

XF series PLC extension module

User manual

Wuxi XINJE Electric Co., Ltd.

Data No. PF 02 20241118EN 1.3

Basic description

- Thank you for purchasing the XINJE XF series programmable controller and extension module.
- This manual mainly introduces the hardware features of XF series extension module.
- 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 don't 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

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.



When used incorrectly, it may cause danger, moderate injury or minor injury, and property damage.



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

Don't install damaged controllers, controllers with missing parts, or controllers with unqualified models.

Danger of injury.

• Product system design



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.



Don't 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



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



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



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.



• Operation and maintenance of products



Danger

1. Don't touch the terminal after the controller is powered on.

Danger of electric shock.

2. Don't 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.



1. Don't 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. Don't 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.

6. Before installing the device, be sure to turn off the power supply. If the power supply is not turned off, the device may malfunction or be damaged. Don't turn off the CPU unit or intermediate power supply when disassembling the XF-I/O unit.

It may cause malfunctions, product damage, etc.

7. Don't stick tape or labels on both sides of the device or at the golden finger. Tape or labels can affect the normal vertical sliding installation of the module unit. The residue of the label or tape, adhesive or debris, may adhere to the pins of the XF-I/O bus connector.

May cause malfunctions, malfunctions, etc.

8. Don't touch the XF-I/O bus connector on the device, as sweat and dust may adhere to the connector or golden fingers.

This may cause a malfunction.



9. Don't use ink to write on the device in the area shown in the picture.

This may cause a malfunction.

Preface

Sincerely thank you for purchasing the XINJE Programmable Controller XF-IO series products.

This manual is convenient for users to understand and use the necessary precautions, specifications, functions, and other contents of XF-IO 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 XF-IO series extension module.

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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	It mainly records the product specifications and maintenance
manual	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		
1020	Protection level according to DIN 40050: protection against finger contact		
120	and intrusion of particles with a diameter greater than 12mm		
	The backplane bus is a serial data bus used by various modules to		
Backplane bus	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	22
	XSF5-A64	52

4. Power module unit XF-P35-E

4-1. Product overview

The XF-P35-E series CPU power module provides power for the CPU unit, coupler unit, and system unit for the expansion unit, suitable for XF and XSF series CPU unit products and XF series communication coupler unit.

- AC Input
- Double ground
- Overload protection

Module version:

Hardware version	Function
H2.0	Basic functions for the first official production

4-2. Naming rules

$\underline{\mathbf{XF}}_{(1)} - \underline{\underline{E}}_{(2)} \ \underline{\underline{P}}_{(3)} \ \underline{\underline{P}}_{(4)} - \underline{\underline{O}}_{(5)}$			
1	Series Name	XF:	XF series extension module
2	Extension module	E:	Right extension module
3	Module Type	P:	Power module
4	Output power	35:	Output power 35W
5 In	Input Tupo	E:	AC Input
	mput Type	C:	DC Input

4-3. Module view

(1) Description of each section



Number	Name	
1	System LED indicator light	
2	Input terminal block	
3	Signal indication	
4	Protective cover plate	

(2) System indicator light

System indicator light	Meaning		
Extinguish		No input power supply	
	Normally ON	The input power of the power module is normal and provides	
PWR (Green)		power to the CPU unit normally	
	Normally ON	The input power of the power module is normal, but the	
	(Red)	power supply to the CPU unit is abnormal	

4-4. General specifications

General specifications		
Project		Content
	Max temperature	55°C
Operating temperature	Min temperature	-20°C
Transportation/storage	Max temperature	70°C
temperature	Min temperature	-40°C
Environmental humidity	Upper limit	95%
(Including operation/storage)	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	
	Accord with IEC61131-2	
	Impact strength of 15G (peak) with a duration of 11ms	
Impact resistance	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	

4-5. Technical specification

Project		Specification
Туре		ХҒ-Р35-Е
Power		35W
Input power	L N	Input AC100~240V 50/60Hz
LG - Protective groun	ding	Protective grounding for equipment and operators (In accordance with the functional protection part of IEC 61131-2 and GB/T 15969.2 standards)
FG - Functional groun	ding	Functional grounding terminals, i.e. grounding functions used for non safety purposes, such as improving anti-interference. (In accordance with the functional grounding part of IEC 61131-2 and GB/T 15969.2 standards)
Allow instant power o	utage time	20ms and below
Dash current		20A 8ms and below
Module weight		199g

4-6. Installation&Wiring

4-6-1. Appearance dimension



4-6-2. Installation method

The module 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).



4-6-3. Installation environment

This product can be installed in four positions (i.e. installation direction): horizontal direction, vertical direction, top of the cabinet, and bottom of the cabinet. It is recommended to install in the horizontal direction. The heat dissipation design is through natural convection, to ensure normal ventilation and heat dissipation, and to reserve sufficient wiring space, the minimum gap must be left around this product, as shown in the following figure:





If there are high-temperature heat source equipment (heaters, transformers, high resistors, etc.) around this product, a minimum gap of 100mm should be left between the equipment and the high-temperature heat source.

5. Digital quantity module unit

5-1. Naming convention

	XF - E	\bigcirc	$X \square \bigcirc Y \square$
	$\boxed{1} \qquad \boxed{2}$	$\overline{3}$ $\overline{4}$	$\overline{(5)} \ \overline{(6)} \ \overline{(7)} \ \overline{(8)} \ \overline{(9)}$
	Series Name	XF:	XF series extension module
2	Extension module	E:	Right extension module
		4:	4 channels
		8:	8 channels
3	Input channel	16:	16 channels
		32:	32 channels
		64:	64 channels
		Empty:	Digital input PNP and NPN type
4	Input point type	N:	Digital input NPN type
		P:	Digital input PNP type
5	Туре	X:	Digital input
		4:	4 channels
		8:	8 channels
6	Output channel	16:	16 channels
		32:	32 channels
		64:	64 channels
		Empty:	Digital output NPN type
\bigcup	Output type	P:	Digital output PNP type
8	Туре	Y:	Digital output
	Output point type	T:	Digital output transistor type
	(9) Output point type	R:	Digital output relay type

5-2. Digital input unit XF-16X

5-2-1. Product overview

XF-E16X series digital input expansion module, which has 16 channels of digital input. Supports NPN and PNP inputs, and is compatible with XF, XSF series CPU unit products and XF series communication coupler units.

- 16 channels digital input.
- Accord with IEC61131-2 input standard type 3.
- NPN and PNP bipolar input.
- 12mm width design.

Module version:

Hardware version	Software version	Function
H2.0	V2.0	Basic functions for the first official production

5-2-2. Module view

(1) Description of each section



Number	Name
1	System LED indicator light
2	Channel LED indicator light
3	Detachable terminal block
4	Clasp
5	Signal indication
	Color identification indicating
0	module type
	Module hardware and software
	versions
8	Wiring diagram

(2) System indicator light

System indicator light	Meaning	
	Extinguish	Module not powered on
PWR(Green)	Normally ON	All external power supplies of the module are normal
	Normally ON	(Backplane bus power supply&external input 24V)
	Normally ON	The module is operating normally
Flashing 1Hz*1RUN(Green)ExtinguishFlashing 10Hz*2	Flashing 1Hz ^{*1}	General errors in module logs
	Important errors in the module log	
	Flashing 10Hz ^{*2}	Module establishing communication
	Double flashing ^{*3}	Module firmware update

*1: A square wave with a duty cycle of 50% and a frequency of 1Hz.

*2: A square wave with a duty cycle of 50% and a frequency of 10Hz.



(3) Channel indicator light

Model	Channel indicator light		
VE ELCY	NO V17	Normally ON(Green)	Corresponding input channel has input ON signal
AF-EI0A	X0~X17	Extinguish	Corresponding input channel has no input ON signal

(4) Color identification

No.	C	Color	Module type
1		Grey White	Digital input
2		Gray	Digital output&digital mixed module
3		Light blue	Analog input
4		Dark blue	Analog output
5		Green	RS232&485 serial port communication
6		Pink	Temperature signal input
7		White	High speed counting

5-2-3. General specifications

General specifications		
Project		Content
On anotin a taman anatawa	Max temperature	55°C
Operating temperature	Min temperature	-20°C
Transportation/storage	Max temperature	70°C
temperature	Min temperature	-40°C
Environmental humidity	Upper limit	95%
(Including operation/storage)	lower limit	10%
Protection grade		IP20
		Accord with IEC61131-2
		Under intermittent vibration (frequency 5-9Hz, constant
		amplitude 3.5mm peak displacement) and (frequency
Anti vibration		9-150Hz, constant acceleration 1.0g peak acceleration)
Anti vibration		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
		Accord with IEC61131-2
Turner of an elister and		Impact strength of 15G (peak) with a duration of 11ms is
Impact resistance		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

5-2-4. Technical specification

Project	Specification	
Input points	16	
Rated input voltage	DC24V	
Rated input current	6mA	
Input ON voltage	11V	
Input ON current	2.5mA	
Input OFF voltage	5V	
Input OFF current	1mA	
Input resistance $ON \rightarrow OFF$ response	1000	
time (Hardware)	Toolds	
Input resistance OFF \rightarrow ON response	10000	
time (Hardware)	10008	
Input doroting	Derate by 75% when operating at 60 °C (with no more than 12 ON	
	input points), or by 10 °C when all input points are ON.	
Public end method	1 common terminal of 8 points	
Connection mode	For example, external terminal connection diagram	
Module power consumption	0.5W (internal backplane)+1.4W (external input)	
Module weight	80g	

5-2-5. Installation&Wiring

5-2-5-1 Appearance dimension

■ XF-E16X

Unit: mm





5-2-5-2 Terminal Definition&Wiring

Terminal I	Definition
------------	------------

XF-E16X				
Meaning	A-list terminal	Terminal layout	B-list terminal	Meaning
CH0	0		0	CH8
CH1	1		1	CH9
CH2	2		2	CH10
CH3	3		3	CH11
CH4	4	4	4	CH12
CH5	5		5	CH13
CH6	6		6	CH14
CH7	7		7	CH15
SS	8	8	8	SS



Two SS are internally short circuited, so all input points of a single module can only choose between NPN or PNP.

External wiring



Number	Name
1	System indicator light
2	Channel indicator light
3	Backplane bus
4	Input Channel&Wiring

5-2-5-3 Installation method

(1) Installation requirements

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



(2) Installation steps



The assembly between IO modules is carried out by sliding installation through the top and bottom rails of the modules, as shown in the left figure:



The module is installed on the guide rail. When installing, align the module with the DIN rail and press the module in the direction indicated by the arrow. After installation, there is a noticeable sound of the module engaging, as shown in the left figure:



After the module installation is completed, the lock buckle will automatically move downwards for locking. If the lock buckle does not move downwards, the top of the lock buckle needs to be pressed downwards to ensure proper installation.

(3) Unstallation steps



5-2-5-4 Installation environment

This product can be installed in four positions (installation direction): horizontal direction, vertical direction, top of the cabinet, and bottom of the cabinet. It is recommended to install in the horizontal direction. The heat dissipation design is through natural convection, to ensure normal ventilation and heat dissipation, and to reserve sufficient wiring space, the minimum gap must be left around this product, as shown in the following figure:





If there are high-temperature heat source equipment (heaters, transformers, high resistors, etc.) around this product, a minimum gap of 100mm should be left between the equipment and the high-temperature heat source.

5-2-5-5 Installation environment

Suitable cable diameter				
Chinese standard/mm ²	American Standard/AWG			
0.3	22			
0.5	20			
0.75	18			
1.0	18			
1.5	16			

When wiring a module, its terminal must meet the following requirements:

If using other tube type wire lugs, please crimp them to the stranded wire, and the shape and size requirements are shown in the following figure:



5-2-6. Parameters and mapping addresses

Name	Туре	Description
XF_E16X	Stuct	16 channels input module
——— СН0	BOOL	Channel 0 input value
CH1	BOOL	Channel 1 input value
CH2	BOOL	Channel 2 input value
—— СНЗ	BOOL	Channel 3 input value
——— СН4	BOOL	Channel 4 input value
—— СН5	BOOL	Channel 5 input value
——— СН6	BOOL	Channel 6 input value
——— СН7	BOOL	Channel 7 input value
CH8	BOOL	Channel 8 input value
—— СН9	BOOL	Channel 9 input value

Name		Туре	Description
XF_E162	X	Stuct	16 channels input module
	- CH10	BOOL	Channel 10 input value
	- CH11	BOOL	Channel 11 input value
	- CH12	BOOL	Channel 12 input value
	- CH13	BOOL	Channel 13 input value
	- CH14	BOOL	Channel 14 input value
	- CH15	BOOL	Channel 15 input value
	- ErrCode_module	WORD	Module level error codes
	ErrCode_CH	DWORD	Channel level error codes

Error code parameters:

Module level error codes(ErrCode_module)				
Bit	Meaning	Error level		
0	Not applicable			
2	Internal module error occurred and cannot be repaired by the user layer.	Important		
3	Version mismatch	Important		



Channel level error code reserved, currently undefined.

• Configuration parameters

XF-E16X					
Variable name Type Meaning		Meaning	N	ote	
CH0_FilterTime	BYTE	Channel 0 input filtering time	0: No filtering	11: 9ms	
CH1_FilterTime	BYTE	Channel 1 input filtering time	1: 0.25ms 2: 0.5ms	12: 10ms 13: 11ms	
CH2_FilterTime	BYTE	Channel 2 input filtering time	3: 1ms 4: 2ms	14: 12ms 15: 13ms	
CH3_FilterTime	BYTE	Channel 3 input filtering time	6: 4ms	10: 14ms 17: 15ms	
CH4_FilterTime	BYTE	Channel 4 input filtering time	8: 6ms	19: 30ms	
CH5_FilterTime	BYTE	Channel 5 input filtering time	10: 8ms	21: 128ms	

CH6 FilterTime	DVTE	Channel 6 input	
	DIIL	filtering time	
CU7 EilterTime	DVTE	Channel 7 input	
CH/_FilterTime	BIIE	filtering time	
CUP EilterTime	DVTE	Channel 8 input	
CH8_FilterTime	BILE	filtering time	
	DVTE	Channel 9 input	
CH9_FilterTime	BYIE	filtering time	
CU10 ElterTime	DVTE	Channel 10 input	
CHI0_FilterTime	BYIE	filtering time	
	DVTC	Channel 11 input	
CHII_FilterTime	BYIE	filtering time	
CU12 ElterTime	BYTE	Channel 12 input	
CH12_FilterTime		filtering time	
CU12 ElterTime	DVTE	Channel 13 input	
CH13_Filter1ime	BYIE	filtering time	
CU14 ElterTime	DVTE	Channel 14 input	
CH14_FilterTime	BYIE	filtering time	
CU15 EilterTime	BYTE	Channel 15 input	
CH15_ritter1ime		filtering time	
CHO 7 Lanut Logisterel	DUTTE	Channel 0-7 logic	0: Positive logic
CH0-/_input_Logicievei	BYIE	level configuration	1: Negative logic
		Channel 8-15 logic	Bit0~bit7 corresponds to
CU9 15 Innut I agialaval	DVTE	level configuration	channels 0~7
CIIO-15_INPUL_LOGICIEVE	DIIE		Bit8~bit15 correspond to
			channel 8-15

5-2-7. Functions and Settings

■ Channel input filtering time

Each channel of "filtering time" corresponds to a separate filtering parameter, and the setting method is to select the parameter from the drop-down menu.

XF-E16XModule parameters	Channel	Channel 0
	Channel Template	
EXT16X I/O Mapping	Channel Selection:	
Status	Channel 0	Parameter Setting: Manual ~
Information	Channel 1	
Information	Channel 2	Till stars Descentions
	Channel 3	Ims V
	Channel 4	Logic Level: Positive Logic V
Parameter definition	When there is a signal at t filtering time, it is considered	he input terminal and the signal duration exceeds d a valid signal.

Settable parameters	0ms, 0.25ms, 0.5ms, 1ms, 2ms, 3ms, 4ms, 5ms, 6ms, 7ms, 8ms, 9ms, 10ms, 11ms, 12ms, 13ms, 14ms, 15ms, 20ms, 30ms, 64ms, 128ms
Default parameters	1ms

■ Channel logic level

The "Logic Level Configuration" corresponds to a separate logic level configuration for each channel. The setting method is to select parameters from the drop-down menu.

Hardware configuration	T XF_E16X X				
XF-E16XModule parameters	Channel		Channel 0		
DTICY VO Magaina	Char	nel Template			
EXT16X I/O Mapping	Channel Selection:		Deservation Contrin		
Status	Channe	10	Parameter Setting	Parameter Setting: Manual V	
Information	Channe	1			
	Channe	12	Filtering Paramet	Filtering Parameters: Ime	
	Channe	13			
	Channe	4	Logic Level:	Positive Logic	~
Parameter definition	External input signal	Logic level configuration	Run program	Operation result	_
	X0=1	Positive logic		Y0=1	
	X0=1	Negative logic	LD X0.	Y0=0	-
	X0=0	Positive logic	OUT Y0.	Y0=0	
	X0=0	Negative logic		Y0=1	
	The fellowing	. 1 1 11	1 9 4 4		, .,.

5-3. Digital output unit XF-E16(P)YT

5-3-1. Product overview

XF series digital output expansion module, which has 16 channels of digital output and is compatible with XF, XSF series CPU units and XF series communication coupler units.

- 16 channels digital output.
- NPN, PNP output.
- 12mm width design.
- Model Description.

Moo	del	Function	
NPN output type	PNP output type		
XF-E16YT	XF-E16PYT	16 channels transistor output	

Module version

Model	Hardware version	Software version	Function
XF-E16YT	H2.0	V2.0	Basic functions for the first official production
XF-E16PYT	H2.0	V2.0	Basic functions for the first official production

5-3-2. Module view

(1) Description of each section



Number	Name		
1	System LED indicator light		
2	Channel LED indicator light		
3	Detachable terminal block		
4	Clasp		
5	Signal indication		
6	Color identification indicating		
0	module type		
	Module hardware and software		
	versions		
8	Wiring diagram		

(2) System indicator light

System indicator light	Meaning		
	Extinguish	Module not powered on	
	Normally ON	All external power supplies of the module are normal	
PWR(Green)		(Backplane bus power supply&external input 24V)	
	Flashing 1Hz*1	Module power supply is abnormal and cannot operate	
		normally	
	Normally ON	The module is operating normally	
	Flashing 1Hz*1	General errors in module logs	
RUN(Green)	Extinguish	Important errors in the module log	
	Flashing 10Hz*2	Module establishing communication	
	Double flashing*3	Module firmware update	

*1: A square wave with a duty cycle of 50% and a frequency of 1Hz.

- *2: A square wave with a duty cycle of 50% and a frequency of 10Hz.
- *3: The following figure:



(3) Channel indicator light

Model	Channel indicator light		
XF-E16(P)YT	Y0~Y17	Normally ON(Green)	Corresponding input channel has input ON signal
		Extinguish	Corresponding input channel has no input ON signal

(4) Color identification

No.	Color		Module type	
1		Grey White	Digital input	
2		Gray	Digital output&digital mixed module	
3		Light blue	Analog input	
4		Dark blue	Analog output	
5		Green	RS232&485 serial port communication	
6		Pink	Temperature signal input	
7		White	High speed counting	

5-3-3. General specifications

General specifications				
Project		Content		
On original temperature	Max temperature	55°C		
Operating temperature	Min temperature	-20°C		
Transportation/storage	Max temperature	70°C		
temperature	Min temperature	-40°C		
Environmental humidity	Upper limit	95%		
(including operation/storage)	lower limit	10%		
Protection grade	•	IP20		
		Accord with IEC61131-2		
		Under intermittent vibration (frequency 5-9Hz, constant		
		amplitude 3.5mm peak displacement) and (frequency		
Anti vibration		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		
		Accord with IEC61131-2		
Immost registeres		Impact strength of 15G (peak) with a duration of 11ms is		
Impact resistance		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		СЕ		

5-3-4. Technical specification

Project	Specification		
Model	XF-E16YT	XF-E16PYT	
Output points	16		
Rated load voltage	DC24V(DC10.2V~28.8V)		
Maximum load current	0.5A/1 point, 4A/module		
Surge current protection	Support		
Leakage current at OFF	Below 0.1mA		
Maximum voltage drop at ON	0.5V~1V		
Output ON \rightarrow OFF response time	0.1		
(Hardware)	0.11115		
Output OFF \rightarrow ON response time	0.1ms		

(Hardware)			
Output donating	Derate by 50% when operating at 55°C(While the output current of		
	ON doesn't exceed 2A), or by 10°C when the output point is fully ON		
Public end method 1 common terminal of 16 points			
Output Protection Support short circuit and overload protection functions			
Module power consumption	1.0W (Backplane bus)+0.8W(External input)		
Module weight	80g		
Insulation voltage	AC510V		
Insulated resistance	1M		

5-3-5. Installation&Wiring

5-3-5-1 Appearance dimension

■ XF-E16(P)YT





Unit: mm



5-3-5-2 Terminal Definition&Wiring

(1) Terminal Definition

XF-E16YT					
Meaning	A-list terminal	Terminal layout	B-list terminal	Meaning	
CH0	0		0	CH8	
CH1	1		1	CH9	
CH2	2		2	CH10	
CH3	3		3	CH11	
CH4	4	4	4	CH12	
CH5	5	5 5	5	CH13	
CH6	6		6	CH14	
CH7	7		7	CH15	
24V+	8		8	0V	

(2) External wiring

■ XF-E16YT


XF-E16PYT



Number	Name
1	System indicator light
2	Channel indicator light
3	Backplane bus
4	Input Channel&Wiring

5-2-5-3 Installation method

(1) Installation requirements

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



(2) Installation steps



The assembly between IO modules is carried out by sliding installation through the top and bottom rails of the modules, as shown in the left figure:



The module is installed on the guide rail. When installing, align the module with the DIN rail and press the module in the direction indicated by the arrow. After installation, there is a noticeable sound of the module engaging, as shown in the left figure:



After the module installation is completed, the lock buckle will automatically move downwards for locking. If the lock buckle does not move downwards, the top of the lock buckle needs to be pressed downwards to ensure proper installation.

(3) Unstallation steps



5-3-5-4 Installation environment

This product can be installed in four positions (installation direction): horizontal direction, vertical direction, top of the cabinet, and bottom of the cabinet. It is recommended to install in the horizontal direction. The heat dissipation design is through natural convection, to ensure normal ventilation and heat dissipation, and to reserve sufficient wiring space, the minimum gap must be left around this product, as shown in the following figure:





If there are high-temperature heat source equipment (heaters, transformers, high resistors, etc.) around this product, a minimum gap of 100mm should be left between the equipment and the high-temperature heat source.

5-3-5-5 Installation environment

When wiring a module, its terminal must meet the following requirements:

Suitable cable diameter			
Chinese standard/mm ²	American Standard/AWG		
0.3	22		
0.5	20		
0.75	18		
1.0	18		
1.5	16		

If using other tube type wire lugs, please crimp them to the stranded wire, and the shape and size requirements are shown in the following figure:



5-3-6. Parameters and mapping addresses

Name	Туре	Description
XF_E16YT	Stuct	16 channels output module
—— СН0	BOOL	Channel 0 output value
——————————————————————————————————————	BOOL	Channel 1 output value
——————————————————————————————————————	BOOL	Channel 2 output value
—— СНЗ	BOOL	Channel 3 output value
CH4	BOOL	Channel 4output value

Name	Туре	Description
XF_E16YT	Stuct	16 channels output module
CH5	BOOL	Channel 5 output value
——— СН6	BOOL	Channel 6 output value
CH7	BOOL	Channel 7 output value
CH8	BOOL	Channel 8 output value
СН9	BOOL	Channel 9 output value
CH10	BOOL	Channel 10 output value
CH11	BOOL	Channel 11 output value
CH12	BOOL	Channel 12 output value
—— СН13	BOOL	Channel 13 output value
——————————————————————————————————————	BOOL	Channel 14 output value
CH15	BOOL	Channel 15 output value
ErrCode_module	WORD	Module level error codes
ErrCode_CH	DWORD	Channel level error codes

Error code parameters:

Module level error codes(ErrCode_module)			
Bit	Meaning	Error level	
0	The 24V input power supply of the module is abnormal	Important	
2	Internal module error occurred and cannot be repaired by the user layer.	Important	
3	Version mismatch	Important	



Channel level error code reserved, currently undefined.

Configuration parameters

XF-E16Y			
Variable name	Туре	Meaning	Note
CH0_ExceptionOut	BYTE	Channel 0 output status in case of	0:Output replacement

		abnormality	value OFF	
CIII Emantine Orat	DVTE	Channel 1 output status in case of	1: Keep Previous Value	
CHI_ExceptionOut	BYIE	abnormality	2:Output replacement	
CII2 Excention Out	DVTE	Channel 2 output status in case of	value ON	
	DIIL	abnormality		
CH3 ExceptionOut	DVTE	Channel 3 output status in case of		
	DIIL	abnormality		
CH4 ExceptionOut	DVTE	Channel 4 output status in case of		
	DIIL	abnormality		
CH5 ExceptionOut	BYTE	Channel 5 output status in case of		
	DIIL	abnormality		
CH6 ExceptionOut	BYTE	Channel 6 output status in case of		
		abnormality		
CH7 ExceptionOut	BYTE	Channel 7 output status in case of		
		abnormality		
CH8 ExceptionOut	BYTE	Channel 8 output status in case of		
- I		abnormality		
CH9_ExceptionOut	BYTE	Channel 9 output status in case of		
		abnormality		
CH10_ExceptionOut	BYTE	Channel 10 output status in case of		
		abnormality		
CH11_ExceptionOut	BYTE	Channel 11 output status in case of		
		abnormality		
CH12_ExceptionOut	BYTE	Channel 12 output status in case of		
CH13_ExceptionOut	BYTE	Channel 13 output status in case of		
		abhormailty		
CH14_ExceptionOut	BYTE	channel 14 output status in case of		
		Channel 15 output status in case of		
CH15_ExceptionOut	BYTE	abnormality		
		Channel 0, 7 logic level	0: Positive logic	
CH0-7_Output_Logic	BYTE	configuration	1. Negative logic	
LeveL			Bit0~bit7 corresponds	
			to channels $0 \sim 7$	
CH8-15_Output_Logi	BYTE	Channel 8-15 logic level	Bit8~bit15 correspond	
cLeveL		configuration	to channel 8-15.	

5-3-7. Functions and Settings

The upper computer does not differentiate between NPN and PNP, and the interfaces XF-E16YT and XF-E16PYT are uniformly displayed as XF-E16Y.

■ Abnormal/STOP output status

Each channel corresponds to a separate parameter for "Abnormal/STOP Output Status", which can be set by selecting a parameter from the drop-down menu.

XF-E16YTModule parameters	Channel	Channel Template	
	Channel Template		
EXT16YT I/O Mapping	Channel Selection:		
Status	Channel 0	Response for CPU Abnormal/STOP Mode:	Output Replace OFF ~
Information	Channel 1	Logic Level:	Positive Logic
	Channel 2	11.87	
	Channel 3		
	Channel 4		

Parameter	The following table pulling method reflects the parameters that can be set: "Output replacement		
definition	value OFF", "Keep previous value", "Output replacement value ON".		
	Output replacement	When the PLC is in STOP mode, the output terminal is in a reset state	
	value OFF	(Physical terminal, regardless of channel logic level).	
Donomotor		When the PLC is in abnormal/STOP mode, the output terminal outputs	
definition	Keep previous value	the last state of the PLC from RUN to STOP (Physical terminal,	
definition		regardless of channel logic level).	
	Output replacement	When the PLC is in abnormal/STOP mode, the output terminal is in a set	
	value ON	state (Physical terminal, regardless of channel logic level).	
Default			
parameters	Output replacement value OFF.		

■ Channel logic level

The "Logic Level Configuration" corresponds to a separate logic level configuration for each channel. The setting method is to select parameters from the drop-down menu.

(F-E16YTModule parameters	Channel		Channel	Template	
	Channel Template				
X11611 I/O Mapping	Channel S	election:	Basagas	a far CBU Abaarmal/STOR Mada	
Status	Channel 0		Respons	e foi CPO Abhonnai/STOP Mode:	Output Replace OFF
nformation		Channel 1	Logic Le	vel:	Positive Logic
		Channel 2			
		Channel 3			
					1
Sattable namenators		The following tab	a nulling method	I reflects the noromete	ma that as m
Sattable param	natara	The following tab.	ie punnig method	i reflects the paramete	ers that can
Settable param	neters	be set: positive log	gic, negative logi	c.	ers that can
Settable param	neters	be set: positive log	gic, negative logi	c. external signal input.	
Settable param	neters	The program exec	gic, negative logi	external signal input.	
Settable param	neters	The ronowing tao be set: positive log The program exec Logic level configuration	gic, negative logi ution logic after Run program	c. external signal input. Operation result	
Settable param	inition	The ronowing tao be set: positive log The program exec Logic level configuration Positive logic	gic, negative logi ution logic after Run program	c. external signal input. Operation result Y0 set to ON	
Settable param Parameter defi	inition	The ronowing tao be set: positive log The program exec Logic level configuration Positive logic Negative logic	Run program SET Y0.	c. external signal input. Operation result Y0 set to ON Y0 set to OFF	
Settable param	inition	The following tab be set: positive log The program exec Logic level configuration Positive logic Negative logic Positive logic	Run program SET Y0.	c. external signal input. Operation result Y0 set to ON Y0 set to OFF Y0 set to OFF	

5-4. Digital input output hybrid unit XF-E8NX8YT

5-4-1. Product overview

XF-E8NX8YT series digital input output hybrid expansion module, which has 8 channels of digital input, 8 channels of digital output and supports NPN input and output, and is suitable for XF, XSF series CPU unit products and XF series communication coupler units.

- 8 channels digital input.
- NPN input.
- 8 channels digital output.
- NPN output.
- 12mm width design.

Module version:

Hardware version	Software version	Function
H2.0	V2.0	Basic functions for the first official production

5-4-2. Module view

(1) Description of each section



Number	Name		
1	System LED indicator light		
2	Channel LED indicator light		
3	Detachable terminal block		
4	Clasp		
5	Signal indication		
6	Color identification indicating		
	module type		
7	Module hardware and software		
	versions		
8	Wiring diagram		

(2) System indicator light

System indicator light	Meaning		
	Extinguish	Module not powered on	
PWR(Green)	Name aller ON	All external power supplies of the module are normal	
	Normany ON	Module not powered on All external power supplies of the module are normal Backplane bus power supply&external input 24V) Module power supply is abnormal and cannot operate normally	
		Module power supply is abnormal and cannot operate	
	Flashing THZ*1	normally	

System indicator light	Meaning		
	Normally ON	The module is operating normally	
RUN(Green)	Flashing 1Hz*1	General errors in module logs	
	Extinguish	Important errors in the module log	
	Flashing 10Hz*2	Module establishing communication	
	Double flashing*3	Module firmware update	

*1: A square wave with a duty cycle of 50% and a frequency of 1Hz.

*2: A square wave with a duty cycle of 50% and a frequency of 10Hz.



(3) Channel indicator light

Model	Channel indicator light		
		Normally ON(Croon)	Corresponding input channel has input
XF-E8NX8YT X0-X7 Y0-Y7	X0-X7	Normany ON(Green)	ON signal
	Entin anish	Corresponding input channel has no	
		Extinguish	input ON signal

(4) Color identification

No.	Color		Module type
1		Grey White	Digital input
2		Gray	Digital output&digital mixed module
3		Light blue	Analog input
4		Dark blue	Analog output
5		Green	RS232&485 serial port communication
6		Pink	Temperature signal input
7		White	High speed counting

5-4-3. General specifications

General specifications			
Project		Content	
On anotin a tama anatama	Max temperature	55°C	
Operating temperature	Min temperature	-20°C	
Transportation/storage	Max temperature	70°C	
temperature	Min temperature	-40°C	
Environmental humidity	Upper limit	95%	
(including operation/storage)	lower limit	10%	
Protection grade		IP20	
		Accord with IEC61131-2	
		Under intermittent vibration (frequency 5-9Hz, constant	
		amplitude 3.5mm peak displacement) and (frequency	
Antiviluation		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	
		Accord with IEC61131-2	
Lung of magister of		Impact strength of 15G (peak) with a duration of 11ms is	
Impact resistance		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	

5-4-4. Technical specification

	Project	Specification
	Input channel	8
	Input type	NPN
	Rated input voltage	DC24V
	Rated input current	6mA
	Input ON voltage	15V
Input specifications	Input ON current	3mA
	Input OFF voltage	5V
	Input OFF current	1mA
		Derate by 50% when operating at 55°C (with no
	Input derating	more than 4 ON input points), or by 10°C when all
		input points are ON.

	Input resistance $ON \rightarrow OFF$ response time (Hardware)	20us	
	Input resistance OFF \rightarrow ON response time (Hardware)	100us	
	Output channel	8	
	Output type	Transistor (NPN)	
	Rated load voltage	DC24V(DC21.6V~26.4V)	
	Rated load current	0.5A/1 point	
	Surge current protection	Support	
	Leakage current at OFF	Below 0.1mA	
Output	Maximum voltage drop at ON	0.5A, 2A/module	
specifications		Derate by 50% when operating at 55°C(While the	
	Output derating	output current of ON doesn't exceed 2A), or by 10°C	
		when the output point is fully ON.	
	Input resistance $ON \rightarrow OFF$	100	
	response time (Hardware)	10005	
	Input resistance OFF \rightarrow ON	100.05	
	response time (Hardware)	10005	
Module	Module power consumption	1W (Backplane bus)+1.2W(External input)	
specifications	Module weight	80g	

5-4-5. Installation&Wiring

5-4-5-1 Appearance dimension

■ XF-E8NX8YT







Unit: mm

5-4-5-2 Terminal Definition&Wiring

Terminal	Definition

XF-E8NX8YT				
Meaning	A-list terminal	Terminal layout	B-list terminal	Meaning
CH0	0		0	CH8
CH1	1		1	CH9
CH2	2		2	CH10
CH3	3		3	CH11
CH4	4	+ 00 +	4	CH12
CH5	5		5	CH13
CH6	6		6	CH14
CH7	7		7	CH15
24V+	8		8	0V

External wiring



5-4-5-3 Installation method

(1) Installation requirements

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



(2) Installation steps



The assembly between IO modules is carried out by sliding installation through the top and bottom rails of the modules, as shown in the left figure:



The module is installed on the guide rail. When installing, align the module with the DIN rail and press the module in the direction indicated by the arrow. After installation, there is a noticeable sound of the module engaging, as shown in the left figure:



After the module installation is completed, the lock buckle will automatically move downwards for locking. If the lock buckle does not move downwards, the top of the lock buckle needs to be pressed downwards to ensure proper installation.

(3) Unstallation steps



5-4-5-4 Installation environment

This product can be installed in four positions (installation direction): horizontal direction, vertical direction, top of the cabinet, and bottom of the cabinet. It is recommended to install in the horizontal direction. The heat dissipation design is through natural convection, to ensure normal ventilation and heat dissipation, and to reserve sufficient wiring space, the minimum gap must be left around this product, as shown in the following figure:





If there are high-temperature heat source equipment (heaters, transformers, high resistors, etc.) around this product, a minimum gap of 100mm should be left between the equipment and the high-temperature heat source.

5-4-5-5 Installation environment

When wiring a module, its terminal must meet the following requirements:

Suitable cable diameter			
Chinese standard/mm ²	American Standard/AWG		
0.3	22		
0.5	20		
0.75	18		
1.0	18		
1.5	16		

If using other tube type wire lugs, please crimp them to the stranded wire, and the shape and size requirements are shown in the following figure:



5-4-6. Parameters and mapping addresses

Name	Туре	Description
XF_E8X8Y	Stuct	8 channels input and 8 channels output module
СН0	BOOL	Channel 0 input value
——————————————————————————————————————	BOOL	Channel 1 input value
——————————————————————————————————————	BOOL	Channel 2 input value
——— СНЗ	BOOL	Channel 3 input value
CH4	BOOL	Channel 4 input value
CH5	BOOL	Channel 5 input value
——— СН6	BOOL	Channel 6 input value
CH7	BOOL	Channel 7 input value
CH8	BOOL	Channel 8 output value
——— СН9	BOOL	Channel 9 output value
CH10	BOOL	Channel 10 output value
CH11	BOOL	Channel 11 output value
CH12	BOOL	Channel 12 output value
CH13	BOOL	Channel 13 output value
CH14	BOOL	Channel 14 output value
CH15	BOOL	Channel 15 output value

Name	Туре	Description
XF_E8X8Y	Stuct	8 channels input and 8 channels output module
ErrCode_module	WORD	Module level error codes
ErrCode_CH	DWORD	Channel level error codes

Error code parameters:

	Module level error codes(ErrCode_module)				
Bit	Meaning	Error level			
0	The 24V input power supply of the module is abnormal	Important			
2	Internal module error occurred and cannot be repaired by the user layer.	Important			
3	Version mismatch	Important			

Configuration parameters

XF-E8NX8YT					
Byte sequence number	Туре	Meaning	Note		
CH0_FilterTime	BYTE	Channel 0 input filtering time	0:No		
CH1_FilterTime	BYTE	Channel 1 input filtering time	filtering 12. 10ms		
CH2_FilterTime	BYTE	Channel 2 input filtering time	1: 0.25ms		
CH3_FilterTime	BYTE	Channel 3 input filtering time	2: 0.5ms 14: 12ms		
CH4_FilterTime	BYTE	Channel 4 input filtering time	3: 1ms 15: 13ms		
CH5_FilterTime	BYTE	Channel 5 input filtering time	4: 2ms 16: 14ms		
CH6_FilterTime	BYTE	Channel 6 input filtering time	5: 3ms 17: 15ms		
CH7_FilterTime	BYTE	Channel 7 input filtering time	6: 4ms18: 20ms7: 5ms19: 30ms8: 6ms20: 64ms9: 7ms21: 128ms		
CH8_ExceptionOut	BYTE	Channel 8 output status in case of abnormality			
CH9_ExceptionOut	BYTE	Channel 9 output status in case of abnormality			
CH10_ExceptionOut	BYTE	Channel 10 output status in case of abnormality	0: Output replacement		
CH11_ExceptionOut	BYTE	Channel 11 output status in case of abnormality	1: Keep Previous Value		
CH12_ExceptionOut	BYTE	Channel 12 output status in case of abnormality	value ON		
CH13_ExceptionOut	BYTE	Channel 13 output status in case of abnormality			
CH14_ExceptionOut	BYTE	Channel 14 output status in case of abnormality			

CU15 Example Out	BYTE	Channel 15 output status in case of	
		abnormality	
			0: Positive logic
CH0-7_Input_Logiclevel	BYTE	Channel 0-7 logic level configuration	1: Negative logic
			Bit0~bit7 corresponds to
	BYTE	Channel 8-15 logic level	channels 0~7,
CH8-15_Output_LogicLeveL		configuration	Bit8~bit15 correspond to
			channel 8-15.

5-4-7. Functions and Settings

■ Channel input filtering time

Each channel of "filtering time" corresponds to a separate filtering parameter, and the setting method is to select the parameter from the drop-down menu.

XF-E8NX8YTModule parameters	Channel	Channel Template		
	Channel Template			
EXT8NX8YT I/O Mapping	Channel Selection:	Input Parameters		
Status	Input	Filtering Parameters:	1ms 🗸	
Information	Channel 0			
Inormation	Channel 1	Logic Level:	Positive Logic 🗸 🗸	
	Channel 2			
	Channel 3	Response for CPU Exception/STOP Mode:	Output Replace OFF V Positive Logic V	
Parameter definition	When there is a signal filtering time, it is conside	When there is a signal at the input terminal and the signal duration exceeds the filtering time, it is considered a valid signal.		
	0ms, 0.25ms, 0.5ms, 1ms, 2ms, 3ms, 4ms, 5ms, 6ms, 7ms, 8ms, 9ms, 10ms, 11ms, 12ms, 13ms, 14ms, 15ms, 20ms, 30ms, 64ms, 128ms			
Settable parameters	12ms, 13ms, 14ms, 15ms	, 20ms, 30ms, 64ms, 128ms		

■ Abnormal/STOP output status

Each channel corresponds to a separate parameter for "Abnormal/STOP Output Status", which can be set by selecting a parameter from the drop-down menu.

XF-E8NX8YTModule parameters	Channel	Channel Template		
	Channel Template			
EXT8NX8YT I/O Mapping	Channel Selection:	Input Parameters		
Status	Input	Filtering Parameters:	1ms 🗸 🗸	
Tofarmatian	Channel 0			
Information	Channel 1	Logic Level:	Positive Logic 🛛 🗸	
	Channel 2			
	Channel 3	Output Parameters		
		Response for CPU Exception/STOP Mode:	Output Replace OFF \smallsetminus	
		Logic Level:	Positive Logic 🗸 🗸	

Parameter	The following table pulling method reflects the parameters that can be set: "Output replacement		
definition	value OFF", "Keep previous value", "Output replacement value ON".		
	Output replacement	When the PLC is in STOP mode, the output terminal is in a reset state	
	value OFF	(Physical terminal, regardless of channel logic level)	
Donomotor		When the PLC is in abnormal/STOP mode, the output terminal outputs	
definition	Keep previous value	the last state of the PLC from RUN to STOP (Physical terminal,	
definition		regardless of channel logic level).	
	Output replacement	When the PLC is in abnormal/STOP mode, the output terminal is in a set	
	value ON	state (Physical terminal, regardless of channel logic level).	
Default	Output and a second sector OFF		
parameters	Output replacement value OFF		

■ Channel logic level

The "Logic Level Configuration" corresponds to a separate logic level configuration for each channel. The setting method is to select parameters from the drop-down menu.

XF-E8NX8YTModule parameters	E8NX8YTModule parameters Channel		Channel Templat	e	
		Channel Template			
EXT8NX8YT I/O Mapping	Channel Selec	tion:	Input Parameters		
tatus	Input		Filtering Parameter	ers:	1ms 🗸 🗸
nformation	(Channel O	LogicLevel		Desitive Logic
	(Channel 1	Logic Level.		Positive Logic V
		Thannel 3	Output Parameter	s	
			Response for CPU	J Exception/STOP Mode:	Output Replace OFF $ \smallsetminus $
			t a stat south		
			Logic Level:		Positive Logic V
		TT1 0 11 1 1 1		1 0 1	
Settable para	meters	The following tabl	le pulling method	i reflects the para	meters that can
1		be set: positive log	gic, negative logi	с.	
		The program exec	ution logic after	external signal in	put.
		Logic level			
			Run program	Operation resul	t
Parameter de	finition	Positive logic		Y0 set to ON	
		Negative logic	SET Y0.	Y0 set to OFF	
		Positive logic	DET VO	Y0 set to OFF	
		Negative logic		Y0 set to ON	
			1		

5.5 Digital input module XF-E32X

5.5.1 Product overview

The XF-E32X series digital input expansion module has 32 channels of digital input, supports NPN and PNP inputs, and is compatible with XF, XSF series CPU unit products and XF series communication coupler units.

- 32 channels digital input;
- Compliant with IEC-61131 input standard type 1;
- NP&PNP bipolar input;
- Designed with a width of 24mm.
- Module version

Hardware	Firmware	Function
version	version	
H2.0	V2.0	First official production of basic functions

5.5.2 Module View

(1) Each part description



No.	Name	No.	Name
1	System LED indicator light	2	Channel LED indicator light
3	Detachable terminal block	4	Buckle
5	Model indication	6	Color identification indicating module type
7	Module hardware and firmware versions	8	Wiring diagram

(2) System indicator light

System		Meaning		
indicator light				
DWD (graan)	OFF	Module not powered on		
r w k (green)	Always ON	All external power supplies of the module are normal (backplane		

System indicator light		Meaning
	bus power supply&external input 24V)	
	Flashing	The module's power supply is abnormal and cannot operate
	$1 Hz^{*1}$	normally
	Always ON	The module is running normally
	Flashing 1Hz ^{*1}	General errors in module logs
PUN (groop)	OFF	Important errors in module logs
KUN (green)	Flashing 10Hz ^{*2}	Module establishment communication in progress
	Double flashing ^{*3}	Module firmware update

 \bigcirc

*1: A square wave with a duty cycle of 50% and a frequency of 1Hz.

*2: A square wave with a duty cycle of 50% and a frequency of 10Hz.

*3: The following figure:



(3) Channel indicator light

Model	Channel indicator light				
XF-E32X	X0-X37	Always ON (green)	Corresponding input channel has input ON signal		
_		OFF	Corresponding input channel has no input ON signal		

(4) Color identification

No.	C	Color	Module type
1		Grey White	Digital input
2		Gray	Digital output&digital mixed module
3		Light blue	Analog input
4		Dark blue	Analog output
5		Green	RS232&485 serial port communication
6		Pink	Temperature signal input
7		White	High speed counting

5.5.3 General specification

Project		Content
	Max temperature	55°C
Operating temperature	Min temperature	-20°C
Transportation/storage	Max temperature	70°C
temperature	Min temperature	-40°C
Environmental	Upper limit	95%
humidity (Including operation/storage)	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		СЕ

5.5.4 Technical specification

Project	Specification
Input points	32
Rated input voltage	DC24V
Rated input current	4mA
Input impedance	5.5ΚΩ
Input ON voltage	15V
Input ON current	2.5mA

Project	Specification	
Input OFF voltage	5V	
Input OFF current	1mA	
Input resistance $ON \rightarrow OFF$	10000	
response time (Hardware)	Toous	
Input resistance OFF \rightarrow ON	10000	
response time (Hardware)	10003	
Input dorating	Derate by 50% when operating at 55°C (with no more than 16	
	ON input points), or by 10°C when all input points are ON.	
Public end method	1 common terminal of 16 points	
Connection mode	Refer to external terminal connection diagram	
Module power consumption	0.8W (internal backplane)+3.2W (external input)	
Module weight	128g	

5.5.5 Installation&Wiring

5.5.5.1 Appearance dimension diagram



(Unit: mm)

5.5.5.2 Terminal Definition&Wiring

				XF-E32X				
Meaning	A-list	Meaning	B-list	Terminal	Meaning	A-list	Meaning	B-list
	terminal(left)	8	terminal(left)	layout	8	terminal(right)	6	terminal(right)
CH0	0	CH8	0		CH16	0	CH24	0
CH1	1	CH9	1		CH17	1	CH25	1
CH2	2	CH10	2		CH18	2	CH26	2
CH3	3	CH11	3	s d d s	CH19	3	CH27	3
CH4	4	CH12	4	4004	CH20	4	CH28	4
CH5	5	CH13	5		CH21	5	CH29	5
CH6	6	CH14	6		CH22	6	CH30	6
CH7	7	CH15	7		CH23	7	CH31	7
SS0	8	SS0	8	ĊĦĊĦĊĦĊĦĊĦĊŀŔĊŀŔĊŀŀĊ ĹŀŀĊŀŀĊŀŀĊŀŀĊŀŀĊŀŀĊŀ ĹŀŀĊŀŀĊŀŀĊŀŀĊŀŀĊŀŀ	SS1	8	SS1	8
	SS0 and SS1 are internally short circuited, so the left and right input points of a single							

Terminal Definition

External wiring (Taking CH0-CH15 as an example, the same applies to CH16-CH31)

module can be either NPN or PNP.



5.5.5.3 Installation method

(1) Installation requirements

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



(2) Installation steps



The assembly between IO modules is carried out by sliding installation through the top and bottom rails of the modules, as shown in the left figure:



The module is installed on the guide rail. When installing, align the module with the DIN rail and press the module in the direction indicated by the arrow. After installation, there is a noticeable sound of the module engaging, as shown in the left figure:



After the module installation is completed, the lock buckle will automatically move downwards for locking. If the lock buckle does not move downwards, the top of the lock buckle needs to be pressed downwards to ensure proper installation.

(3) Unstallation steps



5.5.5.4 Installation environment

This product can be installed in four positions (installation direction): horizontal direction, vertical direction, top of the cabinet, and bottom of the cabinet. It is recommended to install in the horizontal direction. The heat dissipation design is through natural convection, to ensure normal ventilation and heat dissipation, and to reserve sufficient wiring space, the minimum gap must be left around this product, as shown in the following figure:



0

If there are high-temperature heat source equipment (heaters, transformers, high resistors, etc.) around this product, a minimum gap of 100mm should be left between the equipment and the high-temperature heat source.

5.5.5.5 Equipment wiring

When wiring a module, its terminal must meet the following requirements:

Suitable cable diameter				
Chinese standard/mm ²	American Standard/AWG			
0.3	22			
0.5	20			
0.75	18			
1.0	18			
1.5	16			

If using other tube type wire lugs, please crimp them to the stranded wire, and the shape and size requirements are shown in the following figure:



5.5.6 Parameters and mapping addresses

Name	Туре	Description
XF_E32X	Stuct	32 channels input module
——— СН0	BOOL	Channel 0 input value
——————————————————————————————————————	BOOL	Channel 1 input value
CH2	BOOL	Channel 2 input value
CH3	BOOL	Channel 3 input value
CH4	BOOL	Channel 4 input value
CH5	BOOL	Channel 5 input value
CH6	BOOL	Channel 6 input value
——————————————————————————————————————	BOOL	Channel 7 input value
CH8	BOOL	Channel 8 input value
СН9	BOOL	Channel 9 input value
CH10	BOOL	Channel 10 input value
CH11	BOOL	Channel 11 input value
CH12	BOOL	Channel 12 input value
——————————————————————————————————————	BOOL	Channel 13 input value
CH14	BOOL	Channel 14 input value
CH15	BOOL	Channel 15 input value
CH16	BOOL	Channel 16 input value
CH17	BOOL	Channel 17 input value
CH18	BOOL	Channel 18 input value
CH19	BOOL	Channel 19 input value
CH20	BOOL	Channel 20 input value
CH21	BOOL	Channel 21 input value
CH22	BOOL	Channel 22 input value
CH23	BOOL	Channel 23 input value
CH24	BOOL	Channel 24 input value

Name	Туре	Description
XF_E32X	Stuct	32 channels input module
——————————————————————————————————————	BOOL	Channel 25 input value
—— СН26	BOOL	Channel 26 input value
——————————————————————————————————————	BOOL	Channel 27 input value
CH28	BOOL	Channel 28 input value
—— СН29	BOOL	Channel 29 input value
—— СН30	BOOL	Channel 30 input value
—— СН31	BOOL	Channel 31 input value
ErrCode_module	WORD	Module level error codes
ErrCode_CH	DWORD	Channel level error codes

Error code parameters

Module level error codes (ErrCode_module)					
Meaning	Error level				
The 24V input power supply of the module is	General				
abnormal					
Incorrect allocation of module parameters	Important				
An internal module error has occurred and the	Important				
user layer is unable to repair it					
Version mismatch	Important				
	Module level error codes (ErrCo Meaning The 24V input power supply of the module is abnormal Incorrect allocation of module parameters An internal module error has occurred and the user layer is unable to repair it Version mismatch				



Channel level error code reserved, currently undefined.

5.5.7 Function and settings

■ Channel template

XF-E32XModule parameters	Channel		Channel Template		
E TRAVILA M	Channel Template				
EX132X I/O Mapping	Channel Selection:				
Status	Channel 0		Filtering Parameters:	lms V	
Information	Channel 1		Logic Level:	Positive Logic 🛛 🗸	
	Channel 2				
	Channel 3				
	Channel 4				

Doromotor	Initial	Parameter description						
Falametei	value							
Filton		When there is a signal at the input terminal and the signal duration exceeds the filtering time, it is considered a valid signal.						
riller	1ms	Parameters that ca	Parameters that can be set: The following reflects the parameters that can be set:					
parameters		0ms, 0.25ms, 0.5ms, 1ms, 2ms, 3ms, 4ms, 5ms, 6ms, 7ms, 8ms, 9ms, 10ms, 11ms,						
		12ms, 13ms, 14ms, 15ms, 20ms, 30ms, 64ms, 128ms						
		The program execution logic after external signal input.						
		External input	Logic level	Program	Result			
Logic level	Positive	signal	configuration					
		X0=1	Positive logic		Y0=1			
	Logic	X0=1	Negative logic	LD X0;	Y0=0			
		X0=0	Positive logic	OUT Y0;	Y0=0			
		X0=0	Negative logic		Y0=1			

■ Channel selection

XF-E32XModule parameters	Channel		Channel 0		
	Channel Template				
EXT32X I/O Mapping	Channel Selection:				
Status	Channel 0	^	Parameter Setting:	From Template V	
Information	Channel 1				
	Channel 2			1ms	
	Channel 3		Filtering Parameters:		
	Channel 4		Logic Level:		
	Channel 5			1.000.000	
	Channel 6				
XF-E32XModule parameters	Channel		Channel 0		
	Channel Template				
EXT32X I/O Mapping	Channel Selection:				
Status	Channel 0	^	Parameter Setting:	Manual ~	
Information	Channel 1				
Inormation	Channel 2		Ciliaria a Deservations		
	Channel 3		Filtering Parameters:	Ims V	
	Channel 4		Logic Level:	Positive Logic 🗸 🗸	
	Channel 5				

Filter parameters and logic levels can be set separately for each channel.

	From Template: Configuring Parameters Using the "Channel Template"
Channel setting	Interface
	Manual: Use the configuration parameters below this interface

5.6 Digital input module XF-E32YT

5.6.1 Product overview

The XF-E32YT series digital input expansion module has 32 channels of digital output, suitable for XF, XSF series CPU unit products and XF series communication coupler units.

- 32 channel digital output
- NPN output
- Designed with a width of 24mm
- Module version

Hardware version	Firmware version	Function		
H2.0	V2.0	Basic functions for the first official		
		production		

5.6.2 Module view

(1) Description of each section



No.	Name	No.	Name
1	System LED indicator light	2	Channel LED indicator light
3	Detachable terminal block	4	Clasp
5	Model indicator	6	Color identification indicating module type
7	Module hardware and firmware version	(8)	Wiring diagram

(2) System indicator light

System indicator light	Meaning			
	Extinguish	Module not powered on		
P W K(Oleen)	Normally ON	All external power supplies of the module are normal		

System indicator light	Meaning			
		(Backplane bus power supply&external input 24V)		
	Flashing 1Hz*1	Module power supply is abnormal and cannot operate normally		
	Normally ON	The module is operating normally		
	Flashing 1Hz*1	General errors in module logs		
RUN(Green)	Extinguish	Important errors in the module log		
	Flashing 10Hz*2	Module establishing communication		
	Double flashing*3	Module firmware update		

0

*1: A square wave with a duty cycle of 50% and a frequency of 1Hz.

*2: A square wave with a duty cycle of 50% and a frequency of 10Hz.

*3: The following figure:



(3) Channel indicator light

Model	Channel indicator light			
	Y0-Y37	Normally	The corresponding output channel has an ON signal	
XF-E32YT		ON(Green)	output	
		Extinguish	Corresponding output channel has no output ON signal	

(4) Color identification

No.	Color		Module type		
1		Grey White	Digital input		
2		Gray	Digital output&digital mixed module		
3		Light blue	Analog input		
4		Dark blue	Analog output		
5		Green	RS232&485 serial port communication		
6		Pink	Temperature signal input		
7		White	High speed counting		

5.6.3 General specifications

Item		Specification		
Operating temperature	Max temperature	55°C		
	Min temperature	-20°C		
Transportation/storage	Max	70°C		

Item		Specification			
temperature	temperature				
	Min	10%			
	temperature	-40°C			
Environmental	Upper limit	95%			
humidity					
(including	lower limit	10%			
operation/storage)					
Protection grade		IP20			
		Accord with IEC61131-2			
		Under intermittent vibration (frequency 5-9Hz, constant			
		amplitude 3.5mm peak displacement) and (frequency			
Anti wibrotion		9-150Hz, constant acceleration 1.0g peak acceleration)			
Anti vioration		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			
		Accord with IEC61131-2			
Imment mariater as		Impact strength of 15G (peak) with a duration of 11ms is			
Impact resistance		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		UL, CE			

5.6.4 Technical specification

Item	Specification			
Model	XF-E32YT			
Output points	32			
Rated load voltage	DC24V (DC21.6V~26.4V)			
Maximum load current	0.5A/1 point, 8A/module			
Surge current protection	Support			
Leakage current at OFF	Below 0.1mA			
Maximum voltage drop at ON	0.5V			
Output $ON \rightarrow OFF$ response time	0.1ms			
(Hardware)				
Output OFF \rightarrow ON response time	0.1mg			
(Hardware)	0.11118			
	Derate by 50% when operating at 55°C(While the output			
Output derating	current of ON doesn't exceed 2A), or by 10°C when the output			
	point is fully ON			

Item	Specification
Public end method	1 common terminal of 16 points
Output Protection	Support short circuit and overload protection functions
Module power consumption	1.2W (Backplane bus)+0.6W(External input)
Module weight	137g
Insulation voltage	AC510V
Insulated resistance	10M

5.6.5 Installation&Wiring

5.6.5.1 Appearance dimension



(Unit: mm)

5.6.5.2 Terminal Definition&Wiring

(1) Terminal Definition

	XF-E32Y							
Meaning	A-list	Meaning	B-list	Terminal	Meaning	A-list	Meaning	B-list
	terminal(left)		terminal(left)	layout		terminal(right)		terminal(right)
CH0	0	CH8	0		CH16	0	CH24	0
CH1	1	CH9	1		CH17	1	CH25	1
CH2	2	CH10	2		CH18	2	CH26	2
CH3	3	CH11	3	3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	CH19	3	CH27	3
CH4	4	CH12	4	4	CH20	4	CH28	4
CH5	5	CH13	5		CH21	5	CH29	5
CH6	6	CH14	6		CH22	6	CH30	6
CH7	7	CH15	7		CH23	7	CH31	7
24V+	8	0V	8		24V+	8	0V	8



Two 0V internal short circuits and two 24V internal isolation.

(2) External wiring (taking CH0-CH15 as an example, CH16-CH31 is the same)


Number	Name
1	System indicator light
2	Channel indicator light
3	Backplane bus
4	Input Channel&Wiring

5.6.5.3 Installation method

(1) Installation requirements

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



(2) Installation steps



The assembly between IO modules is carried out by sliding installation through the top and bottom rails of the modules, as shown in the left figure:



The module is installed on the guide rail. When installing, align the module with the DIN rail and press the module in the direction indicated by the arrow. After installation, there is a noticeable sound of the module engaging, as shown in the left figure:



After the module installation is completed, the lock buckle will automatically move downwards for locking. If the lock buckle does not move downwards, the top of the lock buckle needs to be pressed downwards to ensure proper installation.

(3) Unstallation steps



5.6.5.4 Installation environment

This product can be installed in four positions (installation direction): horizontal direction, vertical direction, top of the cabinet, and bottom of the cabinet. It is recommended to install in the horizontal direction. The heat dissipation design is through natural convection, to ensure normal ventilation and heat dissipation, and to reserve sufficient wiring space, the minimum gap must be left around this product, as shown in the following figure:





If there are high-temperature heat source equipment (heaters, transformers, high resistors, etc.) around this product, a minimum gap of 100mm should be left between the equipment and the high-temperature heat source.

5.6.5.5 Equipment wiring

Suitable cable diameter			
Chinese standard/mm ²	American Standard/AWG		
0.3	22		
0.5	20		
0.75	18		
1.0	18		
1.5	16		

When wiring a module, its terminal must meet the following requirements:

If using other tube type wire lugs, please crimp them to the stranded wire, and the shape and size requirements are shown in the following figure:



5.6.6 Parameters and mapping addresses

Name	Туре	Description
XF_E32YT	Stuct	32 channels output module
—— СН0	BOOL	Channel 0 output value
——————————————————————————————————————	BOOL	Channel 1 output value
—— СН2	BOOL	Channel 2 output value
CH3	BOOL	Channel 3 output value
——————————————————————————————————————	BOOL	Channel 4output value
—— СН5	BOOL	Channel 5 output value
СН6	BOOL	Channel 6 output value
——————————————————————————————————————	BOOL	Channel 7 output value
CH8	BOOL	Channel 8 output value

Name	Туре	Description
XF_E32YT	Stuct	32 channels output module
——— СН9	BOOL	Channel 9 output value
CH10	BOOL	Channel 10 output value
CH11	BOOL	Channel 11 output value
CH12	BOOL	Channel 12 output value
CH13	BOOL	Channel 13 output value
CH14	BOOL	Channel 14 output value
CH15	BOOL	Channel 15 output value
CH16	BOOL	Channel 16 output value
CH17	BOOL	Channel 17 output value
CH18	BOOL	Channel 18 output value
CH19	BOOL	Channel 19 output value
CH20	BOOL	Channel 20 output value
CH21	BOOL	Channel 21 output value
CH22	BOOL	Channel 22 output value
CH23	BOOL	Channel 23 output value
CH24	BOOL	Channel 24 output value
CH25	BOOL	Channel 25 output value
CH26	BOOL	Channel 26 output value
CH27	BOOL	Channel 27 output value
CH28	BOOL	Channel 28 output value
СН29	BOOL	Channel 29 output value
CH30	BOOL	Channel 30 output value
CH31	BOOL	Channel 31 output value
ErrCode_module	WORD	Module level error code
ErrCode_CH	DWORD	Channel level error code

Error code parameters:

Module level error codes(ErrCode_module)

Bit	Meaning	Error level
0	The 24V input power supply of the module is	General
	abnormal	
1	Incorrect allocation of module parameters	Important
2	An internal module error has occurred and the	Important
	user layer is unable to repair it	
3	Version mismatch	Important



Channel level error code reserved, currently undefined.

5.6.7 Function and setting

■ Channel template

XF-E32YModule parameters	Channel		Channel Template	
EVT22V I/O Managing	Channel Template			
EX1321 I/O Mapping	Channel Selection:			
Status	Channel 0		Response for CPU Abnormal/STOP Mode:	Output Replace OFF ~
Information	Channel 1		Logic Level:	Positive Logic V
	Channel 2			-
	Channel 3			
	Channel 4			

Danamatan	Initial	Description
Parameter	value	
		Output replace OFF: When the PLC is in STOP mode, the output terminal is in a reset state (physical terminal, regardless of channel logic
D C		level).
Response for	Output	Keep previous value: When the PLC is in abnormal/STOP mode, the
CPU	replace	output terminal outputs the last state of the PLC from RUN to STOP
aonormal/STOP	OFF	(physical terminal, regardless of channel logic level).
mode		Output replace ON: When the PLC is in abnormal/STOP mode, the
		output terminal is in the set state (physical terminal, not considering
		channel logic level)
		Positive logic: When the terminal in the program is set to ON, the
Logic level	Positive	external terminal outputs
Logic level	logic	Negative logic: When the terminal in the program is set to OFF, the
		external terminal outputs

Channel setting

XF-E32YModule parameters	Channel		Channel 0	
	Channel Template			
EX132Y I/O Mapping	Channel Selection:			
Status	Channel 0		Parameter Setting:	From Template V
	Channel 1			
mormation	Channel 2			
	Channel 3		Response for CPU Abnormal/STOP Mode:	Output Replace OFF
	Channel 4		Logic Level:	
	Channel 5			r oolare zoge
	Channel 6			
			а 	
XF-E32YModule parameters	Channel		Channel 0	
	Channel Template			
EXT32Y I/O Mapping	Channel Selection:			
Status	Channel 0	^	Parameter Setting:	Manual V
afarmatian	Channel 1			
nformation	Channel 1 Channel 2			
information	Channel 1 Channel 2 Channel 3		Response for CPU Abnormal/STOP Mode:	Output Replace OFF ~
Information	Channel 1 Channel 2 Channel 3 Channel 4		Response for CPU Abnormal/STOP Mode: Logic Level:	Output Replace OFF V
Information	Channel 1 Channel 2 Channel 3 Channel 4 Channel 5		Response for CPU Abnormal/STOP Mode: Logic Level:	Output Replace OFF V

The response and logic level for CPU exception/STOP mode can be set separately for each channel.

	From Template: Configuring Parameters Using the "Channel Template"
Channel setting	Interface
	Manual: Use the configuration parameters below this interface

5.7 Digital IO module XF-E16X16YT

5.7.1 Product overview

The XF-E16X16YT series digital input output expansion module has 16 channels of digital input, supports NPN and PNP inputs, and 16 channels of digital output. It is compatible with XF and XSF series CPU unit products and XF series communication coupler units.

- 16 channel digital input.
- NPN&PNP bipolar input.
- 16 channels digital output.
- NPN output.
- 24mm width design.

Module version:

Hardware version	Software version	Function
H2.0	V2.0	Basic functions for the first official production

5.7.2 Module view

(1) Description of each section



No.	Name	No.	Name
	System LED indicator light	2	Channel LED indicator light
3	Detachable terminal block	4	Clasp
5	Signal indication	6	Color identification indicating module type
7	Module hardware and firmware version	8	Wiring diagram

(2) System indicator light

System indicator light	Meaning		
	Extinguish	Module not powered on	
	Normally ON	All external power supplies of the module are normal	
PWR(Green)		(Backplane bus power supply&external input 24V)	
	Flashing 1Hz*1	Module power supply is abnormal and cannot operate	
		normally	
	Normally ON	The module is operating normally	
	Flashing 1Hz*1	General errors in module logs	
RUN(Green)	Extinguish	Important errors in the module log	
	Flashing 10Hz*2	Module establishing communication	
	Double flashing*3	Module firmware update	

1

*1: A square wave with a duty cycle of 50% and a frequency of 1Hz.

*2: A square wave with a duty cycle of 50% and a frequency of 10Hz. *3: The following figure:



(3) Channel indicator light

Channel	Channel indicator light			
XF-E16X16YTNormally X0-X17Normally ON(Green)CY0-Y17Normally ON(Green)CExtinguishCExtinguishCExtinguishC		Normally	Company on dia a input algorithm of input ON airmal	
	X0-X17	ON(Green)	Corresponding input channel has input ON signal	
		Extinguish	Corresponding input channel has no input ON signal	
	Common and dia a customet allowed has automat ON signal			
		ON(Green)	Corresponding output channel has output ON signal	
		Extinguish	Corresponding output channel has no output ON signal	

(4) Color identification

No.	Color		Module type
1		Grey White	Digital input
2		Gray	Digital output&digital mixed module
3		Light blue	Analog input
4		Dark blue	Analog output
5		Green	RS232&485 serial port communication
6		Pink	Temperature signal input
7		White	High speed counting

5.7.3 General specifications

Item		Specification
Operating	Max temperature	55°C
temperature	Min temperature	-20°C
Transportation/storage	Max temperature	70°C
temperature	Min temperature	-40°C
Environmental	Upper limit	95%
humidity		
(including	lower limit	10%
operation/storage)		
Protection grade		IP20

Item	Specification		
	Accord with IEC61131-2		
	Under intermittent vibration (frequency 5-9Hz, constant		
	amplitude 3.5mm peak displacement) and (frequency		
Antivibration	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		
	Accord with IEC61131-2		
Impact resistance	Impact strength of 15G (peak) with a duration of 11ms is		
impact resistance	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	UL, CE		

5.7.4 Technical specification

Item		Specification		
	Input channel	16		
	Input type	NPN&PNP compatible		
	Rated input voltage	DC24V		
	Rated input current	6mA		
	Input impedance	5ΚΩ		
	Input ON voltage	11V		
Innut	Input ON current	2.5mA		
specifications	Input OFF voltage	5V		
specifications	Input OFF current	1mA		
	Input doroting	Derate by 50% when operating at 55°C (with no more than 4		
		ON input points), or by 10°C when all input points are ON.		
	Input resistance $ON \rightarrow OFF$	100us		
	response time (Hardware)			
	Input resistance OFF \rightarrow ON	100us		
	response time (Hardware)			
	Output channel	16		
	Output type	Transistor (NPN)		
Outmut	Rated load voltage	DC24V(DC21.6V~26.4V)		
Output	Rated load current	0.5A/1 point, 4A/module		
specifications	Surge current protection	Support		
	Leakage current at OFF	Below 0.1mA		
	Maximum voltage drop at ON	0.5V~1V		

Itom		Specification	
Item		specification	
		Derate by 50% when operating at 55°C(While the output	
	Output derating	current of ON doesn't exceed 2A), or by 10°C when the	
c		output point is fully ON.	
	Input resistance $ON \rightarrow OFF$	0.1ms	
	response time (Hardware)		
	Input resistance $OFF \rightarrow ON$	0.1ms	
	response time (Hardware)		
Module	Module power consumption	1W (Backplane bus)+2W(External input)	
specifications	Module weight	132g	

5.7.5 Installation&Wiring

5.7.5.1 Appearance dimension



(Unit: mm)

5.7.5.2 Terminal Definition&Wiring

(1) Terminal definition

XF-E16X16YT								
Meaning	A-list terminal(left)	Meaning	B-list terminal(left)	Terminal layout	Meaning	A-list terminal(right)	Meaning	B-list terminal(right)
CH0	0	CH8	0		CH16	0	CH24	0
CH1	1	CH9	1		CH17	1	CH25	1
CH2	2	CH10	2		CH18	2	CH26	2
CH3	3	CH11	3	a (CH19	3	CH27	3
CH4	4	CH12	4		CH20	4	CH28	4
CH5	5	CH13	5		CH21	5	CH29	5

	XF-E16X16YT							
Meaning	A-list terminal(left)	Meaning	B-list terminal(left)	Terminal layout	Meaning	A-list terminal(right)	Meaning	B-list terminal(right)
CH6	6	CH14	6		CH22	6	CH30	6
CH7	7	CH15	7		CH23	7	CH31	7
SS0	8	SS0	8		24V+	8	0	8



SS0 has an internal short circuit, so all input points of a single module can only choose between NPN or PNP.

(2) External wiring



5.7.5.3 Installation method

(1) Installation requirements

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



(2) Installation steps





After the module installation is completed, the lock buckle will automatically move downwards for locking. If the lock buckle does not move downwards, the top of the lock buckle needs to be pressed downwards to ensure proper installation.

(3) Unstallation steps



5.7.5.4 Installation environment

This product can be installed in four positions (installation direction): horizontal direction, vertical direction, top of the cabinet, and bottom of the cabinet. It is recommended to install in the horizontal direction. The heat dissipation design is through natural convection, to ensure normal ventilation and heat dissipation, and to reserve sufficient wiring space, the minimum gap must be left around this product, as shown in the following figure:





If there are high-temperature heat source equipment (heaters, transformers, high resistors, etc.) around this product, a minimum gap of 100mm should be left between the equipment and the high-temperature heat source.

5.7.5.5 Equipment wiring

When wiring a module, its terminal must meet the following requirements:

Suitable cable diameter				
Chinese standard/mm ²	American Standard/AWG			
0.3	22			
0.5	20			
0.75	18			
1.0	18			
1.5	16			

If using other tube type wire lugs, please crimp them to the stranded wire, and the shape and size requirements are shown in the following figure:



5.7.6 Parameters and mapping addresses

Name	Туре	Description
XF E16X16YT	Stuct	16 channel input, 16 channel
		output module
—— СН0	BOOL	Channel 0 input value
CH1	BOOL	Channel 1 input value
CH2	BOOL	Channel 2 input value
CH3	BOOL	Channel 3 input value
—— СН4	BOOL	Channel 4 input value
CH5	BOOL	Channel 5 input value
CH6	BOOL	Channel 6 input value
CH7	BOOL	Channel 7 input value
—— СН8	BOOL	Channel 8 input value
—— СН9	BOOL	Channel 9 input value
CH10	BOOL	Channel 10 input value
CH11	BOOL	Channel 11 input value
CH12	BOOL	Channel 12 input value
CH13	BOOL	Channel 13 input value
CH14	BOOL	Channel 14 input value
CH15	BOOL	Channel 15 input value
CH16	BOOL	Channel 16 input value
CH17	BOOL	Channel 17 input value
CH18	BOOL	Channel 18 input value
CH19	BOOL	Channel 19 input value
CH20	BOOL	Channel 20 input value
CH21	BOOL	Channel 21 input value
CH22	BOOL	Channel 22 input value
CH23	BOOL	Channel 23 input value
CH24	BOOL	Channel 24 input value

Name	Туре	Description
XF E16X16YT	Stuct	16 channel input, 16 channel
_		output module
—— СН25	BOOL	Channel 25 input value
CH26	BOOL	Channel 26 input value
CH27	BOOL	Channel 27 input value
CH28	BOOL	Channel 28 input value
——— СН29	BOOL	Channel 29 input value
CH30	BOOL	Channel 30 input value
CH31	BOOL	Channel 31 input value
ErrCode_module	WORD	Module level error codes
ErrCode_CH	DWORD	Channel level error codes

Error code parameters

Module level error codes(ErrCode_module)				
Meaning	Error level			
The 24V input power supply of the module is	General			
abnormal				
Incorrect allocation of module parameters	Important			
Internal module error occurred and cannot be	Important			
repaired by the user layer.				
Version mismatch	Important			
	Module level error codes(ErrCo Meaning The 24V input power supply of the module is abnormal Incorrect allocation of module parameters Internal module error occurred and cannot be repaired by the user layer. Version mismatch			



Channel level error code reserved, currently undefined.

5.7.7 Function and setting

■ Channel template

XF-E16X16YModule parameters	Channel		Channel Template	
DETERMENT AND A DETERMENT	Channel Template			
EXII6XI6Y I/O Mapping	Channel Selection:		Input Parameters	
Status	Input	^	Filtering Parameters:	1ms \sim
Information	Channel 0		Logic Level:	
	Channel 1			Positive Logic V
	Channel 2			
	Channel 3		Output Parameters	
	Channel 4		Response for CPU Exception/STOP Mode:	Output Replace OFF $ \smallsetminus $
	Channel 5		a - 1 2021 - 21	
	Channel 6		Logic Level:	Positive Logic V
	Channel 7			

Input	Initial	Parameter explanation				
parameter	value					
Filtering parameter	lms	 When there is a signal at the input terminal and the signal duration exceeds the filtering time, it is considered a valid signal. The parameters can be set are shown in the dropdown list: 0ms, 0.25ms, 0.5ms, 1ms, 2ms, 3ms, 4ms, 5ms, 6ms, 7ms, 8ms, 9ms, 10ms, 11ms, 12ms, 13ms, 14ms, 15ms, 20ms, 30ms, 64ms, 128ms 				
Logic level	Positive	The program execution logic afterExternalLogic levelinput signalconfigurationX0=1Pagitive lagic		external signal i Run program	Operation result	
	0	X0=1 X0=0	Negative logic Positive logic	LD X0. OUT Y0.	Y0=0 Y0=0	
		X0=0	Negative logic		Y0=1	

Output	Initial	Parameter explanation
parameter	value	
Response for CPU exception/STOP mode	Output replace OFF	Output replace OFF: When the PLC is in STOP mode, the output terminal is in a reset state (Physical terminal, regardless of channel logic level). Keep previous value: When the PLC is in abnormal/STOP mode, the output terminal outputs the last state of the PLC from RUN to STOP (Physical terminal, regardless of channel logic level). Output replace ON: When the PLC is in abnormal/STOP mode, the output terminal is in a set state (Physical terminal, regardless of channel logic level).
Logic level	Positive logic	Positive logic: When the terminal in the program is set to ON, the external terminal outputs Negative logic: When the terminal in the program is set to OFF, the external terminal outputs

Channel selection

• Input

XF-E16X16YModule parameters	Channel	Channel 0	Channel 0	
	Channel Template			
EXT16X16Y I/O Mapping	Channel Selection:			
Status	Input	Parameter Setting:	From Template V	
Information	Channel 0	_		
	Channel 1	Elbaria - Brannataria		
	Channel 2	Filtering Parameters:	lms ~	
	Channel 3	Logic Level:	Dogitive Logic	
	Channel 4		i ostare cogie	
	Channel 5			
	Channel 6			
F-E16X16YModule parameters	Channel	Channel 0		
	Channel Template			
X116X16Y I/O Mapping	Channel Selection:			
tatus	Input	Parameter Setting:	Manual 🗸 🗸	
formation	Channel 0			
niomation	Channel 1		•	
	Channel 2	Filtering Parameters:	1ms V	
	Channel 3	Logic Level:	Positive Logic	
	Channel 4			

• Output

XF-E16X16YModule parameters	Channel		Channel 16	
	Channel Template			
EXT16X16Y I/O Mapping	Channel Selection:		Parameter Setting:	
Status	Channel 7	^	i branicce betting.	From remplate V
formation Channel 8				
	Channel 9		Response for CPU Exception/STOP Mode: Logic Level:	Output Replace OFF \sim Positive Logic \sim
	Channel 10			
	Channel 11			
	Channel 12			
	Channel 13			
	Channel 14			
	Channel 15			
	Output			
	Channel 16			
	Channel 17			
	Channel 18			
	Channel 10			

XF-E16X16YModule parameters	Channel	Channel 16		
	Channel Template			
EXT16X16Y I/O Mapping	Channel Selection:	2 0 200		
Status		Parameter Setting:	Manual ~	
	Channel 7			
Information	Channel 8		+	
	Channel 9	Response for CPU Exception/STOP Mode:	Output Replace OFF 🗸	
	Channel 10			
	Channel 11		Positive Logic 🛛 🗸 🗸	
	Channel 12			
	Channel 13			
	Channel 14			
	Channel 15			
	Output			
	Channel 16			
	Channel 17			
	Channel 18			

Filter parameters, response for CPU exception/STOP mode, logic level can be set separately for each channel.

	From Template: Use the "Channel Template" interface to configure
Channel setting	parameters;
	Manual: Use the configuration parameters at the bottom of this interface.

6. Analog module unit

6-1. Naming rules

	Series Name	XF:	XF series extension module
2	Extension module	E:	Right extension module
		1:	1 channel
		2:	2 channels
3	Input channel	4:	4 channels
		6:	6 channels
		8:	8 channels
4	Туре	AD:	Analog voltage and current input
		1:	1 channel
		2:	2 channels
5	Output channel	4:	4 channels
		6:	6 channels
		8:	8 channels
6	Туре	DA:	Analog voltage and current input

 $\underbrace{\mathbf{XF}}_{(1)} - \underbrace{\mathbf{E}}_{(2)} \underbrace{\mathbf{O}}_{(3)} \underbrace{\mathbf{AD}}_{(4)} \underbrace{\mathbf{D}}_{(5)} \underbrace{\mathbf{DA}}_{(6)} - \underbrace{\mathbf{O}}_{(7)} - \underbrace{\mathbf{D}}_{(8)}$

		Empty:	Current&voltage type
7	Analog type	A:	Current type
		V:	Voltage type
(8) Mod		Empty:	Current&voltage type
	Madula truca	H:	Channel to channel isolation
	Module type	S:	High precision
		U:	High speed

6-2. Analog input unit XF-E4AD

6-2-1. Product overview

XF-E4AD series analog input expansion module, which has 4 channels of analog input and supports current and voltage input, and is suitable for XF, XSF series CPU unit products and XF series communication coupler units.

- 4 channel analog input.
- Channel conversion speed 60us/channel.
- Maximum error of 0.2%.
- Voltage and current bipolar input.
- 12mm width design

Module version:

Hardware version	Software version	Function
H2.0	V2.0	Basic functions for the first official production

6-2-2. Module view

(1) Description of each section



Number	Name			
1	System LED indicator light			
2	Channel LED indicator light			
3	Detachable terminal block			
4	Clasp			
5	Signal indication			
	Color identification indicating			
0	module type			
	Module hardware and software			
	versions			
8	Wiring diagram			

(2) System indicator light

System indicator light	Meaning	
PWR(Green)	Extinguish	Module not powered on
	Normally ON	All external power supplies of the module are normal (Backplane bus power supply&external input 24V)
	Flashing 1Hz*1	Module power supply is abnormal and cannot operate normally
	Normally ON	The module is operating normally
	Flashing 1Hz*1	General errors in module logs
RUN(Green)	Extinguish	Important errors in the module log
	Flashing 10Hz*2	Module establishing communication
	Double flashing*3	Module firmware update

*1: A square wave with a duty cycle of 50% and a frequency of 1Hz.

- *2: A square wave with a duty cycle of 50% and a frequency of 10Hz.
- *3: The following figure:



(3) Channel indicator light

Model		Channel indicator light				
		Normally ON(Green)	The channel is enabled and configured correctly			
XF-E4AD	CH0~CH3	Flashing 10Hz	This channel has error messages			
		Extinguish	Disable the channel			

(4) Color identification

No.	C	Color	Module type
1		Grey White	Digital input
2		Gray	Digital output&digital mixed module
3		Light blue	Analog input
4		Dark blue	Analog output
5		Green	RS232&485 serial port communication
6		Pink	Temperature signal input
7		White	High speed counting

6-2-3. General specifications

General specifications			
Project		Content	
Our start in the start start	Max temperature	55°C	
Operating temperature	Min temperature	-20°C	
Transportation/storage	Max temperature	70°C	
temperature	Min temperature	-40°C	
Environmental humidity	Upper limit	95%	
(including operation/storage)	lower limit	10%	
Protection grade		IP20	
		Accord with IEC61131-2	
		Under intermittent vibration (frequency 5-9Hz,	
		constant amplitude 3.5mm peak displacement)	
		and (frequency 9-150Hz, constant acceleration	
Antiviluotion		1.0g peak acceleration)	
Anti vibration		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	
		Accord with IEC61131-2	
		Impact strength of 15G (peak) with a duration of	
Impact resistance		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	

6-2-4. Technical specification

6-2-4-1. Module performance)
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Project			Specification
Input channel			4
		Input range	0V~5V (0~64000)
Analog input	Voltage		0V~10V (0~64000)
range (rated)			-5V~5V (-32000~32000)
			-10V~10V (-32000~32000)

			1V~5V (12800~64000)	
			Impedance greater than 1M	
			0mA~20mA (0~64000)	
		T (4mA~20mA (12800~64000)	
	Current	Input range	-20mA~20mA (-32000~32000)	
			Impedance is approximately 120 Ω	
Maximum input	Voltage input		DC±15V	
range	Current input		-40~40mA	
Conversion speed	Conversion speed		12us/CH	
Response speed			60us	
Resolution ratio			1/64000 (16Bit)	
Module power	Rated input		DC24V±10%, 150mA	
supply	Protect		Reverse protection	
г	Normal temperature 25 °C± 5 °C		±0.1% (25±5 °C)	
Error	Full temperature end -20~55 °C		±0.2%	
Isolate			Channel non isolated, power isolated	
Module power consumption			0.7W (Backplane bus)+0.5W(External input)	
Module weight			80g	

6-2-4-2. Module conversion diagram

Voltage









6-2-5. Installation&Wiring

6-2-5-1 Appearance dimension

■ XF-E4AD

Unit: mm

87. 84



6-2-5-2 Terminal definition&Wiring

Terminal Definition

XF-E4AD						
Meaning		A-list terminal	Terminal layout	B-list terminal	Meaning	
CH0	Input grounding	0		0	CH2	Input grounding
VI0	Analog voltage input terminal	1		1	VI2	Analog voltage input terminal
AI0	Analog current input terminal	2		2	AI2	Analog current input terminal
CH1	Input grounding	3	9 00 9	3	CH3	Input grounding
VI1	Analog voltage input terminal	4		4	VI3	Analog voltage input terminal
AI1 Analog current input terminal		5		5	AI3	Analog current input terminal
Empty		6		6		Empty
Empty		7	▝▁▁₽	7		Empty

24V+	External power	8	8	0V	External power
	supply terminal	0			supply terminal

External wiring



6-2-5-3 Installation method

(1) Installation requirements

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



(2) Installation steps



The assembly between IO modules is carried out by sliding installation through the top and bottom rails of the modules, as shown in the left figure:



The module is installed on the guide rail. When installing, align the module with the DIN rail and press the module in the direction indicated by the arrow. After installation, there is a noticeable sound of the module engaging, as shown in the left figure:



After the module installation is completed, the lock buckle will automatically move downwards for locking. If the lock buckle does not move downwards, the top of the lock buckle needs to be pressed downwards to ensure proper installation.

(3) Unstallation steps



6-2-5-4 Installation environment

This product can be installed in four positions (installation direction): horizontal direction, vertical direction, top of the cabinet, and bottom of the cabinet. It is recommended to install in the horizontal direction. The heat dissipation design is through natural convection, to ensure normal ventilation and heat dissipation, and to reserve sufficient wiring space, the minimum gap must be left around this product, as shown in the following figure:





If there are high-temperature heat source equipment (heaters, transformers, high resistors, etc.) around this product, a minimum gap of 100mm should be left between the equipment and the high-temperature heat source.

6-2-5-5 Equipment wiring

When wiring a module, its terminal must meet the following requirements:

Suitable cable diameter				
Chinese standard/mm ²	American Standard/AWG			
0.3	22			
0.5	20			
0.75	18			
1.0	18			
1.5	16			

If using other tube type wire lugs, please crimp them to the stranded wire, and the shape and size requirements are shown in the following figure:



6-2-6. Parameters and mapping addresses

N	ame	Туре	Description
X	F_E4AD	Stuct	4 channels input module
	——— СНО	DINT	Channel 0 input value
	—— СН1	DINT	Channel 1 input value
	CH2	DINT	Channel 2 input value
	—— СНЗ	DINT	Channel 3 input value
	ErrCode_module	WORD	Module level error codes
	ErrCode_CH	DWORD	Channel level error codes

Error code parameters:

Module level error codes(ErrCode_module)				
Bit	Meaning	Error level		
0	The 24V input power supply of the module is abnormal.	Important		
2	An internal module error occurred and cannot be fixed by the user layer.	Important		
3	Version mismatch.	Important		
4	ADC/DAC read/write failure.	Important		

Module level error codes(ErrCode_module)				
Bit	Meaning	Error level		
0	Channel 1 upper limit overflow.	Normal		
1	Channel 1 low limit overflow.	Normal		
2	Channel 1 disconnected.	Important		
3	Reserve	-		
4	Channel 2 upper limit overflow.	Normal		
5	Channel 2 low limit overflow.	Normal		
6	Channel 2 disconnected.	Important		
7	Reserve	-		
8	Channel 3 upper limit overflow.	Normal		
9	Channel 3 low limit overflow.	Normal		
10	Channel 3 disconnected.	Important		
11	Reserve	-		
12	Channel 4 upper limit overflow.	Normal		
13	Channel 4 low limit overflow.	Normal		
14	Channel 4 disconnected.	Important		

Configuration parameters

Parameter	Туре	Channel	Meaning	1	Note
Power_Detection	Enumeration of	-	Power detection	0: Close	1: Open
CH0_enable_disable	BYTE	Channe 0	Channel	0: Close	1: Open
			enable/disable		
CH0_broken_line_detection_enabl e_disable	Enumeration_of BYTE		Enable/disable	0: Close	1: Open
			wire breakage		
			detection		
CH0_range selection	BYTE		Range select	0: 0~10V	5: 0~20mA
				1: 0~5V	6: 4~20mA
				2: -10~10V	7: -20~20mA
				3: -5~5V	
				4: 1~5V	
CH0_filtering_mode			Filtering method	0: First order	filtering
				1: Time avera	ge
				2: Average nu	mber of times
				3: Moving avo	erage
CH0_FilterPar	INT		Filtering	Time average	(2-100ms)

Parameter	Туре	Channel	Meaning	Note	
			parameter	default value 2	
			-	Average frequency (4-500)	
				default value 4	
				Moving average (2-500)	
				default value 2	
				First order delay filtering	
				(0-254) defaults to 0 (no	
				filtering)	
CH0_Calibrate_enable_disable	Enumeration of BYIE		Calibration enable/disable	0: Close 1: Open	
	INT		Calibration 1	Voltage input	
CH0_Calibration1_Analog			analog quantity	0~10V:	
CHO Calibration 1 Numerical			Calibration 1	Analog range: 0~10000mV	
CH0_Calibration1_Numerical	DINI		digital quantity	Digital range: 0~64000	
CHO Calibration? Analog	DIT		Calibration 2	0~5V:	
			analog quantity	Analog range: 0~5000mV	
	DINT			Digital range: 0~64000 -10~10V: Analog range:	
				-10000~10000mV	
				Digital range: -32000~32000 -5~5V:	
			Calibration 2 digital quantity	Analog range: -5000~5000mV	
				Digital range: -32000~32000	
				Analog range:	
				1000mV~5000mV	
CH0 Calibration2 Numerical				Digital range: 12800~64000	
				Current input	
				0~20mA:	
				Analog range: 0~20000uA	
				Digital range: 0~64000	
				4~20mA:	
				Analog range: 4000~20000uA	
				Digital range: 12800~64000	
				-20~20mA:	
				Analog range:	
				-20000~20000uA	
				Digital range: -32000~32000	
CH0 unit display conversion ena	Enumeration of		Enable/disable		
bled disable	BYTE		unit display	0: Close 1: Open	
			conversion		
CH0 UpperLimit	DINT		Unit display	Range:	
CH0_OpperLimit			conversion limit	-10000000~10000000	

Darameter	Tune	Channel	Meaning	Note
ratameter	Туре	Channel	Unit diamlay	And often enabling unit
CH0_LowerLimit				And alter enabling unit
				limits
		-	$\frac{1}{1}$	11m1()>0
			Enable/disable	
CH0_Opper_and_lower_limit_ove	Enumeration of BYTE		upper and lower	0: Close 1: Open
rflow_set_enabled_disable			limit overflow	
		-	settings	
	INT		Upper limit	Analog range: In mV, uA
CH0_UpperAnalog			overflow analog	units, for example: 0-10V:
		-	quantity	0-10000mV
	DINT		Upper limit	Voltage input
CH0_UpperNumerical			overflow output	0~10V:
		-	digital quantity	Analog range: 0~10000mV
			Lower limit	Digital range: 0~64000
CH0_LowerAnalog	INT		overflow analog	0~5V:
			quantity	Analog range: 0~5000mV
	DINT			Digital range: 0~64000 -10~10V:
				Analog range:
				-10000~10000mV
				Digital range: -32000~32000
				-5~5V:
				Analog range: -5000~5000mV
				Digital range: -32000~32000
				1~5V:
				Analog range:
			Lower limit	1000mV~5000mV
CH0 LowerNumerical			overflow output	Digital range: 12800~64000
eno_lowentumentear			digital quantity	Current input
			digital quality	$0 \sim 20 \text{mA}$
				Analog range: $0 \sim 20000 \mu A$
				Digital range: $0 \sim 64000$
				$4 \sim 20 \text{ m} \Delta$
				A palog range: $4000 - 20000 \mu \Lambda$
				Digital range: 12800-64000
				20-20m A .
				-20000~20000dA
			Channal	Digital range: -52000~52000
CH1_enable_disable	Enumeration of			0: Close 1: Open
	BYIE	-	enable/disable	
CH1_broken_line_detection enabl	Enumeration of	Channe 1	Enable/disable	
e disable	BYTE		wire breakage	0: Close 1: Open
		-	detection	
CH1_range selection	BYTE		Range select	0: 0~10V 5: 0~20mA

Parameter	Туре	Channel	Meaning	Note
				1: 0~5V 6: 4~20mA 2: -10~10V 7: -20~20mA 3: -5~5V 4: 1~5V
CH1_filtering_mode			Filtering method	0: First order filtering1: Time average2: Average number of times3: Moving average
CH1_FilterPar	INT		Filtering parameter	Time average (2-100ms) default value 2 Average frequency (4-500) default value 4 Moving average (2-500) default value 2 First order delay filtering (0-254) defaults to 0 (no filtering)
CH1_Calibrate_enable_disable	Enumeration of BYIE		Calibration enable/disable	0: Close 1: Open
CH1_Calibration1_Analog	INT		Calibration 1 analog quantity	Voltage input 0~10V:
CH1_Calibration1_Numerical	DINT		Calibration 1 digital quantity	Analog range: 0~10000mV Digital range: 0~64000
CH1_Calibration2_Analog	INT		Calibration 2 analog quantity	0~5V: Analog range: 0~5000mV
CH1_Calibration2_Numerical	DINT		Calibration 2 digital quantity	Digital range: $0-64000$ - $10-10V$: Analog range: - $10000-10000mV$ Digital range: $-32000-32000$ - $5-5V$: Analog range: $-5000-5000mV$ Digital range: $-32000-32000$ 1-5V: Analog range: 1000mV-5000mV Digital range: $12800-64000$ Current input 0-20mA: Analog range: $0-20000uA$ Digital range: $0-64000$ 4-20mA: Analog range: $4000-20000uA$ Digital range: $12800-64000$ 20-20mA:

Parameter	Туре	Channel	Meaning	Note	
				Analog range:	
				-20000~20000uA	
				Digital range: -32000~32000	
CU1 unit display conversion one	Enumeration of		Enable/disable		
blad_disable			unit display	0: Close 1: Open	
	DITE		conversion		
CH1 UpperLimit			Unit display	Range:	
	-		conversion limit	-100000000~10000000	
	DINT		Unit display	And after enabling unit	
CH1_LowerLimit			conversion lower	conversion, (upper lower	
			limit	limit)>0	
			Enable/disable		
CH1_Upper_and_lower_limit_ove	Enumeration of		upper and lower	0: Close 1: Open	
rflow_set_enabled_disable	BYTE		limit overflow		
			settings		
	DIT		Upper limit	Analog range: In units of mV	
CH1_UpperAnalog			overflow analog	and uA, for example: 0-10V:	
			quantity	Voltago input	
CH1 UnnerNumerical	DINT		Opper limit		
CH1_Oppenvullencal			digital quantity	$0 \sim 10$ V:	
			Lower limit	Digital range: $0 \sim 64000$	
CH1 LowerAnalog	INT		overflow analog	$0 \sim 5V$	
			quantity	Analog range: 0~5000mV	
			quantity	Digital range: 0~64000	
	DINT			-10~10V:	
				Analog range:	
				-10000~10000mV	
				Digital range: -32000~32000	
				-5~5V:	
				Analog range: -5000~5000mV	
				Digital range: -32000~32000	
				1~5V:	
			Lower limit	Analog range:	
CH0_LowerNumerical			overflow output	1000mV~5000mV	
			digital quantity	Digital range: 12800~64000	
				Current input	
				0~20mA:	
				Analog range: 0~20000uA	
				Digital range: $0 \sim 64000$	
				4~20mA:	
				Analog range: 4000~20000uA	
				20, 20m A	
				-20~20IIIA:	
				Analog range:	
Parameter	Type	Channel	Meaning	Note	
--	------------------------	--	-----------------------------------	--	------------------
				-20000~20000uA	
				Digital range: -32000~32000	
CH2_enable_disable	Enumeration of BYTE		Channel enable/disable	0: Close 1: Open	
CH2_broken_line_detection_enabl e_disable	Enumeration_of BYTE			Enable/disable wire breakage detection	0: Close 1: Open
CH2_range selection	BYTE		Range select	0: 0~10V 5: 0~20mA 1: 0~5V 6: 4~20mA 2: -10~10V 7: -20~20mA 3: -5~5V 4: 1~5V	
CH2_filtering_mode			Filtering method	0: First order filtering1: Time average2: Average number of times3: Moving average	
CH2_FilterPar	INT	Channe 2 On of Calib Calib Calib Calib	Filtering parameter	Time average (2-100ms) default value 2 Average frequency (4-500) default value 4 Moving average (2-500) default value 2 First order delay filtering (0-254) defaults to 0 (no filtering)	
CH2_Calibrate_enable_disable	Enumeration of BYIE		Calibration enable/disable	0: Close 1: Open	
CH2_Calibration1_Analog	INT		Calibration 1 analog quantity	Voltage input 0~10V:	
CH2_Calibration1_Numerical	DINT		Calibration 1 digital quantity	Analog range: 0~10000mV Digital range: 0~64000	
CH2_Calibration2_Analog	INT		Calibration 2 analog quantity	0~5V: Analog range: 0~5000mV	
CH2_Calibration2_Numerical	DINT		Calibration 2 digital quantity	Digital range: 0~64000 -10~10V: Analog range: -10000~10000mV Digital range: -32000~32000 -5~5V: Analog range: -5000~5000mV Digital range: -32000~32000 1~5V: Analog range: 1000mV~5000mV Digital range: 12800~64000	

Parameter	Туре	Channel	Meaning	Note
				Current input
				0~20mA:
				Analog range: 0~20000uA
				Digital range: $0 \sim 64000$
				$4 \sim 20 \text{ m}$ Å
				A nalog range: 4000, 200000
				Analog range. $4000 \sim 20000$ d
				Digital range: $12800 \sim 64000$
				-20~20mA:
				Analog range:
				-20000~20000uA
				Digital range: -32000~32000
CH2 unit display conversion ena	Enumeration of		Enable/disable	
bled disable	BYTE		unit display	0: Close 1: Open
			conversion	
CH2 UpperLimit			Unit display	Range:
	_		conversion limit	-100000000~10000000
	DINT		Unit display	And after enabling unit
CH2_LowerLimit			conversion lower	conversion, (upper lower
			limit	limit)>0
	Enumeration of BYTE		Enable/disable	
CH2_Upper_and_lower_limit_ove			upper and lower	
rflow_set_enabled_disable			limit overflow	0: Close 1: Open
			settings	
			Upper limit	Analog range: In units of mV
CH2_UpperAnalog	INT		overflow analog	and uA, for example: 0-10V:
			quantity	0-10000mV
			Upper limit	Voltage input
CH2_UpperNumerical	DINT		overflow output	0~10V:
			digital quantity	Analog range: 0~10000mV
			Lower limit	Digital range: 0~64000
CH2 LowerAnalog	INT		overflow analog	0~5V:
			quantity	Analog range: 0~5000mV
				Digital range: 0~64000
				-10~10V:
				Analog range:
				-10000~10000mV
				Digital range: -32000~32000
			Lower limit	-5~5V:
CH2 LowerNumerical			overflow output	Analog range: -5000~5000mV
			digital quantity	Digital range: $-32000 \sim 32000$
			aightaí quaittity	1~5V.
				Analog range
				$1000 \text{mV}_{5000 \text{mV}}$
				Digital range: 12800 64000
				Digital range: 12800~04000
				Current input

Parameter	Туре	Channel	Meaning	Note
				0~20mA:
				Analog range: 0~20000uA
				Digital range: 0~64000
				4~20mA:
				Analog range: 4000~20000uA
				Digital range: 12800~64000
				-20~20mA:
				Analog range:
				-20000~20000uA
				Digital range: -32000~32000
CU2 anable disable	Enumeration of		Channel	0. Class 1. Open
CH3_enable_disable	BYTE		enable/disable	0: Close 1: Open
CIII2 hashen line detection angle	Environmention of		Enable/disable	
cH3_bloken_line_detection_enabl	DVTE		wire breakage	0: Close 1: Open
	DIIL		detection	
				0: 0~10V 5: 0~20mA
CH3_range selection				1: 0~5V 6: 4~20mA
			Range select	2: -10~10V 7: -20~20mA
	BYTE			3: -5~5V
				4: 1~5V
			Filtering method	0: First order filtering
CH3 filtering mode				1: Time average
CH3_Intering_inode				2: Average number of times
				3: Moving average
			Filtering	Time average (2-100ms)
				default value 2
				Average frequency (4-500)
		Channe 3		default value 4
CH3_FilterPar	INT		narameter	Moving average (2-500)
			parameter	default value 2
				First order delay filtering
				(0-254) defaults to 0 (no
				filtering)
CH3 Calibrate enable disable	Enumeration of		Calibration	0: Close 1: Open
	BYIE		enable/disable	·····
CH3 Calibration1 Analog	INT		Calibration 1	Voltage input
			analog quantity	0~10V:
CH3 Calibration1 Numerical	DINT		Calibration 1	Analog range: 0~10000mV
			digital quantity	Digital range: 0~64000
CH3 Calibration2 Analog	INT		Calibration 2	0~5V:
6			analog quantity	Analog range: 0~5000mV
				Digital range: 0~64000
CH3 Calibration2 Numerical	DINT		Calibration 2	-10~10V:
			digital quantity	Analog range:
				-10000~10000mV

Parameter	Туре	Channel	Meaning	Note
				Digital range: -32000~32000 -5~5V:
				Analog range: -5000~5000mV
				Digital range: -32000~32000 1~5V:
				Analog range:
				1000mV~5000mV
				Digital range: 12800~64000
				Current input
				0~20mA:
				Analog range: 0~20000uA
				Digital range: $0 \sim 64000$
				4~20mA:
				Digital range: $12800 \sim 64000$
				-20~20mA:
				Analog range:
				-20000~20000uA
				Digital range: -32000~32000
CH2 unit display conversion and	Enumeration of		Enable/disable	
bled disable	BYTE		unit display	0: Close 1: Open
	DITL		conversion	
CH3 UpperLimit			Unit display	Range:
	DINT		conversion limit	-100000000~10000000
			Unit display	And after enabling unit
CH3_LowerLimit			conversion lower	conversion, (upper lower
			Enable/disable	
CH3 Upper and lower limit ove	Enumeration of		upper and lower	
rflow set enabled disable	BYTE		limit overflow	0: Close 1: Open
			settings	
			Upper limit	Analog range: In units of mV
CH3_UpperAnalog	INT		overflow analog	and uA, for example: 0-10V:
			quantity	0-10000mV
			Upper limit	Voltage input
CH3_UpperNumerical	DINT		overflow output	0~10V:
			digital quantity	Analog range: 0~10000mV
	DIT		Lower limit	Digital range: $0 \sim 64000$
CH3_LowerAnalog			overflow analog	$0 \sim 3 V$:
			quantity	Digital range: 0~64000
			Lower limit	-10~10V:
CH3 LowerNumerical	DINT		overflow output	Analog range:
-			digital quantity	-10000~10000mV
				Digital range: -32000~32000

Parameter	Туре	Channel	Meaning	Note
				-5~5V:
				Analog range: -5000~5000mV
				Digital range: -32000~32000
				1~5V:
				Analog range:
				1000mV~5000mV
				Digital range: 12800~64000
				Current input
				0~20mA:
				Analog range: 0~20000uA
				Digital range: 0~64000
				4~20mA:
				Analog range: 4000~20000uA
				Digital range: 12800~64000
				-20~20mA:
				Analog range:
				-20000~20000uA
				Digital range: -32000~32000

6-2-7. Functions and Settings

■ Channel enable/disable

Enable or disable AD sampling channels to save module sampling time.

TF_E4AD X			
XF-E4ADModule parameters	Module	Channel 0	
EXT4AD I/O Mapping	General Settings		
Status	Channel	Parameter Setting:	Manual ~
	Channel Template		
Information	Channel Selection:		1
	Channel 0	Channel Enable/Disable	Enable ~
	Channel 1	Measurement Type:	Voltage 🗸
	Channel 2	Measurement Range:	0/~10/
	Channel 3	22 22	0. 20
		Filtering Mode:	First-Order Filtering $\ \lor$
		Filtering Parameter:	0
Settable parameters	Enable or disable (In corresponding channel can	disable mode, subsequent not be set)	t software functions of the
Default parameters	Enable		
Note	The conversion time of ea	ch channel is 60us, with a	total time of on/off conversion
	speed * the number of ena	bled channels. If this chann	nel is not used, it can be set to

"disable" to reduce the total conversion time of the module.

■ Input type/range

Users can choose different input types and ranges.

XF-E4ADModule parameters	Module	Channel 0	
EXT4AD I/O Mapping	General Settings		
Status	Channel	Parameter Setting:	Manual 🗸 🗸
	Channel Template		
Information	Channel Selection:		
	Channel 0	Channel Enable/Disable	Enable 🗸
	Channel 1	Measurement Type:	Voltage \vee
	Channel 2	Measurement Range:	0V~10V ~
	Channel 3		
		Filtering Mode:	First-Order Filtering ~
		Filtering Parameter:	0
		<u> </u>	\mathbf{n}
Settable parameters	The following table	e putting method terrects the p	barameters that can be
Settable parameters	voltage, current	e putting method reflects the p	
Settable parameters Default parameters	The following table voltage, current Voltage	e putting method reflects the p	
Settable parameters	Voltage 0V~5V, 0V~10V, -	5V~5V, -10V~10V, 1V~5V	
Settable parameters Default parameters Voltage measurement	range The following table voltage, current Voltage 0V~5V, 0V~10V, - Default: 0V~10V	-5V~5V, -10V~10V, 1V~5V	

- Module power detection
- Check whether the external power supply 24V of the module is normal:
- Normal: The module is operating normally.
- Abnormal: The module channel cannot be used but can be configured, configured, and scanned normally.
- Settable parameters: Enable/disable (default to disabled).
 - Wire breakage detection

• Detect abnormal disconnection of AD input channel and configure alarm logs. If there is no current flowing through the module or the current flowing is too low (the measurement range is 4-20 mA or 1-5V), the corresponding alarm log will be triggered, which can activate both circuit breaker detection and underflow simultaneously.



This function is only supported when the "measurement range" is set to " $4mA \sim 20mA$ " and " $1V \sim 5V$ ".

- Parameters can be set: enable or disable (default is disabled).
 - Channel filtering parameters

XF-E4ADModule parameters	Module	Channel 0	
EXT4AD I/O Mapping	General Settings		
Status	Channel	Parameter Setting:	Manual ~
510105	Channel Template		
Information	Channel Selection:		
	Channel 0	Channel Enable/Disable	Enable 🗸 🗸
	Channel 1	Measurement Type:	Voltage 🗸 🗸
	Channel 2		
	Channel 3	Measurement Range:	0V~10V ~
		Filtering Mode:	First-Order Filtering $~\sim~$
		Filtering Parameter:	0

• First order filtering

The first-order low-pass filtering method uses the weighting of the current sampling value and the output value of the previous filtering to obtain the effective filtering value. The filtering coefficient is set by the user to $0\sim254$. The smaller the value, the more stable the data will be, but it may cause data lag. Therefore, when set to 1, the filtering effect is strongest and the data is most stable. When set to 254, the filtering effect is weakest. The default is 0 (not filtered).

• Average filtering

		Perform A/D conversion according to the set time, and average the total value after removing the maximum and minimum values. The	
Time	Functional actions	average processed value is stored in the corresponding output buffer	
average		memory. The number of processing times within the set time varies	
		depending on the number of channels allowed for A/D conversion	
	Set range	2-100ms (default value 2)	
		Perform A/D conversion according to the set number of times, and	
		average the total value after removing the maximum and minimum	
Count	values. The average processed value is stored in the corresponding		
average	Functional actions	channel variable. The time it takes for the average of the number of	
	times to be stored in the corresponding channel variable varies		
		depending on the number of channels allowed for A/D conversion.	
	Set range	4-500 (default value 4)	
		After averaging the specified number of digital output values	
Moving	Eurotional actions	obtained in each sampling cycle, store them in the corresponding	
average	Functional actions	output register/variable. Due to moving average processing in each	
		sampling process, the latest digital output values can be obtained.	
	Set range	2-500 (default value 2)	

- Settable parameters
- Filtering mode (selected from the dropdown menu): "First order filtering", "Time average filtering", "Frequency average filtering", "Moving average filtering" (default: First order filtering).
- ◆ Filtering parameters (selected using the input box): Can be set in "first-order filtering" mode: 0-254 (default value: 0), can be set in "time average filtering" mode: 2ms~100ms (default value: 2), can be set in "number

average filtering" mode: 4-500 (default value: 4), can be set in "moving average filtering" mode: 2-500 (default value: 2).

- Up and down overflow settings
 When the AD channel sampling exceeds the upper/lower limit set value, an alarm log is triggered and the set value is output.
- Calibration function

XF-E4ADModule parameters	Module		
EXT4AD I/O Mapping	General Settings	Over/Underflow	Enable ~
Status	Channel	Upper Overflow-Set Value:	10000 mV
	Channel Template	Upper Overflow-Output Value:	64000
Information	Channel Selection:	Law On the California	
	Channel 0	Lower Overflow-Set Value:	U mV
	Channel 1	Lower Overflow-Output Value:	0
	Channel 2		
	Channel 3		Calibration Frakla
		AD Calibra2 - Digital 64000 AD Calibra1 - Digital 0	D mV 10000 mV AD Calibra1 - Analog AD Calibra2 - Analog



Due to the possibility of drift between the analog output converted from DA and the set digital output after the product leaves the factory or has been in use for a period of time, customers can immediately reflect it to the proportional scaling value (digital operation value) by setting the DA offset calibration function, and can easily complete the calibration at system startup on their own.

■ Unit display conversion

(F-E4ADModule parameters	Module	
EXT4AD I/O Mapping	General Settings	Over/Underflow Enable ~
Status	Channel	Upper Overflow-Set Value: 10000 mV
	Channel Template	Upper Overflow-Output Value: 32000
Information	Channel Selection:	
	Channel 0	
	Channel 1	Lower Overflow-Output Value: 0
	Channel 2	
	Channel 3	
		AD Calibra2 - Digital 32000 AD Calibra1 - Digital 0 0 mV 10000 mV AD Calibra1 - Analog AD Calibra2 - Analog
		Unit Display Conversion Enable ~ Unit Display Upper Limit: 32000
		Unit Display Lower Limit:

This function can directly display the output analog data as the actual output unit required by the customer.

Due to the customer's use of analog expansion module DA, the basic output is to provide analog quantities corresponding to the outputs of some instruments or sensors. For example, controlling a frequency output range of 0~50Hz for a frequency converter and controlling an analog signal of 4~20mA for frequency control. The existing DA module will output an analog signal of 4~20mA to the analog acquisition terminal of the frequency converter, and the customer needs to convert the digital signal of 0~65535 to 0~50Hz for the actual output frequency of the frequency converter. You can automatically convert the analog output of module DA into the actual output frequency value of the frequency converter by setting the conversion value range.

6-3 Analog output unit XF-E4DA

6-3-1 Product overview

XF-E4DA series analog output expansion module, this product has 4 channels of analog input, supports current and voltage input, and is compatible with XF, XSF series CPU unit products and XF series communication coupler units.

- 4-channel analog output.
- The channel conversion speed is 60us/channel.
- Maximum error of 0.2%.
- Voltage and current bipolar input.
- Designed with a width of 12mm.

Module version:

Hardware version	Firmware version	Function
H2.0	V2.0	Basic functions for the first official production

6-3-2 Module view

(1) Description of each section



Number	Name	Number	Name
1	System LED indicator lights	2	Channel LED indicator light
3	Detachable terminal block	4	Clasp
5	Model indication	6	Color identification indicating module type
7	Module hardware and firmware versions	8	Wiring diagram

(2) System indicator light

System indicator light		Meaning	
	Extinguish	Module not powered on	
	Normally ON	All external power supplies of the module are normal	
PWR(Green)	Normany ON	(Backplane bus power supply&external input 24V)	
	Flashing	Abnormal power supply in the module and inability to operate	
	$1 Hz^{*1}$	normally	
	Normally ON	The module is running normally	
	Flashing		
	1Hz^{*1}	General errors in module logs	
DIN(Crean)	Extinguish	Important errors in module logs	
RUN(Green)	Flashing		
	10Hz*2	Module establishing communication	
	Double	Madala famana andata	
	flashing *3	Module firmware update	

*1: A square wave with a duty cycle of 50% and a frequency of 1Hz.

*2: A square wave with a duty cycle of 50% and a frequency of 10Hz.

*3: The following figure:



(3) Channel indicator light

Model	Channel indicator light			
	СН0~СН3	Normally ON	Channel enabled and configured correctly	
XF-E4DA		(Green)		
		Extinguish	Disable channel	

(4) Color identification

No.	Color		Module type
1		Grey White	Digital input
2		Gray	Digital output&digital mixed module
3		Light blue	Analog input
4		Dark blue	Analog output
5		Green	RS232&485 serial port communication
6		Pink	Temperature signal input
7		White	High speed counting

6-3-3 General specifications

General specifications				
Project		Content		
	Max	55%		
Operating	temperature			
temperature	Min	-20°C		
	temperature	-20 C		
	Max	70°C		
Transportation/storage	temperature	70 0		
temperature	Min	-40°C		
	temperature			
Environmental	Upper limit	95%		
humidity				
(including	lower limit	10%		
operation/storage)				
Protection grade		IP20		
		Compliant with IEC61131-2		
		Under intermittent vibration (frequency 5-9Hz, constant		
		amplitude 3.5mm peak displacement) and (frequency		
Anti vibration		9-150Hz, constant acceleration 1.0g peak acceleration)		
And violation		Under continuous intermittent 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		
		Complies with IEC61131-2 standard		
Impact resistance		The impact strength is 15G (peak) and the duration is 11ms. It		
Impact resistance		is applied to three mutually perpendicular axes, and each axis		
		is impacted 3 times (a total of 18 impacts)		
Use environment		Non corrosive gas		
Use altitude		0-2000m		
Over voltage level		II: Compliant with IEC61131-2		
Pollution level		2: Compliant with IEC61131-2		
Anti interference EMC		Accord with IEC 61131-2 IEC61000-6-4 B type		
Related certifications		СЕ		

6-3-4 Technical specification

6-3-4-1 Module performance

Project		Specification		
Output chan	nel	4		
		0V~5V (0~64000)		
		0V~10V (0~64000)		
Analog	Voltage output	-5V~5V (-32000~32000)		
Allalog	range	-10V~10V (-32000~32000)		
ouipui		1V~5V (12800~64000)		
range (roted)		External load resistance 2K Ω ~1M Ω		
(lated)	Current output	0mA~20mA (0~64000)		
	range	4mA~20mA (12800~64000)		
	Tange	External load resistance less than 500 Ω		
Maximum	Voltage output	DC±15V		
output	Current output	40- 40m A		
range	Current output	-40~40mA		
Conversion	speed	45us/CH		
Response sp	eed	60us		
Resolution r	atio	1/64000 (16Bit)		
Module	Rated input	DC24V±10%, 150mA		
power	Protect	Reverse polarity protection		
supply				
	Normal			
	temperature	±0.1%(25±5°C)		
Error	25 °C± 5°C			
	Full temperature	+0.2%		
	end -20~55°C			
Isolate		Channel non isolated, power isolated		
Module pow	ver consumption	0.8W (Backplane bus)+1.2W (External input)		
Module weig	ght	80g		

6-3-4-2 Module conversion diagram

■ Voltage



Current



6-3-5 Installation&Wiring

6-3-5-1 Appearance dimension

■ XF-E4DA



6-3-5-2 Terminal definition&Wiring

Terminal Definition

XF-E4DA					
Meaning	A-list terminal	Terminal layout	B-list terminal	Meaning	
CH0- output ground	0		0	CH2- output ground	
CH0-DA analog voltage output terminal	1		1	CH2-DA analog voltage output terminal	
CH0-DA analog current output terminal	2		2	CH2-DA analog current output terminal	
CH1- Output ground	3		3	CH3- output ground	
CH1-DA analog voltage output terminal	4	3 3 4 4	4	CH3-DA analog voltage output terminal	
CH1-DA analog current output terminal	5		5	CH3-DA analog current output terminal	
Empty	6		6	Empty	
Empty	7		7	Empty	
External 24V power supply for module positive	8	₽₩₩₽	8	External power supply to the module 24V power supply negative	

Unit: mm

External wiring



(1)System indicator light (2)Channel indicator light (3) Backplane bus (4) Output Channel&Wiring

6-3-5-3 Installation method

(1) Installation requirements

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



(2) Installation steps



The assembly between IO modules is carried out by sliding installation through the top and bottom rails of the modules, as shown in the left figure:



The module is installed on the guide rail. When installing, align the module with the DIN rail and press the module in the direction indicated by the arrow. After installation, there is a noticeable sound of the module engaging, as shown in the left figure:



After the module installation is completed, the lock buckle will automatically move downwards for locking. If the lock buckle does not move downwards, the top of the lock buckle needs to be pressed downwards to ensure proper installation.

(3) Unstallation steps



6-3-5-4 Installation environment

This product can be installed in four positions (installation direction): horizontal direction, vertical direction, top of the cabinet, and bottom of the cabinet. It is recommended to install in the horizontal direction. The heat dissipation design is through natural convection, to ensure normal ventilation and heat dissipation, and to reserve sufficient wiring space, the minimum gap must be left around this product, as shown in the following figure:





If there are high-temperature heat source equipment (heaters, transformers, high resistors, etc.) around this product, a minimum gap of 100mm should be left between the equipment and the high-temperature heat source.

6-3-5-5 Equipment wiring

When wiring a module, its terminal must meet the following requirements:

Suitable cable diameter					
Chinese standard/mm ²	American Standard/AWG				
0.3	22				
0.5	20				
0.75	18				
1.0	18				
1.5	16				

If using other tube type wire lugs, please crimp them to the stranded wire, and the shape and size requirements are shown in the following figure:



6-3-6 Parameters and mapping addresses

Name	Туре	Description
XF_E4DA	Stuct	4-channel output module
—— СН0	DINT	Channel 0 output value
—— СН1	DINT	Channel 1 output value
—— СН2	DINT	Channel 2 output value
—— СНЗ	DINT	Channel 3 output value
ErrCode_module	WORD	Module level error codes
ErrCode_CH	DWORD	Channel level error code

Error code parameters

Module level error code (ErrCode_module)					
Bit	Error level				
0	The 24V input power supply of the module is abnormal	Important			
2	Internal module error occurred and cannot be fixed by the user layer	Important			
3	Version mismatch	Important			
4	ADC/DAC read/write failure	Important			

• Configuration parameters

Parameter	Туре	Channel	Meaning	Note		
Power_Detection	Enumeration ofBYTE		Power detection	0: Close 1: Open		
CH0 enable disable	BYTE		Channel enable/disable	0: Close 1: Open		
CH0 Output Range select	BYTE		Output type and range	0: 0~10V 5: 0~20mA 1: 0~5V 6: 4~20mA 2: -10~10V 3: -5~5V 4: 1~5V		
output hold the previous value or preset value in the stopped state	Enumeration ofBYTE		In the STOP state, the output remains at the previous value/preset value	0: Keep the previous 1: Set value value		
CH0 default value	DINT		Presets	-32000~64000		
Calibrate enable disable	Enumeration ofBYTE		Calibration enable/disable	0: Close 1: Open		
CH0 Calibration1 Analoc	INT	Channel 0	Calibration 1 analog quantity	Voltage output 0~10V:		
CH0 Calibration1 Numerical	DINT		Calibration 1 digital quantity	Analog range: 0~10000mV Digital range: 0~64000		
CH0 Calibration2 Analog	INT		Calibration 2 analog quantity	0~5V: Analog range: 0~5000mV		
CH0 Calibration2 Numerical	DINT		Calibration 2 digital quantity	Digital range: 0~64000 -10~10V: Analog range: -10000~10000mV Digital range: -32000~32000 -5~5V: Analog range: -5000~5000mV Digital range: -32000~32000 1~5V: Analog range: 0mV~5000mV Digital range: 12800~64000		

Parameter	Туре	Channel	Meaning	1	Note		
				Current output	Current output		
				0~20mA:			
				Analog range: 0~20000uA			
				Digital range:	0~6400	00	
				$4 \sim 20 \text{ mA}$	0 0 0 0		
				Analog range:	0_2000)011 A	
				Digital range:	12800	64000	
		-	E = -1, 1 = / 1; = -1, 1 =	Digital lange.	12800-	-04000	
Unit display conversion	Enumeration			0 61	1.0		
enable disable	ofBYTE		unit display	0: Close	1: Ope	en	
		-	conversion				
			Unit display				
CH0 UpperLimit			conversion	Range: -10000	0000~	10000000	
			limit	And after enab	ling ur	nit	
			Unit Display	conversion, (upper lower limit)>0			
CH0 LowerLimit			Conversion				
			Lower Limit				
CIII1 11 11 11	Enumeration of		Channel	0.01	1.0		
CHI enable disable	BYTE		enable/disable	0: Close	1: Open		
		-		0: 0~10V	0: 0~10V		
				1.0 - 5V			
				210~10V			
CH1 Output Range select	BYTE		Output type and range	35~5V			
erri ouiput Runge sereet	DITE			4. 1~5V			
				4: $1 \sim 5^{\circ}$			
				5: 0~20mA			
		-	I I CTOD	6: 4~20mA			
			In the STOP				
output hold the previous			state, the output				
value or preset value in the	Enumeration		remains at the	0: Keep the pro	evious	1: Set	
stopped state	ofBYTE		previous	value value		value	
			value/preset				
		Channel 1	value				
CH1 default value	DINT		Presets	-32000~64000			
alibrata anabla disabla	Enumeration		Calibration	0. Class	1.00		
calibrate enable disable	ofBYTE		enable/disable	0: Close	1: Open		
	DIT		Calibration 1	Voltage output			
CHI Calibration Analoc	IN I		analog quantity	0~10V:			
CH1 Calibration1			Calibration 1	Analog range:	0~100	00mV	
Numerical	DINT		digital quantity	Digital range: 0~64000		00	
		-	Calibration 2	0~5V:			
CH1 Calibration2 Analog	INT		analog quantity	Analog range: 0~5000mV		0mV	
		-	unarog quantity	Digital range	0~6400	00	
				-10~10V.	0 0100		
CH1 Calibration2			Calibration 2	$-10 \sim 10 \text{ V}$:			
Numerical			digital quantity	-10000_{-10000}			
				-10000~10000mV			
				Digital range:	-32000	~32000	

Parameter	Туре	Channel	Meaning	Note
				-5~5V:
				Analog range: -5000~5000mV
				Digital range: -32000~32000
				1~5V:
				Analog range: 0mV~5000mV
				Digital range: 12800~64000
				Current output
				0~20mA:
				Analog range: 0~20000uA
				Digital range: 0~64000
				4~20mA:
				Analog range: 0-20000uA
		-		Digital range: 12800-64000
unit display conversion	Enumeration		Enable/disable	
enable disable	ofBYTE		unit display	0: Close 1: Open
		-	conversion	
			Unit display	
CH1 UpperLimit			conversion	Range: -100000000~10000000
			limit	And after enabling unit
			Unit display	conversion, (upper lower
CH1 LowerLimit			conversion	limit)>0
			lower limit	
CH2 enable disable	Enumeration of		Channel	0: Close 1: Open
	BYTE		enable/disable	1
				0: 0~10V
		Output ty		1: 0~5V
			Output type and	2: -10~10V
CH2 Output Range select	BYTE		range	3: -5~5V
				4: 1~5V
				5: 0~20mA
		-		0: 4~20mA
			In the STOP	
output hold the previous	F	C1 10	state, the output	0. Keen the more large 1. Cet
value or preset value in the	enumeration	Channel 2	remains at the	0: Keep the previous 1: Set
stopped state	OIBYIE		previous	value value
			value/preset	
CH2 default value		-	Dresets	32000-64000
	Enumeration	-	Calibration	-32000~04000
calibrate enable disable	enumeration		Calibration	0: Close 1: Open
-		-	Calibration 1	Valtaga autout
CH2 Calibration1 Analoc	INT		Calibration 1	
CU2 Calibration 1		-	Calibration 1	10^{-10} V:
Unz Calloration1	DINT		digital quantity	Digital range: 0~10000mV
CH2 Colibration 2 August		-	Calibratian 2	Digital lange: 0~04000
CH2 Calibration2 Analog			Calibration 2	0~3 V :

Parameter	Туре	Channel	Meaning	Note
			analog quantity	Analog range: 0~5000mV
CH2 Calibration2 Numerical	DINT		Calibration 2 digital quantity	Digital range: $0-64000$ - $10-10V$: Analog range: - $10000-10000mV$ Digital range: $-32000-32000$ - $5-5V$: Analog range: $-5000-5000mV$ Digital range: $-32000-32000$ 1-5V: Analog range: $0mV-32000$ 1-5V: Analog range: $0mV-5000mV$ Digital range: $12800-64000$ Current output 0-20mA: Analog range: $0-20000uA$ Digital range: $0-20000uA$ Digital range: $0-20000uA$ Digital range: $0-20000uA$ Digital range: $12800-64000$
unit display conversion enable disable	Enumeration ofBYTE		Enable/disable unit display conversion	0: Close 1: Open
CH2 UpperLimit	DINT		Unit display conversion limit	Range: -100000000~10000000 And after enabling unit
CH2 LowerLimit	DINI		Unit display conversion lower limit	conversion, (upper lower limit)>0
CH3 enable disable	Enumeration of BYTE		Channel enable/disable	0: Close 1: Open
CH3 Output Range select	BYTE	Channel 3	Output type and range	0: 0~10V 1: 0~5V 2: -10~10V 3: -5~5V 4: 1~5V 5: 0~20mA 6: 4~20mA
output hold the previous value or preset value in the stopped state	Enumeration ofBYTE		In the STOP state, the output remains at the previous value/preset value	0: Keep the previous 1: Set value value
CH3 default value			Presets	-52000~64000
calibrate enable disable	Enumeration		Calibration	0: Close 1: Open

Parameter	Туре	Channel	Meaning	Note		
	ofBYTE		enable/disable			
CH2 Collibration 1 Anol-			Calibration 1	Voltage output		
CH3 Calibration 1 Analoc			analog quantity	0~10V:		
CH3 Calibration1	DNIT		Calibration 1	Analog range: 0~10000mV		
Numerical	DINI		digital quantity	Digital range: 0~64000		
CII2 Calibration 2 Analog	INIT		Calibration 2	0~5V:		
CH3 Calibration2 Analog			analog quantity	Analog range: 0~5000mV		
				Digital range: 0~64000		
				-10~10V:		
				Analog range:		
				-10000~10000mV		
				Digital range: -32000~32000		
			-5~5V: Analog range: -5000~5000m			
				Analog range: -5000~5000mV		
				Digital range: -32000~32000		
CH3 Calibration2	DNIT		Calibration 2	1~5V:		
Numerical	DINI		digital quantity	Analog range: 0mV~5000mV		
			digital quantity Analog range: 0mV~5000mV Digital range: 12800~64000			
				Current output		
				0~20mA:		
				Analog range: 0~20000uA		
			Analog range: 0~20000uA Digital range: 0~64000 4~20mA:			
				Analog range: 0-20000uA		
				Digital range: 12800-64000		
unit display conversion	Enumeration		Enable/disable			
enable disable	ofBVTE		unit display	0: Close 1: Open		
			conversion			
			Unit display			
CH3 UpperLimit			conversion	Range: -100000000~10000000		
			limit	And after enabling unit		
			Unit display	conversion, (upper lower		
CH3 LowerLimit			conversion	limit)>0		
			lower limit			

6-3-7 Functions and Settings

■ Channel enable/disable

Enable or disable AD sampling channels to save module sampling time.

(F-E4DAModule parameters	Module	Channel 0	
EXT4DA I/O Mapping	General Settings		
Status	Channel	Parameter Setting:	Manual 🗸 🗸
	Channel Template		
formation	Channel Selection:		
	Channel 0	Channel Enable/Disable	Enable ~
	Channel 1	OutPut Type:	Voltage 🗸 🗸 🗸
	Channel 2		
	Channel 3	OutPut Range:	0V~10V ~

Settable	Enable/disable (in disable mode, subsequent software functions for the			
parameters	corresponding channel cannot be set)			
Default	Enable			
parameters				
Note	The conversion time for each channel is 60us, and the total time is equal to the			
	on/off conversion speed multiplied by the number of enabled channels, if this			
	channel is not used, it can be set to "disable" to reduce the total conversion time of			
	the module.			

■ Output type/range

Users can choose different output types and output ranges.

TF_E4DA X						
XF-E4DAModule parameters	Module		Channel 0			
EXT4DA I/O Mapping	General Settings					
Status	Channel		Parameter Setting:	Manual ~		
		Channel Template				
Information	Channel	Selection:				
			Channel Enable/Disable	Enable ~		
		Channel 1	OutPut Type:	Voltage ~		
		Channel 2				
		Channel 3	OutPut Range:	0V~10V ~		
Settable parameters The following table pullir current		ling method reflects the	adjustable parameters: voltage,			
Default parameter		Voltage				
T T 1.		0V~5V, 0V~10V, -5V~5V, -10V~10V, 1V~5V				
voltage measurement	range	Default: 0V~10V				
Current measuring ran	nge	0mA~20mA, 4mA~20mA				

■ Module power supply detection

XF-E4DAModule parameters	Module	Module general settings
XT4DA I/O Mapping	General Settings	
tatus	Channel	Power Detection Disable
	Channel Template	Uisabie
In <mark>f</mark> ormation	Channel Selection:	
	Channel 0	
	Channel 1	
	Channel 2	
	Channel 3	

- Check if the external 24V power supply of the module is normal:
- Normal: The module is running normally.
- Exception: The module channel cannot be used but can be configured, configured, and scanned normally.
- Parameters can be set: enable, disable (default is disabled).
 - STOP output

XF-E4DAModule parameters	Module	Channel 0	
EXT4DA I/O Mapping	General Settings		
Status	Channel	Parameter Setting:	Manual 🗸
	Channel Template		
Information	Channel Selection:		1001107.00
	Channel 0	Channel Enable/Disable	Enable ~
	Channel 1	OutPut Type:	Voltage ~
	Channel 2		
	Channel 3	OutPut Range:	0V~10V ~
		Stop Channel Output Status Setting Value:	Keep Previous Value V

- When the CPU unit is in STOP mode or abnormal error mode, the corresponding DA channel of the module outputs according to the set parameters.
- Parameters can be set: Keep the previous value, set the value (default to keep the previous value)
 - Calibration function



Due to the possibility of drift between the analog output converted from DA and the set digital output after the product leaves the factory or has been used for a period of time, customers can set the DA offset calibration function to immediately reflect it to the proportional scaling value (digital operation value), and can easily complete the calibration at system startup on their own.

For example, when the DA1 analog output is set to 0-10V output, and a value of 51118 is assigned to the output channel, the output voltage is 8V. When a value of 14418 is assigned to the output channel, the output voltage is 2V. At this point, set 8000mV in the analog setting of DA1 calibration 1, 51118 in the digital setting of DA1 calibration 1, 2000mV in the analog setting of DA1 calibration 2, and 14418 in the digital setting of DA1 calibration 2 to achieve the calibration function.

Unit display conversion

XF-E4DAModule parameters	Module	
	General Settings	Voltage
EXT4DA I/O Mapping		OutPut Range: 0V~10V V
Status	Channel	
	Channel Template	
Information	Channel Selection:	Stop Channel Output Status Keep Previous Value V
	Channel 0	
	Channel 1	Setting Value: 0
	Channel 2	
	Channel 3	
		DA Calibra2 - Digital 32000 DA Calibra1 - Digital 0 0 mV 10000 mV DA Calibra1 - Analog DA Calibra2 - Analog
		Unit Display Conversion Enable
		Unit Display Opper Limit: 32000
		Unit Display Lower Limit: 0

This function can directly display the output analog data as the actual output unit required by the customer. Due to the fact that customers use analog expansion module DA to output analog signals that correspond to the outputs of some instruments or sensors. For example, controlling the frequency output range of a frequency converter to be $0\sim50$ Hz, the frequency control analog signal of the frequency converter is $4\sim20$ mA. The existing DA module will output the $4\sim20$ mA analog signal to the analog acquisition terminal of the frequency converter, and the customer needs to convert the digital signal from $0\sim65535$ to $0\sim50$ Hz for the actual output frequency of the frequency converter. It is possible to automatically convert the analog output of module DA into the actual output frequency value of the frequency converter by setting the conversion value range.

7. Serial port communication module

7.1 Naming rule

	$\frac{\mathbf{X}\mathbf{F}}{1}$	$-\underline{\underline{E}}_{2}$	$\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{5}$
	Series name	XF:	XF series expansion module
1			
2	Expansion module	E:	Right expansion module
3	Channel number	1:	1 channel
		2:	2 channels
		4:	4 channels
4	Communication type	COM:	Serial port communication
		CAN:	CAN communication
5	Physical interface type	24:	232&485
		2:	232
		4:	485

7.2 Serial Communication Unit XF-E2COM24

7.2.1 Product overview

XF-E2COM24 serial communication expansion module has 2 serial channels and supports RS232 and RS485 communication (each channel can only select one of RS232 and RS485 for communication). It is compatible with XF, XSF series CPU unit products and XF series communication coupler units.

- Two independent RS232/RS485 serial communication channels.
- Supports Modbus master, slave, and free format communication.
- Channel and internal isolation to enhance anti-interference capability.
- 12mm width design.
- Module version

Hardware version	Firmware version	Function
H2.0	V2.0	Basic functions for the first official production



A PLC main unit can have up to 8 XF-E2COM24 serial port modules on the right expansion. Each remote I/O adapter, LFC3-AP or LFP3-AP, can also support up to 8 XF-E2COM24 serial port modules.

7.2.2 Module view

(1) Description of each section



No.	Name	No.	Name
1	System LED indicator light	2	Channel LED indicator light
3	Detachable terminal block	4	Buckle
5	Model indication	6	Color identification indicating module type
7	Module hardware and firmware versions	8	Wiring diagram

(2) System indicator light

System	Meaning			
indicator light				
PWR (green)	OFF	Module not powered on		
	Always ON	All power supplies for the module are normal		
RUN (green)	Always ON	The module is running normally		
	Flashing 1Hz*1	General errors in module logs *3		
	OFF	Important errors in module logs *4		
	Flashing 10Hz ^{*2}	Module establishment communication in progress		

0

*1: A square wave with a 50% duty cycle and a frequency of 1Hz.

*2: A square wave with a 50% duty cycle and a frequency of 10Hz.

*3: General error, does not affect the operation of the equipment.

• *4: Critical error, prevents the equipment from operating normally. Currently, only configuration parameter errors.

(3) Channel indicator light

Model	Channel indicator light		
XF-E2COM24	RX0 RX1	Always ON (green)	Receiving data
		OFF	Received completed or no communication
	TX0	Always ON	Sending data
	TX1	(green)	
		OFF	Sending completed or no communication

During normal communication, RX/TX alternately flashes, and the speed of flashing can indicate the communication rate.

(4) Color identification

No.	Color		Module type
1		Gray White	Digital input
2		Gray	Digital output & digital mixed module
3		Light blue	Analog input
4		Dark blue	Analog output
5		Green	RS232&485 serial port communication
6		Pink	Temperature signal input
7		White	High speed counting

7.2.3 General specifications

General specifications			
Item		Specification	
Operating temperature	Max temperature	55°C	
	Min temperature	-20°C	
Storage	Max temperature	70°C	
temperature	Min temperature	-40°C	
Environmental	Upper limit	95%	
humidity (including operation/storage)	Lower limit	10%	
Protection level		IP20	
Anti vibration		Compliant with IEC61131-2 Under intermittent vibration (frequency 5-9Hz, constant amplitude 3.5mm peak displacement) and (frequency 9-150Hz, constant	

General specifications			
Item Specification			
	acceleration 1.0g peak acceleration)		
	Under continuous intermittent vibration (frequency 5-9Hz half		
	amplitude 1.75mm displacement) and (frequency 9-150Hz		
	constant acceleration 0.5g constant frame amplitude)		
	Scan 10 times in each direction of X, Y, and Z		
	Compliant with IEC61131-2 standard		
T	Impact strength of 15G (peak) with a duration of 11ms is applied		
Impact resistance	to three mutually perpendicular axes, with 3 impacts per axis (a		
	total of 18 impacts)		
Use environment Non corrosive gas			
Use altitude	0-2000m		
Overvoltage level	II: Compliant with IEC61131-2		
Pollution level	2; Compliant with IEC61131-2		
Anti interference EMC	Compliant with IEC 61131-2 IEC61000-6-4 Type B		
Related certifications CE			

7.2.4 Technical specification

Item		Specification		
Number of ports		2		
Communication port		RS-232 and RS-485 (choose one of RS232 and RS485 for single		
		COM)		
Communication protocol		Modbus-RTU/ASCII Master/Slave/Free Format		
	communication	Half duplay		
	mode			
a	Channel	Yes		
	isolation			
communication	Baud rate	2400bps, 4800bps, 9600bps, 19200bps (Default), 38400bps,		
specifications		57600bps, 115200bps		
	Data bits	7 or 8 (Default)		
	Stop bit	1(Default) or 2		
	Check bit	Odd, even (Default), none		
Communication distance		RS-232 15m (19200bps)		
		RS-485 1200m (9600bps)		
Max number of modules		8 pcs (The right extension of the main body and the remote IO		
		adapter each support max 8 modules)		
Max number of bytes		256 bytes(Modbus) 1024 bytes(Free Format)		
Module power consumption		0.8W		

7.2.5 Installation&Wiring

7.2.5.1 Dimension diagram



Unit: mm

7.2.5.2 Terminal definition

XF-E2COM24				
Meaning	A column terminal	Terminal layout	B column terminal	Meaning
TR0—A channel terminal resistor	0		0	TR1—B channel terminal resistor
TR0—A channel terminal resistor	1		1	TR1—B channel terminal resistor
A0—RS485+ terminal	2		2	A1—RS485+ terminal
B0—RS485- terminal	3		3	B1—RS485- terminal
GND—grounding terminal	4		4	GND— grounding terminal
RX0—RS232 receive data terminal	5		5	RX1— RS232 receive data terminal
TX0—RS232 send data terminal	6		6	TX1—RS232 send data terminal
GND—grounding terminal	7		7	GND— grounding terminal
	8		8	

7.2.5.3 Installation method

(1) Installation requirements

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



(2) Installation steps



The assembly between IO modules is carried out by sliding installation through the top and bottom rails of the modules, as shown in the left figure:



The module is installed on the guide rail. When installing, align the module with the DIN rail and press the module in the direction indicated by the arrow. After installation, there is a noticeable sound of the module engaging, as shown in the left figure:



After the module installation is completed, the lock buckle will automatically move downwards for locking. If the lock buckle does not move downwards, the top of the lock buckle needs to be pressed downwards to ensure proper installation.

(3) Unstallation steps



7.2.5.4 Installation environment

This product can be installed in four positions (i.e. installation direction): horizontal direction, vertical direction, top of the electrical cabinet, and bottom of the electrical cabinet. It is recommended to install it in the horizontal direction, and the heat dissipation design is through natural convection. To ensure normal ventilation and heat dissipation and reserve sufficient wiring space, the minimum gap must be retained around this product, as shown in the following figure:



If there are high-temperature heat source equipment (heaters, transformers, large resistors, etc.) around this product, a gap of at least 100mm should be left between them.

7.2.5.5 Equipment wiring

When wiring modules, their connectors must meet the following requirements:

Adaptive wire diameter			
National standard /mm ²	American Standard /AWG		
0.3	22		
0.5	20		
0.75	18		
1.0	18		
1.5	16		

If using other types of terminal lugs, crimp them onto the stranded wire. The shape and dimensions should conform to the diagram shown below.


7.2.6 Function and settings

Channel enable

When the corresponding "channel enable" is checked, configuration is allowed. When not checked, the parameter background displays gray and configuration is not allowed. When a certain serial port channel allows configuration, the configuration data of the serial port channel are linked to each other and automatically configure the same parameters.

XE-E2COM24Module parameters	XF-E2COM24-CO	OM1 Setting	
	Channel Enal	ble	
EXT2COM24 I/O Mapping	COM Port	11	
Status	BaudRate	19200	~
Information	Parity	EVEN	~
	DataBit	8	
	520 528	0 0	
	StopBit	1	
	StopBit -XF-E2COM24-CC Channel Enal COM Port	1 DM2 Setting ble	
	XF-E2COM24-CC	DM2 Setting ble	~
	StopBit XF-E2COM24-CC Channel Enal COM Port BaudRate Parity	1 DM2 Setting 12 19200 EVEN	~
	StopBit XF-E2COM24-CC Channel Enal COM Port BaudRate Parity DataBit	1 DM2 Setting ble 12 19200 EVEN 8	~

COM port

The controller body is sorted using port numbers 1-10, and the right extension port numbers are sorted starting from 11. Dragging and deleting modules with assigned port numbers will not rearrange them.

TF_E2COM24 X	
XF-E2COM24Module parameters	XF-E2COM24-COM1 Setting
EXT2COM24 I/O Mapping	COM Port 11
Status	BaudRate 19200 V
Information	Parity EVEN ~
	DataBit 8
	StopBit 1
	- XF-E2COM24-COM2 Setting
	Channel Enable
	COM Port 12 🜲
	BaudRate 19200 V
	Parity EVEN ~
	DataBit 8
	StopBit 1

Baud rate

THE XF_EZ	COM24 X					
XF-E2COM2	24Module parameters	XF-E2COM24-CO	OM1 Setting			
EXT2COM2	4 I/O Mapping	COM Port	11			
Status		BaudRate	19200	~		
Information	n	Parity	EVEN	~		
		DataBit	8]		
		StopBit	1]		
		-XF-E2COM24-CC ✓ Channel Enat COM Port	DM2 Setting			
		BaudRate	19200	~		
		Parity	EVEN	~		
		DataBit	8]		
		StopBit	1]		
Setting range	2400bps, 4800bp	os, 9600bps,	, 19200bps	s, 38400bps	s, 57600bp	s, 115200bps
Default parameter	19200bps					

Parity

XF-E2COM24Module parameters	XF-E2COM24-COM1 Setting
EXT2COM24 I/O Mapping	COM Port 11
Status	BaudRate 19200 ~
Information	Parity EVEN ~
	DataBit 8
	StopBit 1
	XF-E2COM24-COM2 Setting
	COM Port 12
	BaudRate 19200 V
	Parity EVEN ~
	DataBit 8
	StopBit 1

Setting range	EVEN, ODD, NONE
Default parameter	EVEN

Data bit

XF-E2COM24Module parameters	XF-E2COM24-CO	DM1 Setting	
	Channel Enal	ble	
EXT2COM24 I/O Mapping	COM Port	11 🗘	
Status	BaudRate	19200	~
Information	Parity	EVEN	~
	DataBit	8	
	StopBit	1	
	Channel Enal	ble	
	COM Port BaudRate	12 🗘	~
	COM Port BaudRate Parity	12 * 19200 EVEN	~
	COM Port BaudRate Parity DataBit	12 ÷ 19200 EVEN 8	~

Setting range	7 or 8
Default parameter	8

Stop bit

XF-E2COM24	Module parameters	XF-E2COM24-COM1 Setting				
		Channel Enal	ole			
EXT2COM24	(/O Mapping	COM Port	11 ‡			
Status		BaudRate	19200	~		
Information		Parity	EVEN	~		
		DataBit	8			
		StopBit	1			
		COM Port	DM2 Setting	-		
		connone	*			
		BaudRate	19200	~		
		BaudRate Parity	19200 EVEN	~		
		BaudRate Parity DataBit	19200 EVEN 8	~		
		BaudRate Parity DataBit StopBit	19200 EVEN 8 1	~ ~		

■ Module level error code

Default parameter

1

XF-E2COM24Module parameters	Find		Filter Show all				- 🕂 Add FB for IO Chan
EVT2COM24 I/O Mapping	Variable	Mapping	Channel	Address	Туре	Unit	Description
Ext200H24 (10 Happing	- *0		ErrCode_module	%IW0	WORD		Module level error code
Status	·		ErrCode_CH	%ID1	DWORD		Channel level error code

	Module level error code (ErrCode_module)	
Bit	Meaning	Error level
0	Version error	Important
1	Hardware error	Important
2	Operation fault	Important
3	Parameter error	Important

■ Channel level error code

This function is reserved.

7.2.7 Configure the module

Right Extension Module: Double click the space for the extension module in "CPU Frame", and then double click "XF-E2COM24" in "List of input and output modules" to add the module, as shown in the following figure. Configure LF Series Remote IO: For specific configuration examples, please refer to the LF Series Remote IO User Manual.



7.2.7.1 MODBUS master station

Explanation:

As the master station, a single channel can support up to 32 slave stations for communication.

The length of data that can be communicated through an instruction channel:

Function code	Length
Read coil (01)	2000
Read input coil (02)	2000
Read register (03)	125
Read input register (04)	125
Write single coil (05)	1
Write single coil (06)	1
Write multiple coils (0F)	1968
Write multiple registers (10)	123
Read write multiple registers (17)	Read: 125
Read write multiple registers (17)	Write: 121

通道	
名称	Channel 0
访问类型	Read Coils (函数代码 1) ~
触发器 注释	Read Cols (函数代码 1) Read Discrete Inputs (函数代码 2) Read Holding Registers (函数代码 3) Read Input Registers (函数代码 4)
读寄存器 偏移 と度	Write Single Coll (函数代码 5) Write Single Register (函数代码 6) Write Multiple Colls (函数代码 15) Write Multiple Registers (函数代码 16) Read/Write Multiple Registers (函数代码 23)
^{民國}	Keep last value
写寄存器	
偏移	✓
上度	1

Double click on "CPU Frame" to enter the hardware configuration interface. You can click the checkbox button in the window to configure the protocol of the module's two serial port channels. Select "MODBUS Master" here.



When using an extended serial port as the master station, double-click on "XF_E2COM24_COM" to open the Modbus communication configuration interface. The relevant configuration interface is as follows:

SerialPort Parameters	COM port	11
	Baud rate	19200 ~
Status	Parity	even ~
Information	Data bits	8
	Stop bits	1

COM port	The serial port selected for the physical connection of the master station
Baud rate	Speed during communication
Parity	Verification method for communication frames
Data bits	The actual data bits contained in the communication frame
Stop bits	Representing the last bit of a single packet during communication

Double click on the master device "Modbus_Master_COM_Port" in the device tree to open the Modbus master communication parameter configuration window. The configuration interface is shown in the figure:

General	Modbus RTU/ASCII			Manpue
ModbusGenericSerialMaster I/O Mapping	Transmission mode	<u>● R</u> tu	<u>○ A</u> SCII	MUDBUS
ModbusGenericSerialMaster IEC	Response timeout (ms)	1000		
Objects	Time between frames (ms)	10		
Status	Auto-restart communicati	on		
Information				

Transmission mode	Choose RTU or ASCII code				
	The time interval during which the master station waits for a response from				
	the slave station. If no response is sent from the slave station during this				
Response timeout	period, the master station will request the next slave station. The value entered				
(ms)	at this point will be considered as the default value for each slave station. On				
	the slave configuration page, each slave can individually set an appropriate				
	time interval				
T ' 1 	The time interval between the master station receiving the previous response				
Time between	data frame and the next request data frame. This parameter can be used to				
Irames (ms)	adjust the data exchange rate				

After the configuration of the master station is completed, corresponding configurations need to be made for the slave stations connected to the master station.

Click on the master station device "Modbus_Saster_COM_Port" and right-click, select "Add Device...", then select the slave station device and click "Add Device". At this point, the slave station device has been added, as shown in the figure:







Double click on the Modbus_Slave_COM_Port node to open the slave configuration interface, as shown in the figure:

Device (XSF5-A32)	General	Modbus RTU/ASCII	
Network configuration Image: CPU Frame	Modbus Slave Channel	Slave address [1247]	1
III PLC Logic Application	Modbus Slave Init	Response timeout [ms]	1000
Typicate Typicate	ModbusGenericSerialSlave IEC Objects		
Task Configuration	Status		
	Information		
XF_E2COM24_COM1 (Modbus COM) Modbus_Master_COM_Port (Modbus Master, COM Port) Modbus_Slave_COM_Port (Modbus Slave, COM Port)		1	
XF_E2COM24_COM2 (Modbus COM) Modbus_Master_COM_Port_1 (Modbus Master, COM Port)			
Iight_Expansion_Module (HighExtModuleMaster) Iight_XF_E2COM24 (XF-E2COM24)			
SoftMotion General Axis Pool			

Slave address	Set the station address of the slave station, valid from 1 to 247
Derman	Set the response timeout for the slave station. If the slave station does not
time a sut (ma)	respond to the master station after this time, the master station considers that the
timeout (ms)	slave station has a communication failure.

Users can customize the Modbus communication channel of the slave station, but it must match the actual slave station hardware. After clicking "Add Channel", the system will automatically pop up the "Modbus Channel" dialog box, and users can directly select the access type, address offset, data length, and communication cycle time, as shown in the following figure:

Devices 👻 🕂 🗙	Modbus_Master_COM_Port	Modbus_Slave_COM_Port X
Devices • 4 × • 0 Device (XFF-A32) • 2 Dev	Modbus, Master_COM_Port General Modbus Slave Channel Modbus Slave Init Modbus Slave Init Modbus GenericSerialSlave IEC Objects Status Information	Modbus_Slave_COM_Port X Name Access Type Trigger READ Offset Length Error Handling WRITE Offset Length Comment Modbus Channel X Channel X Channel X Trigger Cycle Cycle time (ms) 100 Comment X READ Register Cycle time (ms) 100 Offset 0x0000 X Length 1 I QK Cancel Cancel
K >		Move Up Move Down Add Channel Delete Edit

After completing the configuration of "Add Channel", the corresponding "IO Mapping" interface will automatically appear, which contains the data involved in communication. The default setting for 'always update variables' is' use parent device settings'. Users need to set' always update variables' according to their actual needs, and can select Enable 1 or Enable 2 from the dropdown menu. As shown in the following figure:

Seneral			The show all			- Auu Fi	o tor to charmena. § 001	co mista
Modbus Slave Channel	Variable	Mapping	Channel Channel 0	Address %IW0	Type ARRAY [00] OF WORD	Unit	Description Read Holding Registers	
Modbus Slave Init	🖻 - ᡟ		Channel 0[0]	%IW0	WORD		0x0000	
	- *		Bit0	%IX0.0	BOOL			
ModbusGenericSerialSlave I/O Mapping	🐌		Bit1	%IX0.1	BOOL			
Modbus Canaric Sarial Slave IEC	- *		Bit2	%IX0.2	BOOL			
Objects	🍫		Bit3	%IX0.3	BOOL			
	···· *>		Bit4	%IX0.4	BOOL			
status	- *		Bit5	%IX0.5	BOOL			
Information	🍫		Bit6	%IX0.6	BOOL			
	🍫		Bit7	%IX0.7	BOOL			
	🏘		Bit8	%IX1.0	BOOL			
	*>		Bit9	%IX1.1	BOOL			
	**		Bit10	%IX1.2	BOOL			
	- *		Bit11	%IX1.3	BOOL			
	🍫		Bit12	%IX1.4	BOOL			
	- 🏘		Bit13	%IX1.5	BOOL			
	🏘		Bit14	%IX1.6	BOOL			
	* *		Bit15	%IX1.7	BOOL			
	- 16		Bit15	%IX1.7	BOOL			
								<u> </u>

7.2.7.2 MODBUS slave station (XINJE)

Double click on "CPU Frame" to enter the hardware configuration interface. You can click the checkbox button in the window to configure the protocol of the module's two channel serial ports. Use the first channel of the module for serial communication here, and select "MODBUS Slave (XINJE)".



After adding a slave device, double-click on the "XF_E2COM24_COM1 (XINJE Modbus COM)" node to open the configuration interface, which can switch to the Modbus Slave Communication Configuration interface. As shown in the following figure:

Devices	→ ∓ X	XF_E2COM24_COM1 X					
Untitled4	-	Modbus Com Parameter Setting	Serial port confi	guration			_
		Modbus COM I/O Mapping Modbus COM IEC Objects Status Information	Baud rate Data bits Parity Stop bits	19200 ✓ 8 ‡ Even ✓ 1 ‡	Station[1247] Mode:	1 RTU	
Right_Expansion_Mod Model XF_E2COM24 (XF SoftMotion General A	iule (HighExtModuleMäster) -E2COM24) kis Pool						
Baud rate	Speed during comm	unication					
Data bit	The actual data bits	contained in the comm	unication f	rame			
Parity	Verification method	for communication fra	ames				
Stop bit	Representing the las	st bit of a single packet	during con	nmunication	l		
Station	The station number	of this device ranges fi	rom 1 to 24	7			
Mode	MODBUS RTU						

When making Modbus RTU (XINJE) slave devices, the address range that can be accessed by the master device is defined as follows:

All coil operations (function codes 0x01, 0x02, 0x05, 0x0F) can be read and written to addresses %MB0-%MB65534;

All register operations (function codes 0x03, 0x04, 0x06, 0x10) have read-write addresses of %MW40000-%MW105534.

7.2.7.3 MODBUS slave (Other)

Double click on "CPU Frame" to enter the hardware configuration interface. You can click the checkbox button in the window to configure the protocol of the module's two channel serial ports. Use the first channel serial communication of the module here, and check "MODBUS Slave (Other)".



Double click the XF_E2COM24_COM1 (Modbus COM) node to open the configuration interface, which can switch to the Modbus slave communication configuration interface. As shown in the following figure:



COM port	The right expansion port number is sorted from 11 and cannot be modified. (Serial				
	port numbers are arranged according to the order of addition, and copying and				
	pasting modules are also arranged in order. Dragging and deleting modules with				
	assigned port numbers will not rearrange them.)				
Baud rate	The actual data bits contained in the communication frame				
Parity	Verification method for communication frames				
Data bits	Representing the last bit of a single packet during communication				
Stop bits	The station number of this device ranges from 1 to 247				
Baud rate Parity Data bits Stop bits	assigned port numbers will not rearrange them.) The actual data bits contained in the communication frame Verification method for communication frames Representing the last bit of a single packet during communication The station number of this device ranges from 1 to 247				

Click on the "Modbus_Serial_Device(Modbus Serial Device)" node in the left device tree to open the Modbus slave communication data configuration interface. As shown in the following figure:



Switch to "Modbus Serial Device I/O Mapping" in this window, and users need to set the "Bus Cycle Options" and "Always Update Variables" according to their actual needs, as shown in the following figure:

General	Find		Filter Show all		-	Add FB f	for IO Channel 😁 Go t	o Instance
Modbus Serial Device I/O Mapping	 Variable ⊥ *≱	Mapping	Channel Holding Registers	Address %IW0	Type ARRAY [09] OF WORI	Unit	Description	
Modbus Serial Device IEC Objects	±- *		Input Registers	%QW0	ARRAY [09] OF WORL	0		
Status								
oformation								
			Reset Ma	pping A	Always update variables	Use parent	device setting	
	🍫 = Create new variable	* = Ma	ap to existing variable	. L				
	Due Cude Ontena							
	DUS CYCIE UDDODS							

7.2.7.4 Free protocol

There are two configuration methods: configuration interface configuration and XJ_COMFree instruction library, and there are some differences in data processing between the two.

Double click on "CPU Frame" to enter the hardware configuration interface. You can click the checkbox button in the window to configure the protocol of the module's two channel serial ports. Use the first channel of the module for serial communication here, and select 'Free Agreement'.



8. Temperature module

8.1 Naming rule

	$\underline{\mathbf{XF}} - \underline{\mathbf{E}} \subseteq$		
	$\begin{pmatrix} 1 \end{pmatrix} \qquad \begin{pmatrix} 2 \end{pmatrix} \begin{pmatrix} 3 \end{pmatrix}$) (4) (5) (6) (7) (8)
1	Series name	XF:	XF series expansion module
2	Expansion module	E:	Right expansion module
3	Input channel	4:	4 channels
		8:	8 channels
4	Input type	RTD:	Thermal resistance
		TC:	Thermocouple
5	Output channel	Vacant:	No output
		4:	4 channels
		8:	8 channels
6	Output type	Vacant:	No output
		Y:	Digital output
		DA:	Analog output
(7)	PID control function	Vacant:	Not support PID control
		P:	Support PID control
8	Module type	Vacant:	Normal type
		Н:	Isolated between channels

8.2 Ordinary thermistor temperature acquisition unit XF-E4RTD

8.2.1 Product Overview

XF-E4RTD series ordinary thermistor temperature acquisition expansion module, 4-channel thermistor temperature acquisition, power supply DC24V, compatible with XF, XSF series CPU unit products and XF series communication coupler units.

- 4-channel thermal resistance temperature acquisition.
- Compatible with three wire and two-wire thermal resistance sensors.
- Supports PT100, PT1000, CU50, CU100, NTC-5K, NTC-10K sensor types.
- 0.1°C, 1°C resolution (optional).
- Conversion speed of 250ms/4CH, 500ms/4CH, 1000ms/4CH (optional).
- 12mm width design.
- Module version

Hardware version	Firmware version	Function
H2.0	V2.0	Basic functions for the first official production

8.2.2 Module view

(1) Description of each section



No.	Name	No.	Name
1	System LED indicator light	2	Channel LED indicator light
3	Detachable terminal block	4	Buckle
5	Model indication	6	Color identification indicating module type
7	Module hardware and firmware versions	8	Wiring diagram

(2) System indicator light

System	Meaning			
indicator light				
	OFF	Module not powered on (backplane bus)		
	Always ON	All power supplies for the module are normal (backplane bus		
PWR (green)	VR (green) power supply&external input 24V)			
	Flashing 1Hz ^{*1}	Module power supply abnormal and unable to operate normally		
		(external)		
	Always ON	The module is running normally		
	Flashing 1Hz ^{*1}	General errors in module logs		
	OFF	Important errors in module logs		
RUN (green)	Flashing	Madula establishment communication in anomas		
	10Hz*2	Module establishment communication in progress		
	Double	Madula firmunara un data		
	flashing*3			

- * 1: A square wave with a duty cycle of 50% and a frequency of 1Hz.
- * 2: A square wave with a duty cycle of 50% and a frequency of 10Hz.
- * 3: Double flashing as shown in the following figure:



(3) Channel indicator light

Model	Channel indicator		
		Always ON	The channel is enabled and configured correctly
		(green)	
XF-E4RTD	CH0~CH3	Flashing	Sensor disconnection/channel level error
		1Hz	
		OFF	Disable channel

(5) Color identification

No.	Color		Module type
1		Grey White	Digital input
2		Gray	Digital output&digital mixed module
3		Light blue	Analog input
4		Dark blue	Analog output

No.	Color		Module type
5		Green	RS232&485 serial port communication
6		Pink	Temperature signal input
7		White	High speed counting

8.2.3 General specifications

General specifications			
Item	Specification		
Protection level	IP20		
	Compliant with IEC61131-2		
	Under intermittent vibration (frequency 5-9Hz, constant amplitude		
	3.5mm peak displacement) and (frequency 9-150Hz, constant		
A anti milanati an	acceleration 1.0g peak acceleration)		
Anti vioration	Under continuous intermittent vibration (frequency 5-9Hz half		
	amplitude 1.75mm displacement) and (frequency 9-150Hz constant		
	acceleration 0.5g constant frame amplitude)		
	Scan 10 times in each direction of X, Y, and Z		
	Compliant with IEC61131-2 standard		
Import register of	Impact strength of 15G (peak) with a duration of 11ms is applied to		
Impact resistance	three mutually perpendicular axes, with 3 impacts per axis (a total		
	of 18 impacts)		
Use altitude	0-2000m		
Overvoltage level	II: Compliant with IEC61131-2		
Pollution level	2, Compliant with IEC61131-2		
Anti interference EMC	Compliant with IEC 61131-2 IEC61000-6-4 Type B		
Related certifications	СЕ		

8.2.4 Technical specification

Item		Specification		
Number of in	nput channels	4CH		
Sensor type		PT100, PT1000, CU50, CU100, NTC-5K, NTC-10K		
Temperature	input range	Pls refer to the sensor accuracy table for details		
Conversion s	speed	250ms, 500ms,1000ms optional (Default 500ms)		
Resolution		1°C, 0.1°C optional (Default0.1°C)		
Module	Rated input	DC24V±10%, 6mA		
power supply	Protection	Reverse polarity protection		
	Normal			
Accuracy	temperature	Please refer to the sensor accuracy table for details		
	25°C±5°C			
	Full temperature	Please refer to the sensor accuracy table for details		

range -20~55°C	
Indian	Channel not isolated,
Isolation	Power isolated
Module power consumption	0.7W (Backplane bus)+0.3W(External input)
Weight	82g
	200m(Only three-wire PT100, PT1000, CU50, CU100; two-wire
Maximum ashla lanath	sensors cannot measure wire resistance, while NTC sensors have
Maximum cable lengui	low sensor accuracy and cannot guarantee sampling accuracy over
	long distances

Example of channel conversion speed calculation:

If the sampling time is set to 250ms, then each channel=250ms/4 channels=62.5ms.

When channels are not disabled, sampling time=number of channels 4*62.5ms=250ms for each 4 channels.

When disabling a channel and enabling three channels, the sampling time is 3*62.5ms=187.5ms. When disabling two channels and enabling two channels, the sampling time is 2*62.5ms=125ms.

8.2.5 Sensor Accuracy Table

Туре		Temperature lower limit	temperature upper limit	Normal temperature accuracy (25°C±5°C)	Full temperature accuracy (-20~55°C)
	PT100	-200.0	850.0	±1°C	±2°C
	PT1000	-200.0	850.0	±1°C	±2°C
	CU50	-50.0	150.0	±1°C	±2°C
	CU100	-50.0	150.0	±1°C	±2°C
NTC-5K	B value:2000~6000	Resistance value: 40000Ω Calculate the temperature	Resistance value: 400Ω Calculate the temperature	±1.5°C	±3°C
NTC-10K B value: 2000~6000 Ca ter		Resistance value: 40000Ω Calculate the temperature	Resistance value: 400Ω Calculate the temperature	±1.5°C	±3°C

The above accuracy indicators are all technical indicators in °C units.

The resistance measurement range of NTC sensor is 400 Ω ~40000 Ω , the setting range of B value is 2000~6000, and the sensor label supports 5K and 10K. The temperature measurement range of NTC sensor is calculated based on the B value and sensor label setting. The temperature calculation formula is as follows:

$$T = \frac{298.15*B}{298.15*\ln(\frac{R_{L}}{R_{25}}) + B} - 273.15$$

(Refer to the method specified in 4.9 of the Chinese national standard GB/T6663.1-2007) The resistance value measured by R_L has a maximum value of 40000 Ω and a minimum value of 400 Ω . B is the B value, with a mini value of 2000 and a max value of 6000. R_{25} is the sensor label, currently supporting 5K and 10K.

For example:

The NTC sensor is NTC-5K, with a B value set to 3000, a maximum R_L value of 40000 Ω , and a minimum R_L value of 400 Ω . The lower temperature limit is calculated to be -26 °C (rounded to the nearest integer), and the upper temperature limit is calculated to be 125 °C (rounded to the nearest integer).

8.2.6 Installation&Wiring

8.2.6.1 Dimension



⁽Unit: mm)

8.2.6.2 Terminal definition and wiring

(1) Terminal definition

XF-E4RTD						
Meaning	Terminal	A-column terminal	Terminal layout	B-column terminal	Terminal	Meaning
CH0—input terminal	A0	0		0	A2	CH2— input terminal
CH0—common terminal	В0	1		1	B2	CH2— common terminal
CH0— common terminal	C0	2		2	C2	CH2— common terminal
CH1—input terminal	A1	3		3	A3	CH3— input terminal
CH1— common terminal	B1	4		4	В3	CH3— common terminal
CH1— common terminal	C1	5		5	C3	CH3— common terminal
Empty	NC	6		6	NC	Empty
Empty	NC	7		7	NC	Empty
External power supply to the module 24V power supply positive	24V	8		8	0V	External power supply to the module 24V power supply negative

(2) External wiring



8.2.6.3 Installation method

(1) Installation requirements

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



(2) Installation steps



(3) Unstallation steps



8.2.6.4 Installation environment

This product can be installed in four positions (i.e. installation direction): horizontal direction, vertical direction, top of the electrical cabinet, and bottom of the electrical cabinet. It is recommended to install it in the horizontal direction, and the heat dissipation design is through natural convection. To ensure normal ventilation and heat dissipation and reserve sufficient wiring space, the minimum gap must be retained around this product, as shown in the following figure:





8.2.6.5 Equipment wiring

When wiring modules, their connectors must meet the following requirements:

Adaptive wire diameter				
National standard /mm ²	American Standard /AWG			
0.3	22			
0.5	20			
0.75	18			
1.0	18			
1.5	16			

If using other types of terminal lugs, crimp them onto the stranded wire. The shape and dimensions should conform to the diagram shown below.



8.2.7 Configure the module

Right Extension Module: Double click the space for the extension module in "CPU Frame", and then click "XF-E4RTD" in the pop-up "Insert ontology extension module" dialog box to add the module, as shown in the following figure.

Configure LF Series Remote IO: For specific configuration examples, please refer to the LF Series Remote IO User Manual.



8.2.8 Module parameter

8.2.8.1 General setting

XF-E4RTDModule parameters	Module	Module General Setti	ngs		
EXT4RTD I/O Mapping	General Settings				
Shahua	Channel	Power Detection:	Enable	\sim	
Status	Channel Template	Sampling Period:	500ms/4CH	~	
Information	Channel Selection:	Temperature Unit:	Celsius	~	
	Channel 0	Resolution:	0.1	~ ~	C
	Channel 1		(***		
	Channel 2				
	Channel 3				

Parameter	Initial value	Explanation
Power detection	Enable	Disable /enable
		250ms/4CH
Sampling period	500ms/4CH	500ms/4CH
		1000ms/4CH
Temperature unit	°C	°C/°F
Desclution	0.190	1°C/1°F
Resolution	0.1 C	0.1°C/0.1°F

8.2.8.2 Channel template

XF-E4RTDModule parameters	Module	Channel Template		
EXT4RTD I/O Mapping	General Settings			
Status	Channel	Channel Enable	Enable	\sim
	Channel Template	Sensor Type:	PT 100	~
Information	Channel Selection:	Filtering Method:	First-order Filtering	~
	Channel 0	Filtering Parameters:	0	
	Channel 1			
	Channel 2	NTC Material Constant B Value:	3950	
	Channel 3	Sensor disconnection Detection:	Disable	~
		Overflow and Underflow Detection:	Disable	\sim

Parameter	Initial value	Explanation	
Channel enable	Enable	Disable /enable	
Sensor type	PT100	PT100/PT1000/CU50/CU100/NTC-5K/NTC-10K	
	First order	First order filtering/time averaging/frequency	
Filtering method	filtering	averaging/moving average	
		First order filtering (0~254) defaults to 0	
Filtering parameter	0	Time average (250~60000ms) default value 1000	
		Average frequency (4~500) default 4	

Parameter	Initial value	Explanation
		Moving average (2~500) default 2
NTC matanial assistant		2000~6000
NTC material constant	3950	When the "Sensor Type" is "NTC-5K" or "NTC-10K", it can
B value		be inputted
Sensor disconnection	Disable	Dischle/Enchle
detection	Disable	Disable/Enable
Overflow and	Disable	Dischle/Ershle
underflow detection	Disable	Disable/Enable

Channel filtering parameters				
First order filtering	Functional action Setting	The first-order low-pass filtering method weights the current sampling value with the previous filtering output value to obtain the effective filtering value; The filtering coefficient is set by the user to $0\sim254$. The smaller the value, the more stable the data is, but it may cause data lag; Therefore, when set to 1, the filtering effect is the strongest and the data is the most stable; When set to 254, the filtering effect is the weakest; 0 is unfiltered. $0\sim254$ (default value 0)		
Time average	Functional action Setting range	Perform A/D conversion according to the set time, and average the total value after removing the maximum and minimum values. The average processed value is stored in the corresponding output to the buffer memory. The number of processing times within the set time varies according to the number of channels allowed for A/D conversion. The larger the value, the stronger the filtering effect. 250~60000ms (default 1000)		
Count average	Functional action Setting range	Perform A/D conversion according to the set number of times, and average the total value after removing the maximum and minimum values. The average processed value is stored in the corresponding channel variable. The average value of the number of times stored in the corresponding channel variable varies depending on the number of channels allowed for A/D conversion. The larger the value, the stronger the filtering effect. 4~500 (default value 4)		
Moving average	Functional action Setting	After averaging the specified number of digital output values obtained in each sampling period, store them in the corresponding output register/variable. Due to the use of moving average processing in each sampling process, the latest digital output value can be obtained. The larger the value, the stronger the filtering effect. 2~500 (default value 2)		
	range			



Calculate the number of measurement input values to be averaged when using 'time averaging' according to the following formula.

The average number of measured input values processed=average time ÷ sampling period

Discard the numerical value after the decimal point in the calculation result. When the calculated quantity is less than or equal to 1, it is not filtered.

8.2.8.3 Channel selection

XI -EARIDHOUGHE parameters	Module	Channel 0	
EXT4RTD I/O Mapping	General Settings		21 21
Status	Channel	Channel Settings	From Template 🗸 🗸
	Channel Template		
Information	Channel Selection:		
	Channel 0	Channel Enable	Enable
	Channel 1	Sensor Type:	PT100 ~
	Channel 2	Filtering Method:	First-order Filtering 🔗
	Channel 3	Filtering Parameters:	0
		NTC Material Constant B Values	2050
		Wite Material Constant D value.	3930
		Sensor disconnection Detection:	Disable
		Overflow and Underflow Detection:	Disable
XF-E4RTDModule parameters	Modul e	Channel 0	
XF-E4RTDModule parameters	Module General Settings	Channel 0	
XF-E4RTDModule parameters EXT4RTD I/O Mapping	Module General Settings	Channel 0	Marcal and
XF-E4RTDModule parameters EXT4RTD I/O Mapping Status	Module General Settings Channel	Channel 0 Channel Settings	Manual
XF-E4RTDModule parameters EXT4RTD I/O Mapping Status Information	Module General Settings Channel Channel Template	Channel 0 Channel Settings	Manual
XF-E4RTDModule parameters EXT4RTD I/O Mapping Status Information	Module General Settings Channel Channel Template Channel Selection:	Channel 0 Channel Settings Channel Enable	Manual V Enable V
XF-E4RTDModule parameters EXT4RTD I/O Mapping Status Information	Module General Settings Channel Channel Template Channel Selection: Channel 0 Channel 1	Channel 0 Channel Settings Channel Enable Sensor Type:	Manual V Enable V PT100 V
XF-E4RTDModule parameters EXT4RTD I/O Mapping Status Information	Module General Settings Channel Channel Template Channel Selection: Channel 0 Channel 1 Channel 2	Channel 0 Channel Settings Channel Enable Sensor Type: Ellering Method:	Manual V Enable V PT100 V
XF-E4RTDModule parameters EXT4RTD I/O Mapping Status Information	Module General Settings Channel Channel Template Channel Selection: Channel 0 Channel 1 Channel 2 Channel 3	Channel 0 Channel Settings Channel Enable Sensor Type: Filtering Method:	Manual V Enable V PT 100 V First-order Filtering V
XF-E4RTDModule parameters EXT4RTD I/O Mapping Status Information	Module General Settings Channel Channel Template Channel Selection: Channel 0 Channel 1 Channel 2 Channel 3	Channel 0 Channel Settings Channel Enable Sensor Type: Filtering Method: Filtering Parameters:	Manual V Enable V PT 100 V First-order Filtering V 0
XF-E4RTDModule parameters EXT4RTD I/O Mapping Status Information	Module General Settings Channel Channel Template Channel Selection: Channel 0 Channel 1 Channel 2 Channel 3	Channel 0 Channel Settings Channel Enable Sensor Type: Filtering Method: Filtering Parameters: NTC Material Constant B Value:	Manual V Enable V PT 100 V First-order Filtering V 0 3950
XF-E4RTDModule parameters EXT4RTD I/O Mapping Status Information	Module General Settings Channel Channel Template Channel Selection: Channel 0 Channel 1 Channel 2 Channel 3	Channel 0 Channel Settings Channel Enable Sensor Type: Filtering Method: Filtering Parameters: NTC Material Constant B Value: Sensor disconnection Detection:	Manual V Enable V PT 100 V First-order Filtering V 0 3950 Disable V

Parameters such as whether to enable, sensor type, filtering method, etc. can be set separately for each channel.

Channel astting	From Template: Use the parameters from "Channel Template" Interface			
Channel setting	Manual: Use the configuration parameters below this interface			

8.2.9 I/O mapping

XF-E4RTDModule parameters	Find		Filter Show all				 Add FB for IO Channe
EXT4RTD I/O Mapping	Variable	Mapping	Channel CH0_PV	Address %ID0	Type REAL	Unit	Description Channel 0 input value
Status	- *0		CH1_PV	%ID1	REAL		Channel 1 input value
			CH2_PV	%ID2	REAL		Channel 2 input value
Information			CH3_PV	%ID3	REAL		Channel 3 input value
	🏘		ErrCode_module	%IW8	WORD		Module level error code
	· · · · · · · · · · · · · · · · · ·		ErrCode_CH	%ID5	DWORD		Channel level error code

	Display the temperature values of each of the four channels, with units and
Channel input value	resolutions specified in the "Module Parameters" - "General Settings"
	section for temperature units and resolutions
Module level error code	See the table below
Channel level error code	See the table below

Module level error code (ErrCode_module)					
Bit location	Meaning Error level				
0	The 24V input power supply of the module is abnormal	Important			
2	An internal module error has occurred and the user layer is unable to repair it	Important			
3	Version mismatch	Important			
4	ADC read/write failure	Important			

Channel level error code (EErrCode_CH)				
Bit location	Meaning	Error level		
0	Channel 0 upper limit overflow	General		
1	Channel 0 lower limit overflow	General		
2	Channel 0 disconnected	General		
3	Reserved	-		
4	Channel 1 upper limit overflow	General		
5	Channel 1 lower limit overflow	General		
6	Channel 1 disconnected	General		
7	Reserved	-		
8	Channel 2 upper limit overflow	General		
9	Channel 2 lower limit overflow	General		
10	Channel 2 disconnected	General		
11	Reserved	-		
12	Channel 3 upper limit overflow	General		
13	Channel 3 lower limit overflow	General		
14	Channel 3 disconnected	General		
15	Reserved	-		

8.3 Thermocouple temperature acquisition module

XF-E4TC

8.3.1 Product overview

XF-E4TC series thermocouple temperature acquisition expansion module, 4-channel thermocouple temperature acquisition, suitable for pure acquisition scenarios, no output channel, power supply DC24V, compatible with XSF series CPU unit and XF series communication coupler units.

- 4-channel thermocouple temperature acquisition.
- Supports K, S, E, N, B, T, J, and R sensor types.
- Support -100mV~100mV voltage acquisition.
- 0.1°C, 1°C resolution (optional).
- Conversion speed of 250ms/4CH, 500ms/4CH, 1000ms/4CH (optional).
- Designed with a width of 12mm.
- Module version

Hardware	Firmware	Function
H2.0	V2.0	First official production of basic functions

8.3.2 Module view

(1) Explanation of each section



No.	Name	No.	Name
1	System LED indicator light	2	Channel LED indicator light
3	Detachable terminal block	4	Buckle

No.	Name	No.	Name
5	Model indication	6	Color identification indicating module type
7	Module hardware and firmware versions	8	Wiring diagram

(2) System indicator light

System	Meaning				
indicator					
light					
	OFF	Module not powered on (backplane bus)			
	Awlays ON	All power supplies for the module are normal (backplane			
Pwk (green)		bus power supply&external input 24V)			
	Flashing	Module power supply abnormal and unable to operate			
	$1 Hz^{*1}$	normally (external)			
	Always ON	The module is running normally			
	Flashing	General errors in module logs			
RUN	OFF	Important errors in module logs			
(green)	Flashing				
(8)	10Hz*2	Module establishment communication in progress			
	Double	Madula firmanana undata			
	flashing*3				



- * 1: A square wave with a duty cycle of 50% and a frequency of 1Hz.
 - * 2: A square wave with a duty cycle of 50% and a frequency of 10Hz.
- * 3: Double flashing as shown in the following figure:



(3) Channel indicator light

Model	Channel indicator light				
		Awlays	The channel is enabled and configured correctly		
	ON				
XF-E4TC	CH0~CH3	(green)			
		Flashing	Sensor disconnection/channel level error		
		1Hz			

Model	Channel indicator light			
		OFF	Disable channel	

(4) Color identification

No.	Color		Module type	
1		Grey white	Digital input	
2		Gray	Digital output&digital mixing module	
3		Light blue	Analog input	
4		Deep blue	Analog output	
5		Green	RS232&485 serial port communication	
6		Pink	Temperature signal input	
7		White	High speed counting	

8.3.3 General specification

General specification					
Item	Specification				
Protection level	IP20				
	Under the requirements of IEC 61131-2.				
	For intermittent vibration:				
	- Frequency from 5-9 Hz with a constant amplitude of 3.5 mm peak				
	displacement				
	- Frequency from 9-150 Hz with a constant acceleration of 1.0g				
A uti wilanti au	peak acceleration				
Anu-vioration	For continuous vibration:				
	- Frequency from 5-9 Hz with a half amplitude of 1.75 mm				
	displacement				
	- Frequency from 9-150 Hz with a constant acceleration of 0.5g				
	constant frame amplitude				
	Scanning is performed 10 times in each direction: X, Y, and Z.				
	Compliant with IEC 61131-2 standards;				
Internet acceleton of	Shock intensity of 15g (peak) with a duration of 11ms is applied to				
Impact resistance	each of the three mutually perpendicular axes. Each axis is				
	subjected to 3 shocks, totaling 18 shocks.				
Using altitude	0-2000m				
Usage environment	Non corrosive gas				
Overvoltage level	II: Compliant with IEC61131-2				
Pollution level	2; Compliant with IEC61131-2				
EMC	Compliant with IEC 61131-2 IEC61000-6-4 B type				
Certificate	СЕ				

8.3.4 Technical specification

Item		Specification		
Input channe	els	4CH		
Sancantuna		Thermocouple: K, S, E, N, B, T, J, R		
Sensor type		Voltage:	-100mV~100mV	
		К	-200.0°C~1300.0°C	
		S	-50.0°C~1768.0°C	
Analaa		Е	-200.0°C~1000.0°C	
Analog	Thermonourle	Ν	-200.0°C~1300.0°C	
mput	Thermocoupie	В	250.0°C~1820.0°C	
(rated)		Т	-200.0°C~400.0°C	
(lateu)		J	-210.0°C~1200.0°C	
		R	-50.0°C~1768.0°C	
	Voltage	-100mV	~100mV (-32000~32000)	
Conversion speed		250ms, 5	500ms, 1000ms optional (default 500ms)	
Desclution	Thermocouple	1°C, 0.1°C optional (default 0.1°C)		
Resolution	Voltage	1/64000		
Module	Rated input	DC24V±	=10%, 6 mA	
power supply	Protection	Reverse	connection protection	
	normal atmospheric temperature 25°C±5°C	Please re	efer to the sensor accuracy table for details.	
Accuracy	Full temperature range -20~55°C	Please refer to the sensor accuracy table for details.		
Repeatabilit	у	±0.05%		
Caldandaa	man and the state of	Built in o	cold end sensor, external cold end	
	Inpensation method	compens	ation, fixed value compensation	
Cold end co	mpensation accuracy	Please re	efer to the cold end accuracy table for details	
Isolation		Channel	non isolated, power isolated	
Module power consumption		0.7W (backplane bus) +0.3W (external input)		
Module wei	ght	82g		
Maximum c	able length	50m		

Example of channel conversion speed calculation:

If the sampling time is set to 250ms, then each channel=250ms/4 channels = 62.5ms. When channels are not disabled, sampling time=number of channels 4 * 62.5ms=250ms/4 channels. When disabling a channel, such as disabling one channel and enabling three channels, the sampling time is 3 * 62.5ms=187.5ms; Disable 2 channels, and enable 2 channels with a sampling time of 2 * 62.5ms=125ms.



If the "external compensation channel" method is selected for the "cold end compensation method", the sampling time of the module will be increased by one channel.

If the sampling time is set to 250ms, the channel is not disabled, and the "external compensation channel" method is selected for the "cold end compensation method", then the actual sampling time of the module is 250+250/4=312.5ms.

8.3.5 Sensor accuracy table

Accuracy standards

			Room	Full
Trees	Lower limit temperature	Unner limit temperature	temperature	temperature
Type		Opper mint temperature	accuracy	range accuracy
			(25°C±5°C)	(-20~55°C)
Κ	-200.0°C	1300.0°C	±1.5°C	±3°C
S	-50.0°C	1768.0°C	±2°C	±4°C
Е	-200.0°C	1000.0°C	±1°C	±2°C
Ν	-200.0°C	1300.0°C	±1.5°C	±3°C
D	250.0°C	799.9°C	±4°C	±5°C
В	800.0°C	1820.0°C	±2°C	±4°C
Т	-200.0°C	400.0°C	±1°C	±2°C
J	-210.0°C	1200.0°C	±1°C	±2°C
R	-50.0°C	1768.0°C	±2°C	±4°C
100	-32000 (Numbers are	32000 (Numbers are		
-100mv /+100mv	only integers, decimals	only integers, decimals	$\pm 0.1\%$	$\pm 0.2\%$
	are 0)	are 0)		

Built in cold end compensation accuracy

		Built in sensor cold e	Built in sensor cold end compensation accuracy			
Installation direction	Adjacent module types	T-type above 90°C J, E, K, N above -100°C R, S above 200°C Above 400°C for B type	T-type below -90°C J, E, K, N below -100°C R, S below 200°C B-type does not guarantee accuracy below 400°C			
Horizontal	Temperature module	±1.5	±3.0			
upright installation	Non temperature module	±4.0	±7.0			
Non horizontal	Temperature module	±4.0	±7.0			
upright installation	Non temperature module	±4.0	±7.0			

External cold end channel compensation accuracy: $\pm 1.5^{\circ}$ C.

Comprehensive accuracy=channel conversion accuracy+cold end compensation accuracy

Explanation: The above accuracy indicators are all technical indicators in °C units.

8.3.6 Installation and wiring

8.3.6.1 Appearance dimension diagram



(Unit: mm)

8.3.6.2 Terminal definition and wiring

(1) Terminal definition

XF-E4TC						
Meaning	Terminal	A-column terminal	Terminal layout	B-column terminal	Terminal	Meaning
Cold end compensation -A	CJ-A	0		0	CJ-B	Cold end compensation -B
Vacant	NC	1		1	NC	Vacant
CH0-input terminal	TC0+	2		2	TC2+	CH2- input terminal
CH0-common terminal	TC0-	3		3	TC2-	CH2- common terminal
CH1- input terminal	TC1+	4		4	TC3+	CH3- input terminal
CH1- common terminal	TC1-	5		5	TC3-	CH3- common terminal
Vacant	NC	6		6	NC	Vacant
Vacant	NC	7		7	NC	Vacant
External power supply to the module 24V+	24V	8		8	0V	External power supply to the module 24V-

(2) External wiring


(1) System LED (2) Channel LED (3) Backplane bus (4) Output channel&wiring

8.3.6.3 Installation method

(1) Installation requirements

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



(2) Installation steps



(3) Unstallation steps



8.3.6.4 Installation environment

This product can be installed in four positions (i.e. installation direction): horizontal direction, vertical direction, top of the electrical cabinet, and bottom of the electrical cabinet. It is recommended to install it in the horizontal direction, and the heat dissipation design is through natural convection. To ensure normal ventilation and heat dissipation and reserve sufficient wiring space, the minimum gap must be retained around this product, as shown in the following figure:





If there are high-temperature heat source equipment (heaters, transformers, large resistors, etc.) around this product, a gap of at least 100mm should be left between them.

8.3.6.5 Equipment wiring

When wiring modules, their connectors must meet the following requirements:

Adaptive wire diameter					
National standard /mm ²	American Standard /AWG				
0.3	22				
0.5	20				
0.75	18				
1.0	18				
1.5	16				

If using other types of terminal lugs, crimp them onto the stranded wire. The shape and dimensions should conform to the diagram shown below.



8.3.7 Module configuration

Right Extension Module: Double click the space for the extension module in "CPU Frame", and then click "XF-E4TC" in the pop-up "Insert ontology extension module" dialog box to add the module, as shown in the following figure.

Configure LF Series Remote IO: For specific configuration examples, please refer to the LF Series Remote IO User Manual.



8.3.8 Module parameters

8.3.8.1 General setting

XF-E4TCModule parameters	Module	Module General Settings		
EXT4TC I/O Mapping	General Settings			
Statue	Channel	Power Detection:	Enable	~
510103	Channel Template	Sampling Period:	500ms/4CH	~
Information	Channel Selection:	Temperature Unit:	Centigrade	~
	Channel 0	Resolution:	0.1	~ °C
	Channel 1			
	Channel 2	Cold Junction Compensation Method:	Built in temperature	~
	Channel 3	Fixed Compensation Temperature	250	×0.1°C

Parameter	Initial value	Explanation
Power detection	Enable	Disable/Enable
		250ms/4CH
Sampling period	500ms/4CH	500ms/4CH
		1000ms/4CH
Tommonoturo unit	°C	°C
Temperature unit	C	°F
Desolution	0.1%	1°C/1°F
Resolution	0.1 C	0.1°C/0.1°F
Coldiumation	Dwilt in	Built in temperature sensor
cold junction	Built in	External compensation channel
compensation method	temperature sensor	Fixed value compensation
Fixed common setion		Fixed value compensation temperature
Fixed compensation	250 (25.0°C)	Unit: 0.1°C
temperature		Range: -145.0°C~155.0°C

■ Cold end compensation method&fixed value compensation temperature

Thermocouples consist of two wires made from different metals or metal alloys, with the ends of the wires welded together at one end, known as the measuring junction, and the other ends are open, referred to as the reference junction (or cold junction). A thermoelectric voltage appears at the measuring junction, which is dependent on the temperature there. By measuring this thermoelectric voltage, the temperature at the measuring junction can be determined. When measuring temperature with a thermocouple, it is important to keep the temperature of the cold junction constant so that the resulting thermoelectric voltage maintains a proportional relationship with the measured temperature. If the ambient temperature of the cold junction changes during measurement, it will significantly affect the accuracy. Therefore, when using a thermocouple for temperature measurement, cold junction compensation is typically required. The module provides three methods for cold junction compensation: "built-in temperature sensor," "external compensation channel," and "fixed value compensation."

• "Built-in temperature sensor" cold junction compensation uses the temperature collected by the module's built-in cold junction sensor. This requires directly connecting the thermocouple to the module or connecting it through compensation wires.



 "External compensation channel" requires using an additional thermistor (NTC10K, B3950) connected to the module's A0 and B0 terminals to detect the cold junction temperature for compensation.



"Fixed value compensation" uses a preset "fixed compensation temperature" for the cold junction, with a default of 250 (25.0°C). The setting range is -1450 to 1550 (in 0.1°C units). It's important to ensure that the "fixed compensation temperature" matches the actual temperature at the cold junction location. To further improve accuracy, you can use a thermostat as shown in the diagram and set the "fixed compensation temperature" to match the thermostat's temperature.



间极达规				
索引:子索引	名称	标志	数值	通讯错误信息
#xB001:00	Module	rv	>6<	
-01	Basic_PowerDiagnostics	TW		通信未建立
-02	Basic_AcquisitionCycle	IW		通信未建立
-03	Basic_TemperatureUnit	rv		通信未建立
-04	Basic ResolutionRatio	rv		通信未建立
-08	Basic_ColdJunctionCompensation	IA		通信未建立
-09	Basic_FixedCompensationTemperation	TA		通信未建立
#x8002:00	Channal 0	rv	>6<	
#x8003:00	Channal 1	rw	>6<	
#x8004:00	Channal 2	IW	>6<	
#x8005:00	Channal 3	IA	>6<	
± #x9000:00	Information of E4TC	ro	>17<	

8.3.8.2 Channel template

XF-E4TCModule parameters	Module	Channel Template	
EXT4TC I/O Mapping	General Settings		
Status	Channel	Channel Enable	Enable ~
Status	Channel Template	Sensor Type:	Type K 🗸 🗸 🗸
Information	Channel Selection:	Filtering Mode:	First Order Filtering V
	Channel 0	Filtering Parameters:	0
	Channel 1		× .
	Channel 2	Sensor disconnection Detection:	Disable \vee
	Channel 3	Overflow/Underflow Detection:	Disable 🗸 🗸

Parameter	Initial value	Explanation
Channel enable	Enable	Enable/disable
		Thermocouples: K-type, S-type, E-type, N-type, B-type, T-type,
Sensor type	Туре К	J-type, R-type
		Voltage: -100mv/+100mv
Filtanin a mada	First order	First order filtering/time averaging/frequency
Filtering mode	filtering	averaging/moving average
		First order filtering (0~254) defaults to 0
Filtering parameters	0	Time average (250~60000ms) default value 1000
Pritering parameters		Average frequency (4~500) default 4
		Moving average (2~500) default 2
Sensor		
disconnection	Disable	Enable/disable
detection		
Overflow/underflow	Disable	Enable/disable
detection	DISAULE	

■ Channel filtering parameters

• First order filtering

The first-order low-pass filter method uses a weighted combination of the current sample value and the previous filtered output value to obtain an effective filtered value. The filter coefficient is user-defined, ranging from 0 to 254. A smaller value results in more stable data but may cause data lag. Therefore, setting it to 1 provides the strongest filtering effect and most stable data, while setting it to 254 gives the weakest filtering effect. A setting of 0 means no filtering.

• Average filtering

Paramter		Explanation
Time average	Functional action Setting	Perform A/D conversion according to the set time, and average the total value after removing the maximum and minimum values. The average processed value is stored in the corresponding output to the buffer memory. The number of processing times within the set time varies according to the number of channels allowed for A/D conversion. The larger the value, the stronger the filtering effect. 250~60000ms (default 1000)
	range	
Count average	Functional action Setting range	Perform A/D conversion according to the set number of times, and average the total value after removing the maximum and minimum values. The average processed value is stored in the corresponding channel variable. The average value of the number of times stored in the corresponding channel variable varies depending on the number of channels allowed for A/D conversion. The larger the value, the stronger the filtering effect. 4~500 (default value 4)
Moving average	Functional action Setting range	After averaging the specified number of digital output values obtained in each sampling period, store them in the corresponding output register/variable. Due to the use of moving average processing in each sampling process, the latest digital output value can be obtained. The larger the value, the stronger the filtering effect. 2~500 (default value 2)



Calculate the number of measurement input values to be averaged when using 'time averaging' according to the following formula.

The average number of measured input values processed=average time ÷ sampling period

Discard the numerical value after the decimal point in the calculation result. When

the calculated quantity is less than or equal to 1, it is not filtered.

■ Overflow/underflow setting

When the channel sampling exceeds the sensor's upper limit or falls below the sensor's lower limit, it triggers an alarm log and outputs a preset value. If it exceeds the upper limit, the upper limit value is displayed; if it falls below the lower limit, the lower limit value is displayed.

XF-E4TCModule parameters	Module	Channel 0		
EXTATC I/O Mapping	General Settings			
Extend for Mapping		Channel Settings	From Tomoloto	
Status	Channel Chanal Tamalata	Chainer Settings	From Template	~
Information				
	Channel Selection:	Channel Enable	Enable	~
	Channel 0			
	Channel 1	Sensor Type:	Туре К	~
	Channel 2	Filtering Mode:	First Order Filtering	
	Channel 3	Filtering Parameters:	0	
		Sensor disconnection Detection:	Disable	\sim
		Overflow/Underflow Detection:	Disable	\sim
XF-E4TCModule parameters	Module	Channel 0		
	General Settings	chanter o		
EXT4TC I/O Mapping				
Status	Channel	Channel Settings	Manual ~	
	Channel Template			
Information	Channel Selection:	Channel Enable	- H	
	Channel 0		Enable	
	Channel 1	Sensor Type:	Туре К 🗸 🗸	
	Channel 2	Filtering Mode:	First Order Filtering 🗸	•
	Channel 3	Filtering Parameters:	0	1
		Sensor disconnection Detection:	Disable 🗸 🗸	8

8.3.8.3 Channel selection

Parameters such as whether to enable, sensor type, filtering method, etc. can be set separately for each channel.

	From Template: Configuring Parameters Using the "Channel Template"
Channel setting	Interface
	Manual: Use the configuration parameters below this interface

8.3.9 I/O mapping

XF-E4TCModule parameters	Find		Filter Show all				 Add FB for IO Channel
EXT4TC I/O Mapping	Variable	Mapping	Channel CH0_PV	Address %ID0	Type REAL	Unit	Description Channel 0 input value
Status	- *>		CH1_PV	%ID1	REAL		Channel 1 input value
	*		CH2_PV	%ID2	REAL		Channel 2 input value
Information	*		CH3_PV	%ID3	REAL		Channel 3 input value
	* •		ErrCode_module	%IW8	WORD		Module level error code
	- ×		ErrCode CH	%ID5	DWORD		Channel level error code

Channel input value	Display the temperature values of each of the four channels, with units and
	resolutions specified in the Module Parameters - General Settings
Module level error	See the table below
code	
Channel level error	See the table below
code	

Module level error code (ErrCode_module)			
Bit	Meaning	Error level	
0	The 24V input power supply of the module is	Important	
	abnormal	1	
2	An internal module error has occurred and the	Important	
Z	user layer is unable to repair it		
3	Version mismatch	Important	
4	ADC read/write failure	Important	
5	Cold end sensor disconnected	Important	

Channel level error code (EErrCode_CH)				
Bit	Meaning	Error level		
0	Channel 0 upper limit overflow	General		
1	Channel 0 lower limit overflow	General		
2	Channel 0 disconnected	General		
3	Reserved	-		
4	Channel 1 upper limit overflow	General		
5	Channel 1 lower limit overflow	General		
6	Channel 1 disconnected	General		
7	Reserved	-		
8	Channel 2 upper limit overflow	General		
9	Channel 2 lower limit overflow	General		
10	Channel 2 disconnected	General		
11	Reserved	-		
12	Channel 3 upper limit overflow	General		
13	Channel 3 lower limit overflow	General		
14	Channel 3 disconnected	General		

Channel level error code (EErrCode_CH)			
Bit	Meaning	Error level	
15	Reserved	-	

9. High speed counting module

9.1 Naming rule

$\frac{\mathbf{XF}}{1} - \frac{\mathbf{E}}{2} \bigcirc \mathbf{I} \bigcirc \mathbf{I} \bigcirc \mathbf{I} $				
1	Series	XF:	XF series expansion module	
2	Expansion module	E:	Right expansion module	
3	Input channel	1:	1 channel	
		2:	2 channels	
		4:	4 channels	
4	Output type	HSC:	High speed counting	
		HSP:	High speed pulse output	

9.2 High speed counting module XF-E1HSC

9.2.1 Product overview

XF-E1HSC high-speed counting expansion module, power supply DC24V, compatible with XSF series CPU unit products and LF series communication coupler units.

- The module supports encoder single ended input (bipolar) or differential input (A\B\Z) for one channel.
- Differential input supports up to 2MHz (1×frequency), single ended input supports up to 200KHz (1×frequency).
- Channel mode supports single-phase, pulse+direction, A/B/Z phase, CW/CCW mode.
- A/B phase supports 1/2/4 frequency doubling.
- The module supports frequency measurement function.
- Support pulse width measurement function.
- Supports two channels of high-speed (high response) inputs X0 and X1, and supports probe function.
- Support 4-channel high-speed (high response) output Y0, Y1, Y2, Y3, and support comparison output (snapshot) function.
- Designed with a width of 12mm.
- Module version

Hardware	Firmware	Function
version	version	
H2.0	V2.0	First official production of basic functions

9.2.2 Module View

(1) Each part description

	(1) (2) (3)		(1) (5) (6) (7) (8)
No.	Name	No.	Name
1	System LED indicator light	2	Channel LED indicator light
3	Detachable terminal block	4	Buckle
5	Model indication	6	Color identification indicating module type
7	Module hardware and firmware versions	8	Wiring diagram

(2) System indicator light

System	Meaning			
indicator				
light				
	OFF	Module not powered on (backplane bus)		
DWD	Always ON	All power supplies for the module are normal (backplane		
FWK		bus power supply&external input 24V)		
(green)	Flashing	Module power supply abnormal and unable to operate		
	$1 Hz^{*1}$	normally (external)		
	Always ON	The module is running normally		
	Flashing	General errors in module logs		
	$1 Hz^{*1}$	General errors in module logs		
DIN	OFF	Important errors in module logs		
KUN	Flashing			
(green)	10Hz*2	Module establishment communication in progress		
	Flashing *3	Module heartbeat detection in progress		
	Double	Madala formana and the		
	flashing ^{*4}			

0

* 1: A square wave with a duty cycle of 50% and a frequency of 1Hz.

- * 2: A square wave with a duty cycle of 50% and a frequency of 10Hz.
- * 3: Indicator light flashing specification: ON: 0.2s OFF: 1.8s
- * 4: Double flashing as shown in the following figure:



(3) Channel indicator light

Model	Channel indicator light			
		Always ON	The corresponding input channel	
		(green)	has an input ON signal	
	A, D, Z	OFF	Corresponding input channel has	
			no input ON signal	
		Always ON	The corresponding input channel	
VE EIUSC	X0, X1	(green)	has an input ON signal	
AF-EIHSC		OFF	Corresponding input channel has	
			no input ON signal	
	Y0, Y1, Y2, Y3	Always ON	The corresponding output channel	
		(green)	has an ON signal output	
		OFF	The corresponding output channel	
			has no output ON signal	

(4) Color identification

No.	Color		Module type	
1		Grey white	Digital input	
2		Grey	Digital output&digital mixing module	
3		Light blue	Analog input	
4		Deep blue	Analog output	
5		Green	RS232&485 serial port communication	
6		Pink	Temperature signal input	
7		White	High speed counting	

9.2.3 General specification

General specification				
Item		Specification		
Operation	maximum temperature	55°C		
temperature	Minimum temperature	-20°C		
Transportation/storage	maximum temperature	70°C		
temperature	Minimum temperature	-40°C		
Environmental	Upper limit	95%		
humidity (including operation/storage)	Lower limit	10%		
Protection level		IP20		
		Conforming to IEC 61131-2:		
		Under intermittent vibration:		
		- Frequency 5-9 Hz with a constant amplitude of		
		3.5mm peak displacement		
		- Frequency 9-150 Hz with a constant acceleration of		
Anti-vibration		1.0g peak acceleration		
Anti-vibration		Under continuous vibration:		
		- Frequency 5-9 Hz with a half amplitude of 1.75mm		
		displacement		
		- Frequency 9-150 Hz with a constant acceleration of		
		0.5g constant frame amplitude		
		Each direction (X, Y, Z) is scanned 10 times.		
		Conforming to IEC 61131-2:		
		Shock intensity of 15G (peak) with a duration of 11ms		
Impact resistance		is applied to each of the three mutually perpendicular		
		axes. Each axis is subjected to 3 shocks, making a total		
		of 18 shocks.		
Usage environment		Non corrosive gas		
Using altitude		0-2000m		
Overvoltage level		II: conforming to IEC61131-2		
Pollution level		2; conforming to IEC61131-2		
EMC		Conforming to IEC 61131-2 IEC61000-6-4 B type		
Certificate		CE		

9.2.4 Technical specification

	Item	Specification
	Counter	A, B, Z
	Туре	Support single ended input or differential input
	High speed counting	2 channels (X0 X1)
Innut	channel	
input	Input type	NPN&PNP
specification	Rated input voltage	24VDC
	Rated input current	6mA
	Input ON current	Above 2.5mA
	Input OFF current	Below 1mA
	Output type	NPN
	Control circuit voltage	DC24V(DC21.6V~26.4V)
Output	Rated load current	0.5A/1 point 1A/module
specification	ON response time	lus
	OFF response time	lus
	Output protection	Support short circuit and overload protection functions
Module powe	er consumption	0.8W (internal backplane)+1.2W (external input)

9.2.5 Installation and wiring

9.2.5.1 Appearance drawing







(unit: mm)

9.2.5.2 Terminal definition and wiring

(1) Terminal definition

XF-E1HSC					
Meaning	A-column terminal	Terminal layout	B-column terminal	Meaning	
A-DIFF	0		0	B-DIFF	
A-COM	1		1	B-COM	
A-24V	2		2	B-24V	
Z-DIFF	3		3	X0	
Z-COM	4	4	4	X1	
Z-24V	5		5	S/S	
Y0	6		6	Y2	
Y1	7	7	7	Y3	
24V+	8		8	24V-	

(2) External wiring





The module supports a set of A, B, Z high-speed single-ended and differential signal inputs. When in use, ensure correct wiring. Using A0 as an example, the application is illustrated in the table below:

Input type	External wiring	No.	Si gnal name	Internal circuit
		0	Differential input (A-DIFF)	
PNP collector type (24V	$\begin{bmatrix} 0V \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ $	1	In put common terminal (A-COM)	
	24V encoder A/B/Z	2	34V single end input (A-24V)	<u>3.3K</u> Ω
		0	Differential input (A-DIFF)	
NPN collector type (24V level)	0V (single $A/B/Z$ ended	1	In put common terminal (A-COM)	
	24V encoder	2	34V single end input (A-24V)	<u>3.3K</u> Ω
	A+/B+/Z+	0	Differential input (A-DIFF)	
Differential signal	Differential	1	In put common terminal (A-COM)	
		2	34 V single end input (A-24 V)	<u>3.3K</u> Ω

Explanation: If it is a PNP type AB phase encoder, A-COM and B-COM need to be short circuited, and if it is an NPN type AB phase encoder, A-24V and B-24V need to be short circuited.

9.2.5.3 Installation method

(1) Installation requirements

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



(2) Installation steps



The assembly between IO modules is carried out by sliding installation through the top and bottom rails of the modules, as shown in the left figure:



The module is installed on the guide rail. When installing, align the module with the DIN rail and press the module in the direction indicated by the arrow. After installation, there is a noticeable sound of the module engaging, as shown in the left figure:



After the module installation is completed, the lock buckle will automatically move downwards for locking. If the lock buckle does not move downwards, the top of the lock buckle needs to be pressed downwards to ensure proper installation.

(3) Unstallation steps



9.2.5.4 Installation environment

This product can be installed in four positions (i.e. installation direction): horizontal direction, vertical direction, top of the electrical cabinet, and bottom of the electrical cabinet. It is recommended to install it in the horizontal direction, and the heat dissipation design is through natural convection. To ensure normal ventilation and heat dissipation and reserve sufficient wiring space, the minimum gap must be retained around this product, as shown in the following figure:





If there are high-temperature heat source equipment (heaters, transformers, large resistors, etc.) around this product, a gap of at least 100mm should be left between them.

9.2.5.5 Equipment wiring

When wiring modules, their connectors must meet the following requirements:

Adaptive wire diameter					
National standard /mm ²	American Standard /AWG				
0.3	22				
0.5	20				
0.75	18				
1.0	18				
1.5	16				

If using other types of terminal lugs, crimp them onto the stranded wire. The shape and dimensions should conform to the diagram shown below.



9.2.6 Module configuration

Right Extension Module: Double click the space for the extension module in "CPU Frame", and then click "XF-E1HSC" in the pop-up "Insert ontology extension module" dialog box to add the module. After adding the module, the axis variable instance of "XJ_HSC_FreeEncoder" will be automatically created in the "SoftMotion General Axis Pool".

Configure LF Series Remote IO: For specific configuration examples, please refer to the LF Series Remote IO User Manual.



After adding XF-E1HSC, XJ_HSC_FreeEncoder is automatically instantiated and bound to the module.

9.2.7 Instructions

When XS Studio adapts XF-E1HSC, including XSF5 body mounted XF-E1HSC and LFC3-AP mounted XF-E1HSC, the following FB function blocks need to be compatible.

Function block	Explanation			
XJ_Counter_Enable_Ex	Counter enable, counting, measure frequency			
XJ_Counter_Compare_Ex	Counter comparison consistent output			
XJ_Counter_PresetValue_Ex	Counter preset value writing, including internal preset,			
	external preset, and Z-phase preset			
XJ_TouchProbe_Ex	Counter reading lock position or lock time function			
XJ_MeasurePulseWidth_Ex	Read the pulse width measurement value of the counter			
XJ_Counter_Reset_Ex	Counter error reset			

9.2.7.1 Counter enable XJ_Counter_Enable_Ex

High speed counter enable [XJ_Counter_Enable_Ex]						
Execution condition	cecution dition Normally open/ close triggering Suitable model XF-E1HSC module					
Firmware	V2.0.0 and up	Software	XS Studio V2.3.1 and up			
Library	XJ_HSC					

Command	Name	Graphic	ST
XJ_Counter_Enable	High speed counter enable	XJ_Counter_Enable_Ex_0 XJ_Counter_Enable_Ex Counter diValue – - xEnable udiFrequency – - xDirectionControl xDirectionState – xValid – xBusy – xError – eErrorID –	<pre>XJ_Counter_Enable_Ex_0(Counter:=, xEnable:= , xDirectionControl:= , diValue=> , udiFrequency=> , xDirectionState=> , xValid=> , xBusy=> , xError=> , eErrorID=>);</pre>

(1) Input variables

Input	Name	Data type	Effective	Initial	Description
variables			range	value	
Counter	High speed counter input	XJ_COUNTER_REF	-	-	Add XF-E1HSC automatic instantiation and select the corresponding

					instantiation name for the
					high-speed counter
vEnchlo	Enable	DOOL	TRUE,	EALCE	Normally open to enable
XEnable	Enable	BOOL	FALSE	FALSE	counting
v Direction C			TDUE		0: A-phase priority
xDirectionC	Direction	BOOL	TRUE,	FALSE	(default)
ontrol			FALSE		1: B-phase priority

(2) Output variables

Output variables	Name	Data type	Effective	Initial value	Description
diValue	High speed count value	DINT	Data range	0	High speed count value
udiFrequency	Pulse frequency measurement value	UDINT		0	Unit: Hz. If it is a low frequency, it can be used in conjunction with measuring the period through the interface
xDirectionState	Direction	BOOL	TRUE, FALSE	FALSE	0: count up 1: count down
xValid	Counter counting status	BOOL	TRUE, FALSE	FALSE	0: Counter stops counting 1: The counter is counting normally
xBUSY	Busy	BOOL	TRUE, FALSE	FALSE	
xError	Error flag	BOOL	TRUE, FALSE	FALSE	
eErrorID	Error type	HSIO_ERROR	-	0	

9.2.7.2 Counter comparison output XJ_Counter_Compare_Ex

Counter comparison output [XJ_Counter_Compare_Ex]					
Execution condition	Edge triggering	XF-E1HSC module			
Firmware	V2.0.0 and up	Software	XS Studio V2.3.1 and up		
Library	XJ_HSC				

Command	Name	Graphic	ST
XJ_Counter_Compare	Comparison consistent output	XJ_Counter_Compare_Ex_0 XJ_Counter_Compare_Ex Counter_ xDone - -xExecute -xAbort xCommandAborted - -diCompareValue -byChannel -uilmRefreshCycle	<pre>XJ_Counter_Compare_Ex_0(Counter:= , xExecute:= , xAbort:= , diCompareValue:= , byChannel:= , uiImRefreshCycle:= , xDone=> , xBusy=> , xCommandAborted=> , xError=> , eErrorID=>);</pre>

(1) Input variables

Input variables	Name	Data type	Effective	Initial	Description
			range	value	
Counter	High speed counter input	XJ_COUNTER_REF	-	-	
xExecute	Triggering	BOOL	TRUE, FALSE	FALSE	Triggering
xAbort	Terminate comparison	BOOL	TRUE, FALSE	FALSE	Rising edge effective
diCompareVal ue	Specify comparison value	DINT	-	0	
byChannel	Channel selection	Byte	1-4	1	1-4 correspond to Y0-Y3
uiImRefreshCy cle	Hardware direct output time	UINT	-	0	Unit: 100us, maximum output time is 3000ms

Output variables	Name	Data type	Effective	Initial	Description
			range	value	
xDone	Completion flag	BOOL	TRUE, FALSE	FALSE	After the instruction is executed, the flag is set to 'TRUE'
xBusy	Running	BOOL	TRUE, FALSE	FALSE	
xCommandAborted	Function block termination execution	BOOL	TRUE, FALSE	FALSE	

xError	Error flag	BOOL	TRUE, FALSE	FALSE	
eErr1orID	Error type	HSIO_ERROR	-	0	

9.2.7.3 Preset value write in XJ_Counter_PresetValue_Ex

Preset value write in [XJ_Counter_PresetValue_Ex]					
Execution condition	Edge triggering	Suitable model	XF-E1HSC module		
Firmware	V2.0.0 and up	Software	XS Studio V2.3.1 and up		
Library	XJ_HSC				

Command	Name	Graphic	ST
XJ_Counter_PresetValue	Preset value input	XJ_Counter_PresetValue_Ex_0 XJ_Counter_PresetValue_Ex Counter xDone- - xExecute xBusy- - xAbort xCommandAborted - byTriggerType xError- - diPresetValue eErrorID-	<pre>XJ_Counter_PresetValue_Ex_0(Counter:= , xExecute:= , xAbort:= , byTriggerType:= , diPresetValue:= , xDone=> , xBusy=> , xCommandAborted=> , xError=> , eErrorID=>);</pre>

(1) Input variables

Input variables	Name	Data type	Effective	Initial	Description
			range	value	
Counter	High speed counter input	XJ_COUNTER_ REF	-	-	High speed counter, high-speed counting input terminal needs to be defined (see functional description)
xExecute	Triggering	BOOL	TRUE, FALSE	FALSE	Triggering
xAbort	Terminate preset	BOOL	TRUE, FALSE	FALSE	Rising edge effective
byTriggerType	Trigger Type	Byte	-	0	Internal trigger: 1 DI trigger: 2 Z-phase trigger: 3 Internal+DI trigger: 4 Internal+Z-phase trigger: 5 DI+Z phase trigger: 6

Input variables	Name	Data type	Effective	Initial	Description
			range	value	
					Internal+DI+Z-phase trigger:
					7
1: Due au 43 / - 1	Preset	DNIT	Data range	0	Write the preset value for
diffesetvalue	value	DINI			high-speed counting

(2) Output variables

Output variables	Name	Data type	Effective	Initial	Description
			range	value	
xDone	Completion flag	BOOL	TRUE,FALSE	FALSE	After completing the writing, the flag bit is set to TRUE
xBusy	Running	BOOL	TRUE,FALSE	FALSE	
xCommandAborted	Function block termination execution	BOOL	TRUE,FALSE	FALSE	
xError	Error flag	BOOL	TRUE,FALSE	FALSE	
eErrorID	Error type	HSIO_ERROR	-	0	

9.2.7.4 Counter probe XJ_TouchProbe_Ex

Counter probe [XJ_TouchProbe_Ex]					
Execution condition	Edge triggering	Suitable model	XF-E1HSC module		
Firmware	V2.0.0 and up	Software	XS Studio V2.3.1 and up		
Library	XJ_HSC				

Command	Name	Graphic	ST
XJ_TouchProbe	Probe	XJ_Counter_PresetValue_Ex_0 XJ_Counter_PresetValue_Ex Counter xDone- -xExecute xBusy- -xAbort xCommandAborted - -byTriggerType xError- -diPresetValue eErrorID-	<pre>XJ_Counter_PresetValue_Ex_0(Counter:= , xExecute:= , xAbort:= , byTriggerType:= , diPresetValue:= , xDone=> , xBusy=> , xCommandAborted=> , xError=> , eErrorID=>);</pre>

(1) Input variables

Input variables	Name	Data type	Effective range	Initial	Description
				value	
Counter	High speed counting input	XJ_COUNT ER_REF	-	-	High speed counter, high-speed counting input terminal needs to be defined (see functional description)
xExcute	Triggering	BOOL	TRUE,FALSE	FALSE	Triggering
xAbort	Terminate probe	BOOL	TRUE,FALSE	FALSE	Rising edge effective
byProbeId	Specify input point	Byte	1-2	0	1: Channel 1 probe 2: Channel 2 probe
byEdgeType	Edge type	Byte	0-2	0	0: Rising edge 1: Falling edge 2: Rising edge+falling edge
byInputType	External trigger selection	Byte	0-1	0	0: DI 1: Z phase

Output variables	Name	Data type	Effective	Initial	Description
			range	value	
diTouchVaulePos	Rising edge latch value	DINT		0	
diTouchVauleNeg	Falling edge latch value	DINT		0	
diTouchTimePos	Rising edge latch time	LINT			
diTouchTimeNeg	Falling edge latch time	LINT			
xDone	Completion flag	BOOL	TRUE, FALSE	FALSE	After completing the writing, the flag bit is set to TRUE
xBusy	Running	BOOL	TRUE, FALSE	FALSE	
xCommandAborted	Function block termination execution	BOOL	TRUE, FALSE	FALSE	
xError	Error flag	BOOL	TRUE, FALSE	FALSE	
eErrorID	Error type	HSIO_ERROR	-	0	

Measure pulse width [XJ_MeasurePulseWidth_Ex]					
Execution condition	Normally open/close triggering	Suitable model	XF-E1HSC module		
Firmware	V2.0.0 and up	Software	XS Studio V2.3.1 and up		
Library	XJ_HSC				

9.2.7.5 Measure pulse width XJ_MeasurePulseWidth_Ex

Command	Name	Graphic	ST
XJ_MeasurePulseWidth	Read the pulse width measurement value of the counter	XJ_MeasurePulseWidth_Ex_0 XJ_MeasurePulseWidth_Ex Counter udiValue – - xEnable xDone – - eMode xBusy – xError – eErrorID –	<pre>XJ_MeasurePulseWidth_Ex_0(Counter:= , xEnable:= , eMode:= , udiValue=> , xDone=> , xBusy=> , xError=> , eErrorID=>);</pre>

(1) Input variables

Input	Name	Data type	Effective range	Initial	Description
variables				value	
Counter	High speed counter input	XJ_COUNTER_ REF	-	-	High speed counter, high-speed counting input terminal needs to be defined (see functional description)
xEnable	Normally open/close	BOOL	TRUE,FALSE	FALSE	Normally open enable
eMode	Measure high/low level pulse width	HSC_PULSEWI DTH_TYPE	0,1	0	0: External signal high level (measuring high-level pulse width); 1: External signal low level (measuring low level pulse width)

Output	Name	Data type	Effective range	Initial	Description
variables				value	
udiValue	Measurement value	UDINT		0	
xDone	Completion flag	BOOL	TRUE,FALSE	FALSE	After completing the writing, the flag bit is

					set to TRUE
xBusy	Running	BOOL	TRUE,FALSE	FALSE	
xError	Error flag	BOOL	TRUE,FALSE	FALSE	
eErrorID	Error type	HSIO_ERROR	-	0	

9.2.7.6 Counter reset XJ_Counter_Reset_Ex

Counter reset [XJ_Counter_Reset _Ex]							
Execution condition	Edge triggering	Suitable model	XF-E1HSC module				
Firmware	V2.0.0 and up	Software	XS Studio V2.3.1 and up				
Library	XJ_HSC						

Command	Name	Graphic	ST
XJ_Counter_Reset	Counter reset	XJ_Counter_Reset_0 XJ_Counter_Reset EN ENO Counter xDone xExcute xBusy xError eErrorID	<pre>XJ_Counter_Reset_0(Counter:= , xExcute:= , xDone=> , xBusy=> , xError=> , eErrorID=>);</pre>

(1) Input variables

Input	Name	Data type	Effective range	Initial	Description
variables				value	
Counter	High speed counter input	XJ_COUNTER_ REF	-	-	High speed counter, high-speed counting input terminal needs to be defined (see functional description)
xExcute	Triggering	BOOL	TRUE,FALSE	FALSE	Triggering

Output	Name	Data type	Effective range	Initial	Description
variables				value	
xDone	Completion flag	BOOL	TRUE,FALSE	FALSE	After completing the writing, the flag bit is set to TRUE
xBusy	Running	BOOL	TRUE,FALSE	FALSE	
xError	Error flag	BOOL	TRUE,FALSE	FALSE	
eErrorID	Error type	HSIO_ERROR	-	0	

9.2.8 Functions and setting

9.2.8.1 General functions

F-E1HSCModule parameters	Channel Selection:	Channel 0					
	Channel 0						
INSC I/O Mapping	_	Counter Type:	O Linear	Cir	cular		
atus		Maximum Value of Counter:	2147483647		Minimum Value of Counter:	-214748364	3
formation		Counter Mode:	AB_1x_frequency	~	A\B\Z Filtering Time:	2	us
		Frequency Sampling Period:	10	ms	Power Detection:	OFF	O ON
		Counter Power-off Retention:	() Discard	Sa	ve		

■ Counter type

The data type of the counter is a 32-bit signed number (-2147483648~2147483647). Counter counting types can be divided into ring counters and linear counters.

• Ring counters

Ring counter counts between the maximum and the minimum value.

When forward counting exceed the maximum value, it jumps to the minimum value. When backward counting is less than the minimum, it jumps to the maximum value.



• Linear counter

Linear counter counts between the maximum and the minimum value.

When the forward counting reaches the maximum value or the backward counting reaches the minimum value, it will stop counting.

When the current counting value reaches the set limit, up and down overflow alarm will be triggered.



■ Counter mode



Counter direction control

The counting direction of the counter can be changed through PDO, and A-phase priority or B-phase priority can be set.

• AB phase

When set to prioritize A phase , the counter increases when A phase leads B phase . When set to prioritize B phase , the counter decreases when A phase lags behind B phase .

• Single phase

Only for A phase , without directional control.

• Pulse + direction

When set to prioritize A-phase, the counter increases when B-phase input is at high level. When set to prioritize B-phase, the counter increases when B-phase input is at low level.

• CW/CCW

When set to prioritize A-phase, the counter increase when A-phase has a count. When set to prioritize B-phase, the counter increase when B-phase has a count.

■ Counter application example

For example, if the power detection is not turned on, the counter type is set to circular, the counter mode is AB phase 1x frequency, the count value is power down hold, and the maximum and minimum values of the counter are default

Channel 0

Counter Type:	() Linear	() ()	ircular		
1aximum Value of Counter:	2147483647		Minimum Value of Counter:	-2147483648	3
Counter Mode:	AB_1x_frequency	~	A\B\Z Filtering Time:	2	us
Frequency Sampling Period:	10	ms	Power Detection:	OFF	OON
Counter Power-off Retention:	○ Discard	Si	ave		

The result of rotating the external encoder is as follows:

• Encoder rotates forward (counting up)

类型	值	准备值	地址	注释
XJ_Counter_Enable				
REFERENCE TO XJ				数据类型XJ_COUNTER_REF
BOOL	TRUE			常开使能进行计数
BOOL	FALSE			FALSE:A 相优先(默认) TRUE:B 相优先
DINT	29398			高速计数值
UDINT	0			脉冲频率测量值(单),若为低频可通过
BOOL	FALSE			FALSE:增计数 TRUE:减计数
BOOL	TRUE			FALSE:计数器停止计数 TRUE:计数器正常
BOOL	TRUE			忙碌中
BOOL	FALSE			错误标志
HSC_ERROR	ERR_OK			错误类型
			,	
	类型 XJ_Counter_Enable RFFERENCE TO XJ BOOL DINT UDINT BOOL BOOL BOOL BOOL BOOL HSC_ERROR	送型 値 XJ_Counter_Enable REFERENCE TO XJ BOOL FALSE DDNT 29398 UDINT 0 BOOL FALSE BOOL TRUE BOOL TRUE BOOL TRUE BOOL FALSE HSC_ERROR ERR_OK	受型 ダ型 X1_Counter_Enable REFERENCE TO X1 BOOL TRUE BOOL FALSE DINT DINT DINT DOL FALSE BOOL TRUE BOOL TRUE BOOL TRUE BOOL FALSE SOL SOL FALSE SOL FALSE SOL SOL	美型 備

Use the XJ_Counts_Enabled_Ex counter enable command to rotate the encoder after enabling. The current count value is displayed in the high-speed count value of the output parameter, and the output pin "xDirectionState" is set to False.

类型	值	准备值	地址	注释
XJ_Counter_Enable				
REFERENCE TO XJ				数据类型XJ_COUNTER_REF
BOOL	TRUE			常开使能进行计数
BOOL	FALSE			FALSE:A 相优先(默认) TRUE:B 相优先
DINT	27938			高速计数值
UDINT	0			脉冲频率测量值(单),若为低频可通过
BOOL	TRUE			FALSE:增计数 TRUE:减计数
BOOL	TRUE			FALSE:计数器停止计数 TRUE:计数器正常
BOOL	TRUE			忙碌中
BOOL	FALSE			错误标志
HSC_ERROR	ERR_OK			错误类型
			,	
	送型 X)_Counter_Enable REFERENCE TO X) BOOL DINT UDINT BOOL BOOL BOOL BOOL BOOL BOOL HSC_ERROR	美型 算 X)_Counter_Enable REFERENCE TO XJ BOOL TRUE BOOL FALSE DINT 27938 UDINT 0 BOOL TRUE BOOL FALSE HSC_ERROR ERR_OK	#型 #	类型 値 准备值 地址 X1_Counter_Enable REFERENCE TO X1 BOOL TRUE BOOL FALSE DINT 27938

Use the XJ_Counts_Enabled_Ex counter enable command to rotate the encoder after enabling it. The current count value is displayed in the high-speed count value of the output parameter, and the output pin "xDirectionState" is set to TRUE.

■ Module level error code

• Encoder rotates reverse (countdown)

Module level error code (ErrCode_module)					
Bit	Meaning	Error level			
0	The 24V input power supply of the module is abnormal	General			
1	Incorrect allocation of module parameters	Important			
2	An internal module error has occurred and the user	Important			
	layer is unable to repair it				
3	Version mismatch	Important			

■ Channel level error code

Channel level error code (ErrCode_CH)				
Bit	Meaning	Error level		
0	Input frequency overload	General		

9.2.8.2 Preset function

There are three preset methods for counters, namely internal command, external digital input terminal, and Z signal.



Example: Change the current high speed count value to 200.

(1) Internal preset writing

Set the preset value of the counter to 200.

First, execute the counter enable command, then use the preset value write command to write the preset value using the internal preset function. The preset value set upon successful execution of the command will be written into the current count value.

The instruction parameter configuration is as follows:

XJ_Counter_PresetValue_Ex_0	XJ_Counter_PresetV		
🗈 🍫 Counter	REFERENCE TO XJ		数据类型XJ_COUNTER_REF
¥∲ xExecute	BOOL	TRUE	触发(上升沿有效)
* xAbort	BOOL	FALSE	终止预置(上升沿有效)
byTriggerType	BYTE	1	触发器类型(1:内部触发 2:D确发 3:Z相触发)
🍬 diPresetValue	DINT	200	预置值
🍫 xDone	BOOL	TRUE	完成标志
[™] ∲ xBusy	BOOL	FALSE	正在运行
xCommandAborted	BOOL	FALSE	功能块终止执行
™ ∲ xError	BOOL	FALSE	错误标志
* eErrorID	HSC_ERROR	ERR_OK	错误类型

The execution effect is shown in the figure:
Devic	e.Application.PLC_PRG					
表达式		类型	值	准备值	地址	注释
	Counter	REFERENCE TO XJ				数据类型XJ_COUNTER_REF
	🖗 xEnable	BOOL	TRUE			常开使能进行计数
	xDirectionControl	BOOL	FALSE			FALSE:A 相优先(默认) TRUE:B 相优先
	diValue	DINT	200			高速计划值
	udiFrequency	UDINT	0			脉冲频率测量值(单位:hz)频可通过界面测量周期配合
	xDirectionState	BOOL	TRUE			FALSE:偿计数 TRUE:成计数
	w vValid	BOOL	TRUE			FAISE:计称哭信止计称 TRUE:计称哭正常计称
	xBusy	BOOL	TRUE			竹港山
	v veror	ROOL	FALSE			推得行士
	a servario	LICC FREDOR	ERR. OK			5日のではかない
0.43	a Country Descriptions Do A	HSC_ERROR	LKK_OK			t Etc. secal
	O_Counter_Preservalue_EX_0	XJ_Counter_Presetv				** P** The COUNTED DEC
	Counter	REFERENCE TO XJ				刻號突型XJ_COUNTER_REF
	xExecute	BOOL	TRUE			職友(上井治有效)
	xAbort	BOOL	FALSE			终止预查(上升沿有效)
-	byTriggerType	BYTE	1			触发器类型(1:内部触发 2:D 吨发 3:Z相触发)
	diPresetValue	DINT	200			预置值
	🛊 xDone	BOOL	TRUE			完成标志
	xBusy	BOOL	FALSE			正在运行
1.1	xCommandAborted	BOOL	FALSE			功能块终止执行
1	xError	BOOL	FALSE			错误标志
1	eErrorID	HSC_ERROR	ERR_OK			错误类型
				~ v		
0 1	XJ_Counter_Enable_Ex_0(
2	Counter:=XJ_HSC_FreeEncoder ,					
4	xEnable:= , xDirectionControl:=					
5	diValue=> .					
e	udiFrequency=> ,					
7	xDirectionState=> ,					
8	xValid=> ,					
9	xBusy=> ,					
10	xError=> ,					
11	eErrorID=>);					
0 12	XJ_Counter_PresetValue_Ex_0(
13	Counter:=XJ_HSC_FreeEncoder ,					
10	xExecute:= ,					
16	huTriggerTune :=					
17	diPresetValue:= .					
18	xDone=> ,					
19	xBusy=> ,					
20	xCommandAborted=> ,					
21	xError=> ,					
22	<pre>eErrorID=>);</pre>					

(2) External digital preset

Taking X0 as an example, set the X0 terminal function to "preset":

Function Selection:	Preset	~
Logic Level:	Positive	~
Filtering Time:	2	us
1		
1 Function Selection:	General Input	~
1 Function Selection: Logic Level:	General Input Positive	~ ~

Set the preset value of the counter to 200.

First, execute the counter enable command, then use the preset value write command to use the internal preset function. At the rising edge of external X signal, the preset value is written, and after successful command execution, the preset value will be written into the current count value. The instruction parameter configuration is as follows:

XJ_Counter_PresetValue_Ex_0	XJ_Counter_Prese	tV	
🗷 🍫 Counter	REFERENCE TO XJ	Les anno 1	数据类型XJ_COUNTER_REF
M xExecute	BOOL	TRUE	触发(上升沿有效)
🍫 xAbort	BOOL	FALSE	终止预置(上升沿有效)
🍫 byTriggerType	BYTE	2	触发器类型(1:内部触发 2:DI触发 3:Z相触发)
🏘 diPresetValue	DINT	200	预置值
🍫 xDone	BOOL	TRUE	完成标志
🔯 xBusy	BOOL	FALSE	正在运行
🍫 xCommandAborted	BOOL	FALSE	功能快终止执行
🖗 xError	BOOL	FALSE	错误标志
* eErrorID	HSC_ERROR	ERR_OK	错误类型

The execution effect is as follows:

DEM	e-application.rtc_rco					
表达式		类型	值	准备值	地址	注释
8 🚸	XJ_Counter_Enable_Ex_0	XJ_Counter_Enable				
۲	😻 Counter	REFERENCE TO XJ				数据类型XJ_COUNTER_REF
8	🏘 xEnable	BOOL	TRUE			常开使能进行计数
	🐐 xDirectionControl	BOOL	FALSE			FALSE:A 相优先(默认) TRUE:B 相优先
	😻 diValue	DINT	200			高速计数值
	w udiFrequency	UDINT	0			脉冲频率测量值(单位:hz),频可通过界面测量周期配合
	xDirectionState	BOOL	FALSE			FALSE:增计数 TRUE:减计数
	🔷 xValid	BOOL	TRUE			FALSE:计教器停止计教 TRUE:计教器正常计教
3	* xBusy	BOOL	TRUE			忙碌中
	V xError	BOOL	FALSE			错误标志
	eErrorID	HSC ERROR	ERR OK			错误类型
E @	X1 Counter PresetValue Ex 0	X1 Counter PresetV				Preve of the states
	A Counter	REFERENCE TO X1				新掘 地利X1 COUNTER REF
-	An vEversite	ROOL	TRUE			() () () () () () () () () () () () () (
	A vébert	BOOL	FALSE			(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(
a 10	A ANDOR	DOOL	2			34 生 19世 (上 / 141 円 207) 34 学 四米田(1, 古 前34 学 2, 5 13 年学 2, 74日34 学 3)
	ite synngeniye	DTIE	2			服及當兴望(11円前服及 2.0場版 5.2相服及) 32里店
	op dipresetvalue	DINI	200			
	Ø XDone	BOOL	TRUE			元與怀志
	A xprink	BOOL	FALSE			上住运行
	xCommandAborted	BOOL	FALSE			功能决终止执行
	xError	BOOL	FALSE			错误标志
	🖗 eErrorID	HSC ERROR	ERR_OK			错误类型
	<pre>xX_counter_Rable_Rx_[] Counter_XX_BSC_PreeEncoder , xThable:*, xThable:*, diValue>, udFrequency*>, xValue>, xValue>, xValue>, xValue>, xValue>, xValue>, xValue>, xValue>, xValue>, xValue>,</pre>					
1 1 1 1 1 1 1 1 1 1 1 1 1 1	<pre>effrorID> [] XJ_Counter_PrestValue_Ex_0 (Counter=xX]BSC_PrestNooder , RRecute:=, xkbort:=, byTiggerType:=, diPrestValue:=, xDone=>, xDone=>, xDone=>, xDone=>, xTorm=>, xCommandAborted=>, effrorID>);</pre>					

(3) Z signal preset

Set the preset value of the counter to 200.

First, execute the counter enable command, then use the preset value write command to use the internal preset function. When the rising edge of the external Z signal arrives, write the preset value, after the successful execution of the command, the preset value will be written into the current count value.

The instruction parameter configuration is as follows:

-	•		
A X0_Counter_PresetValue_Ex_0	XJ_Counter_Prese	tV	
🕀 🍫 Counter	REFERENCE TO XJ	Line	数据类型XJ_COUNTER_REF
🍫 xExecute	BOOL	TRUE	触发(上升沿有效)
🍫 xAbort	BOOL	FALSE	终止预置(上升沿有效)
🍫 byTriggerType	BYTE	3	触发器类型(1:内部触发 2:D 龜发 3:Z相触发)
* diPresetValue	DINT	200	预置值
🍫 xDone	BOOL	TRUE	完成标志
🍫 xBusy	BOOL	FALSE	正在运行
* xCommandAborted	BOOL	FALSE	功能块终止执行
🔯 xError	BOOL	FALSE	错误标志
eErrorID	HSC ERROR	ERR OK	错误类型

The execution effect is as follows:

Device.	Application.PLC_PRG						
表达式		人	值	准备值	地址	注释	
H 🍫	Counter	REFERENCE TO XJ				数据类型XJ_COUNTER_REF	
**	xEnable	BOOL	TRUE			常开使能进行计数	
	xDirectionControl	BOOL	FALSE			FALSE:A 相优先(默认) TRUE:B	相优先
5.	diValue	DINT	200			宣冲计称值	HIVO/0
	udiFrequency	LIDINT	0			除'由新安测量值(单位-bz) 新司道	新过史 而测度 用的两公
	DirectionCate	000141	70115				三人之うて 国次1至 月初目に日…
	xpirectionscare	BOOL	TRUE			FALSE JE IT SU TRUE JAK TOUR 2 144	99
	xvalid	BOOL	TRUE			FALSE:计刻器停止计数 IRUE:计数	器正常计划
	xBusy	BOOL	TRUE			忙碌中	
2	xError	BOOL	FALSE			错误标志	
	eErrorID	HSC_ERROR	ERR_OK			错误类型	
🗏 🛊 XI	_Counter_PresetValue_Ex_0	XJ_Counter_PresetV	•				
H 🍫	Counter	REFERENCE TO XJ				数据类型XI_COUNTER_REF	
**	xExecute	BOOL	TRUE			触发(上升沿有效)	
20	xAbort	BOOL	FALSE			终止预置(上升沿有效)	
*	byTriggerType	BYTE	3			触发器类型(1:内部触发 2:D 确发	3:2相触发)
×9	diPresetValue	DINT	200			预置值	
50	xDone	BOOL	TRUE			完成标志	
5.0	xBusy	BOOL	FALSE			正在运行	
50	xCommandAborted	BOOL	FALSE			功能块终止执行	
50	xError	BOOL	FALSE			错误标志	
5.	eErrorID	HSC ERROR	ERR_OK			错误类型	
		-					
0 1	XJ Counter Enable Ex 0(A 7.			
2	Counter:=XJ_HSC_FreeEncoder ,						
3	xEnable:= ,						
4	xDirectionControl:= ,						
5	diValue=> ,						
7	vDirectionState=>						
8	xValid=> .						
9	xBusy=> ,						
10	xError=> ,						
11	<pre>eErrorID=>);</pre>						
0 12	XJ_Counter_PresetValue_Ex_0(
13	counter:=XJ_HSC_FreeEncoder ,						
15	xAbort:= .						
16	byTriggerType:= ,						
17	diPresetValue:= ,						
18	xDone=> ,						
19	xBusy=> ,						
20	xCommandAborted=> ,						
21	AFTERNATION) .						
1 2 3 4 5 6 7 8 9 9 10 11 13 14 15 16 17 13 19 20 20 22	<pre>XJ_Counter_Enable_Ex_0(Counter_KJ_HSC_FreeEncoder, xfnable=, xfnable=, divfluee>, udifrequency=>, xblrectionState=>, xvliectio</pre>						

9.2.8.3 Gate control function

XF-E1HSCModule parameters	Channel Selection:	Channel 0		
E1HSC I/O Mapping	Channel 0			
		Counter Type:	Linear	۲
Status		Maximum Value of Counter:	2147483647	
Information		Counter Mode:	AB_1x_frequency	~
		Frequency Sampling Period:	10	ms
		Counter Power-off Retention:	O Discard	۲
		X0 Function Selection:	Gating V	1
		Logic Level:	Positive 🗸	
		Filtering Time:	2 us	
		_X1		
		Function Selection:	Gating 🗸 🗸	
		Logic Level:	Positive 🗸 🗸 🗸	
		Filtering Time:	2 us	

The gate control function refers to hardware enabled control, and users can set X0 or X1 as the gate control function to use. When the gate control function is invalid, the counter is only enabled by the control command. When the gate control function is valid, the counter is enabled to count when both the control command and the gate control input signal are valid. After the counter starts counting, the status word related flag bits will be valid. The control logic is shown in the following figure:

• Not use gate control function



• Use gate control function



9.2.8.4 Probe function

The probe function is used to latch the DC time and counter value when a specific signal occurs. Each channel can be equipped with up to two probe terminals, and each probe can achieve rising edge latching and falling edge latching.

For example, using the X0 terminal as a probe trigger signal, the rising edge condition locks the probe position.

Set the X0 terminal function to 1 "probe":

Function Selection:	Probe	~
Logic Level:	Positive	~
Filtering Time:	2	US
1		
1 Function Selection:	General Input	~
1 Function Selection: Logic Level:	General Input Positive	~

First, execute the counter enable instruction, then use the counter probe instruction to trigger an external probe signal. After the instruction is successfully executed, latch the current position and current DC time value in the instruction output parameters.

The instruction parameter configuration is as follows:

XJ_TouchProbe_Ex_0	XJ_TouchProbe_Ex		
🗷 🍫 Counter	REFERENCE TO XJ		数据类型X1_COUNTER_REF
🍫 xExcute	BOOL	FALSE	触发(上升沿有效)
🍫 xAbort	BOOL	FALSE	终止探针(上升沿有效)
🍫 byProbeMode	BOOL	FALSE	FALSE:单次 TRUE:连续触发
🍫 byProbeId	BYTE	1	指定输入点 1-2对应第一路探针或第二路探针
byEdgeType	BYTE	0	边沿类型 0:上升沿 1:下降沿 2:上升沿+下降沿
byInputType	BYTE	0	外部触发选择 0:DI 1:Z相
🍫 diTouchVaulePos	DINT	.0	上升沿锁存值
🍫 diTouchVauleNeg	DINT	0	下降沿锁存值
b diTouchTimePos	LINT	0	上升沿锁存时间(单位:ns)
🍫 diTouchTimeNeg	LINT	0	下降沿锁存时间(单位:ns)
byTouchNum	BYTE	0	探针计数
🍫 xDone	BOOL	FALSE	完成标志
🍫 xBusy	BOOL	FALSE	正在运行
🍫 xCommandAborted	BOOL	FALSE	功能快终止执行
🍫 xError	BOOL	FALSE	错误标志
🍫 eErrorID	HSC_ERROR	ERR_OK	错误类型

The execution effect is as follows:

大式	类型	值	准备值	地出土	注释
XJ_Counter_Enable_Ex_0	XJ_Counter_Enable				
🗄 🍫 Counter	REFERENCE TO XJ				数据类型XJ_COUNTER_REF
🍫 xEnable	BOOL	TRUE			常开使能进行计数
🍫 xDirectionControl	BOOL	FALSE			FALSE:A 相优先(默认) TRUE:B 相优先
🍫 diValue	DINT	5084			高速计数值
🐐 udiFrequency	UDINT	0			脉冲频率测量值(单位:hz),频可通过界面测量周期配合
* xDirectionState	BOOL	TRUE			FALSE:增计数 TRUE:臧计数
🍫 xValid	BOOL	TRUE			FALSE:计数器停止计数 TRUE:计数器正常计数
🗇 xBusy	BOOL	TRUE			忙碌中
🔯 xError	BOOL	FALSE			错误标志
🍫 eErrorID	HSC ERROR	ERR_OK			错误类型
XJ_TouchProbe_Ex_0	XJ TouchProbe Ex				
E 🍫 Counter	REFERENCE TO XJ				数据类型XJ_COUNTER_REF
🀐 xExcute	BOOL	TRUE			純炭(上升沿有效)
* xAbort	BOOL	FALSE			终止探针(上升沿有效)
* bvProbeMode	BOOL	FALSE			FALSE:单次 TRUE:连续触发
bvProbeId	BYTE	1			指定输入占 1-2对应第一路探针或第二路探针
* byEdgeType	BYTE	0			辺治学型 0:上升沿 1:下陸沿 2:上升沿+下陸沿
* byInputType	BYTE	0			外部触发洗择 0:DI 1:Z相
diTouchVaulePos	DINT	5084			上升沿锁存值
diTouchVauleNeg	DINT	0			下陸沿地存值
diTouchTimePos	LINT	914913636120			上升沿锁存时间(单位:ns)
diTouchTimeNeg	LINT	0			下陸沿跡存时间(単位:ns)
byTouchNum	BYTE	0			探针计数
* xDone	BOOL	TRUE			完成标志
Se vBusy	BOOL	FALSE			正在运行
* xCommandAborted	BOOL	FALSE			功能快终止执行
Sa vError	8001	FALSE			特遇転主
A A A A A A A A A A A A A A A A A A A	HSC ERROR	ERP. OK			· · · · · · · · · · · · · · · · · · ·
4 ELIGID	H3C_ERROR	ERK_OK			相庆天皇
<pre>3 xEnable:= ,</pre>			Y A.		
4 xDirectionControl:= ,					
<pre>5 diValue=> ,</pre>					
6 udiFrequency=> ,					
<pre>xDirectionstate=> , yUnlide></pre>					
9 VBIIGU->					
10 vErrore)					
11 eErrorID=> Dr					
12 XJ TouchProbe Ex 0(
13 Counter:=XJ HSC FreeEncoder ,					
The second					

9.2.8.5 Comparison output

Example: Take Y0 as a comparison output signal. Set the Y terminal function to "Compare Output":

Function Selection:	Comparison Output	~
ogic Level:	Positive	~
bnormal Output State:	OFF	~

First, execute the counter enable instruction, then use the counter comparison output instruction, set the comparison output value and comparison output time. After the instruction is successfully executed, the corresponding Y will output the status of the corresponding time.

The instruction parameter configuration is as follows:

XJ_Counter_Compare_Ex_0	XJ_Counter_Compar.		
🗉 🍫 Counter	REFERENCE TO XJ	• No. 754	数据类型XI_COUNTER_REF
🍫 xExecute	BOOL	TRUE	触发
🍫 xAbort	BOOL	FALSE	终止比较
M diCompareValue	DINT	7000	指定比较值
🍫 byChannel	BYTE	1	通道选择(1-4对应Y0-Y3)
uiImRefreshCycle	UINT	30000	单位: 0.1ms,最大输出时间是3000ms
🍫 xDone	BOOL	FALSE	完成标志
🍫 xBusy	BOOL	TRUE	正在运行
xCommandAborted	BOOL	FALSE	功能块终止运行
🍫 xError	BOOL	FALSE	错误标志
eErrorID	HSC_ERROR	ERR_OK	错误类型

The execution effect is as follows:

Device	Application.PLC_PRG					
表达式		类型	值	准备值	地址	注释
🗟 🧄 X3	_Counter_Enable_Ex_0	XJ_Counter_Enable				
H 4	Counter	REFERENCE TO XJ				数据类型XJ_COUNTER_REF
*	xEnable	BOOL	TRUE			常开使能进行计数
*	xDirectionControl	BOOL	FALSE			FALSE:A 相优先(默认) TRUE:B 相优先
	diValue	DINT	9905			高速计数值
-	udiFrequency	UDINT	0			脉冲频率测量值(单位:hz),频可通过界面测量周期配合
	xDirectionState	BOOL	TRUE			FALSE:増计数 TRUE:戚计数
50	xValid	BOOL	TRUE			FALSE:计数器停止计数 TRUE:计数器正常计数
	xBusy	BOOL	TRUE			忙碌中
	* xError	BOOL	FALSE			错误标志
	eErrorID	HSC_ERROR	ERR_OK			错误类型
😑 🔹 xa	_Counter_Compare_Ex_0	XJ Counter Compar				
· · ·	Counter	REFERENCE TO XJ				教据类型XJ_COUNTER_REF
*	xExecute	BOOL	TRUE			触发
	xAbort	BOOL	FALSE			终止比较
	diCompareValue	DINT	7000			指定比较值
×	byChannel	BYTE	1			通道选择(1-4对应Y0-Y3)
	uIImRefreshCycle	UINT	30000			单位: 0.1ms, 最大输出时间是3000ms
5	xDone	BOOL	TRUE			完成标志
-	xBusy	BOOL	FALSE			正在运行
	xCommandAborted	BOOL	FALSE			功能抉终止运行
	xError	BOOL	FALSE			错误标志
	eErrorID	HSC_ERROR	ERR_OK			错误类型
			Loss Botos	A V		
1 2 3 4 5 6 7 7 8 9 9 10 11 12 13 14 15 16 15 16 17 18 19 200	<pre>xd_counter_nable_x_0(Counter_NAD_REX_0) Counter_NAD_REX_0(xthreated) HSC TreePenoder , xthreatedConcontrol:= , divalue> , xthreatedConcontrol:= , divalue> , xtvlid= , xtvlid= , xtvlid= , xtrate= , xtrate= , xtrate= , xt</pre>					

10. Common problem

Q1: After power on, the PWR light of the module flashes at a frequency of 1Hz.

A1: Please check if the current module is powered by DC24V normally.



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