



XSF series PLC

User manual 【Hardware】

Wuxi Xinje Electric Co., Ltd.

Data No. PF 01 20250207 1.1

Basic description

- ◆ Thank you for purchasing the XINJE XSF series programmable controller.
- ◆ This manual mainly introduces the hardware features of XSF series programmable controllers.
- ◆ Before using the product, please read this manual carefully and conduct wiring on the premise of fully understanding the contents of the manual.
- ◆ For software and programming, please refer to the relevant manuals.
- ◆ Please deliver this manual to the end user.

Notes to users

- ◆ Only operators with certain electrical knowledge can conduct wiring and other operations on the product. If there is any unknown place, please consult our technical department.
- ◆ The examples listed in the manual and other technical data are only for users' understanding and reference, and do not guarantee certain actions.
- ◆ When using this product in combination with other products, please confirm whether it conforms to relevant specifications and principles.
- ◆ When using this product, please confirm whether it meets the requirements and is safe.
- ◆ Please set up backup and safety functions by yourself to avoid possible machine failure or loss caused by the failure of this product.

Statement of responsibility

- ◆ Although the contents of the manual have been carefully checked, errors are inevitable, and we cannot guarantee complete consistency.
- ◆ We will often check the contents of the manual and make corrections in subsequent versions. We welcome your valuable comments.
- ◆ The contents described in the manual are subject to change without notice.

Contact us

If you have any questions about the use of this product, please contact the agent and office who purchased the product, or you can directly contact the company.

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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.



Attention

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



Attention

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.



Attention

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.



Attention

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, M3 screw or Xinje XG-EB 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/DC power supply to the dedicated power terminal of the controller.

If the power supply is connected incorrectly, the controller may be burned.

3. Before the controller is powered on and operated, please cover the cover plate on the terminal block.

Danger of electric shock.



Attention

1. Do not use external 24V power supply to connect to 24V and 0V terminals of the controller or expansion module.

It may cause damage to the product.

2. Please use 2mm² 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.

3. Do not make external wiring to the empty terminal.

It 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.

May cause malfunction, fault, etc.

5. 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.



Attention

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.

Preface

Sincerely thank you for purchasing the XINJE Programmable Controller XSF series products.

This manual is convenient for users to understand and use the necessary precautions, specifications, functions, and other contents of XSF-CPU units.

Before use, one should thoroughly read this manual and related manuals, and correctly use this product based on a thorough understanding of the functions/performance of the XSF series programmable controller.

Catalog

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1. Document Guide

1-1. Related manual

(1) CPU unit

| Manual name | Main content |
|---|---|
| XSF series hardware user manual | It mainly records the hardware specifications and hardware maintenance information of XSF series CPU units. |
| XS series PLCopen controller instruction manual (XS Studio) | It mainly records XS series instruction section. |

(2) I/O unit

| Manual name | Main content |
|--|--|
| XF Series expansion module user manual | It mainly records the product specifications and maintenance information of the XF series IO unit. |

2. Terminology

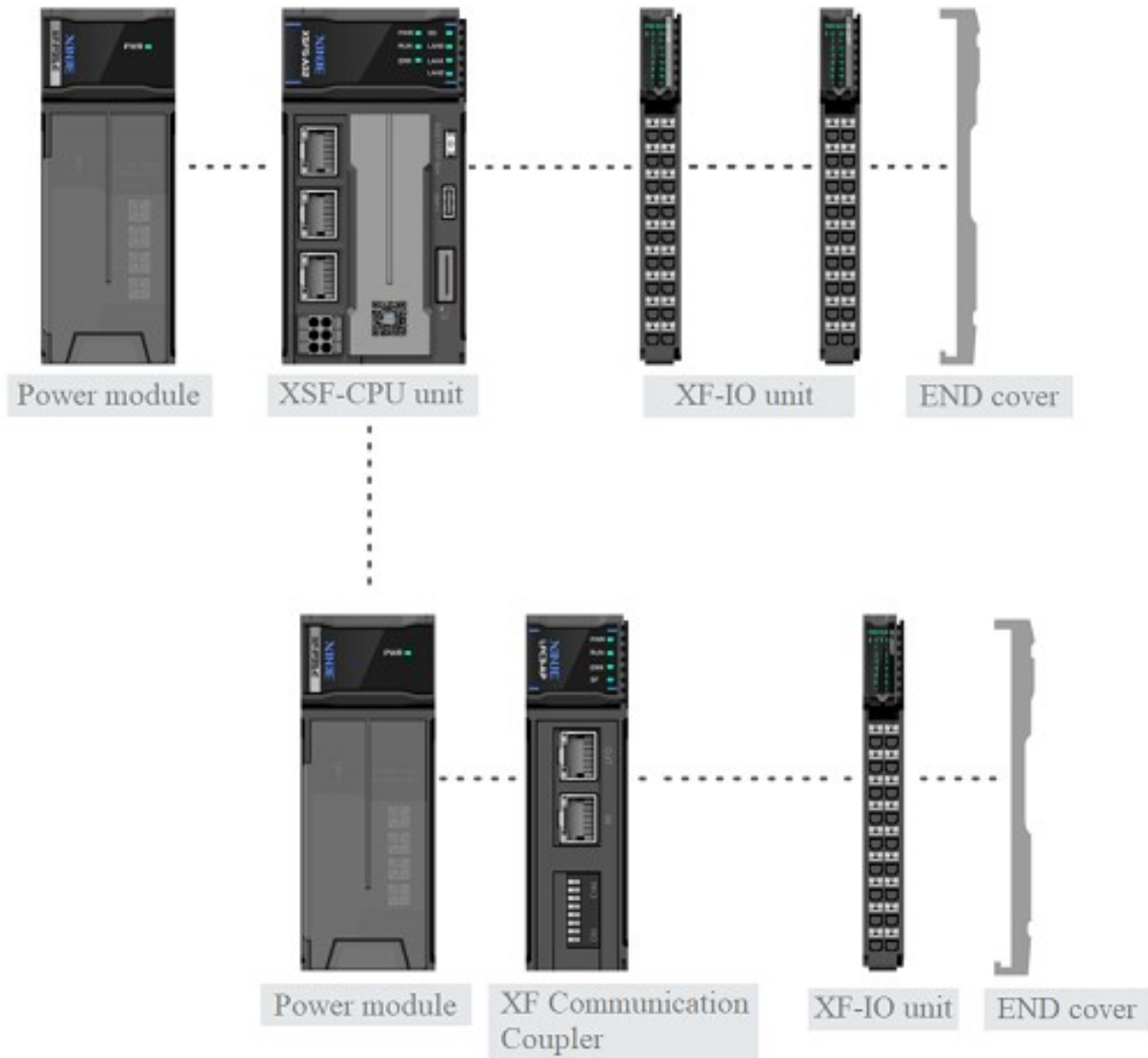
In this manual, unless otherwise specified, the following terms will be used for explanation.

| Terminology | Instructions |
|-------------------|---|
| CPU unit | General term for XF/XSF series CPU units |
| Power module unit | General term for XF series power modules |
| IP20 | Protection level according to DIN 40050: protection against finger contact and intrusion of particles with a diameter greater than 12mm |
| Backplane bus | The backplane bus is a serial data bus used by various modules to communicate with each other. The backplane bus is also used to provide some necessary power supply for each module. Each module is connected through a bus connector. |

3. Product System Configuration

In this chapter, the overall configuration, precautions during configuration, and peripheral device related content are explained.

3-1. Overall configuration



3-2. Major event

- Different CPU units are used, and the corresponding expandable IO units are also different.
- The I/O units that can be powered through the backplane bus vary according to the power supply units used.

The types and quantities of CPU units and expandable IO units are as follows:

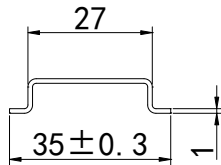
| CPU unit model | Scalable basic I/O unit |
|----------------|-------------------------|
| XSF5-A8 | 32 |
| XSF5-A16 | |
| XSF5-A32 | |
| XSF5-A64 | |

4. Installation&Wiring

4-1. CPU installation method

(1) Installation requirements

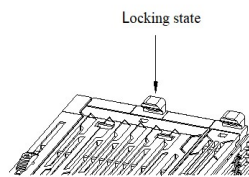
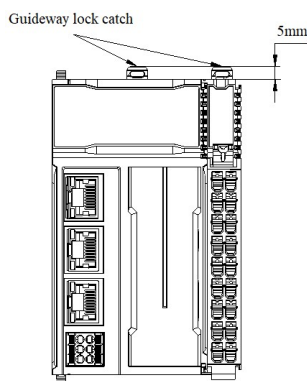
The host is installed using DIN rails, which must comply with the IEC 60715 standard (35mm wide and 1mm thick). The size information is shown in the following figure, in millimeters (mm).



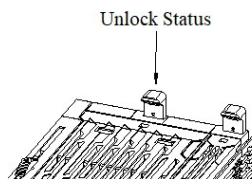
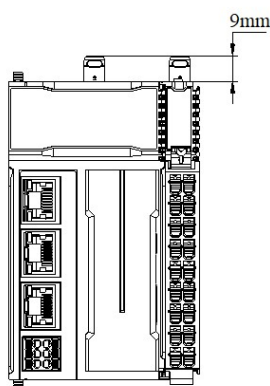
Attention

When installing this product on non recommended DIN rails (especially when the thickness of the DIN rail is not 1.0mm), it will cause the DIN rail latch to fail, prevent the product from being installed in place, and thus prevent the product from working properly.

(2) Installation procedure



During installation, align the main engine with the DIN rail and press the module in the direction indicated by the arrow. After the module is installed in place, the clamping sound is obvious, as shown on the left:



Confirm that the DIN rail lock of the main engine is locked, and the lock and unlock state of the rail lock are shown on the left:



If the DIN guideway lock catch is below, it is locked.

If the DIN guideway lock catch is on top, it is unlocked. When in the unlocked position, press down on the DIN guideway lock catch to make it locked.

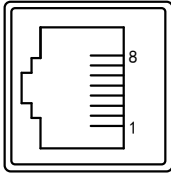
4-2. Network cable installation method

(1) Network cable requirements

To improve the reliability of device communication, the Ethernet cable must be shielded twisted pair cables with iron injection molding wires.

- Connection: Hold the RJ45 connector with the cable and insert it into the Ethernet port (RJ45 port) until the sound clicks.
- Detach: Press and hold the crystal head and tail mechanism to pull out the connector horizontally from the product.

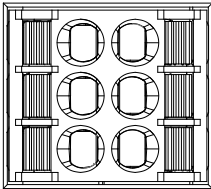
(2) Signal pin assignment

| Connector View | Pin | Signal |
|---|-----|--------|
|  | 1 | TD+ |
| | 2 | TD- |
| | 3 | RD+ |
| | 4 | - |
| | 5 | - |
| | 6 | RD- |
| | 7 | - |
| | 8 | - |

4-3. 485&CAN

When the XSF5-A32 and XSF5-A64 CPU units leave the factory, the 485&CAN terminals have been inserted.

The following table lists the signal names and pin assignment instructions for 485&CAN terminals:

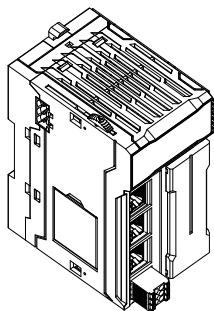
| Connector View | Number | Signal name | Instructions |
|---|--------|-------------|--------------------------------|
|  | 1 | CAN+ | CAN+ wiring terminal of CAN |
| | 2 | CAN- | CAN- wiring terminal of CAN |
| | 3 | GND | Ground terminal of CAN |
| | 4 | A | A-phase wiring terminal of 485 |
| | 5 | B | B-phase wiring terminal of 485 |
| | 6 | GND | Ground terminal of GND |
| | - | - | - |

4-4. Battery maintenance and replacement

(1) The function of batteries

- XSF5 series products delivered without batteries by default. If you need to add batteries later, use standard CR2032 batteries.
- The battery is only used to maintain RTC clock data in the event of a power outage.

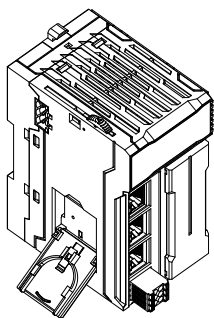
(2) Battery replacement procedure



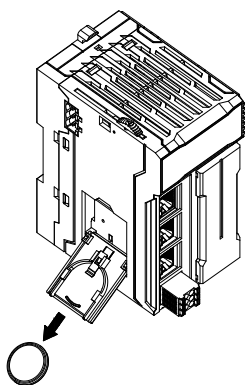
1. Please complete the following steps before replacing:

- ① Record RTC data.
- ② Set the power supply of the CPU module to ON for 10 minutes or more.

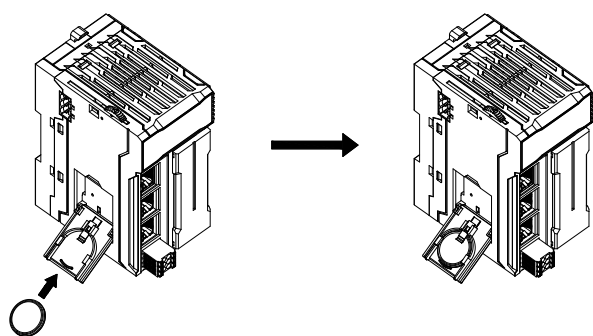
2. Open the side cover of the CPU unit (battery box)



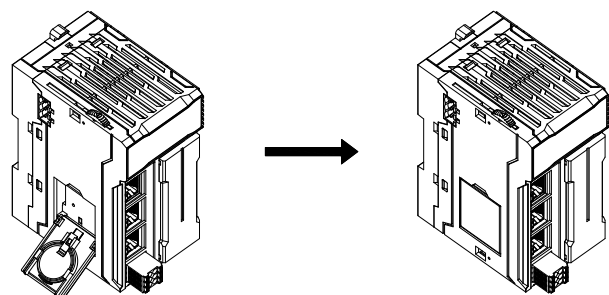
3. Remove the currently in use battery from the battery box (default to no battery at the factory, this step can be omitted).



4. Insert a new battery.

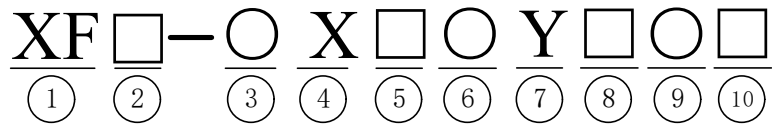


5. Close the cover plate.



5. Naming convention

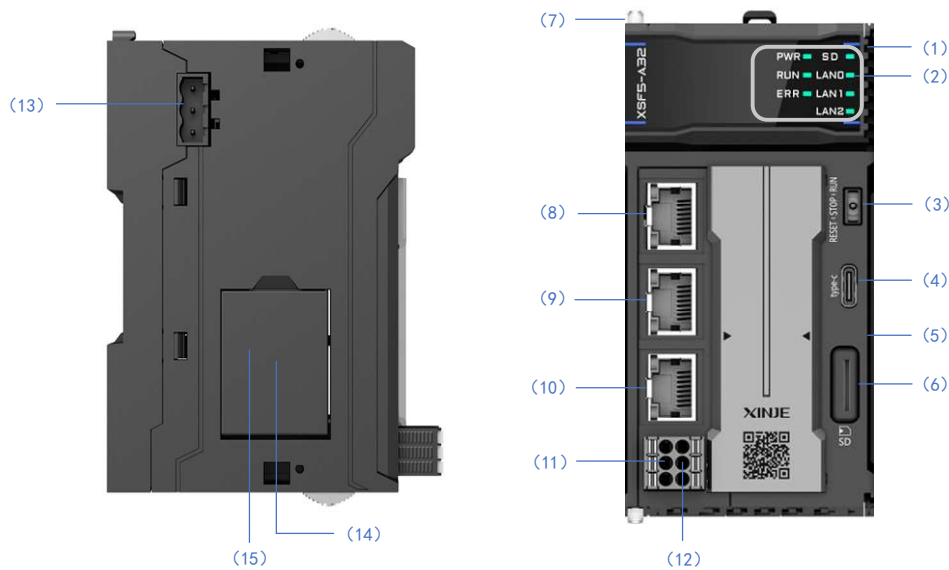
CPU unit



| | | | |
|---|--|--------|--|
| ① | Series Name | XF: | XF series |
| | | XSF: | XSF series |
| ② | Serial number | 1: | Basic type |
| | | 2: | Ethernet type |
| | | 3: | Entry level motion control type |
| | | 5: | Motion control type |
| | | 7: | Advanced motion control type |
| ③ | Input channel | 4: | 4 channels |
| | | 8: | 8 channels |
| | | 16: | 16 channels |
| | | 32: | 32 channels |
| ④ | Type | X: | Digital input |
| ⑤ | Output channel | 4: | 4 channels |
| | | 8: | 8 channels |
| | | 16: | 16 channels |
| | | 32: | 32 channels |
| ⑥ | Output point type | Empty: | Digital output NPN type |
| | | P: | Digital output PNP type |
| ⑦ | Type | Y: | Digital output |
| ⑧ | Output point type | T: | Digital output transistor type |
| | | R: | Digital output relay type |
| | | RT: | The first two channels are transistor outputs, and the others are relay types. |
| ⑨ | High speed pulse output channel (only effective when output type is T) | Empty: | 2 channels |
| | | 4: | 4 channels |
| | | 6: | 6 channels |
| | | 8: | 8 channels |
| | | 10: | 10 channels |
| ⑩ | Axis capacity (only applicable to series 3, 5, and 7) | A8: | 8 axes |
| | | A16: | 16 axes |
| | | A32: | 32 axes |
| | | A64: | 64 axes |
| | | A128: | 128 axes |

6. Names of each part

XSF5-A8, XSF5-A16, XSF5-A32, XSF5-A64



| Number | Name | Purpose | |
|--------|---|--|---|
| (1) | Extended Connection | Used for connecting to XF-IO units. | |
| (2) | Pilot lamp | PWR(green) | On: With power input |
| | | | Off: No power input |
| | | RUN(green) | On: User program running |
| | | | Off: User program stopping |
| | | ERR(red) | On: System critical error |
| | | | Off: System normal |
| | | SD(green) | On: SD card pending access status |
| | | | Flashing 1Hz: Accessing SD card |
| | | | Flashing 10Hz: Software access failure, unsupported SD card format. |
| | | | Off: SD card not detected, inserted or hardware damaged. |
| LAN0 | Blinking: Change the IP address of the corresponding network interface. | | |
| LAN1 | | | |
| LAN2 | | | |
| (3) | System dialing | Used to control CPU unit to allow stopping and IP recovery. | |
| (4) | USB interface | Used to connect to the upper computer. | |
| (5) | Slide cover | It can move left and right to protect the system dialing, TF card slot, and USB interface. | |
| (6) | TF card interface | TF card can be used to import and export data | |
| (7) | Sliding latch | Used to fix the XF power module and CPU unit. | |
| (8) | ENET0 | Used to connect to the upper computer or other network nodes. | |
| (9) | ENET1 ECAT1 | Used to connect network nodes or ECAT nodes. | |
| (10) | ECAT0 | Used to connect the ECAT node | |

| | | |
|------|------------------------------|---|
| (11) | CAN | 1 channel isolated CAN port (reserved) |
| (12) | 485 | 1 channel isolated 485 port |
| (13) | Power module connection port | Connect and use with the XF power module. |
| (14) | Battery holder | The effective time of RTC can be increased by adding standard CR2032 batteries. |
| (15) | Auxiliary dialing | Control the load resistance of CAN and 485. |

7. CPU unit specifications

7-1. General specifications

| General specifications | | |
|--|-----------------|--|
| Project | | Content |
| Operating temperature | Max temperature | 55°C |
| | Min temperature | -20°C |
| Transportation/storage temperature | Max temperature | 70°C |
| | Min temperature | -40°C |
| Environmental humidity (including operation/storage) | Upper limit | 95% |
| | lower limit | 10% |
| Protection grade | | IP20 |
| Anti vibration | | <p>Accord with IEC61131-2</p> <p>Under intermittent vibration (frequency 5-9Hz, constant amplitude 3.5mm peak displacement) and (frequency 9-150Hz, constant acceleration 1.0g peak acceleration)</p> <p>Under continuous vibration (frequency 5-9Hz, half amplitude 1.75mm displacement) and (frequency 9-150Hz, constant acceleration 0.5g, constant frame amplitude)</p> <p>Scan 10 times in X, Y, and Z directions</p> |
| Impact resistance | | <p>Accord with IEC61131-2</p> <p>Impact strength of 15G (peak) with a duration of 11ms is applied to three mutually perpendicular axes, with 3 impacts per axis (a total of 18 impacts)</p> |
| Use environment | | Non corrosive gas |
| Use altitude | | 0-2000 meters |
| Over voltage level | | II: Accord with IEC61131-2 |
| Pollution level | | 2: Accord with IEC61131-2 |
| Anti interference EMC | | Accord with IEC 61131-2 IEC61000-6-4 B type |
| Related certifications | | CE |

7-2. Technical specification

| Project | | XSF-A8 | XSF-A16 | XSF-A32 | XSF-A64 |
|-------------------|-----------------------------------|--|---------|---------|---------|
| Processing time | LD Bit | 15ns | | | |
| | Mov Double | 25ns | | | |
| Data capacity | Program capacity | 32MB | | | |
| | Non persistent data capacity | 32MB | | | |
| | Maintain data capacity | 10M | | | |
| | Storage capacity (files/formulas) | 512MB | | | |
| SD card extension | | <p>Used for uploading/downloading programs and firmware upgrade on PLC</p> <p>Storage capacity \geq 2GB</p> | | | |

| | | |
|-----------------------------------|-------------|---|
| USB interface | Type-C type | Used for uploading/downloading programs, firmware upgrade, and program monitoring on PLC USB drive connection, upload/download program |
| Internal I/O function in the body | | None |
| Extension quantity | | 32 |
| Power outage hold | | Non battery retention type |
| Clock | Clock Hold | Super capacitors ensure RTC availability for at least 14 days Optional CR2032 battery module for RTC clock only |
| | Precision | Year, month, day, hour, minute, second, week (automatically recognized in leap years) Ambient temperature 55 °C: -13.20~+2.12s/1 day Ambient temperature 25 °C: -3.18~+3.74s/1 day Ambient temperature 0 °C : -2.96~+3.74s/1 day |
| Dial switch | | The dial switch adopts a 3-segment type, named RUN, STOP, and RESET. RUN and STOP control RTE enable status, and STOP ->RES enable default IP and other functions. |
| COM | RS485 | Isolation type, with terminals A, B, and SG. Among them, A is RS485+, B is RS485-, and SG is the signal ground. Communication mode: half duplex The maximum number of slave stations is 32 Transmission distance: 1000m Terminal resistance: 120 Ω Baud rate: 2400bps~115200bps Mode: ModbusRTU (default), ModbusASCII, free format. The maximum number of bytes for free format communication is 1000 bytes. |
| ENET | Port | 0#ENET 1 # Configurable ENET&ECAT, which can be used to independently connect network nodes or redundant buses during ECAT |
| | Parameter | Physical layer 10Base-T or 100Base-TX Media access method CSMA/CD Modulation baseband Topological Star Transmission speed 100Mbps(100Base-TX) STP (shielded twisted pair) cables with transmission medium Ethernet Class 5, 5e or higher The maximum transmission distance between Ethernet switches and nodes is 100m. There is no limit to the maximum number of serial connections when using the Ethernet switch. |
| | Function | 1. ModbusTCP Support at least 32 servers Supports a minimum of 32 clients 2. TCP/IP, UDP/IP Supports a minimum of 32 |

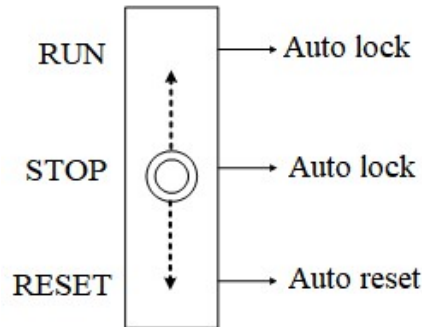
| | | | | | |
|--------|---------------------------------------|--|-------------|----------------------------|---|
| | | <p>3. EtherNet/IP Explicit, EtherNet/IP Implicit Implicit (I/O) message communication supports scanners and adapters. Supports 128 devices and 256 connections. Minimum release cycle 1ms. Single connection supports a maximum of 1448 bytes.</p> <p>4. OPC UA Supports a minimum of 8 client connections. Support sampling period of 50ms to 10s. Supports a maximum number of 5000 tags. Can specify NTP server information and automatically synchronize the clock.</p> | | | |
| ECAT | Port | <p>2 # can be configured with ENET&ECAT, which can be used to independently connect network nodes or redundant buses during ECAT; 3 # independent ECAT dedicated port</p> | | | |
| | Parameter | <p>Topological linearity, daisy chains, and branches Twisted pair cable with transmission medium category 5 or higher (aluminum foil+woven mesh double shielded direct connected cable) The maximum transmission distance between nodes is 100m Maximum number of slave stations 128 (SM mode) Maximum process data Input: 5,736 byte Output: 5,736 byte(The maximum number of frames for process data is 4) Maximum process data for each slave station Input: 1,434 byte Output: 1,434 byte Synchronization cycle 125~4000us</p> | | | |
| | ECAT node(DC mode) | 8-axis/1ms | 16-axis/1ms | 16-axis/1ms 32-axis/2ms | 16-axis/1ms 32-axis/2ms 64-axis/4ms |
| Motion | Single axis | 8 | 16 | 32 | 64 |
| | Master slave instance | 8 | 16 | 32 | 64 |
| | Axis Group instance | 4 | 8 | 16 | 32 |
| | NC (G code DIN6602) multi channels | 4 | 8 | 16 | 32 |
| Weight | | 267g | | | |
| Power | | 10W | | | |

7-3. Functional specifications

(1) Auxiliary dialing specifications

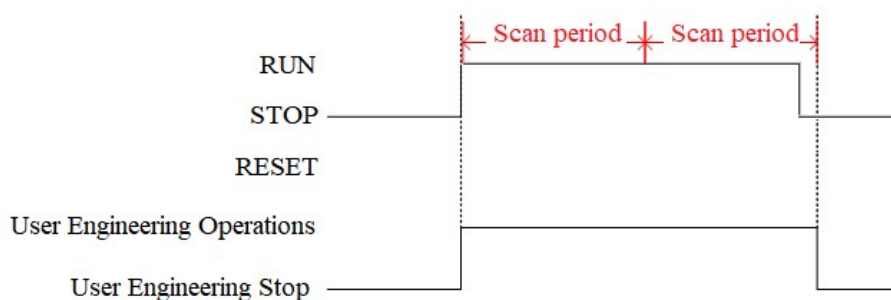
| Dial position | | | | Definition | Comment |
|---------------|--------------|----|----|-----------------------------------|-----------------------------|
| S1(obligate) | S2(obligate) | S3 | S4 | | |
| - | - | 0 | 0 | Empty | Set ON is 1 Set OFF is 0 |
| - | - | 1 | 0 | Use 485 terminal resistor | |
| - | - | 0 | 1 | Use CAN terminal resistor | |
| - | - | 1 | 1 | Use 485 and CAN terminal resistor | |

(2) System dialing specifications



| Dial | Function Description |
|-------|---|
| RUN | Dial to RUN, PLC switches to running state |
| STOP | Dial to STOP, PLC switches to stop state |
| RESET | Dial to RESET and hold for 11s-20s, immediately restore the default IP and release the corresponding connection (ENET0:192.168.6.6, ENET1: Automatically obtain IP address). |

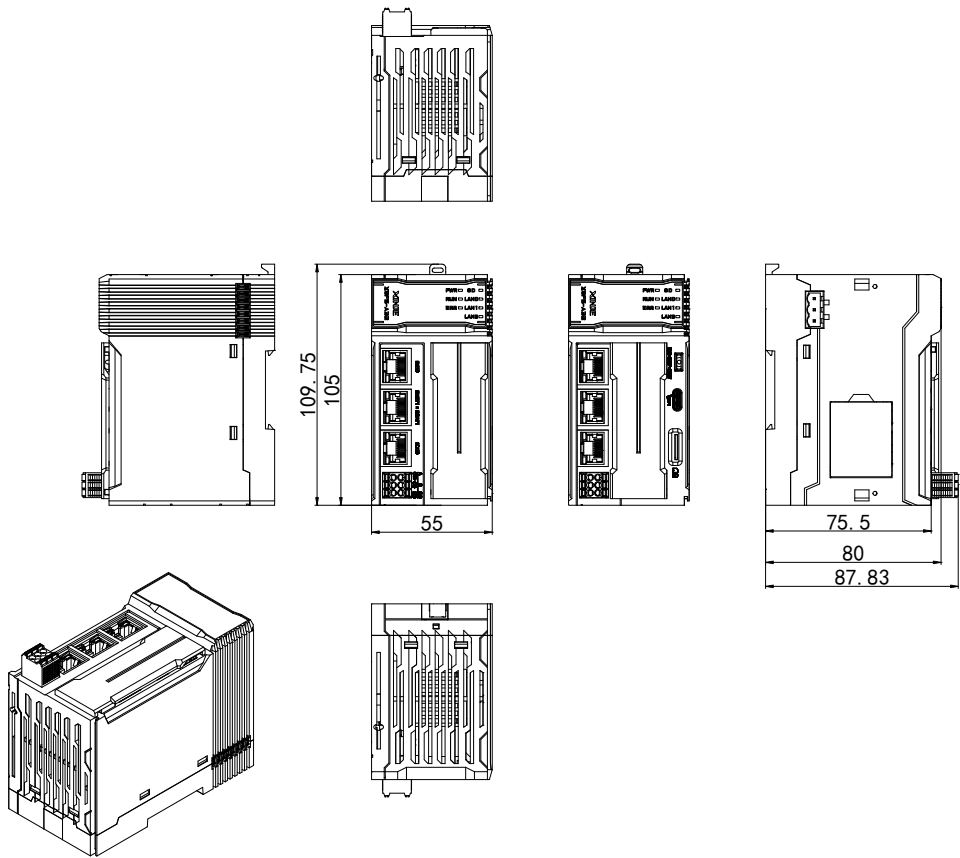
Note: When the device leaves the factory, the system dials the code to the "STOP" mode by default.



7-4. Apparent dimension

XSF5-A8, XSF5-A16, XSF5-A32, XSF5-A64:

unit: mm



XINJE



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