



# **XSF series PLC**

User manual 【Hardware】

Wuxi Xinje Electric Co., Ltd.

Data No. PF 01 20230801 1.0

## 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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September 2023

# 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 2mm<sup>2</sup> 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 Xinjie 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.

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## Catalog

SAFETY PRECAUTIONS .....	11
1. DOCUMENT GUIDE .....	1
1-1. RELATED MANUAL .....	1
1-2. READING METHOD OF THE MANUAL .....	1
2. TERMINOLOGY .....	2
3. PRODUCT SYSTEM CONFIGURATION .....	3
3-1. OVERALL CONFIGURATION .....	3
3-2. MAJOR EVENT .....	3
4. INSTALLATION&WIRING .....	4
4-1. CPU INSTALLATION METHOD .....	4
4-2. NETWORK CABLE INSTALLATION METHOD .....	5
4-3. 485&CAN .....	5
4-4. BATTERY MAINTENANCE AND REPLACEMENT .....	5
5. NAMING CONVENTION .....	7
6. NAMES OF EACH PART .....	8
7. CPU UNIT SPECIFICATIONS .....	10
7-1. GENERAL SPECIFICATIONS .....	10
7-2. TECHNICAL SPECIFICATION .....	10
7-3. FUNCTIONAL SPECIFICATIONS .....	12
7-4. APPARENT DIMENSION .....	14

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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.

## 1-2. Reading method of the manual

The page composition and symbols of this manual are described below.

The following is a description of the manual reading method, which is different from the actual recorded content.



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## 2. Terminology

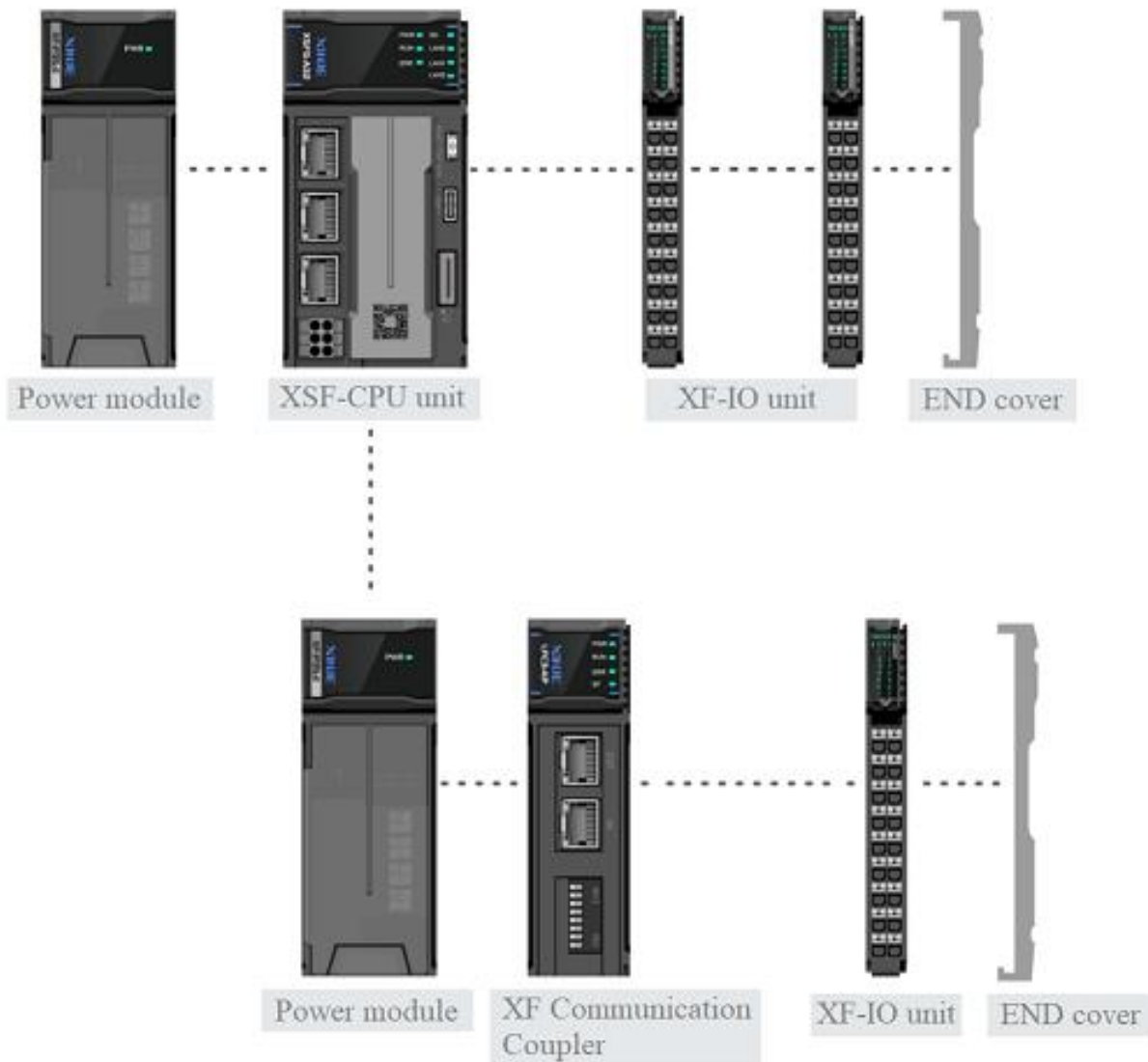
In this manual, unless otherwise specified, the following terms will be used for explanation.

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, power units, and expandable IO units are as follows:

Power unit model	CPU unit model	Scalable basic I/O unit
XF-P35-E	XSF5-A32	18
	XSF5-A64	

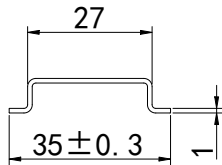
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# 4. Installation & Wiring

## 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).



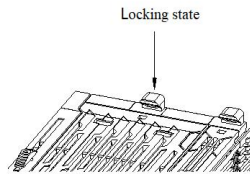
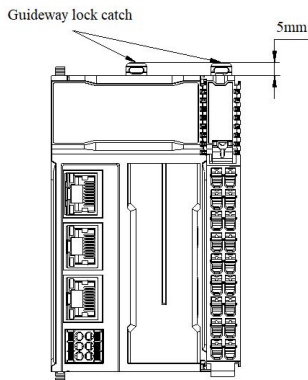
Attention

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.

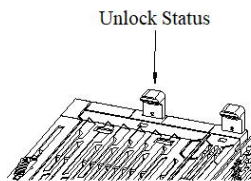
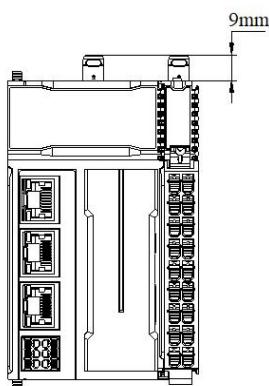
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### (2) Installation procedure

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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.

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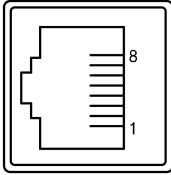
## 4-2. Network cable installation method

### (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.

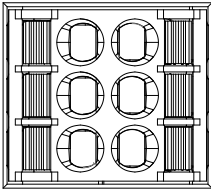
### (2) Signal pin assignment

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

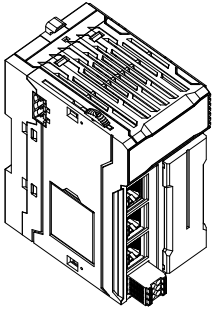
### (1) The function of batteries

- XSF5-A32 and XSF5-A64 are 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.

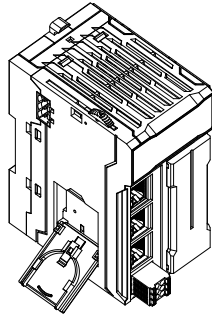
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## (2) Battery replacement procedure

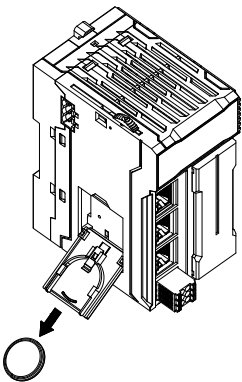
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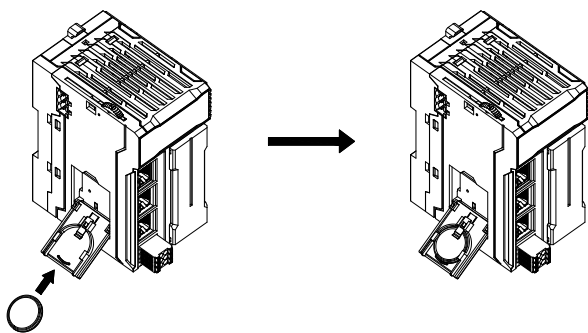
1. Please complete the following steps before replacing:
    - ① Record RTC data.
    - ② Set the power supply of the CPU module to ON for 10 minutes or more.
- 



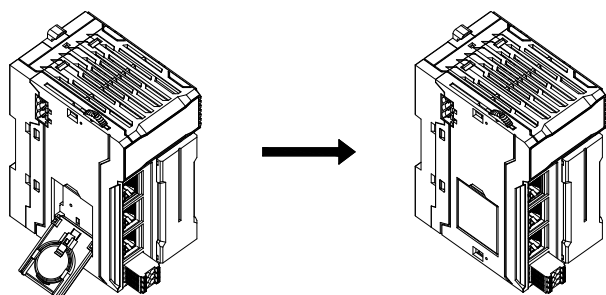
2. Open the side cover of the CPU unit (battery box)
- 



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



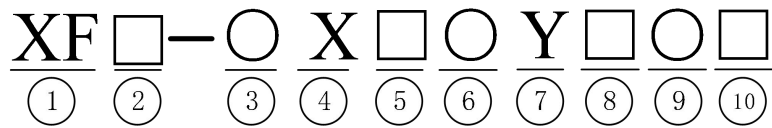
4. Insert a new battery.
- 



5. Close the cover plate.
-

## 5. Naming convention

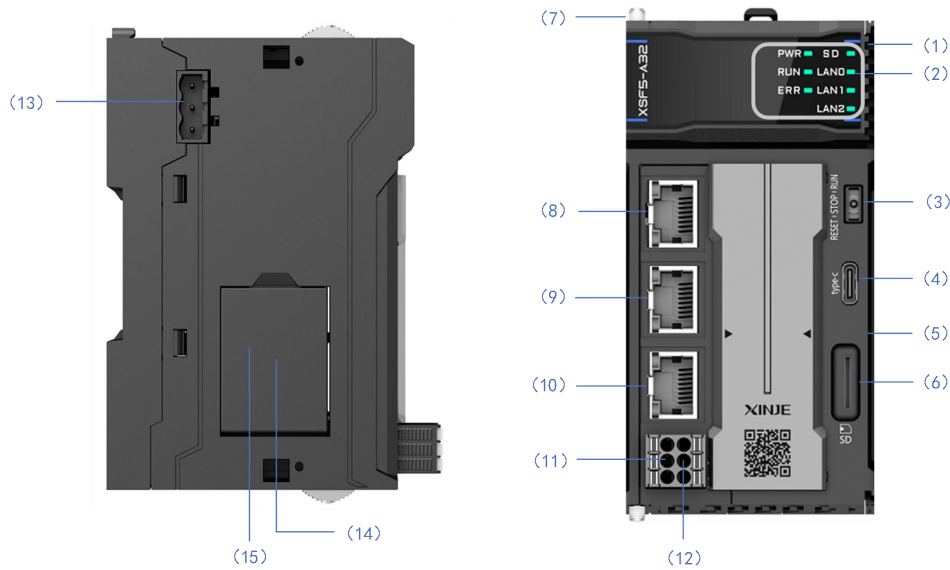
CPU unit



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-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 (supported in Q3 of 2023).	
(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-A32	XSF-A64
Processing time	LD Bit	15ns	
	Mov Double	25ns	
Data capacity	Program capacity	32MB	32MB
	Non persistent data capacity	32MB	32MB
	Maintain data capacity	10M	10M
	Storage capacity (files/formulas)	512MB	512MB
SD card extension		Used for downloading programs and firmware upgrades on PLC Storage capacity $\geq$ 2GB (Q3 support in 2023)	
USB interface	Type-C type	Used for downloading programs, firmware upgrades, and program	

		<p>monitoring on PLC</p> <p>USB drive connection, download program (supported in Q3 of 2023)</p>
Internal I/O function in the body		None
Extension quantity		32
Power outage hold		Non battery retention type
Clock	Clock Hold	<p>Super capacitors ensure RTC availability for at least 14 days</p> <p>Optional CR2032 battery module for RTC clock only</p>
	Precision	<p>Year, month, day, hour, minute, second, week (automatically recognized in leap years)</p> <p>Ambient temperature 55 °C: -13.20~+2.12s/1 day</p> <p>Ambient temperature 25 °C: -3.18~+3.74s/1 day</p> <p>Ambient temperature 0 °C : -2.96~+3.74s/1 day</p>
Dial switch		<p>The dial switch adopts a 3-segment type, named RUN, STOP, and RESET.</p> <p>RUN and STOP control RTE enable status, and STOP -&gt;RES enable default IP and other functions.</p>
COM	RS485	<p>Isolation type, with terminals A, B, and SG. Among them, A is RS485+, B is RS485-, and SG is the signal ground.</p> <p>Communication mode: half duplex</p> <p>The maximum number of slave stations is 32</p> <p>Transmission distance: 1000m</p> <p>Terminal resistance: 120 Ω</p> <p>Baud rate: 2400bps~115200bps</p> <p>Mode: ModbusRTU (default), ModbusASCII, free format.</p> <p>The maximum number of bytes for free format communication is 1000 bytes.</p>
ENET	Port	<p>0#ENET</p> <p>1 # Configurable ENET&amp;ECAT, which can be used to independently connect network nodes or redundant buses during ECAT</p>
	Parameter	<p>Physical layer 10Base-T or 100Base-TX</p> <p>Media access method CSMA/CD</p> <p>Modulation baseband</p> <p>Topological Star</p> <p>Transmission speed 100Mbps(100Base-TX)</p> <p>STP (shielded twisted pair) cables with transmission medium</p> <p>Ethernet Class 5, 5e or higher</p> <p>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.</p>
	Function	<p>1. ModbusTCP</p> <p>Support at least 32 servers</p> <p>Supports a minimum of 32 clients</p> <p>2. TCP/IP, UDP/IP</p> <p>Supports a minimum of 32</p>

		<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&amp;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)	32 1000us 64 4000us	64 1000us 128 4000us
Motion	Single axis	32	64
	Master slave instance	32	64
	Axis Group instance	16	32
	NC (G code DIN6602) multi channels	16	32
Weight		267g	
Power		10W	

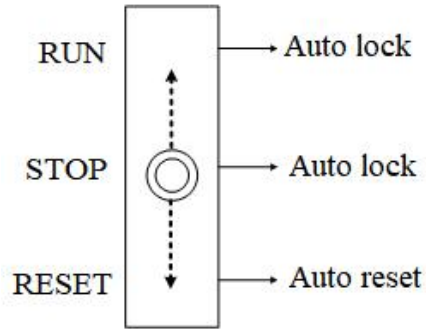
### 7-3. Functional specifications

#### (1) Auxiliary dialing specifications

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

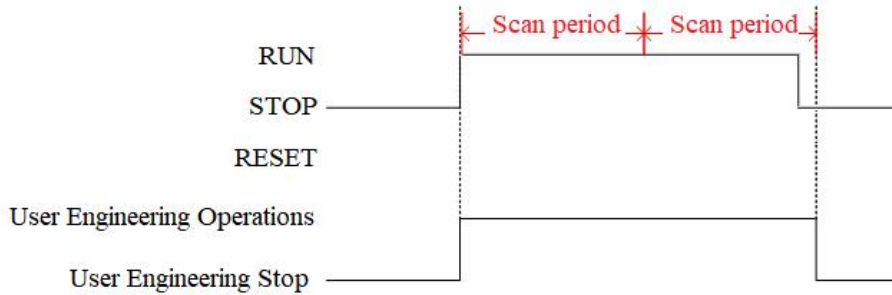
-	-	0	1	Use CAN terminal resistor
-	-	1	1	Use 485 and CAN terminal resistor

(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).

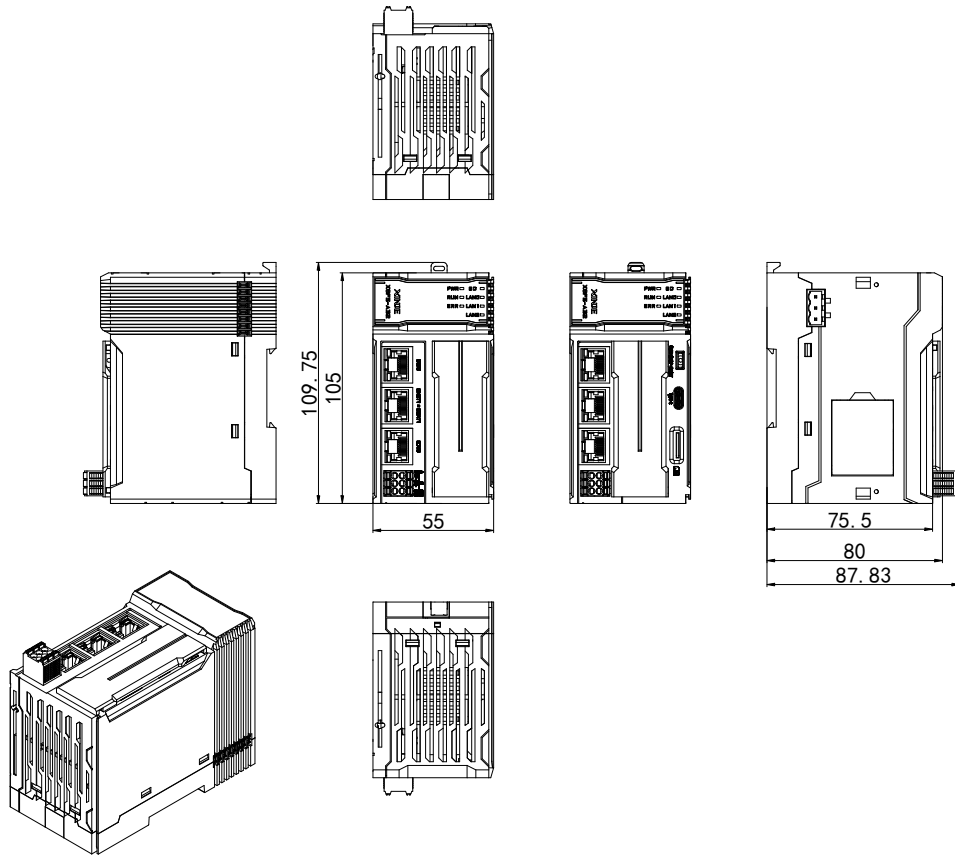
**Note:** When the device leaves the factory, the system dials the code to the "STOP" mode by default.



## 7-4. Apparent dimension

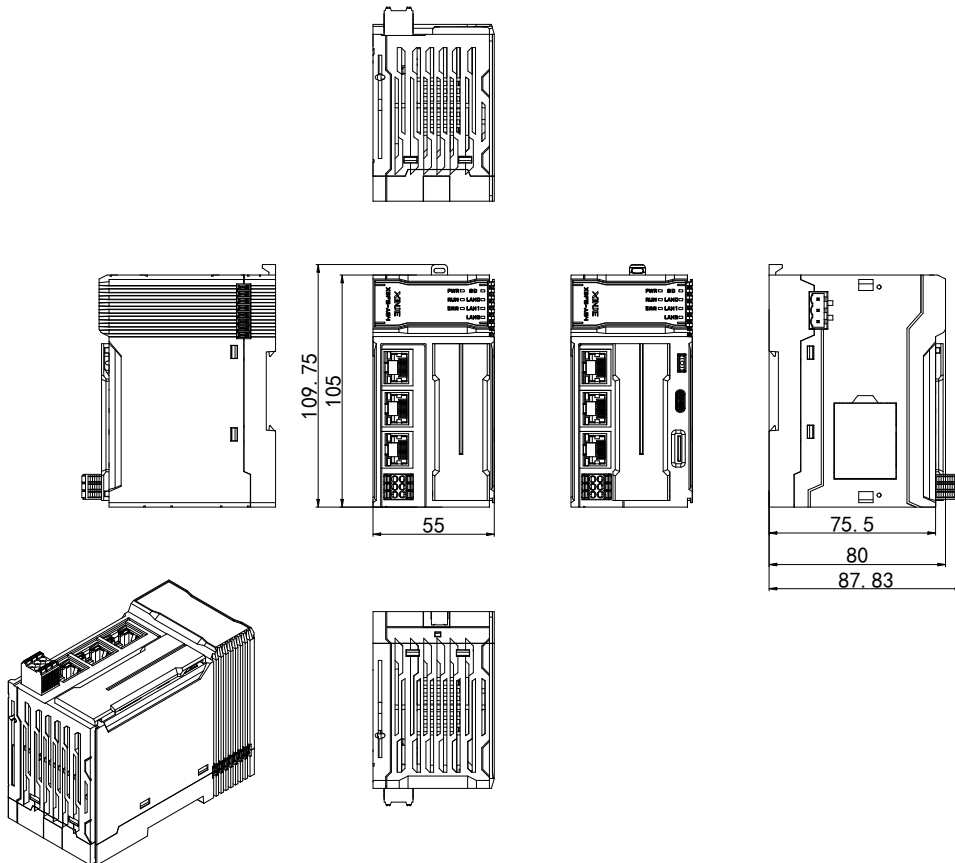
(1) XSF5-A32:

unit: mm



(2) XSF5-A64:

unit: mm



# XINJE



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