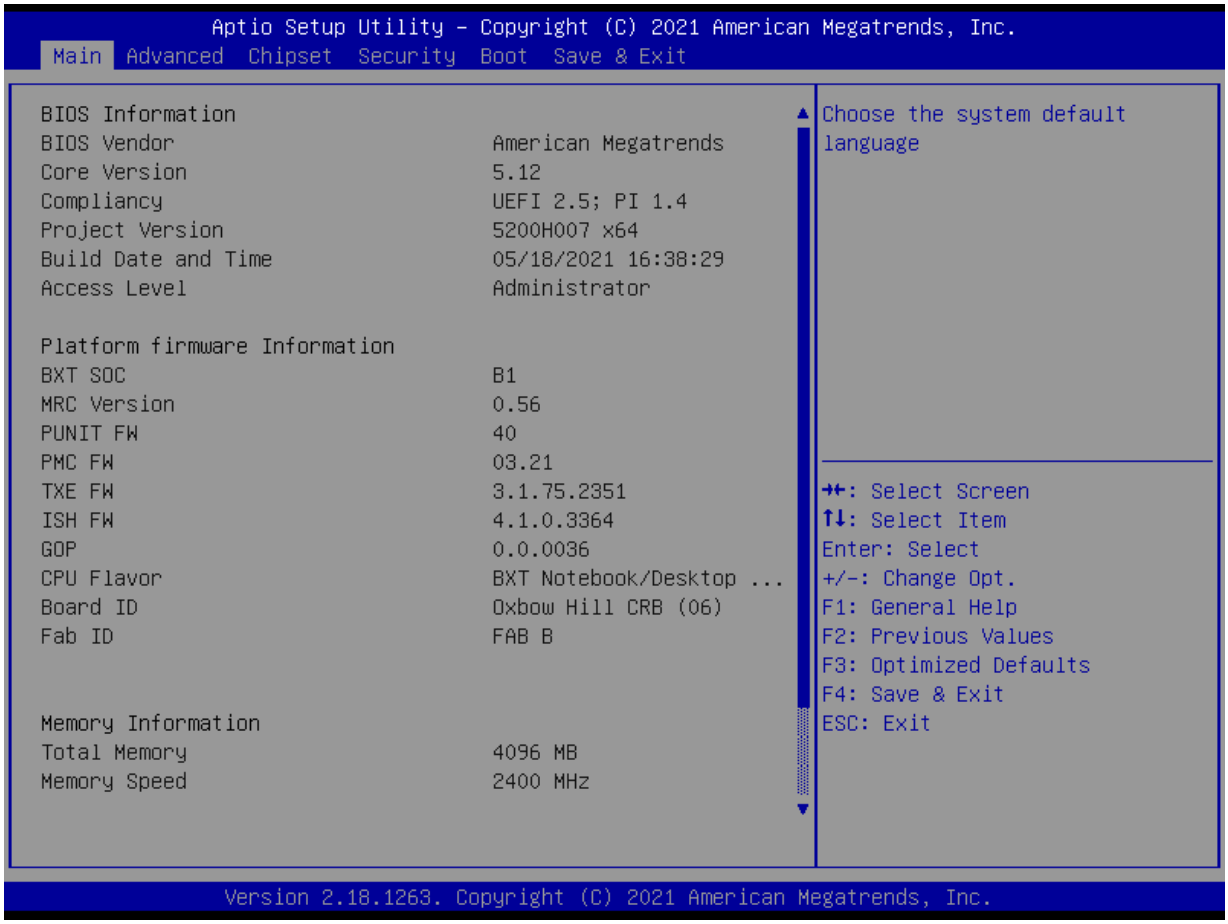
Auxiliary description of the main screen:

When you are in the Setup main screen, the main settings of the corresponding options are displayed below as the options move.

If you want to leave the auxiliary description window, just press the [ESC] key.

7-2. Main menu

When you enter the CMOS setup setting menu, you can see the main menu shown at the top of the screen. In the main menu, you can select different setting options by pressing the left and right direction keys. After selecting the submenu, detailed setting options will be displayed below.



Main menu

(1) Main (standard CMOS function setting)

Set the date, time, etc.

(2) Advanced (Advanced BIOS function settings)

Set the special functions provided by BIOS, such as CPU, USB, PCI, network port, etc.

(3) Chipset(Chipset Performance Settings)

Set device options such as North Bridge and South Bridge.

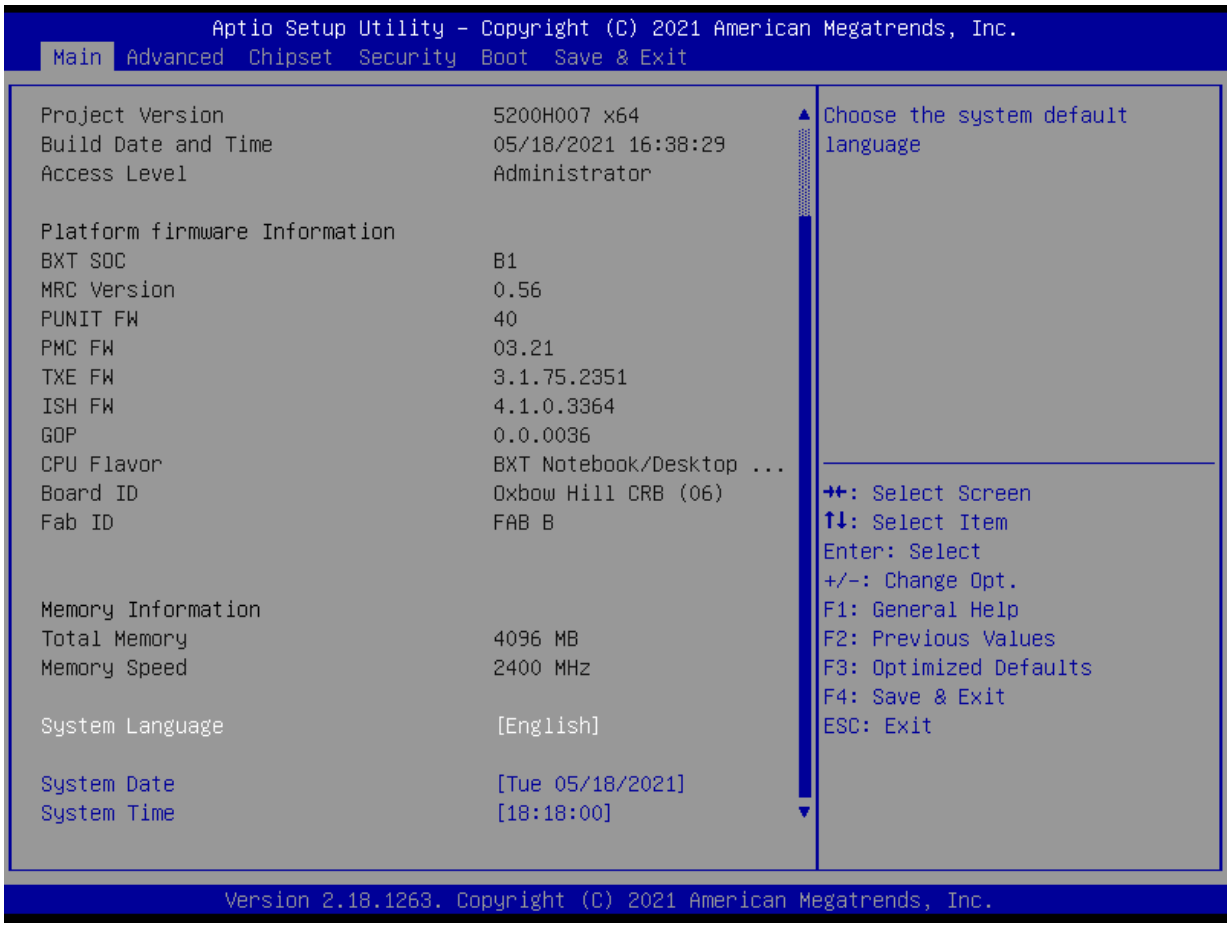
(4) Security (set Administrator/User password)

(5) Boot(Boot item configuration feature)

(6) Save & Exit:

This option includes discarding changes, exiting without saving, and exiting without saving.

7-3. Main (Standard CMOS setting)



Main menu

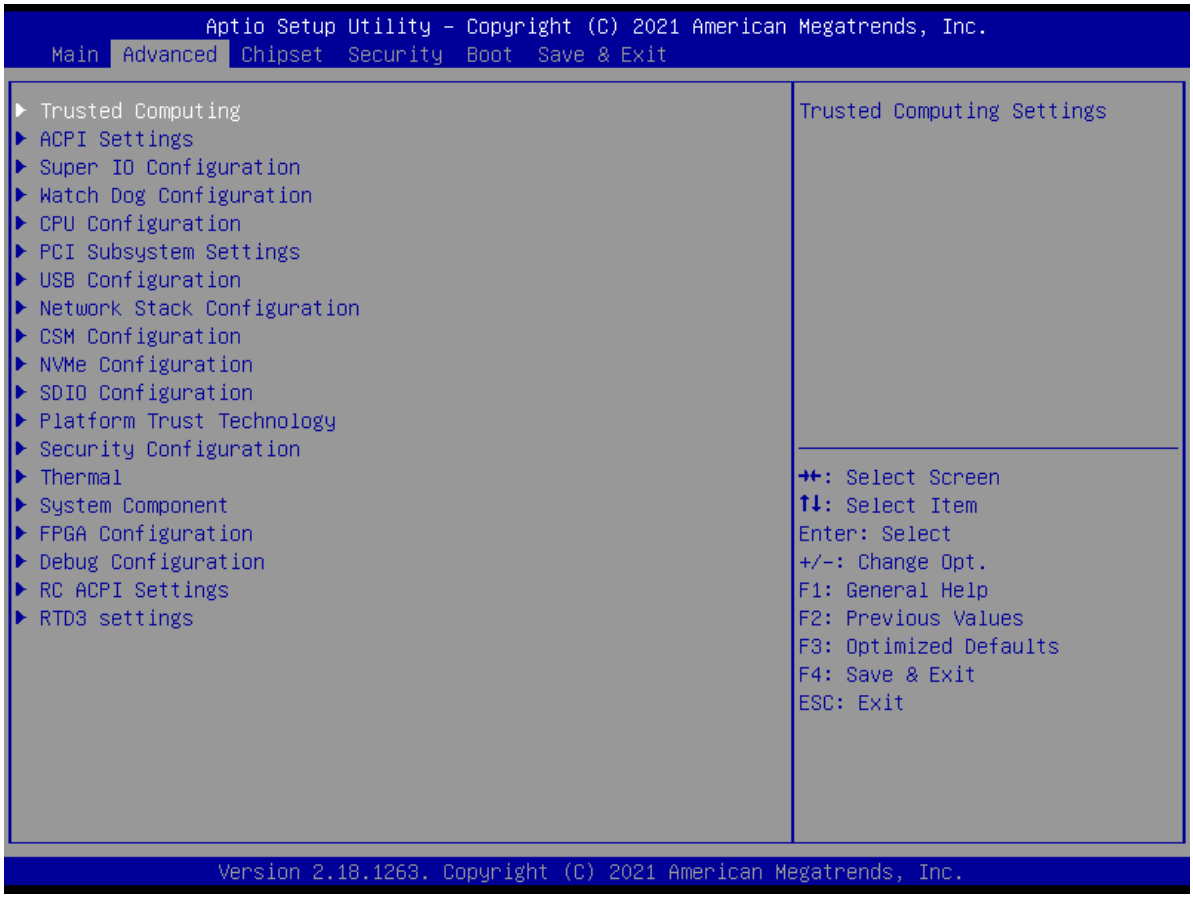
(1) System Language: Set the language in the computer.

(2) System Date(mm:dd:yy)(set the date): Set the date in the computer in the format of "Week/Month/Day/Year".

(3) System Time(hh:mm:ss)(set the time): Set the time in the computer in the format of "hour/minute/second".

7-4. Advanced(Advanced BIOS function)

7-4-1. Advanced menu



Advanced menu

(1) Trusted Computing

(2) ACPI Settings

(3) SMART Settings

(4) Super IO Configuration

(5) Watch Dog Configuration

(6) CPU Configuration

(7) PCI Subsystem Settings

(8) USB Configuration

(9) Network Stack Configuration

(10) CSM Configuration

(11) NVMe Configuration

(12) SDIO Configuration: Secure digital IO port settings

(13) Platform Trust Technology

(14) Security Configuration

(15) Thermal

(16) System Component

(17) FPGA Configuration

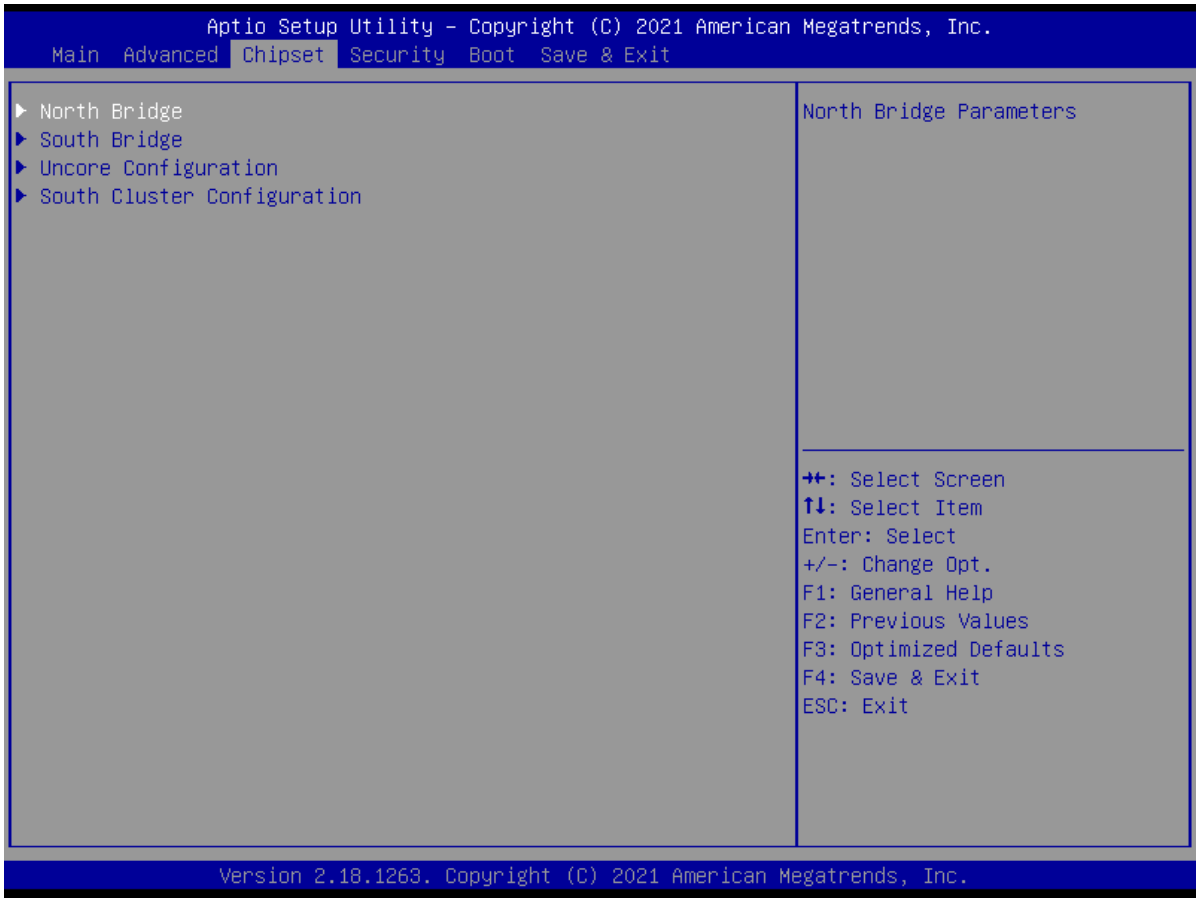
(18) Debug Configuration

(19) RC ACPI Settings

(20) RTD3 Settings

(21) 4.5 Chipset(Chipset performance settings)

7-4-2. Chipset menu



Chipset menu

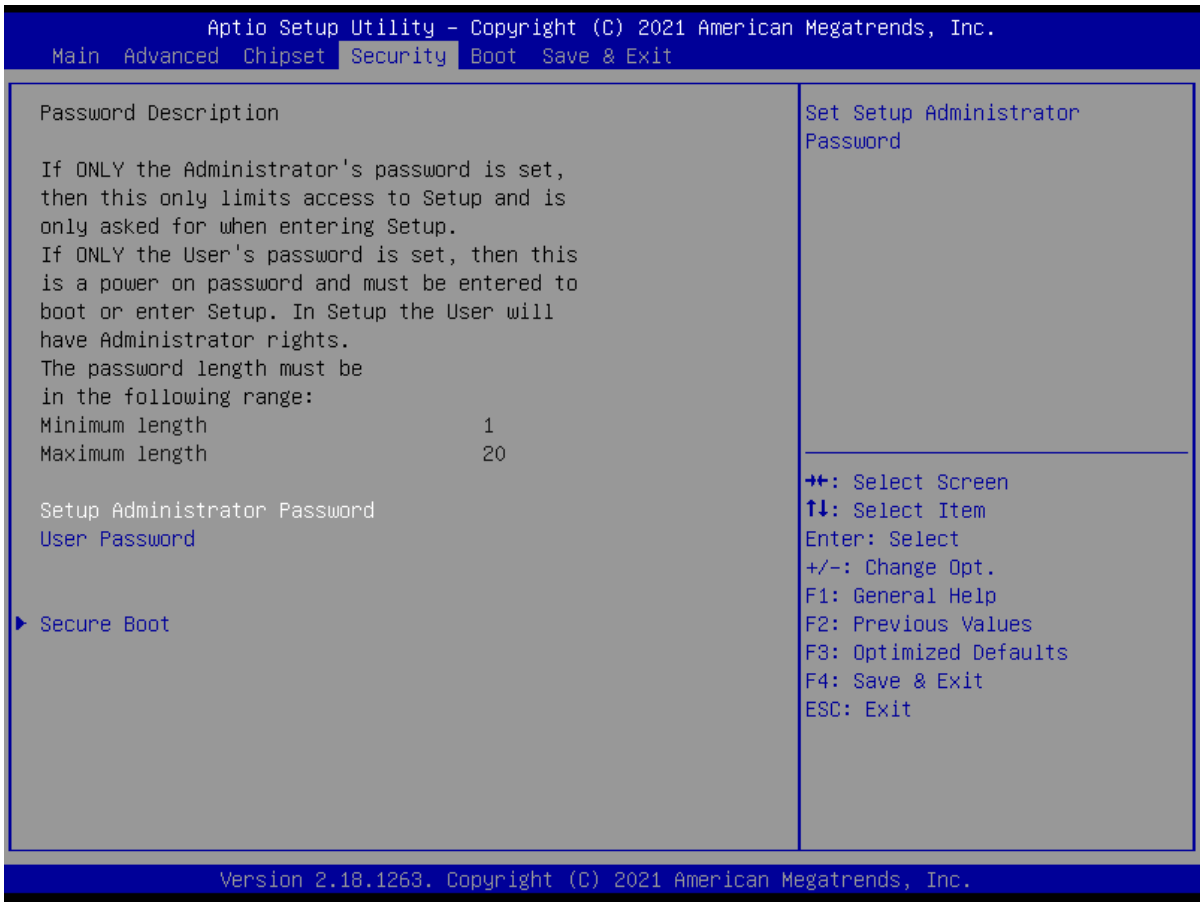
(1) North Bridge setting

(2) South Bridge setting

(3) Uncore Configuration

(4) South Cluster Configuration

7-5. Security (Administrtor/User password)



Security menu

(1) Setup Administrator Password: Set the super user password option, which has the highest permissions.

When you select this function, the following message will appear: Crate New Password******

Enter a password of up to 20 characters, and then press the <Enter> key. The BIOS requires you to enter the same password again. After entering it, the BIOS saves the set password. Once using the password function, you will be asked to enter a password each time before entering the BIOS setup program. This can prevent any unauthorized person from using your controller.

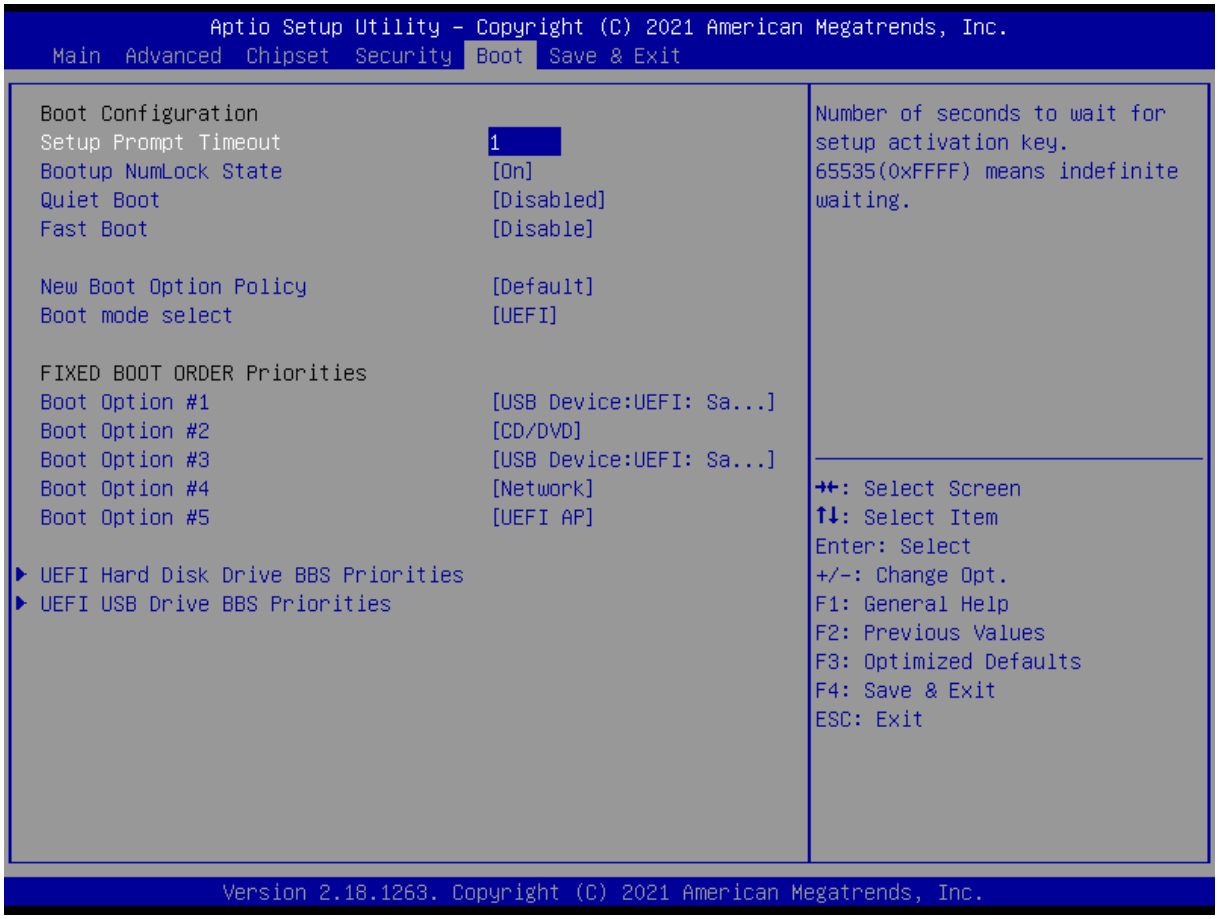
(2) User Password: Set the user password option. This password permission will be restricted, and some settings cannot be changed.

When you select this function, the following message will appear: Crate New Password******

Enter the password, up to 20 characters, and press the<Enter>key. The BIOS requires the same password to be input again. After the input is completed, the BIOS saves the set password. Once you use the password function, you will be asked to enter the password before entering the BIOS setup program.

(3) Secure Boot: Security guidance settings.

7-6. Boot setting



Boot menu

(1) Boot Configuration:

Setup Prompt Timeout

The POST dwell time is displayed at startup. The larger the value, the longer the dwell time.

Bootup NumLock State: Num Lock key state after system startup

Setting value：[On] / [Off]. This option specifies the state of the Num Lock key on the keyboard after the controller is started.

Quiet Boot

Setting value :[Disabled] / [Enabled]. This option specifies whether to display a LOGO when the controller starts.

(2) Boot Option Priorities：

Boot Option #1: First boot option. Use this option to choose which disk to start from

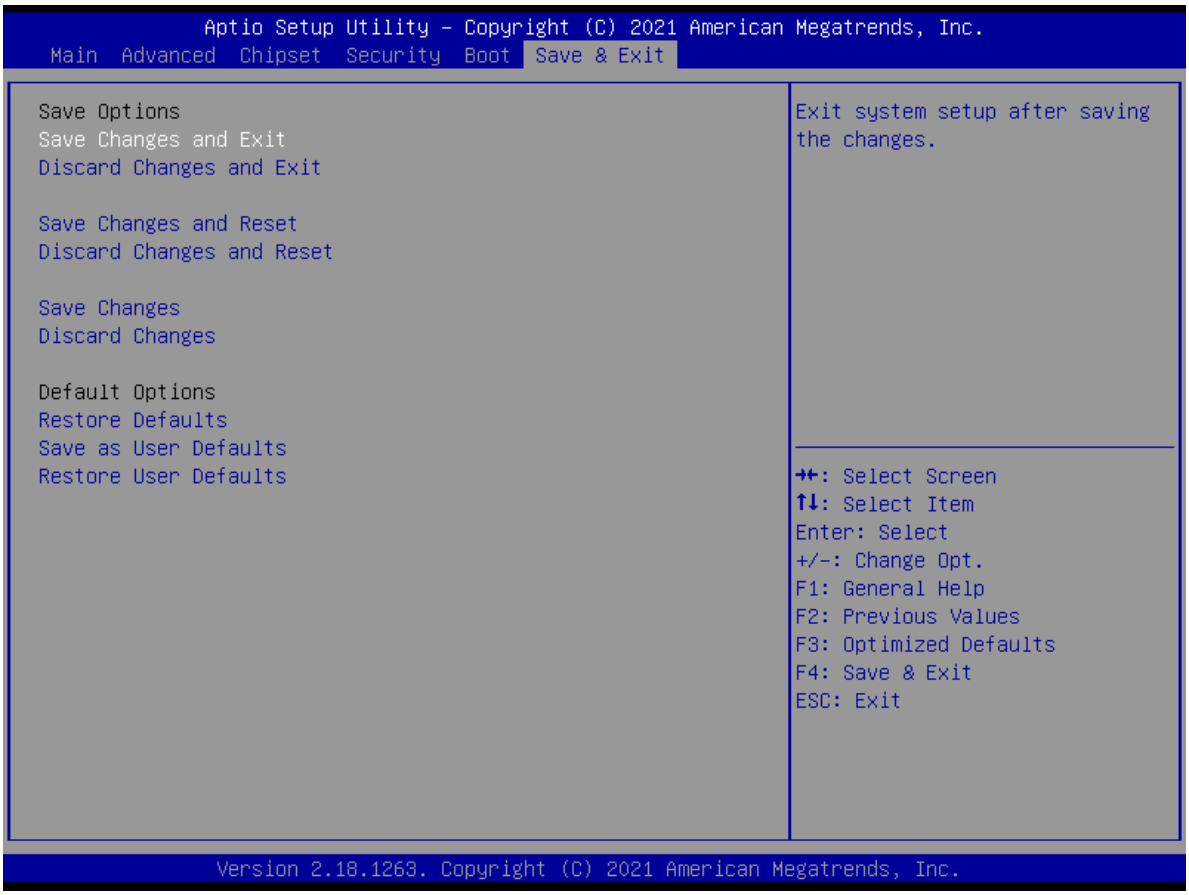
Fast Boot

Setting value :[Disabled]/ [Enabled]

This option specifies whether to perform hardware self testing at startup.

(3) New Boot Option Policy

7-7. Save & Exit



Save&Exit menu

(1) Save Options

Save Changes and Reset

Discard Changes and Reset

(2) Defaults Options

Restore Defaults: Load Optimal Defaults

This option in the main menu allows the user to restore all BIOS options to optimized values. The optimization default value is the default value set to optimize the performance of the motherboard. If you select YES and press Enter, you can save all the settings to CMOS SRAM and leave the BIOS setup program. If you do not want to save, select NO to return to the main menu.

Save as User Defaults

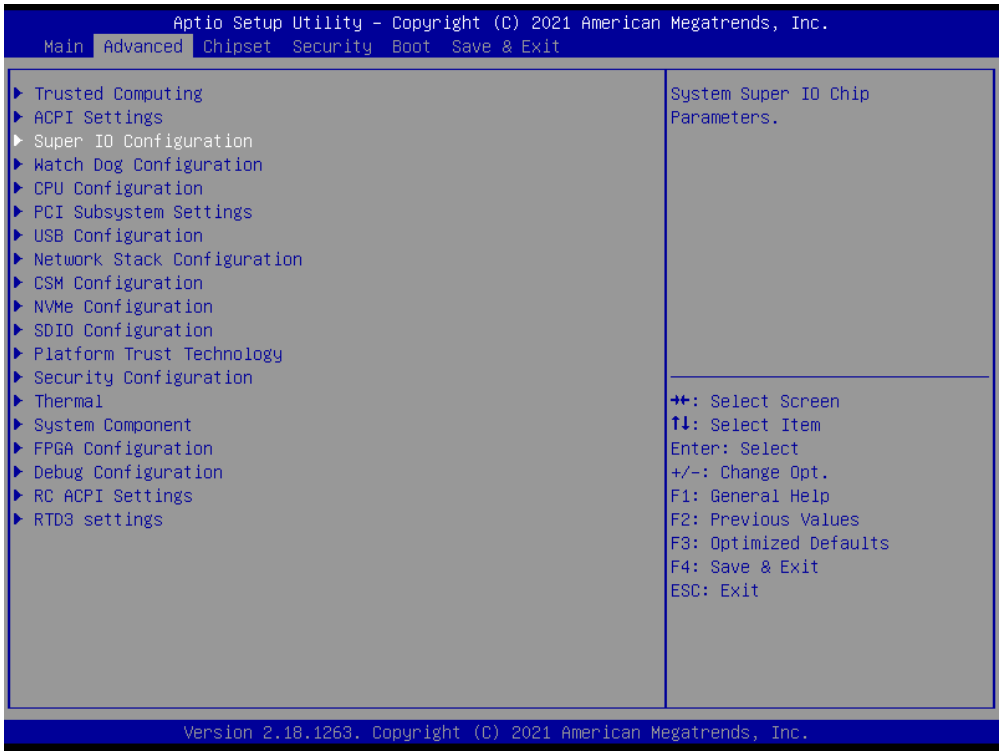
Restore as User Defaults

(3) Boot Override

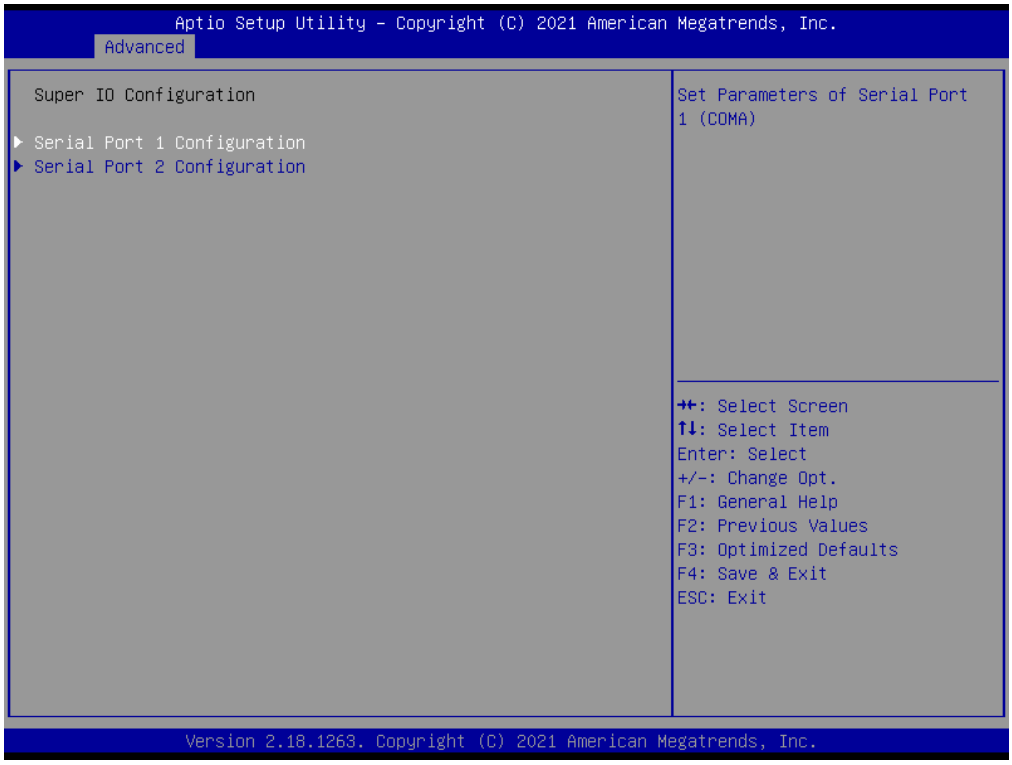
7-8. Set com port mode

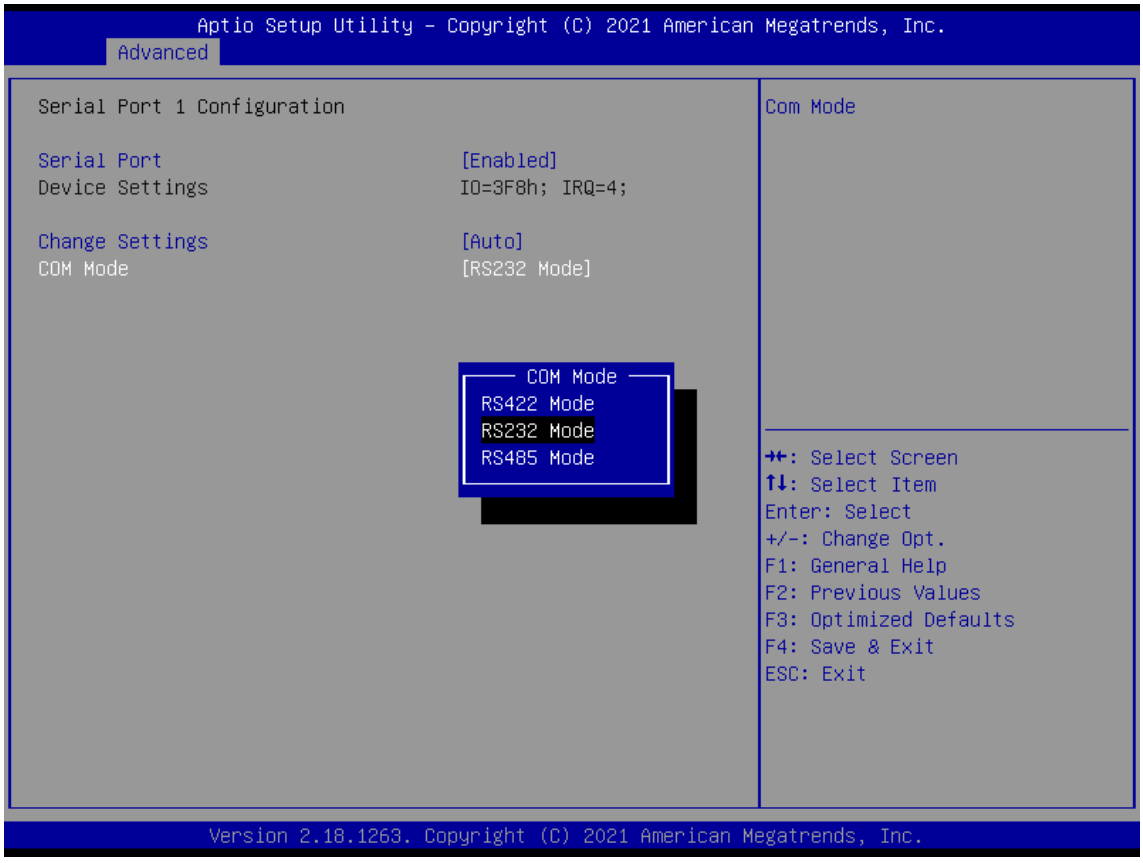
Set com port to RS232 or RS485

Select Advanced----Super IO configuration.



Select the COM port, enter, there is COM mode options, please select RS232, RS485, RS422.




Aptio Setup Utility – Copyright (C) 2021 American Megatrends, Inc.
Advanced
Serial Port 1 Configuration
Serial Port [Enabled]
Device Settings IO=3F8h; IRQ=4;
Change Settings [Auto]
COM Mode [RS232 Mode]
COM Mode
RS422 Mode
RS232 Mode
RS485 Mode
Com Mode
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2021 American Megatrends, Inc.

8. Operation, commissioning and maintenance

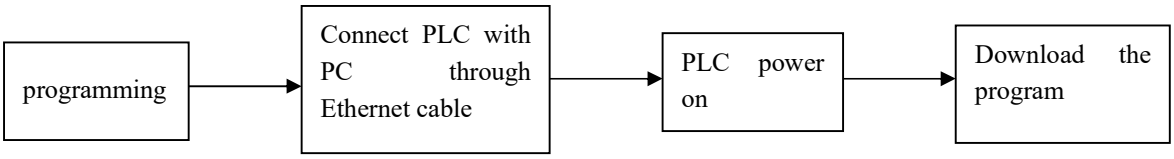
8-1. Operation and commissioning

(1) Product inspection

After receiving the product, please first check whether the input and output terminal blocks of the product are intact and whether there are missing parts. Generally speaking, the PLC at this time can be directly connected to the power cable for power on inspection, and the PWR and RUN indicators should be always on.

(2) Programming and downloading

After confirming that the product is in good condition, the PLC can be programmed. The programming is carried out in the personal computer. The completed program can be downloaded to PLC. The general operation steps are as follows:



[Note]: Please connect the programming cable before powering on the controller to effectively prevent the serial port from being burned out!

(3) Debugging

Ideally, the PLC is in normal operation, but if the program in the PLC is found to be wrong and needs to be modified, it is necessary to rewrite the program to the running PLC.

- Use RS232 or Ethernet cable to connect PLC and computer
- Upload the program in the PLC
- Modify the uploaded program, and save the modified program
- Pause the operation of PLC and download the modified program to PLC
- Monitor PLC through software debugging function
- If the requirements are still not met, continue to modify the program and download it to PLC until the requirements are met.

(4) PLC indicator light

- When the PLC is in normal operation, the indicator lights PWR and RUN should always be on.
- When the indicator ERR is always on, it indicates that there is a problem with the PLC operation. Please correct the program in time.
- If the indicator PWR is not on, there is a problem with the power supply. Check the power wiring.

8-2. Routine maintenance

(1) Regular inspection of products

Although the programmable controller has certain anti-interference and strong stability, it should also form the habit of regular inspection and maintenance of the controller. The inspection items include:

- Whether the input and output terminals and power supply terminals of PLC are loose
- Whether the communication port is intact
- Whether the power indicator and input / output indicator can be lit
- Remove the accumulated dust outside the PLC to avoid dust and conductive dust falling inside the PLC
- Try to make the PLC operation and storage environment conform to the standards described in section 2-1-1 of this manual.

(2) Discard

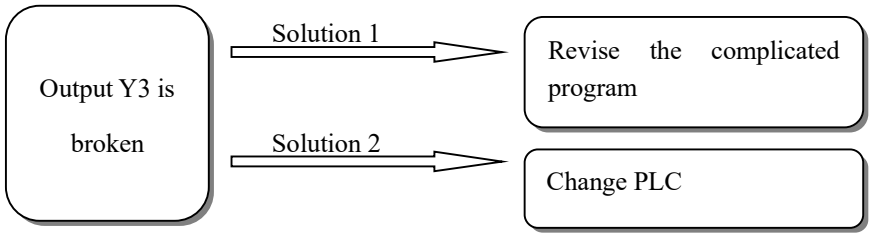
If you decide to discard this product, please treat it as industrial waste.

9. Soft components switching

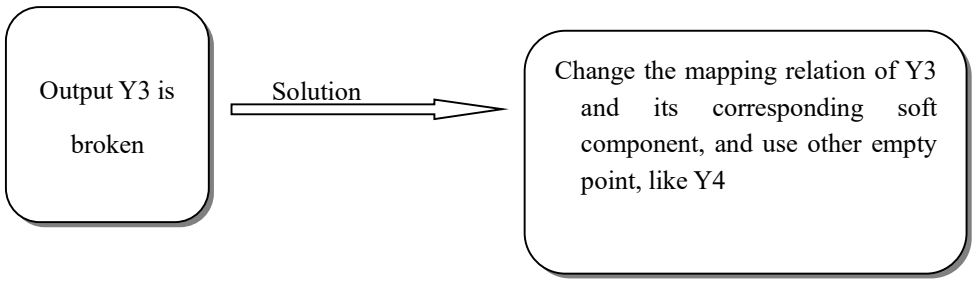
9-1. Function overview

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)



9-2. Operation method

For a damaged input/output point, we change its mapping relationship in a way that allows other points to execute its function without needing to modify the user program. In the special registers of the controller, we allocate a section of addresses for the user to modify this mapping relationship. The user simply needs to locate the address for modifying the mapping of the damaged input/output point and change the value at that address to the value of the replacement input/output point.

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

Table 1 mapping address of input points

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)

Table 2 mapping address of output points

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.

[Note]:

※1: After changing the mapping relation, please power on PLC again.

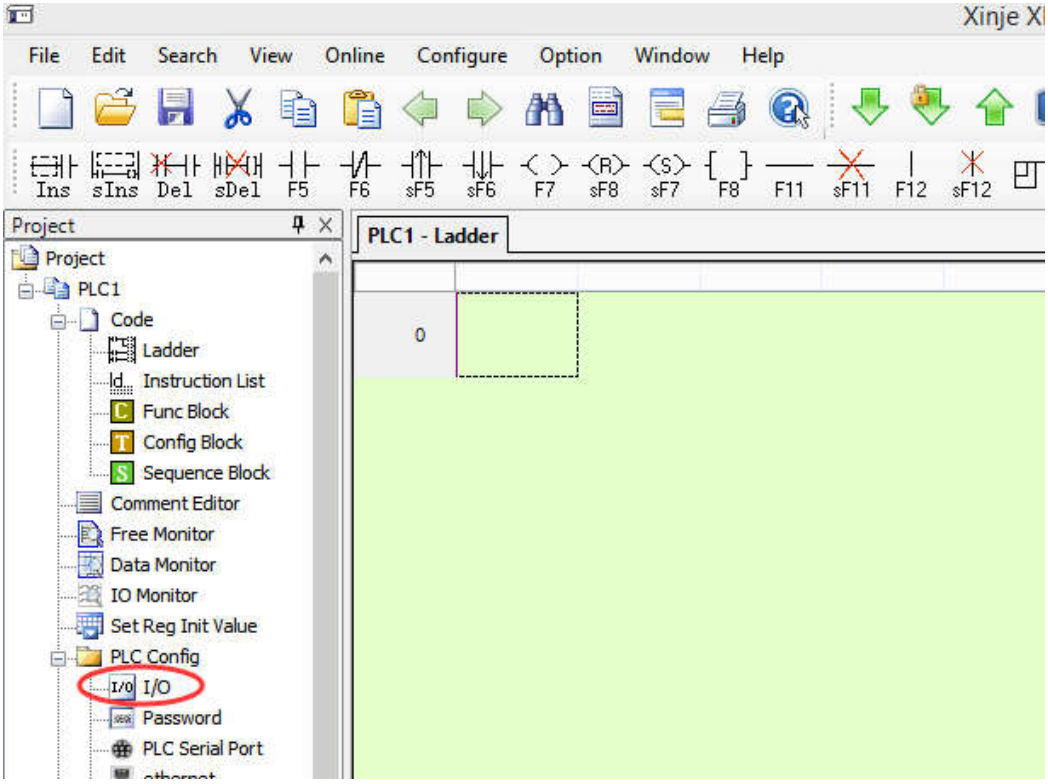
※2: When change the mapping relation, please pay attention, input/output data is octal number while ID is decimal number.

※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;

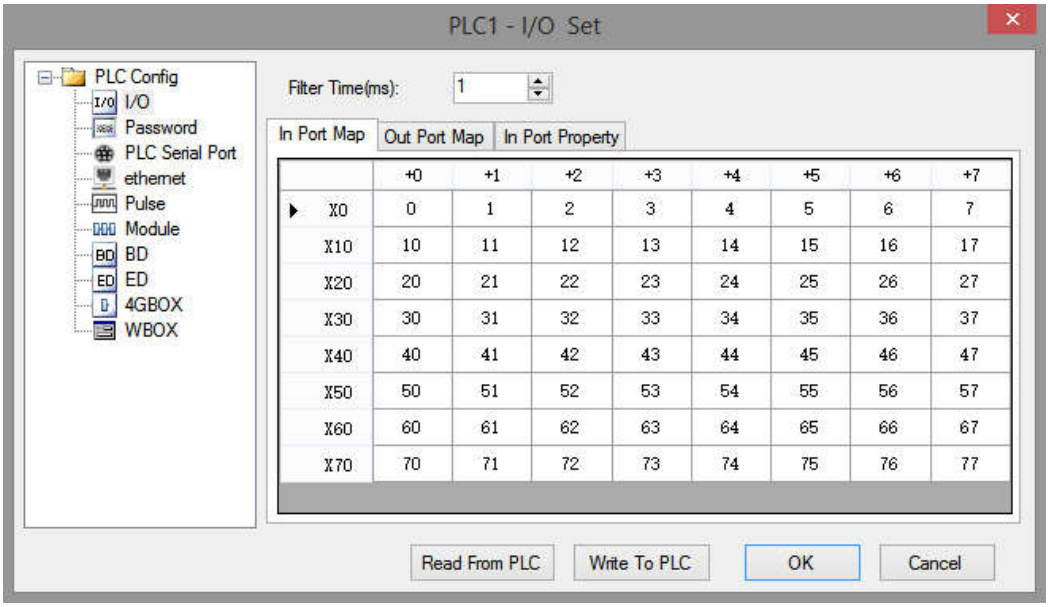
※4: Mapping relation, one terminal corresponds to one soft component.

※5: Users can modify the SFD value in the software, please see method 2.

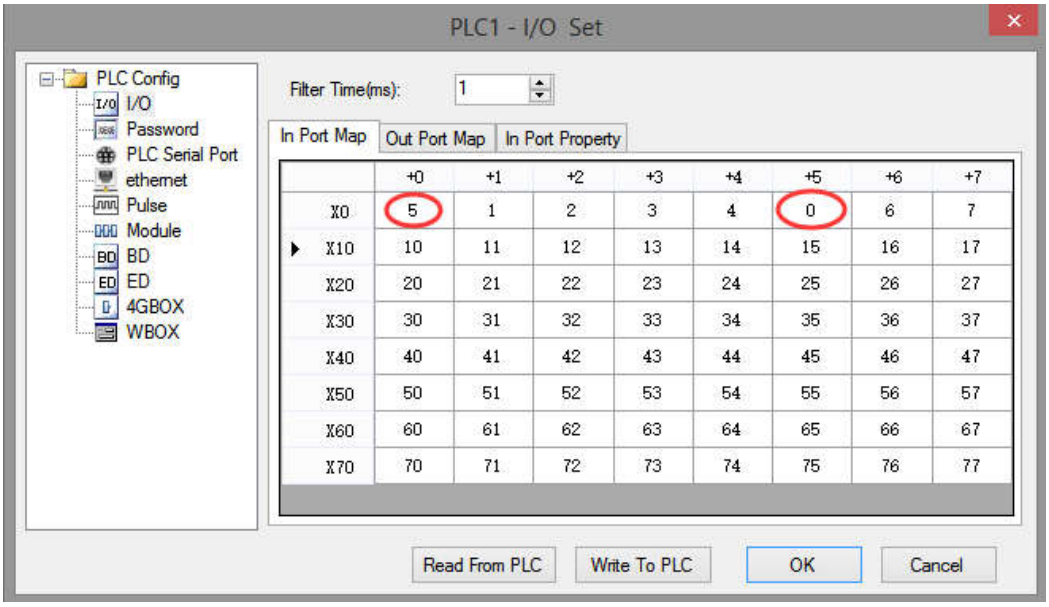
Method 2: modify in the software directly. Click the project bar/PLC config/I/O.



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.



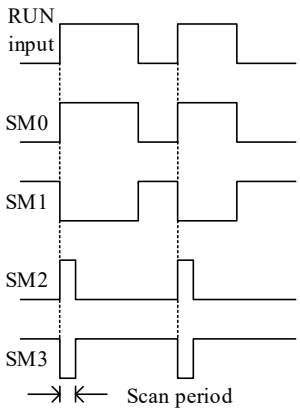
	+0	+1	+2	+3	+4	+5	+6	+7
X0	5	1	2	3	4	0	6	7
X10	10	11	12	13	14	15	16	17
X20	20	21	22	23	24	25	26	27
X30	30	31	32	33	34	35	36	37
X40	40	41	42	43	44	45	46	47
X50	50	51	52	53	54	55	56	57
X60	60	61	62	63	64	65	66	67
X70	70	71	72	73	74	75	76	77

Appendix

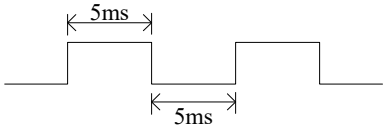
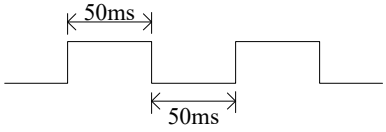
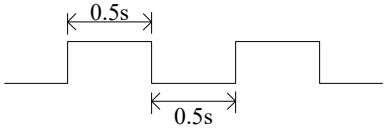
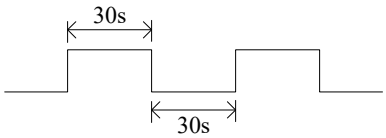
Appendix 1. Special soft components list

Appendix 1-1. Special auxiliary relay list

(1) Initial status (SM0~SM5)

<table>
<tr><th>Address</th><th>Function</th><th colspan="2">Explanation</th></tr>
<tr><td>SM000</td><td>Normally ON coil when operation</td><td rowspan="4"> 
</td><td>SM000 keeps ON when PLC running</td></tr>
<tr><td>SM001</td><td>Normally OFF coil when operation</td><td>SM001 keeps OFF when PLC running</td></tr>
<tr><td>SM002</td><td>Initial positive pulse coil</td><td>SM002 is ON in first scan cycle</td></tr>
<tr><td>SM003</td><td>Initial negative pulse coil</td><td>SM003 is OFF in first scan cycle</td></tr>
<tr><td>SM004</td><td>PLC running error</td><td colspan="2">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)</td></tr>
<tr><td>SM005</td><td>Battery low alarm coil</td><td colspan="2">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)</td></tr>
</table>

(2) Clock (SM11~SM14)

<table>
<tr><th>Address</th><th>Function</th><th>Explanation</th></tr>
<tr><td>SM011</td><td>10ms frequency cycle</td><td> 
</td></tr>
<tr><td>SM012</td><td>100ms frequency cycle</td><td> 
</td></tr>
<tr><td>SM013</td><td>1s frequency cycle</td><td> 
</td></tr>
<tr><td>SM014</td><td>1min frequency cycle</td><td> 
</td></tr>
</table>

(3) Flag (SM20~SM22)

Address	Function	Explanation
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

(4) PC mode (SM30~SM34)

Address	Function	Explanation
SM030	Controller initialization	Controller restored to factory settings
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		
SM034	All output forbidden	The output indicator lights of the controller are all off, but the output status of the Y terminal remains. If it is used for pulse output, the software will also monitor the pulse changes, but there is no actual output. The pulse stop sending method is emergency stop, and the output of the expansion module is also prohibited.

(5) Stepping ladder (SM40)

Address	Function	Explanation
SM040	The process is running	Set ON when the process is running

(6) Interruption ban (SM50~SM90)

No.	Address	Function	Explanation
SM050	I0000/I0001	Forbid input interruption 0	After executing EI instruction, the input interruption couldn't act independently when SM 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 SM 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

(7) High speed ring counter (SM99)

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

(8) High speed counting complete flag (SM100~SM109)

Address	Function	Explanation
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）	

(9) High speed counting direction flag (SM110~SM119)

Address	Function	Explanation
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	

(10) High speed counting error flag (SM120~SM129)

Address	Function	Explanation
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	

(11) High speed counting overflow flag (SM130~SM139)

Address	Function	Explanation
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	

(12) Communication (SM140~SM193)

Com port	Address	Function	Explanation
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

(13) Sequence function BLOCK (SM300~SM399)

Address	Function	Explanation
SM300	BLOCK1 running flag	ON during execution
SM301	BLOCK2 running flag	ON during execution
SM302	BLOCK3 running flag	ON during execution
SM303	BLOCK4 running flag	ON during execution
SM304	BLOCK5 running flag	ON during execution
SM305	BLOCK6 running flag	ON during execution
……	……	
SM396	BLOCK97 running flag	ON during execution
SM397	BLOCK98 running flag	ON during execution
SM398	BLOCK99 running flag	ON during execution
SM399	BLOCK100 running flag	ON during execution

(14) Error detection (SM400~SM414)

Address	Function	Explanation
SM400	I/O error	
SM401	Expansion module communication error	
SM402	BD/ED communication error	
SM403	FROM/TO instruction error flag	
SM404	PID instruction error flag	
SM405	No user program	Internal code check wrong
SM406	User program error	Implement code or configuration table check wrong
SM407	SSFD check error	
SM408	Memory error	Can not erase or write Flash
SM409	Calculation error	
SM410	Offset overflow	Offset exceeds soft element range
SM411	FOR-NEXT overflow	
SM412	Invalid data fill	
SM413	Encryption check error	
SM414	Flash register data error	

(15) Error information (SM450~SM465)

Address	Function	Explanation
SM450	System error flag	
SM451	Firmware interrupt flag	
SM452		
SM453	SD card error	
SM454	Power supply is cut off	
SM455	Power off holding data error	
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	

Appendix 1-2. Special data register list

(1) Battery (SD5)

Address	Function	Explanation
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.

(2) Clock (SD10~SD19)

Address	Function	Explanation
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
SD014	Minute (clock)	0~59
SD015	Hour (clock)	0~23
SD016	Day (clock)	0~31
SD017	Month (clock)	0~12
SD018	Year (clock)	2000~2099
SD019	Week (clock)	0(Sunday)~6(Saturday)

(3) Flag (SD20~SD31)

Address	Function	Explanation
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	

(4) Step ladder (SD040)

Address	Function	Explanation
SD40	Flag of the executing process S	

(5) High speed loop counter (SD99)

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

(6) High speed counting value (SD100~SD109)

Address	Function	Explanation	HSC address
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

(7) High speed counter error (SD120~SD129)

Address	Function	Explanation
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	

(8) Communication (SD140~SD199)

Serial port	Address	Function	Explanation
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 420: XNET read write error

Serial port	Address	Function	Explanation
Serial port 0	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		
Serial port 1	SD150	Modbus read write instruction execution result	Same to SD140
	SD151	X-Net communication result	Same to SD141
	SD152	Free format communication send result	Same to SD142
	SD153	Free format communication receive result	Same to SD143
	SD154	Free format communication receive data numbers	In bytes, there are no start and stop characters
	……		
	SD159		
Serial port 2	SD160	Modbus read write instruction execution result	Same to SD140
	SD161	X-Net communication result	Same to SD141
	SD162	Free format communication send result	Same to SD142
	SD163	Free format communication receive result	Same to SD143
	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		

(9) Sequence function block (SD300~SD399)

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

(10) Error detection (SD400~SD414)

Address	Function	Explanation
SD400	I/O error type	
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	
SD405	No user program	
SD406	User program error type	
SD407	SSDF error type	
SD408	Erasing FLASH 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	Offset error type	
SD411		
SD412	Invalid data fill value (low 16 bits)	
SD413	Invalid data fill value (high 16 bits)	
SD414	Flash register data error type	

(11) Error detection (SD450~SD465)

Address	Function	Explanation
SD450	System error type	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	Firmware error code	
SD453	SD card error	
SD454	Power-off time	
SD455	Extension module ID not match	
SD460	BD/ED module ID not match	
SD461	Extension module communication overtime	
SD462	BD/ED module communication overtime	
SD463	Extension module communication data overflow	
SD464	BD/ED module communication data overflow	
SD465	Power-off time	

(12) Version information (SD990~SD993)

Address	Function	Explanation
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

(13) Special function (HSD50~HSD55) (firmware V3.4.6 and above supported)

Address	Function	Explanation
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)	

(14) Error history record (HSD80~HSD179)

Address	Function	Explanation
HSD79	Error list index value	(1) XDC 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	

Address	Function	Explanation
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	

Appendix 1-3. Special Flash register list

A * indicates that it needs to be powered on again to take effect.

(1) I filter

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

(2) Special function configuration

Address	Function	Explanation
SFD3*	Special function configuration(default:0x0000)	Bit0:Power down memory register exception handling. 0: the system clears it; 1: No processing. Bit1: Execute user program in external interrupt subroutine. 0: execute in task; 1: Execute in interrupt (in this mode, the user interrupt subroutine cannot contain C language function block). This mode is generally used in occasions that require high real-time performance of external signals. Bit2: whether to raise the external interrupt priority. 0: not raise; 1: raise (raise to the highest).

(3) Test mode configuration

Address	Function	Explanation
SFD4*	Test mode configuration (Default value 0x0000)	Generally used for problem diagnosis when the controller crashes. Bit0: test mode enabled. 0: Not enabled; 1: Enable (ERR light will continue to flash). Bit1: ERR light flashing status. 0:1ms task flashing (1Hz); 1: Interrupt flashing at 100us (10Hz).

		Bit2: increase the interrupt priority by 100us. 0: Not increase; 1: Increase (to the highest level).

(4) I mapping

Address	Function	Explanation	Note
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)	

(5) O mapping

Address	Function	Explanation	Note
SFD74*	O00 corresponds to Y**	Output terminal 0 correspond to Y** number，Default value is 0	0xFF means terminal bad，0xFE means terminal idle
……	……		
SFD137*	O77 corresponds to Y**	Default value is 77(Octonary)	

(6) I attribute

Address	Function	Explanation	Note
SFD138*	I00 attribute	Attribute of input terminal 0	0: positive logic Others: negative logic
SFD139*	I01 attribute		
……	……		
SFD201*	I77 attribute		

(7) High speed counting

Address	Function	Explanation
SFD310	HSC0 single phase counting edge configuration	0: rising edge count, 1: Falling edge count, 2: Both rising and falling edges are counted
SFD311	HSC2 single phase counting edge configuration	0: rising edge count, 1: Falling edge count, 2: Both rising and falling edges are counted
SFD312	HSC4 single phase counting edge configuration	0: rising edge count, 1: Falling edge count, 2: Both rising and falling edges are counted
SFD313	HSC6 single phase counting edge configuration	0: rising edge count, 1: Falling edge count, 2: Both rising and falling edges are counted
SFD320	HSC0 frequency doubling	2：2 times frequency; 4: 4 times frequency(effective at AB phase counting mode)
SFD321	HSC2 frequency doubling	Ditto
SFD322	HSC4 frequency doubling	Ditto
SFD323	HSC6 frequency doubling	Ditto
SFD324	HSC8 frequency doubling	Ditto

Address	Function	Explanation
SFD325	HSC10 frequency doubling	Ditto
SFD326	HSC12 frequency doubling	Ditto
SFD327	HSC14 frequency doubling	Ditto
SFD328	HCS16 frequency doubling	Ditto
SFD329	HCS18 frequency doubling	Ditto
SFD330	Bit selection of HSC absolute and relative(100 segment)	bit0 corresponds to HSC0，bit1corresponds to HSC2，and so on, bit9 corresponds to HSC18 0：relative 1：absolute
SFD331	Interrupt circulating of 100 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

(8) Expansion module configuration

Address	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~SFD359	Extension module configuration	Configuration of Extension Module 1
SFD360~SFD369	Extension module configuration	Configuration of Extension Module 2
……	……	……
SFD500~SFD509	Extension module configuration	Configuration of Extension Module 16
SFD510~SFD519	BD module configuration	Configuration of BD Module 1
SFD520~SFD529	BD module configuration	Configuration of BD Module 2
SFD530~SFD539	ED module configuration	Configuration of ED Module 1

(9) Communication

Address	Function	Explanation
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	0: 8-bit 1: 16-bit

	numbers	

Appendix 2. Instruction list

Appendix 2 will list all the instructions supported by the XA310 series controller, including basic instructions, application instructions, special function instructions, and motion control instructions. The corresponding implementation range of these instructions is also explained.

This section is only for users to quickly access instructions. For more detailed information on the application of instructions, please refer to the "XD/XL Series PLC User Manual [Basic Instructions] and [Motion Control]".

Appendix 2-1. Basic instructions

Mnemonic	Function	Mnemonic	Function
LD	Operation starts with normally open contacts	ORDI	Directly read normally closed contacts and connect them in parallel
LDI	Operation starts with normally closed contacts	OUTD	Directly output to the contact point
OUT	Coil driven	ORB	Parallel connection of series circuit blocks
AND	Series normally open contacts	ANB	Series connection of parallel circuit blocks
ANI	Series normally closed contacts	MCS	New busbar starts
OR	Parallel normally open contacts	MCR	Bus reset
ORI	Parallel normally closed contacts	ALT	Coil reversal
LDP	Rising edge detected operation starts	PLS	Connect one scanning cycle during the rising edge
LDF	Falling edge detected operation starts	PLF	Connect one scanning cycle during the falling edge
ANDP	Rising edge detected series connection	SET	Coil on hold
ANDF	Falling edge detected series connection	RST	Coil connection clearing
ORP	Pulse rising edge detected parallel connection	OUT	Drive of Counting Coil
ORF	Pulse falling edge detected parallel connection	RST	Reset the output contact and reset the current value to zero
LDD	Read the status directly from the contact point	END	Input/output processing and returning to step 0
LDDI	Directly read normally closed contacts	GROUP	Instruction block folding begins
ANDD	Read the status directly from the contacts and connect them in series	GROUPE	Instruction block folding completed
ANDDI	Directly read normally closed contacts and connect them in series	TMR	Timer
ORD	Read the status directly from the contacts and connect in parallel		

Appendix 2-2. Application instructions

Mnemonic	Function	Mnemonic	Function
Program process			
CJ	conditional jump	SET	Open the specified process and close the current process
CALL	Call subprogram	ST	Open the specified process without closing the current process
SRET	Subprogram return	FOR	Cycle range begins
STL	Process starts	NEXT	End of cycle range
STLE	Process ends	FEND	End of main program
Data compare			
LD=※1	Conducted at the beginning (S1) = (S2)	AND<>※1	Conducted when (S1) ≠ (S2) in serial connection
LD>※1	Conducted at the beginning (S1) > (S2)	AND>=※1	Conducted when (S1) ≥ (S2) in serial connection
LD<※1	Conducted at the beginning (S1) < (S2)	AND<=※1	Conducted when (S1) ≤ (S2) in serial connection
LD<>※1	Conducted at the beginning (S1) ≠ (S2)	OR=※1	Conducted when (S1) = (S2) in parallel connection
LD>=※1	Conducted at the beginning (S1) ≥ (S2)	OR>※1	Conducted when (S1) > (S2) in parallel connection
LD<=※1	Conducted at the beginning (S1) ≤ (S2)	OR<※1	Conducted when (S1) < (S2) in parallel connection
AND=※1	Conducted when (S1) = (S2) in serial connection	OR<>※1	Conducted when (S1) ≠ (S2) in parallel connection
AND>※1	Conducted when (S1) > (S2) in serial connection	OR>=※1	Conducted when (S1) ≥ (S2) in parallel connection
Mnemonic	Function	Mnemonic	Function
Data compare			
AND<※1	Conducted when (S1) < (S2) in serial connection	OR<=※1	Conducted when (S1) ≤ (S2) in parallel connection
Data transfer			
CMP※1	Comparison of data	EMOV	Floating point transfer
ZCP※1	Comparison of data intervals	FWRT※1	FlashROM write in
MOV※1	Transmit	MSET	Batch set on
BMOV	Data block transfer	ZRST	Batch reset
PMOV	Data block transfer	SWAP	High low byte exchange
FMOV※1	Multi-point repeated transmission	XCH※1	Two data exchanges
Data Operation			
ADD※1	addition	MEAN※1	averaging
SUB※1	subtraction	WAND※1	Logical AND
MUL※1	multiplication	WOR※1	Logical or
DIV※1	division	WXOR※1	exclusive-OR
INC※1	Add 1	CML※1	Reverse
DEC※1	Subtract 1	NEG※1	Negation
Data shift			
SHL※1	Arithmetic shift left	ROR※1	Rotate right

SHR※1	Arithmetic shift right	SFTL※1	Shift left
LSL※1	Logical shift left	SFTR※1	Shift right
LSR※1	Logical shift right	WSFL	Word shift left
ROL※1	Rotate left	WSFR	Word shift right
Data conversion			
WTD	Convert single word integers to double word integers	ASCI	Convert hexadecimal to ASCII
FLT※1	Convert 16-bit integers to floating-point numbers	HEX	ASC II to hexadecimal conversion
FLTD※1	Convert 64-bit integers to floating-point numbers	DECO	Decode
INT※1	Floating point to integer conversion	ENCO	High bit encoding
BIN	BCD to binary conversion	ENCOL	Low bit encoding
BCD	Binary to BCD conversion		
Floating point operation			
ECMP※2	floating-point comparisons	SIN※2	Floating point number SIN operation
EZCP※2	Floating point interval comparison	COS※2	Floating point COS operation
EADD※2	Floating point addition	TAN※2	Floating point number TAN operation
ESUB※2	Floating point subtraction	ASIN※2	Floating point inverse SIN operation
EMUL※2	Floating point multiplication	ACOS※2	Floating point number inverse COS operation
EDIV※2	Floating point division	ATAN※2	Floating point number inverse TAN operation
ESQR※2	Floating point number square root		
Clock operation			
TRD	Clock data reading	TSUB	Clock data subtraction operation
TWR	Clock data writing	HTOS	Convert hour, minute, and second data into seconds
MOV	Accurate clock BD board data reading	STOH	Convert second data into hours, minutes, and seconds
TO	Accurate clock BD board data writing	TCMP	Time (hour, minute, second) comparison command
TADD	Clock data addition operation	DACMP	Date (year, month, day) comparison instruction

Note:

※ 1: Unless otherwise specified, instructions are generally 16-bit and do not have a 32-bit instruction form. The instruction marked with ※1 has a 32-bit instruction form. Generally, the expression of a 32-bit instruction is to add a "D" before its corresponding 16-bit instruction. For example, the 32-bit instruction of ADD is DADD.

※ 2: The instructions marked with ※2 are 32-bit instructions and do not have a 16-bit instruction form.

Appendix 2-3. Special instruction list

Mnemonic	Function	Mnemonic	Function
Positioning control			
PLSR※2	Multi-segment pulse output	STOP	Pulse stop
PLSF※2	Variable frequency pulse output	GOON	Pulse continues
DRVI※2	Relative single segment pulse output	ZRN※2	Mechanical origin return
DRVA※2	Absolute single segment pulse output		
Motion control			
DRV	rapid positioning	DRVR	Quick positioning (polar coordinates)
LIN	linear interpolation	CW	Circular arc (center coordinates)
CCW	Reverse arc (center coordinates)	CW_R	Straight arc (radius of circle)
CCW_R	Reverse arc (circle radius)	ARC	Three-point arc
FOLLOW	Follow up (single-phase incremental mode)	FOLLOW_AB	Follow up (AB phase mode)
High speed count			
CNT※2	Single phase high-speed counting	RST	Reset high-speed counter
CNT_AB※2	AB phase high-speed counting	DMOV※2	High speed counter reading or writing
High speed counting interrupt			
CNT※2	Single phase 100 segments high-speed counting (with interruption)	CNT_AB※2	AB phase 100 segments high-speed counting (with interruption)
Communication			
COLR	MODBUS coil read	REGR	MODBUS register read
INPR	MODBUS input coil read	INRR	MODBUS input register write
COLW	MODBUS single coil write	REGW	MODBUS single register write
MCLW	MODBUS multi-coil write	MRGW	MODBUS multi-register write
SEND	Free format communication sending data	RCV	Free format communication receiving data
CFGCR	Reading serial port parameters	CFGCW	Writing of serial port parameters
Precise timing			
STR※2	precise timing	STOP	Stop precise timing
DMOV※1	Read precise timing register		
Interruption			
EI	Allow interruptions	IRET	Interrupt return
DI	disable interrupt		
BLOCK			
SBSTOP	Stop the operation of BLOCK	WAIT	Wait
SBGOON	Continue executing the paused BLOCK	FROM	Read module/BD data
TO	Write module/BD data		
Others			
PWM※1	Pulse Width Modulation	FRQM	Frequency measurement
PID	PID operation control	NAME_C	C function block

Note:

※ 1: The instructions marked with ※1 are 32-bit instructions and do not have a 16-bit instruction form, while other instructions are 16-bit.

※ 2: The table does not include communication commands for X-NET and Etnernet. Please refer to the "X-NET Bus User Manual" and "Ethernet based TCP IP Communication User Manual".

Appendix 3. Troubleshooting guide

1. Abnormal startup

(1) After pressing the power button to turn on the device, the power indicator light does not light up

a. Check if the controller is connected correctly and if the power outlet has power;

b. Check the controller power adapter, plug and unplug the power cable, display data cable, and keyboard/mouse cable. Confirm if the monitor is connected correctly to the host;

c. Check if the positive and negative terminals of the power plug are reversed.

(2) The power indicator light is on, but the monitor is not displaying

a. Check the power supply and switch of the monitor;

b. Check if the data cable of the monitor has poor contact;

c. If using a DisplayPort or VGA converter, replace it with another brand converter;

d. Observe the keyboard and mouse indicator lights. If the keyboard and mouse indicator lights are on, replace the monitor for troubleshooting.

(3) After booting up, both the mouse and keyboard cannot be used

a. Check if the keyboard lock is locked and unlock it;

b. If not, check whether the connection between the motherboard and the bottom board, as well as the keyboard and mouse, are connected correctly;

c. Check if a keyboard/mouse splitter adapter is connected. If so, swap the keyboard and mouse connections.

d. Replace the splitter adapter;

e. Replace the mouse and keyboard.

2. System crashes or blue screen during operation

(1) Check if the temperature of the controller is too high;

(2) Check if incorrect or expired drivers have been installed;

(3) Check if the system is infected with viruses;

(4) Whether the system files, applications, and disks are damaged.

3. Unable to install device drivers correctly

(1) Check if the driver program is correct and up-to-date;

(2) Does the driver program require support from patches for the operating system;

(3) Is there a conflict between the resources occupied by other devices and the resources occupied by the devices that need to be driven;

(4) If it is a peripheral device, change the slot and reinstall the driver;

(5) Replace the device and reinstall the driver program.

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