XINJE

XSF series PLC

User manual【Hardware】

Wuxi Xinje Electric Co., Ltd.

Data No. PF 01 202602026 1.1.1

User Manual of XSF Series Programmable Controller [Hardware]

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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

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

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^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.
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.

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1. Document Guide

1-1. Related manual

(1) CPU unit

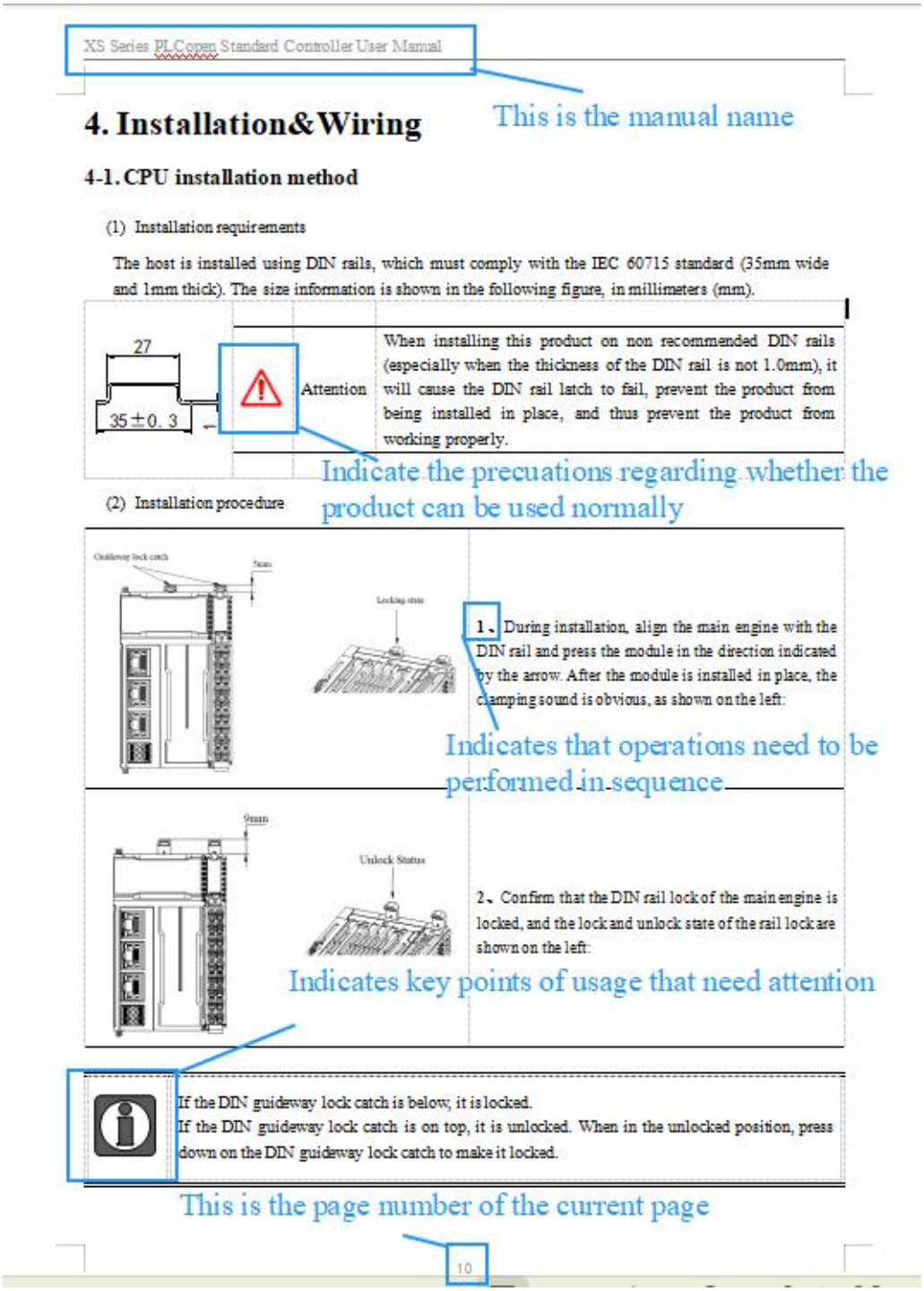
Manual name	Main content
XS Series PLCopen Standard Controller User Manual [Basic Instructions] (XS Studio)	It mainly records the hardware specifications and hardware maintenance information of XSF series .
User Manual of XS Series PLCopen Standard Controller [Motion Control Edition] (XS Studio)	It mainly records the application of XS series ethercat and pulse instructions.
XS Series PLCopen Standard Controller User Manual [Software Edition] (XS Studio)	It mainly introduces the relevant usage content of the XS software.

(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 methods of the manual

The following is an explanation of the page composition and symbols related to this manual. The following method for manual reading related, so the actual content is different.



2. Terminology

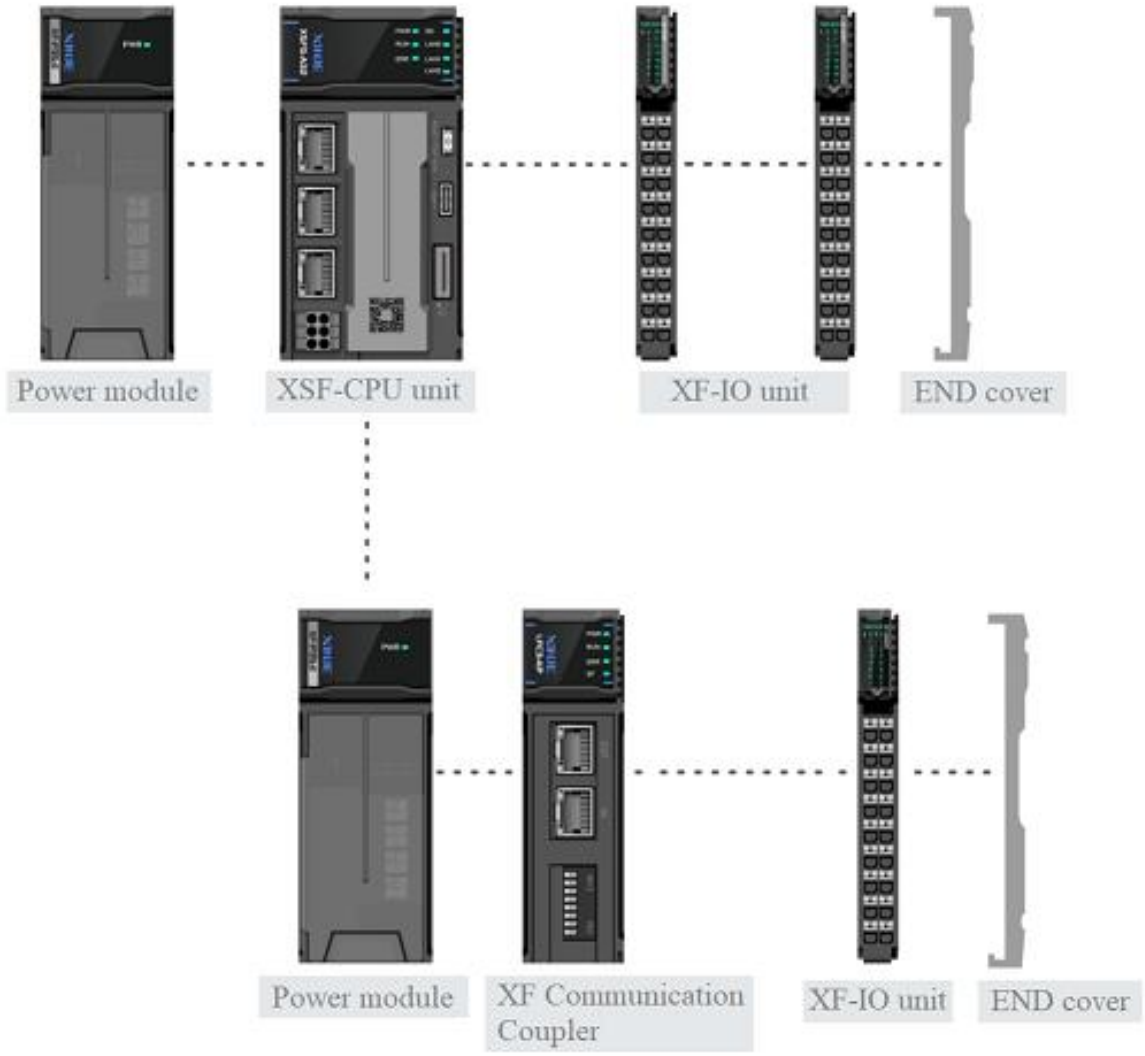
In this manual, unless otherwise specified, the following terms will be used for explanation.

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:

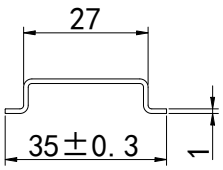
CPU unit model	Scalable basic I/O unit
XSF5-A8	32
XSF5-A16	
XSF5-A32	
XSF5-A64	

4. Installation&Wiring

4-1. CPU installation method

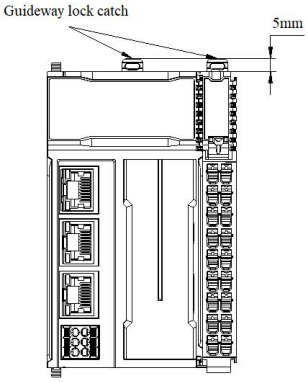
(1) Installation requirements

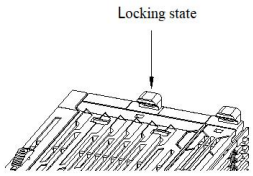
The host is installed using DIN rails, which must comply with the IEC 60715 standard (35mm wide and 1mm thick). The size information is shown in the following figure, in millimeters (mm).



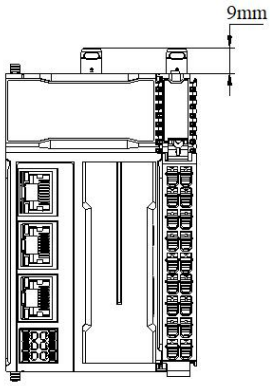
Attention	When installing this product on non recommended DIN rails (especially when the thickness of the DIN rail is not 1.0mm), it will cause the DIN rail latch to fail, prevent the product from being installed in place, and thus prevent the product from working properly.

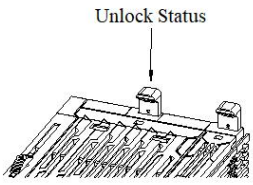
(2) Installation procedure





1、 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:





2、 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.

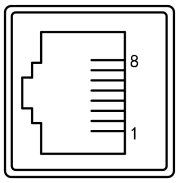
4-2. Network cable installation method

(1) Network cable requirements

To improve the reliability of device communication, the Ethernet cable must be shielded Category 5 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.

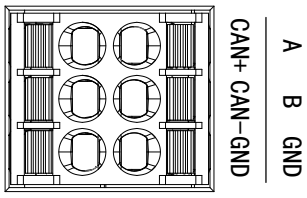
(2) Signal pin assignment

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

4-3. 485&CAN

When the XSF5 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:

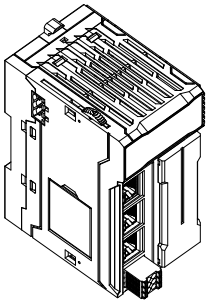
Connector View	Number	Signal name	Instructions
	1	CAN+	CAN+ wiring terminal of CAN
	2	CAN-	CAN- wiring terminal of CAN
	3	GND	Ground terminal of CAN
	4	A	A-phase wiring terminal of 485
	5	B	B-phase wiring terminal of 485
	6	GND	Ground terminal of GND
	-	-	-

4-4. Battery maintenance and replacement

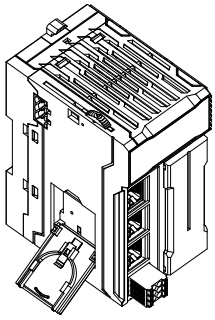
(1) The function of batteries

- 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.

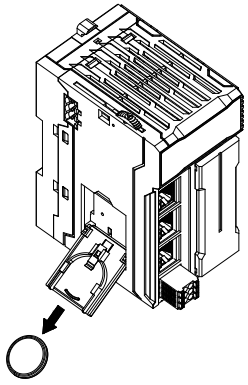
(2) Battery replacement procedure



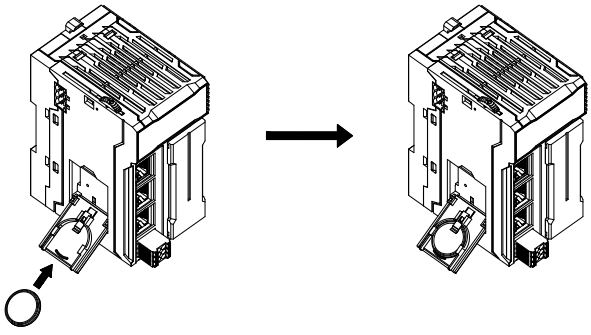
1. Please complete the following steps before replacing:
① Record RTC data.
② Set the power supply of the CPU module to ON for 10 minutes or more.



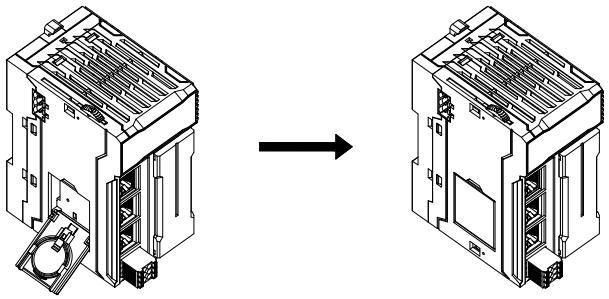
2. Open the side cover of the CPU unit (battery box)



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



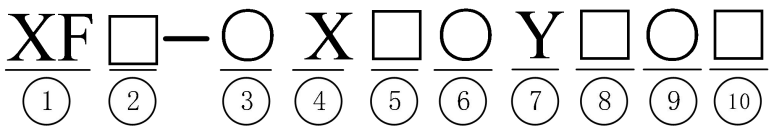
4. Insert a new battery.



5. Close the cover plate.

5. Naming convention

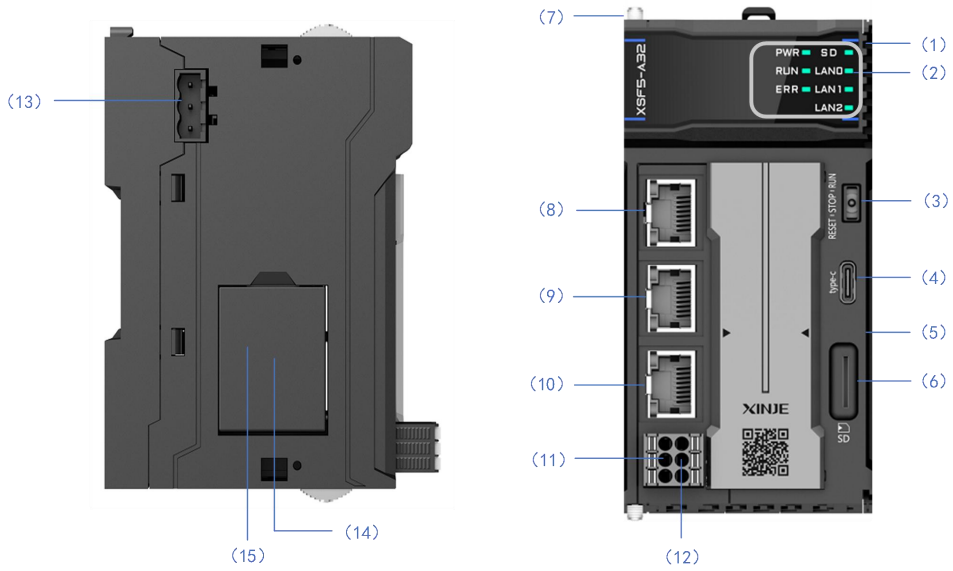
(1) CPU unit



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℃
	Min temperature	-20℃
Transportation/storage temperature	Max temperature	70℃
	Min temperature	-40℃
Environmental humidity (including operation/storage)	Upper limit	95%
	lower limit	10%
Protection grade		IP20
Anti vibration		Accord with IEC61131-2 Under intermittent vibration (frequency 5-9Hz, constant amplitude 3.5mm peak displacement) and (frequency 9-150Hz, constant acceleration 1.0g peak acceleration) Under continuous vibration (frequency 5-9Hz, half amplitude 1.75mm displacement) and (frequency 9-150Hz, constant acceleration 0.5g, constant frame amplitude) Scan 10 times in X, Y, and Z directions
Impact resistance		Accord with IEC61131-2 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)
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		Used for uploading/downloading programs and firmware upgrade on PLC,Storage capacity ≤32GB			

		The SD card is formatted in either FAT32 or NTFS format.
USB interface	Type-C type	Used for uploading/downloading programs, firmware upgrade, and program monitoring on PLC USB drive connection, upload/download program The USB is formatted in either FAT32 or NTFS format.
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 ℃: -13.20~+2.12s/1 day Ambient temperature 25 ℃: -3.18~+3.74s/1 day Ambient temperature 0 ℃ : -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.
	Function	1. ModbusTCP Support at least 32 servers Supports a minimum of 32 clients

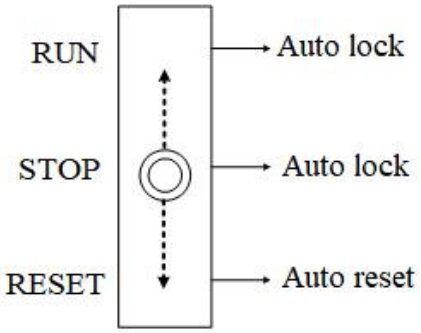
		2. TCP/IP, UDP/IP Supports a minimum of 32 3. EtherNet/IP Explicit, EtherNet/IP Implicit Implicit (I/O) message communication supports scanners and adapters. Supports 128 devices and 256 connections. Minimum release cycle 1ms. Single connection supports a maximum of 1448 bytes. 4. OPC UA Supports a minimum of 8 client connections. Support sampling period of 50ms to 10s. Supports a maximum number of 5000 tags.			
ECAT	Port	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			
	Parameter	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			
	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

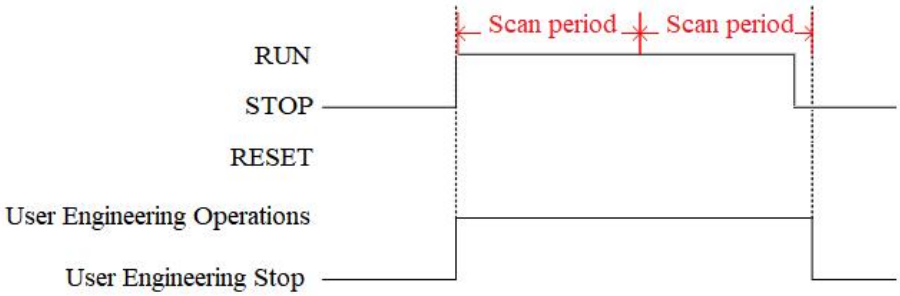
Dial position				Definition	Comment
S1(obligate)	S2(obligate)	S3	S4		
-	-	0	0	Empty	Set ON is 1 Set OFF is 0
-	-	1	0	Use 485 terminal resistor	
-	-	0	1	Use CAN terminal resistor	
-	-	1	1	Use 485 and CAN terminal resistor	

(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).

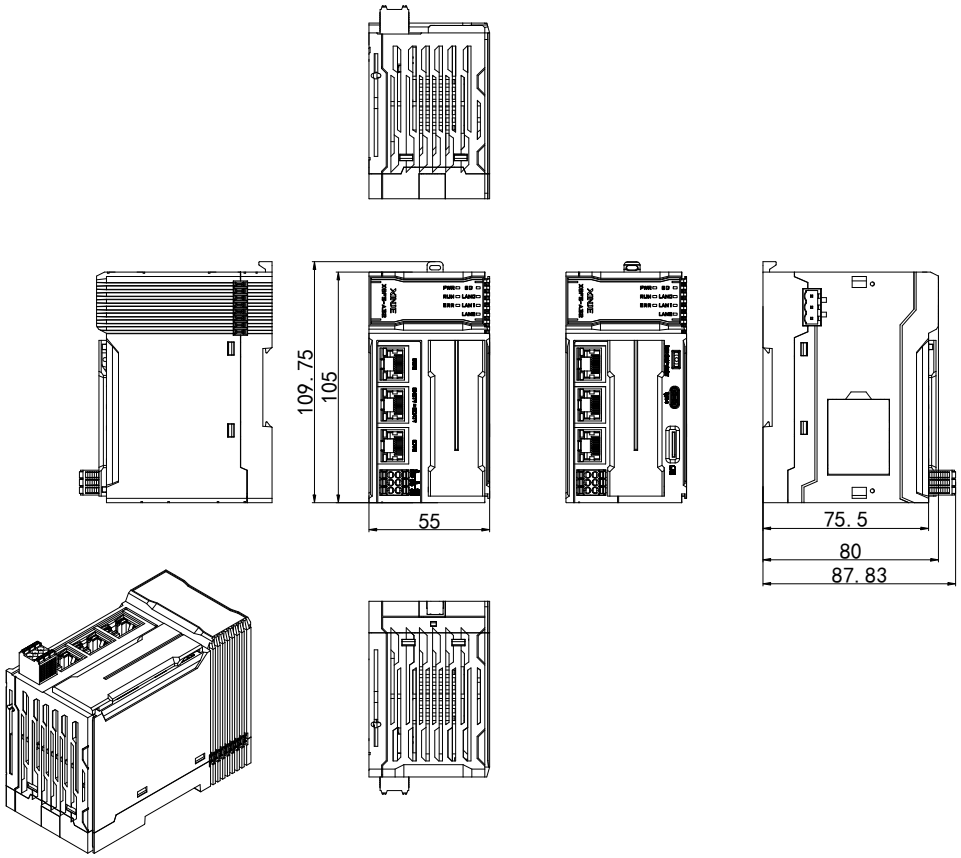
Note: When the device leaves the factory, the system dials the code to the "STOP" mode by default.



7-4. Apparent dimension

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

unit: mm



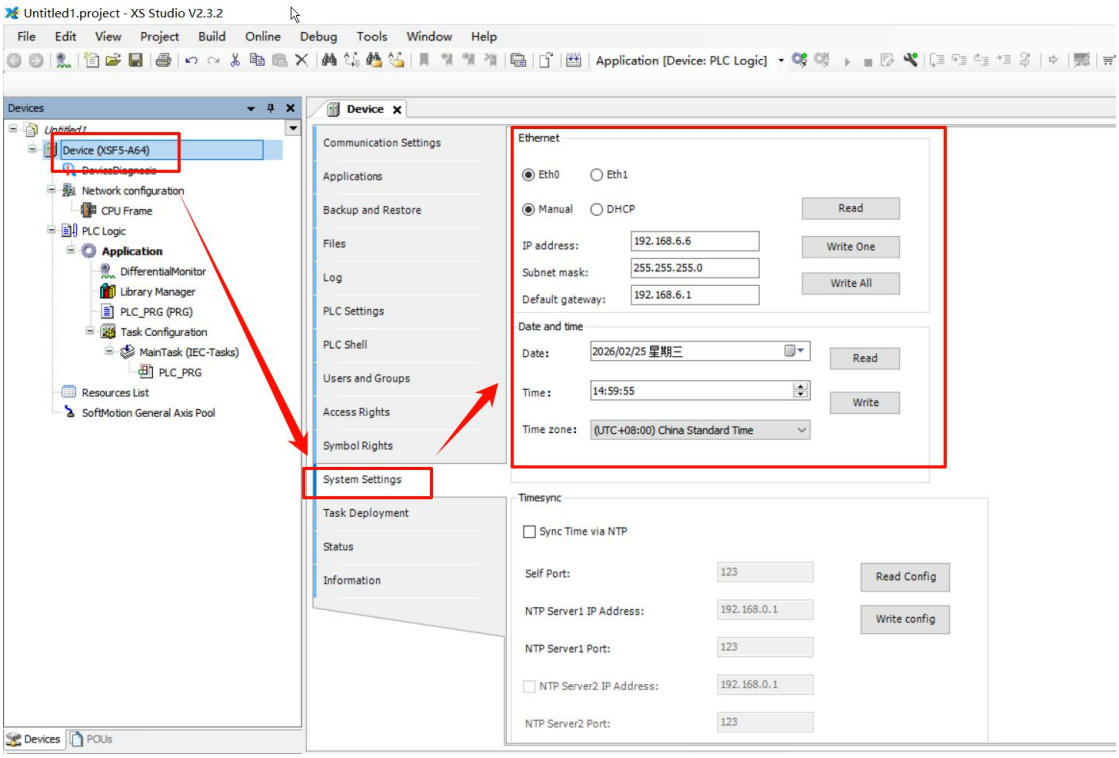
8. Acquisition and modification of IP

8-1. Acquisition and modification of IP

8.1.1 XS Studio Software

1) "System Settings" interface

Click "Device"-"System Settings" to read and modify network port information.

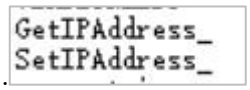


2）Instructions

The network port information can be read and modified using the commands XJ_GetNetInfo and XJ_SetNetInfo. For detailed usage of these commands, please refer to the instructions in the *XS Series PLCopen Standard Controller User Manual [Basic Command Section] (XS Studio)*.

3）"PLC Instruction" Interface

Click "Device" - "PLC Instructions", then click the three dots to see the supported commands, which include "GetIPAddress_" and "SetIPAddress_"



You can press "GetIPAddress_0" Enter or "GetIPAddress_1" Enter to view the IP address and subnet mask for the ENET0 port and ENET1||ECAT1 port respectively.

```
GetIPAddress_0

192.168.6.6_255.255.255.0


----
GetIPAddress_1

0.0.0.0_0.0.0.0
```

You can input "SetIPAddress_0_IP address_subnet mask" and press Enter or "SetIPAddress_1_IP address_subnet mask" and press Enter to set the IP and subnet mask for the ENET0 port and ENET1||ECAT1 port respectively.

- The firmware of the XSF5 series PLC must reach version 2.4.1 or above to support obtaining or modifying the IP address in the "PLC Instructions" interface.
- If the network port attribute is set to automatic acquisition, modifying it will prompt "The modification is invalid because the network port is in DHCP mode." It is necessary to set it to manual through the "System Settings" interface or command before the IP address and subnet mask can be modified in the "PLC Command" interface.

```
----
SetIPAddress_0_192.168.6.11_255.255.255.0

The IP address is set successfully.


----
SetIPAddress_1_192.168.7.11_255.255.255.0

The modification is invalid because the network port is in DHCP mode.


----
SetIPAddress_1_192.168.7.11_255.255.255.0

The IP address is set successfully.
```

8.1.2 Codesys native software

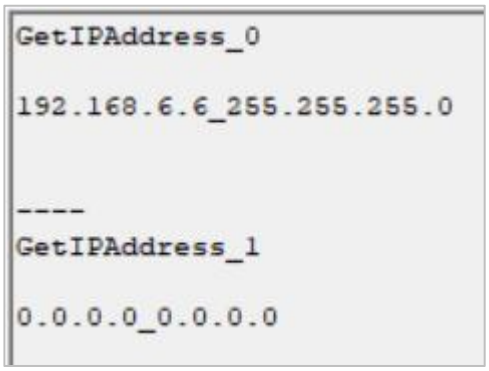
1) Command

usage for obtaining network port information: The XJ_GetNetInfo and XJ_SetNetInfo commands can be used to read and modify network port information. For specific instructions on their usage, please refer to the description in the "XS Series PLCopen Standard Controller User Manual [Basic Instruction Section] (XS Studio)."

2) On the "PLC Instruction" interface,

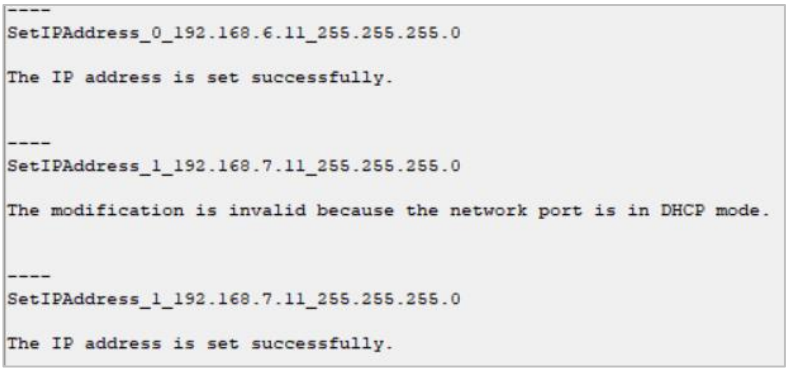
click "Device" - "PLC Instruction", then click the three dots to view the supported commands, which include "GetIPAddress_" and "SetIPAddress_".

You can press "GetIPAddress_0" Enter or "GetIPAddress_1" Enter to view the IP address and subnet mask of the ENET0 port and ENET1||ECAT1 port respectively.



You can enter "SetIPAddress_0_IP address_subnet mask" followed by Enter or "SetIPAddress_1_IP address_subnet mask" followed by Enter to set the IP and subnet mask for the ENET0 port and ENET1||ECAT1 port respectively.

- The firmware of the XSF5 series PLC must reach version 2.4.1 or above to support obtaining or modifying the IP address in the "PLC Instruction" interface.
- If the network port property is set to automatic acquisition, modifying it will prompt "The modification is invalid because the network port is in DHCP mode." It is necessary to set it to manual through the "System Settings" interface or via instructions before the IP address and subnet mask can be modified in the "PLC Instruction"interface.



8.1.3 System Dialing

Switch 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).

8.2 Effective method

After modifying the network port information, XSF5 can take effect through power-off restart or system dial switch STOP->RUN.

Manual Update Log

The document number of this manual is recorded in the lower right corner of the manual cover. The information regarding manual revisions is summarized as follows:

Time	Document ID	Change content
2023.8	PF 01 20230801 1.0	First Edition Manual Released
2025.2	PF 01 20250207 1.1	Added product descriptions for XSF5-A8 and XSF5-A16.
2025.4	PF 01 20250408 1.2	Add the content of Chapter 8
2025.5	PF 01 20250519 1.1.1	Correct known error descriptions in the manual

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