K in C の 歩 科

RP series

Plug-in remote I/O module

User Manual



Kinco Electric (Shenzhen) Ltd.

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1. Product Overview 1.1. Product introduction

RP series plug-in I/O module modules adopt a structure that combines connection modules, power supplies and I/O modules. The connector connects the scalable I/O modules to the real-time industrial helicopter system. The backplane uses the S-Link interface. The connector module is responsible for the field interface, thus enabling various I/O modules to exchange data with the connector/controller in real time. function.

RP series plug-in I/O modules are rich in variety and have high real-time performance, allowing users to collect high-speed data, optimize system configuration, simplify field wiring, and improve system reliability. Sex etc. provided.

1.2. Product Features

• Occupies few nodes

A node consists of a link connector, 1 to 32 I/O modules, and a termination end cap.

• Rich function extensions

Supports flexible expansion and complete I/O types; it can integrate a variety of digital, analog and temperature modules to meet the needs of different application scenarios.

• Use it flexibly

Various types of plug-in I/O modules can be combined at will.

• Strong compatibility

The coupler communication interface communication complies with standards and supports mainstream PROFINET master stations and EtherCAT master stations. (_____twenty three_)

• Small size

Compact structure and small space occupation.

• Easy to diagnose

The left side is fully designed, the module status is clear at a glance, and detection and maintenance are convenient.

• Fast

The backplane adopts S-Link hiking: the maximum scanning period is 1 ms.

• Easy to install

DIN 35 mm standard stair installation.

Adopts chip-type terminal blocks for convenient and quick wiring.

1.3. Application method

The coupler module is connected to the controller at the application site, and the I/O module is responsible for connecting to the input and output sensors at the application site. The usual data collection, processing and control process is as follows:

- 1. The input I/O module collects various signals on site and sends them to the coupler through the internal bus;
- 2. The controller reads data from the coupler through the fieldbus, processes it, and then writes the output data to the coupler;
- 3. The coupler then writes the output data to the output I/O module through the internal bus to control the device.

Expandable I/O modules include digital input modules, digital output modules, digital input and output modules, analog input modules, analog output modules, temperature modules, etc.

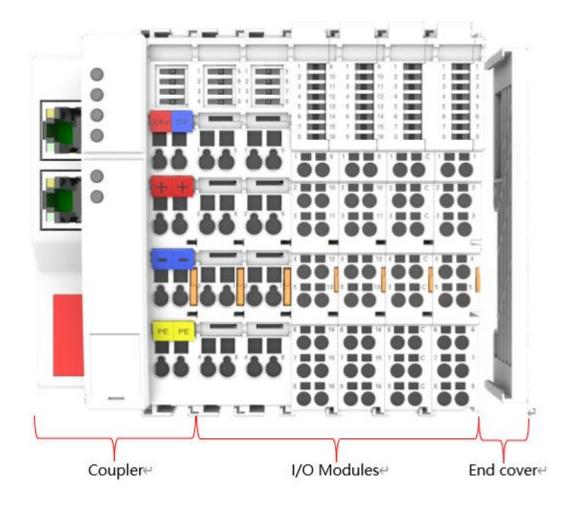
Application method: Application method using a combination of coupler power module, digital quantity, analog quantity, temperature, extended power supply and other modules.

Application configuration: Based on the master station access capability, number of sites, number of I/O points, function types and other requirements, it can adapt to the combination configuration of different types of I/O modules.

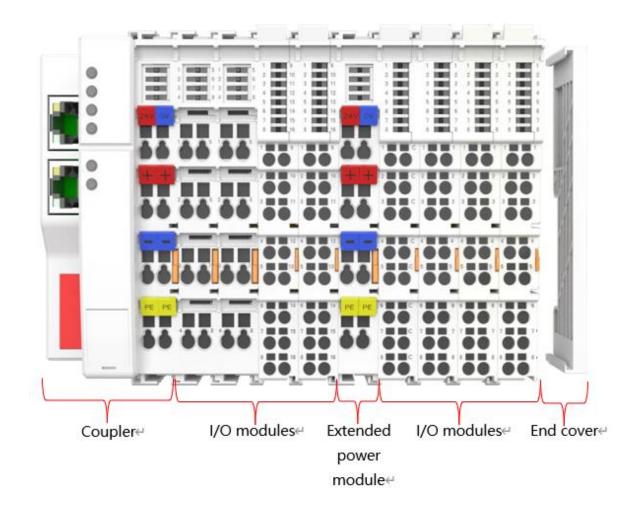
Configuration rules: The modules from left to right are coupler module, power module, I/O module, end cover (must be configured), etc.

The product adopts the application method of coupler, I/O module and end cover combination, with the following two combinations.

• Product combination method one (coupler power supply, I/O module, end cover)



• Product combination method two (coupler power supply, I/O module, extended power supply module, I/O module, end cover)



2. Product type 2.1. module list

Model	Product description	Output current/power consumption
RP00PN	PROFINET connector module	1600 mA
RP00EC	EtherCAT Connector Module	1600 mA
RP0016N	16-channel digital output module, NPN type, 24VDC, 0.5A	40 mA
RP0016P	16-channel digital output module, PNP type, 24VDC, 0.5A	40 mA
RP1600N	16-channel digital input module, NPN type, 24VDC, auxiliary 3ms	30 mA
RP1600P	16-channel digital input module, PNP type, 24VDC, auxiliary 3ms	30 mA
RP0808N	8-channel digital input, 8-channel digital output module, NPN type, 24VDC, 0.5A, auxiliary 3ms	35 mA
RP0808P	8-channel digital input, 8-channel digital module output, PNP type, 24VDC, 0.5A, auxiliary 3ms	35 mA
RP0800N	8-channel digital input module, NPN type, 24VDC, auxiliary 3ms	30 mA
RP0800P	8-channel digital input module, PNP type, 24VDC, auxiliary 3ms	30 mA
RP0008N	8-channel digital output module, NPN type, 24VDC, 0.5A	30 mA
RP0008P	8-channel digital output module, PNP type, 24VDC, 0.5A	30 mA
RP0800V	8-channel analog voltage input module	120 mA
RP0800A	8-channel analog current input module	120 mA
RP0008V	8-channel analog voltage output module	220 mA

RP0008A	8-channel analog current output module	30 mA
RP0400V	4-channel analog voltage input module	110 mA
RP0400A	4-channel analog current input module	110 mA
RP0004V	4-channel analog voltage output module	180 mA
RP0004A	4-channel analog current output module	30 mA
RP01EX	Common extension module	/
RP04RD	4-channel thermal resistance, thermocouple temperature acquisition module	100 mA
PR01PW	Power supply expansion module, providing system side 5V power supply and side 18~30V power supply	2000 mA
RP01CO	Terminal resistor module, end cap, must be connected in current design	/
RP01RS	RS232, RS485, RS422, serial communication module	70 mA
RP01ABZ1	24V single-ended incremental encoder counting module	96 mA
RP01ABZ2	5V incremental encoder counting module	96 mA

2.2. Calculation formula for the number of I/O modules connected to the coupler

When calculating the formula for the number of I/O modules connected to a coupler, you need to consider that the coupler is divided into three data areas, namely data area 1, data area 2 and data area 3. Each data area has a predetermined space capacity.

Each time an I/O module is added, each data area of the coupler consumes corresponding data space. When the space in any data area is completely consumed, the coupler will no longer be able to add more I/O modules.

	Data area 1	Data area 2	Data area 3
Coupler available space	892 bytes	8192 bytes	22528 bytes

Bytes consumed by I/O module data area 1

Data area 1 $_{\text{consumes}}$ = 4 + 5 × number of parameters

Bytes consumed by I/O module data area 2

Data area 2 _{consumption} = number of channel names × number of channels + parameter name × number of parameters

Bytes consumed by I/O module data area 3

Data area 3 _{consumption} = 40 × number of channels + 36 × number of parameters

model	Channel name	parameter name	Number of parameters
Digital output	Channel 1(9)	none	0
digital input	Channel 1(9)	Channel Debounce Time(21)	1
Analog output	Channel 1(9)	Range Select Channel1(21)	Number of channels
	Channel 1(0)	Range Select Channel1(21)	Number of channels
Analog input	Channel 1(9)	Filter Channel1(15)	Number of channels

2.2.1. Example

l/O module	Number of channel names	Number of channels	parameter name	Number of parameters	Data area 1 space	Data area 2 space	Data area 3 space
RP1600P	9	16	twenty one	1	-9	-165	-676
Coupler free space remaining			883	8027	21852		
RP0016P	9	16	0	0	-4	-144	-640
Coupler free space remaining				879	7883	21212	

Number of I/O modules that can be connected to coupler data area 1

Number of I/O modules that can be connected to coupler data area 2

Number of I/O modules that can be connected to coupler data area 3

The number of I/O module connections is the minimum of the three calculations above – > the coupler can connect 17 pairs of RP1600P+RP0016P.

The actual number of I/O modules connected by the coupler needs to consider the remaining power consumption of the coupler and the required power consumption of the I/O modules. For details, see <u>3.7.3 and below</u>.

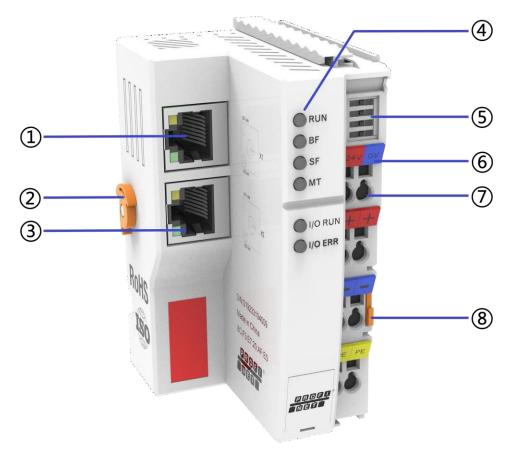
3. Module introduction 3.1. PROFINET coupler-RP00PN

3.1.1. Technical Parameters

PROFINET interface parameters			
Network protocol		Industrial wall	
Number of I/O s	tations	Controller	
Data transmissi	on medium	100Base-TX 2x2 twisted pair copper cable, meeting CAT5 transmission requirements IEEE 802.3	
Transmission ra	ite	100Mbps	
Transmission di	stance	≤100 m (station-to-station distance)	
Entrance interfa	ice	2×RJ45	
Power supply pa	arameters		
Power module Working power 24V DC (18V~30V) supply		24V DC (18V~30V)	
	Output voltage	5 VDC	
	Output current	2A	
Connector module	Working power supply	5 VDC	
	Operating current	≤ 400 mA	
	Output current	1600mA	
General technical parameters			
Specifications and dimensions		100×48×69 mm (see dimensional drawings <u>4.4.1</u> <u>Chapter</u>)	
Weight		180 grams	

Operating temperature	-10°C~+60°C(480)
Storage temperature	-20°C~+75°C(504_)
Relative humidity	95%, no condensation (529_)
Protection level	IP20

3.1.2. Panel structure



serial number	name	illustrate
1	bus interface	RJ45
2	Guide rail rotation buckle	Suitable for DIN 35 mm rail mounting
3	bus interface	RJ45
(4)	Indicator lights and indicator light markings	Indicate module running status
5	Power Indicator	Indicates power status
6	Power channel marking strip	Indicates channel type

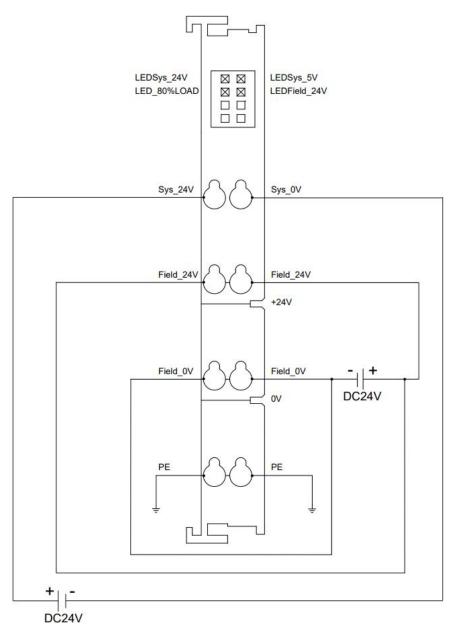
7	Power terminal block	8P snap-type terminal block
8	Module removal pull-out strip	Remove the pull bar

3.1.3. Indicator function

PROFINET coupler identification and indicator lights					
logo	name	color	state	status description	
LEDSys_24V	V Input power g indicator		Always on	Input power access	
			go out	Input power is not connected	
LEDSys_5V	Output power indicator light	green	Always on	5V output power is normal	
			go out	5V output power supply abnormality	
LED_80%LOAD	80% load indicator light	red	Always on	5V power supply output current exceeds 1.6A	
			go out	The output current of the 5V power supply does not exceed 1.6A	
LEDField_24V	Field side power indicator light	green	Always on	On-site power supply access	
			go out	On-site power supply is not connected	
RUN	Running status indicator light	green	Always on	The system is running normally	
			go out	The system is running abnormally or is not powered on	
BF	Network alarm indicator light	red	flashing	Network connection abnormality	
	indicator light		go out	Network connection is normal	
SF	System alarm indicator light	red	Always on	There is an abnormality in the operation of the module	
			go out	The module works without exception	
MT	MAINT maintenance	yellow	Always on	PROFINET diagnostic alarms requiring or requiring maintenance	

	indicator light			status
			go out	PROFINET diagnostic alarms with no maintenance required or required status
I/O RUN	I/O operation indicator light	green	Always on	The system is interacting with process data
			flashing 1Hz	The I/O module is powered on and ready for data exchange.
			go out	I/O module is not powered on
I/O ERR	I/O error light	red	Always on	S-Link communication establishment failed or the slave station is lost
			go out	Initialization state, not powered on or error-free

3.1.4. Power wiring diagram



*Sys is the system side power supply, and Field is the field side power supply. The system side power supply and the field side power supply need to be isolated.

*On-site power supply 24V is internally conductive, 0V is internally conductive, and PE is internally conductive.

*The system side power supply supports reverse connection protection and output short circuit protection.

3.2. EtherCAT coupler-RP00EC 3.2.1. Technical Parameters

EtherCAT interface parameters				
bus protocol		EtherCAT(MDP)		
Number of I/O	stations	According to the main site settings		
data transmiss	ion medium	Ethernet/EtherCAT CAT5 cable		
Transmission r	rate	100Mbps		
Transmission of	distance	≤100 m (distance between stations)		
bus interface		2×RJ45		
Power parame	ters			
Power module	Working power supply	24VDC (18V~30V)		
	The output voltage	5 VDC		
	Output current	2A		
coupler module	Working power supply	5 VDC		
	Working current	≤400 mA		
	Output current	1600mA		
General techni	cal parameters			
Standard sizes		100×48×69 mm (for dimensional drawings, see <u>4.4.1</u> <u>Chapter</u>)		
weight		185g		
Operating temperature		-10°C~+60°C		
storage temperature		-20°C~+75°C		
Relative humid	lity	95%, no condensation		

Protection level	IP20
------------------	------

3.2.2. Parier structure

serial number	name	illustrate
1	Bus interface IN	RJ45
2	Guide rail rotation buckle	Suitable for DIN 35 mm rail mounting
3	Bus interface OUT	RJ45
(4)	Indicator lights and indicator light markings	Indicate module running status
5	Power Indicator	Indicates power status
6	Power channel marking strip	Indicates channel type
7	Power terminal block	8P snap-type terminal block

3.2.2. Panel structure

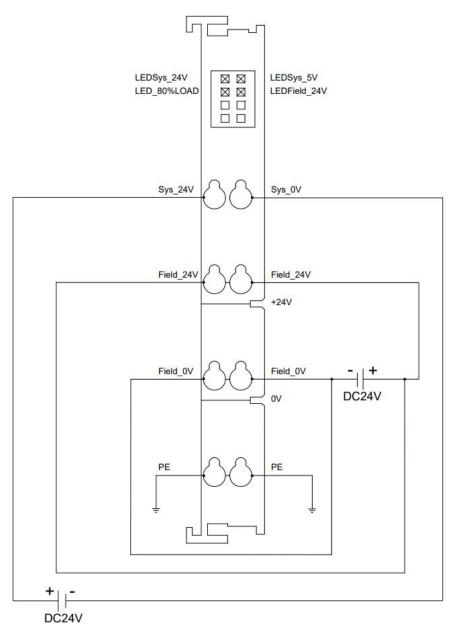
8	Module removal pull-out strip	Remove the pull bar
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3.2.3. Indicator function

EtherCAT coupler identification and indicator lights					
logo	name	color	state	status description	
LEDSys_24V	Input power indicator	green	Always on	Input power access	
	Indicator		go out	Input power is not connected	
LEDSys_5V	Output power indicator light	green	Always on	5V output power is normal	
	mulcator light		go out	5V output power supply abnormality	
LED_80%LOAD	80% load indicator light	red	Always on	5V power supply output current exceeds 1.6A	
			go out	The output current of the 5V power supply does not exceed 1.6A	
LEDField_24V	Field side power indicator light	green	Always on	On-site power supply access	
			go out	On-site power supply is not connected	
RUN	Running status indicator light	green	Always on	EtherCAT OP status	
			Flashing 5Hz	EtherCAT PreOP status	
			Blinking regularly (off for 1s and on for 200ms in a cycle)	EtherCAT SafeOP status	
			go out	Initialization state or not powered on, EtherCAT Init state	
ERR	Alarm indicator light	red	Always on	An abnormality occurs in the coupler	
			go out	Initialization state, not powered on or error-free	

I/O RUN	I/O operation indicator light	green	Always on	The system is interacting with process data
			Flashing 1Hz	The I/O module is powered on and ready for data exchange.
			go out	I/O module is not powered on
I/O ERR	I/O error light	red	Always on	S-Link communication establishment failed or the slave station is lost
			go out	Initialization state, not powered on or error-free

3.2.4. Power wiring diagram



*Sys is the system side power supply, and Field is the field side power supply. The system side power supply and the field side power supply need to be isolated.

*On-site power supply 24V is internally conductive, 0V is internally conductive, and PE is internally conductive.

*The system side power supply supports reverse connection protection and output short circuit protection.

3.3. Digital I/O modules 3.3.1. Technical Parameters

digital input		
Rated voltage	24VDC (18V~30V)	
signal points	8, 16	
signal type	NPN/PNP	
"0" signal voltage (PNP)	-3~+3 V	
"1" signal voltage (PNP)	15~30V	
"0" signal voltage (NPN)	15~30V	
"1" signal voltage (NPN)	-3~+3 V	
Input filtering	3ms	
Input Current	4mA	
Isolation method	Optocoupler isolation	
Isolation withstand voltage	500VAC	
Channel indicator light	Green LED light	
Digital output		
Rated voltage	24VDC (18V~30V)	
signal points	8, 16	
signal type	NPN/PNP	
Load type	Resistive load, inductive load	
Single channel rated current	NPN type Max: 500 mA PNP type Max: 500 mA	

Port protection	Overvoltage and overcurrent protection			
Isolation method	Optocoupler isolation			
Isolation withstand voltage	500VAC			
Channel indicator light	Green LED light			
General technical param	neters			
Standard sizes	8-channel digital I/O module: 100×14.8×66.8 mm (see <u>4.4.3 chapter</u> for dimensional drawings)			
	16-channel digital I/O module: 100×14.8×68.67 mm (see chapter <u>4.4.2</u> for dimension drawings)			
weight	50g			
Operating temperature	-10°C~+60°C			
storage temperature	-20°C~+75°C			
Relative humidity	95%, no condensation			
Protection level	IP20			

3.3.2. Panel structure



3.3.3. Indicator function

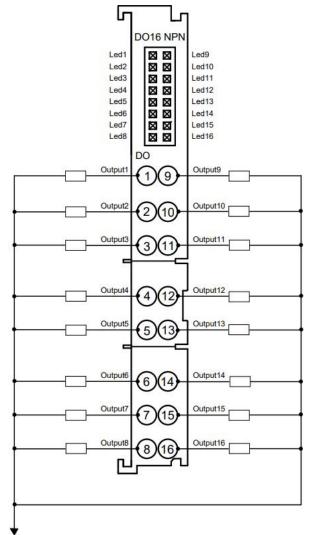
I/O module indicator light description			
logo	color	state	status description
Input channel indicator	green	Always on	The module channel has signal input
Led1~Led8		go out	There is no signal input in the module channel or the signal input is abnormal.
Output channel indicator	green	Always on	The module channel has signal output
Led1~Led8		go out	The module channel has no signal output or the signal output is abnormal.

3.3.4. Wiring diagram

3.3.4.1. 16-channel digital output (NPN)-RP0016N

Wiring diagram

16-channel digital output (NPN)-RP0016N





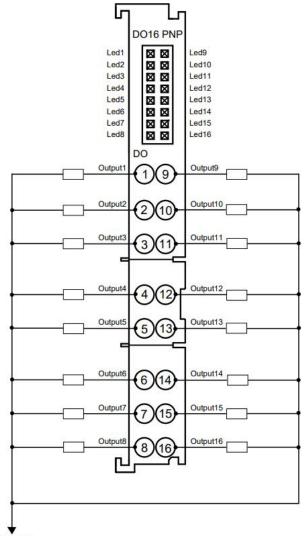
*The load power supply must be the same power supply as the field side power supply of the front-end power module.

*All channel loads must come from the same source, and channels are not isolated.

*Digital I/O modules support output overcurrent protection.

3.3.4.2. 16-channel digital output (PNP)-RP0016P

16-channel digital output (PNP)-RP0016P



Field_0V

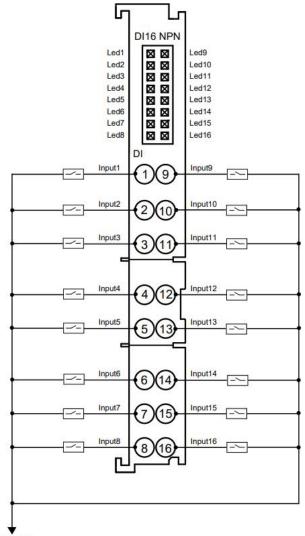
*The load power supply must be the same power supply as the field side power supply of the front-end power module.

*All channel loads must come from the same source, and channels are not isolated.

*Digital I/O modules support output overcurrent protection.

3.3.4.3. 16-channel digital input (NPN)-RP1600N

16-channel digital input (NPN)-RP1600N



Field_0V

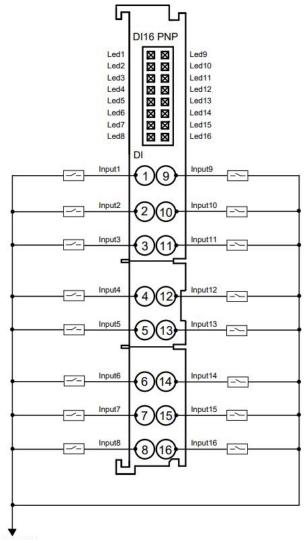
*The load power supply must be the same power supply as the field side power supply of the front-end power module.

*All channel loads must come from the same source, and channels are not isolated.

*Digital I/O modules support output overcurrent protection.

3.3.4.4. 16-channel digital input (PNP)-RP1600P

16-channel digital input (PNP)-RP1600P



Field_24V

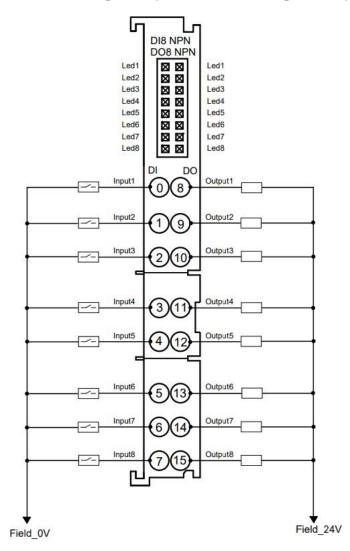
*The load power supply must be the same power supply as the field side power supply of the front-end power module.

*All channel loads must come from the same source, and channels are not isolated.

*Digital I/O modules support output overcurrent protection.

3.3.4.5. 8-channel digital input, 8-channel digital output (NPN)-RP0808N

8-channel digital input, 8-channel digital output (NPN)-RP0808N



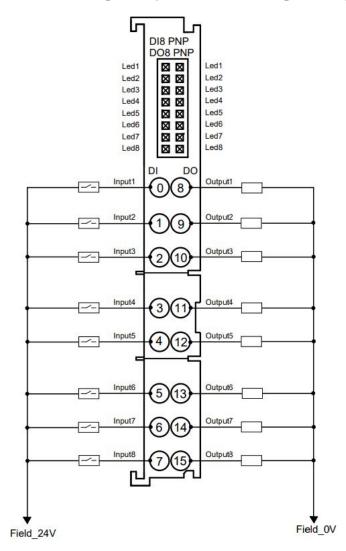
*The load power supply must be the same power supply as the field side power supply of the front-end power module.

*All channel loads must come from the same source, and channels are not isolated.

*Digital I/O modules support output overcurrent protection.

3.3.4.6. 8-channel digital input, 8-channel digital output (PNP)-RP0808P

8-channel digital input, 8-channel digital output (PNP)-RP0808P



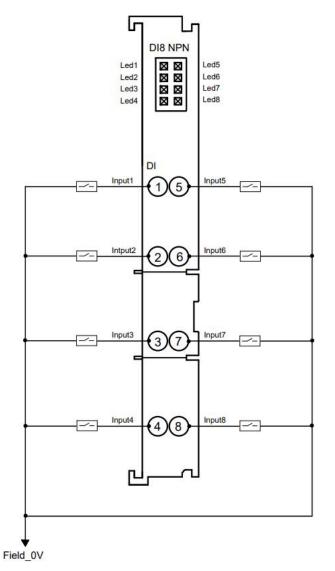
*The load power supply must be the same power supply as the field side power supply of the front-end power module.

*All channel loads must come from the same source, and channels are not isolated.

*Digital I/O modules support output overcurrent protection.

3.3.4.7. 8-channel digital input (NPN)-RP0800N

8-channel digital input (NPN)-RP0800N



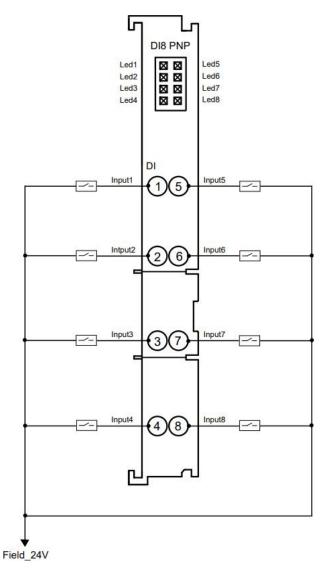
*The load power supply must be the same power supply as the field side power supply of the front-end power module.

*All channel loads must come from the same source, and channels are not isolated.

*Digital I/O modules support output overcurrent protection.

3.3.4.8. 8-channel digital input (PNP)-RP0800P

8-channel digital input (PNP)-RP0800P



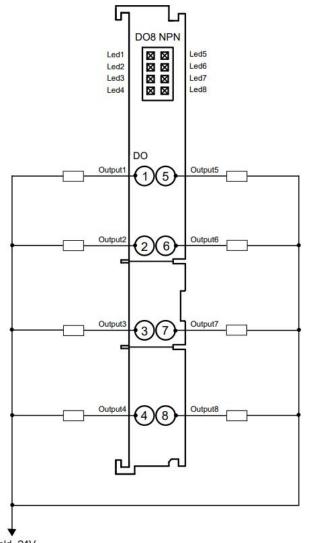
*The load power supply must be the same power supply as the field side power supply of the front-end power module.

*All channel loads must come from the same source, and channels are not isolated.

*Digital I/O modules support output overcurrent protection.

3.3.4.9. 8-channel digital output (NPN)-RP0008N

8-channel digital output (NPN)-RP0008N



Field_24V

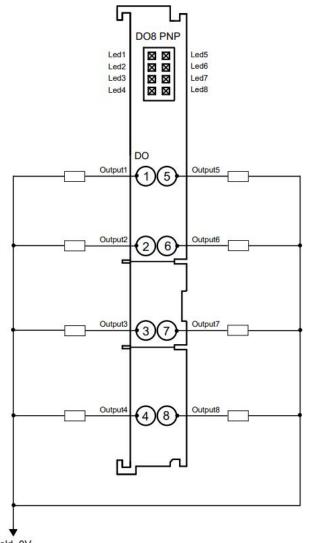
*The load power supply must be the same power supply as the field side power supply of the front-end power module.

*All channel loads must come from the same source, and channels are not isolated.

*Digital I/O modules support output overcurrent protection.

3.3.4.10. 8-channel digital output (PNP)-RP0008P

8-channel digital output (PNP)-RP0008P



Field_0V

*The load power supply must be the same power supply as the field side power supply of the front-end power module.

*All channel loads must come from the same source, and channels are not isolated.

*Digital I/O modules support output overcurrent protection.

3.4 Analog I/O modules 3.4.1. Technical Parameters

Analog input					
Enter points	4, 8	4, 8			
Input signal (voltage type)	0~+10 V, -10 V~+10 V (range	e adjustable)[1]			
Input signal (current type)	0~20 mA, 4~20 mA (range a	djustable)			
Input signal type	single ended signal				
resolution	16 bits				
Sampling rate (all channels)	4/8-channel analog voltage and current input module	RP0800V, RP0400V RP0800A, RP0400A	≤1ksps		
Accuracy	4/8-channel analog voltage and current input module RP0800V, RP0400V RP0800A, RP0400A		±0.2%		
Input filtering	10 times (filtering times are a	adjustable)	Smoothing series 1~200		
Input impedance (voltage type)	≥2 kΩ	≥2 kΩ			
Input impedance (current type)	100Ω				
Isolation withstand voltage	500VAC				
Channel indicator light	Green LED light	Green LED light			
Analog output	Analog output				
Output points	4, 8				
Output signal (voltage type)	0~+10 V, -10~+10 V (range adjustable)				
Output signal (current type)	0~20 mA, 4~20 mA (range a	djustable)			

resolution	12 bits			
Accuracy	4/8-channel analog voltage and current output module	RP0008V, RP0004V RP0008A, RP0004A	±0.2%	
Load impedance (voltage type)	≥2 kΩ			
Load impedance (current type)	≤500Ω			
Isolation withstand voltage	500VAC	500VAC		
Channel indicator light	Green LED light			
General technical par	ameters			
Standard sizes	4-channel analog I/O module dimensional drawings)	: 100×14.8×66.8 mm (see	4.4.3 chapter for	
	8-channel analog I/O module dimension drawings)	8-channel analog I/O module: 100×14.8×68.67 mm (see chapter <u>4.4.2</u> for dimension drawings)		
weight	50g			
Operating temperature	-10°C~+60°C			
storage temperature	-20°C~+75°C			
Relative humidity	95%, no condensation			
Protection level	IP20			

Note [1]: The analog voltage module does not support overflow and overshoot, and the analog current module supports overflow and overshoot.

3.4.1.1. Voltage input/output range selection and code value table

Voltage input/output range selection and code value table

Voltage input/output range selection and code value range				
Range selection	0	1	2	3

Measuring range	-10 V~+10 V	0~+10V	-10 V~+10 V	0~+10V
Code value range	-32768~32767	0~32767	-27648~27648	0~27648
Voltage input calculation formula	D=(65535/20)*U	D=(32767/10)*U	D=(55296/20)*U	D=(27648/10)*U
Voltage output calculation formula	U=(D*20)/65535	U=(D*10)/32767	U=(D*20)/55296	U=(D*10)/27648
Code value correspondence table	See Table 3-1 Voltage code value table .			

Note: D represents code value, U represents voltage.

Table	3-1	Voltage	code	value	table
-------	-----	---------	------	-------	-------

	0 (default)	1	2	3
	-10 V~+10 V	0~+10V	-10 V~+10 V	0~+10V
Range Voltage	code value	code value	code value	code value
-10	-32768	-	-27648	-
-9	-29491	-	-24883	-
-8	-26214	-	-22118	-
-7	-22937	-	-19354	-
-6	-19661	-	-16589	-
-5	-16384	-	-13824	-
-4	-13107	-	-11059	-
-3	-9830	-	-8294	-
-2	-6554	-	-5530	-
-1	-3277	-	-2765	-
0	0	0	0	0
1	3277	3277	2765	2765

2	6554	6553	5530	5530
3	9830	9830	8294	8294
4	13107	13107	11059	11059
5	16384	16384	13824	13824
6	19661	19660	16589	16589
7	22937	22937	19354	19354
8	26214	26214	22118	22118
9	29491	29490	24883	24883
10	32767	32767	27648	27648
	Code value = (65535/20) *Voltage	Code value = (32767/10) *Voltage	Code value = (55296/20) *Voltage	Code value = (27648/10) *Voltage
	Voltage = (code value * 20) /65535	Voltage = (code value * 10) /32767	Voltage = (code value * 20) /55296	Voltage = (code value * 10) /27648

Note: In the analog voltage input module, when the channel input voltage exceeds 10V, the maximum code value is displayed. Analog voltage output module, when the code value setting exceeds the maximum code value corresponding to the range in the table, all channels will output 10V voltage.

3.4.1.2. Current input/output range selection and code value table

Current input/output range selection and code value table

Current input and output range selection and code value range				
Range selection	0	1	2	3
Measuring range	4~20mA	0~20mA	4~20mA	0~20mA
Code value range	0~65535		0~27648	
Current input calculation formula	D=65535/16*l- 16384	D=(65535/20)*I	D=(27648/16)*l- 6912	D=(27648/20)*I

Current output calculation formula	I=(D+16384)*16/ 65535	I=(D*20)/65535	I=((D+6912)*16)/ 27648	I=(D*20)/27648
Code value correspondence table	See Table 3-2 Current Code Value Table .			

Note: D represents code value, I represents current.

 Table 3-2 Current code value table

/	0 (default)	1	2	3
	4~20mA	0~20mA	4~20mA	0~20mA
Range selection range current	code value	code value	code value	code value
0	-	0	-	0
1	-	3277	-	1382
2	-	6554	-	2765
3	-	9830	-	4147
4	0	13107	0	5530
5	4096	16384	1728	6912
6	8192	19661	3456	8294
7	12288	22937	5184	9677
8	16384	26214	6912	11059
9	20479	29491	8640	12442
10	24575	32768	10368	13824
11	28671	36044	12096	15206
12	32767	39321	13824	16589
13	36863	42598	15552	17971

14	40959	45875	17280	19354
15	45055	49151	19008	20736
16	49151	52428	20736	22118
17	53247	55705	22464	23501
18	57343	58982	24192	24883
19	61439	62258	25920	26266
20	65535	65535	27648	27648
twenty one	65535	65535	29376	29030
twenty two			31104	30413
22.81			32511	31538
22.96			32767	31743
twenty three				31795
23.52				32511
23.70				32767
twenty four				
25				
	Code value=65535/16* current-16384	Code value = (65535/20) *Current	Code value = (27648/16) *Current- 6912	Code value = (27648/20) *Current

Note: When the input current of range 2 is >22.81 mA, the code value displays 32767; when the specified code value is >32511, the output current is 22.81 mA. In range 3, when the input current is >23.52 mA, the code values all display 32767; when the specified code value is >32511, the output current is 23.52 mA.

3.4.2. Panel structure



3.4.3. Indicator function

I/O module indicato	I/O module indicator light description			
logo	color	state	status description	
Input channel indicator	green	Always on	The module channel has signal input	
Led1~Led8		go out	There is no signal input in the module channel or the signal input is abnormal.	
Output channel indicator	green	Always on	The module channel has signal output	
Led1~Led8		go out	The module channel has no signal output or the signal output is abnormal.	

Note: When the input and output values of the analog module are within one thousandth of the range code value, the channel indicator light does not light up. When the maximum code value is 27648, the indicator light does not light up within the code value range of -55.296~55.296;

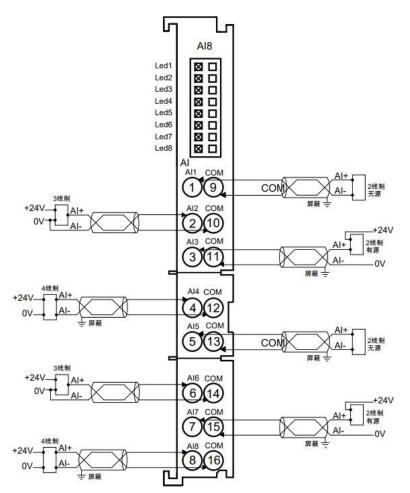
When the maximum code value is 65535, the indicator light does not light up within the code value range of -65.535~65.535; when the maximum code value is 32767, the indicator light does not light up within the code value range of -65.535~65.535.

3.4.4 Wiring diagram

3.4.4.1. 8-channel analog voltage/current input module-RP0800V/RP0800A

Wiring diagram

8-channel analog voltage/current input module-RP0800V/RP0800A



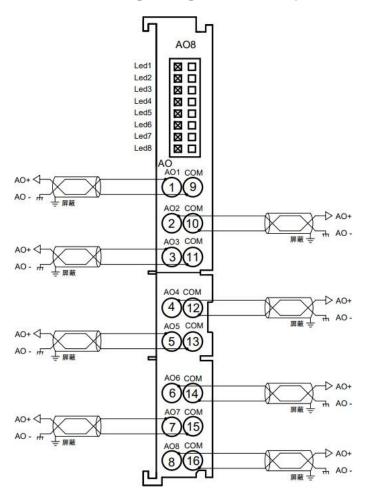
*COM terminal is internally conductive.

*All channel loads must come from the same source, and channels are not isolated.

*Analog I/O modules support input overvoltage protection.

3.4.4.2. 8-channel analog voltage/current output module-RP0008V/RP0008A

8-channel analog voltage/current output module-RP0008V/RP0008A

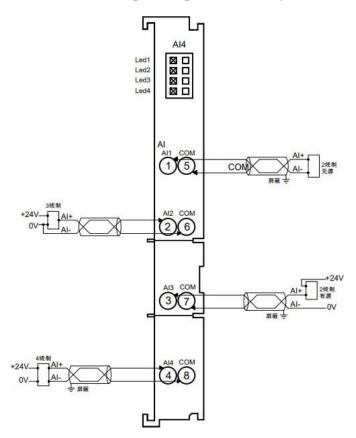


*COM terminal is internally conductive.

*All channel loads must come from the same source, and channels are not isolated.

3.4.4.3. 4-channel analog voltage/current input module-RP0400V/RP0400A

4-channel analog voltage/current input module-RP0400V/RP0400A



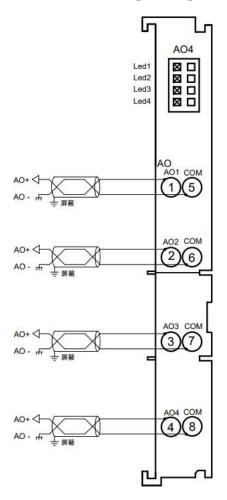
*COM terminal is internally conductive.

*All channel loads must come from the same source, and channels are not isolated.

*Analog I/O modules support input overvoltage protection.

3.4.4.4. 4-channel analog voltage/current output module-RP0004V/RP0004A

4-channel analog voltage/current output module-RP0004V/RP0004A

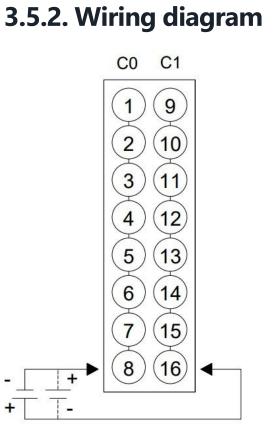


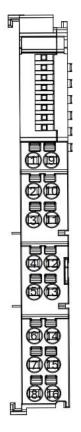
*COM terminal is internally conductive.

*All channel loads must come from the same source, and channels are not isolated.

3.5. Common module 3.5.1. Technical Parameters

Common terminal				
Rated voltage	DC36V & AC36V MAX			
Rated current	8A			
Number of public terminals	2 sets (8Pin/CH)			
General technical parameters				
Standard sizes	100×14.8×68.67 mm (for dimensional drawings, see <u>4.4.2</u> <u>Chapter</u>)			
weight	45g			
Operating temperature	-10°C~+60°C			
storage temperature	-20°C~+75°C			
Relative humidity	95%, no condensation			
Protection level	IP20			





*C0一列内部导通;C1一列内部导通

3.6. Temperature acquisition module

3.6.1. Technical Parameters

Temperature input						
Number of channels	4					
sensor type	Thermocouple	Thermal resistance	resistance			
Connection method	2 wire system	2-wire, 3-wire system	2 wire system			
	K: -200~1370°C J: - 200~1200°C E: -200~1000°C S: -50~1690°C B: 50~1800°C	Pt100: -200~850°C Pt200: -200~600°C Pt500: -200~600°C Pt1000: -200~600°C	15Ω~3kΩ			
Accuracy	±0.3% ±1°C		±0.1%			
Sensitivity	0.1°C ±0.1Ω					
resolution	16 bit (int type)					
Conversion time (when the filtering level of all channels is 1)	40ms/4ch 125ms/4ch					
filter	Single channel filtering, configurable (number of levels 1 to 10)					
Channel indicator light	Green LED light					
General technical parameters						
Standard sizes	100×14.8×68.67 mm (for dimensional drawings, see <u>4.4.2 Chapter</u>)					
weight	50g					
Operating temperature	-10°C~+60°C					

storage temperature	-20°C~+75°C
Relative humidity	95%, no condensation
Protection level	IP20

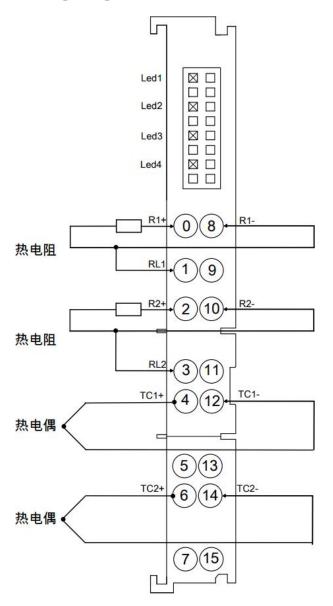
3.6.2. Indicator function

Indicator light function

Module indicator light description				
logo	color	state	status description	
Channel indicator light	green	Always on	The channel is enabled and the sensor is connected normally	
Led1~Led4		go out	The channel is prohibited or the sensor is not connected properly.	

3.6.3. Wiring diagram

Wiring diagram



3.7. Extended power module

The power module is used with products of the same series to provide stable power for the internal circuit of the IO module. The housing is consistent with the 8-channel I/O module.

3.7.1. Technical Parameters

Power parameters	
Working power supply	24VDC (18V~30V)
The output voltage	5 VDC
Output current	2A
General technical parame	eters
Standard sizes	100×14.8×66.8 mm (for dimensional drawings, see <u>4.4.3 Chapter</u>)
weight	55g
Operating temperature	-10°C~+60°C
storage temperature	-20°C~+75°C
Relative humidity	95%, no condensation
Protection level	IP20

3.7.2. Indicator function

Expansion power module indicator light				
logo	name	color	state	status description
LEDSys_24V	Input power indicator	green	Always on	Input power access
			go out	Input power is not connected
LEDSys_5V	Output power indicator light	green	Always on	5V output power is normal
			go out	No output power
LED_80%LOAD	80% load indicator light	red	Always on	5V power supply output current exceeds 1.6A
			go out	The output current of the 5V power supply does not exceed 1.6A
LEDField_24V	Field side power indicator light	green	Always on	On-site power supply access
			go out	On-site power supply is not connected

3.7.3. I/O module power consumption calculation

When combining multiple I/O modules, the power consumption of each I/O module must be fully considered. If the coupler's own power supply cannot meet the needs of the combined I/O modules, an additional expansion power module must be added to ensure stable and reliable power supply for the internal circuits of the I/O modules.

Coupler connection I/O module power consumption calculation

When the "80% load indicator" of the coupler lights up, an expansion power module needs to be added to ensure stable and reliable power supply for the internal circuit of the I/O module.

When adding a new expansion power module, only additional current will be added without being superimposed on the previous residual current.

Calculation of power consumption of extended power module connected to I/O module

When the "80% load indicator" of the expansion power module lights up, an expansion power module needs to be added to ensure stable and reliable power supply for the internal circuit of the I/O module. When adding a new expansion power module, only additional current will be added without being superimposed on the previous residual current.

Sorting after module insertion	I/O module	Required power consumption	remaining power consumption
00	RP00EC	0mA	1600mA
01, 02, 03	3*RP0016P	120mA	1480mA
04, 05, 06	3*RP1600P	90mA	1390mA
07	PR01PW	0	2000mA
08	RP0016P	40mA	1960mA
09	PR01PW	0	2000mA
10	RP0016P	40mA	1960mA

3.7.3.1 Example

Note: When adding a new expansion power module, only additional current will be added and will not be superimposed on the previous residual current.

The actual number of I/O modules connected to the coupler needs to take into account the remaining data space bytes of the coupler. For details, see <u>2.2 and above</u>.

3.8. Serial communication module

The plug-in 1-channel serial communication module adopts S-Link bottom bus and is adapted to the RP series coupler. Through different function blocks, it can realize the three major serial communication functions of Modbus master-slave station, Freeport and transparent transmission. The module occupies a small space. , data interaction processing is simple and can meet the serial communication needs of different application scenarios.

3.8.1. Technical Parameters

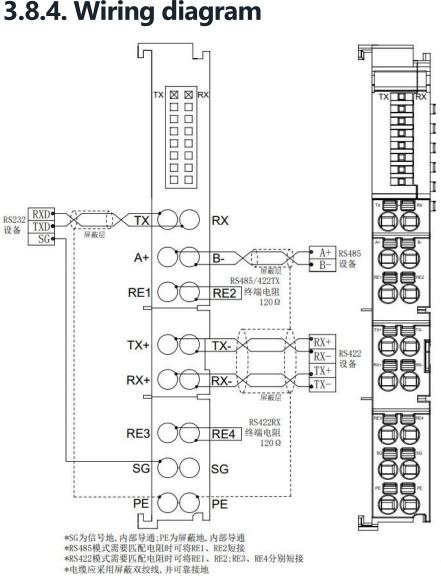
Interface parameters	
bus protocol	bus protocol
Process data volume: Downstream	Process data volume: Downstream
Process data volume: Upstream	Process data volume: Upstream
Technical Parameters	
Number of channels	1 channel
Communication mode	MRM/MRS/MAM/MAS/FP/PT
Communication interface type	RS232, RS485, RS422
Protocol	Modbus RTU, Modbus ASCII
baud rate	1200bps~115200bps
power	70mA@5VDC
weight	50g
size	100×14.8×68.67mm
Operating temperature	-10°C~+60°C
storage temperature	-20°C~+75°C
Relative humidity	95%, no condensation
Protection level	IP20

3.8.2. Panel structure



3.8.3. Indicator function

name	logo	color	state	status description
Input channel indicator	RX	green	flashing	The channel has data reception
			go out	No data reception on channel
Output channel indicator	ТΧ	green	flashing	The channel has data to send
			go out	No data is sent on the channel



3.8.4. Wiring diagram

Wiring diagram

name	logo	color	state	status description
Input channel indicator	RX	green	flashing	The channel has data reception
			go out	No data reception on channel
Output channel indicator	ТΧ	green	flashing	The channel has data to send
			go out	No data is sent on the channel

3.9. 24V single-ended incremental encoder counting module

The plug-in encoder counting module can be connected to an external 24V single-ended incremental encoder. The module supports Z phase clearing, comparison output, probe latch and other functions.

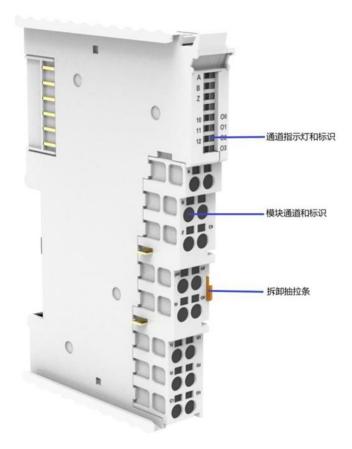
3.9.1. Technical Parameters

Interface parameters	
bus protocol	S-Link
Process data volume: Downstream	10 Bytes
Process data volume: Upstream	18 Bytes
Channel type	Encoder input channel: 1 set of channels (A phase, B phase and Z phase), PNP/NPN
	Probe input channel: 2 channels, PNP/NPN
	Ordinary digital input channels: 1 channel, PNP/NPN
	Comparison output channels: 2 channels, NPN
	Ordinary digital output channels: 2 channels, NPN
refresh rate	1ms
Technical Parameters	
System input power	5VDC
Field side power supply rating (range)	24VDC (18V~36V)
Input channel voltage rating (range)	24VDC (15V~30V)
Encoder pulse input mode	AB quadrature (ABZ), direction pulse (Pul+Dir), double pulse (CW/CCW)

Encoder pulse input frequency	1MHz
Report channel real-time speed	support
Z phase clear	support
Counting magnification setting	4x/2x/1x (default 1x)
ring count	support
Counting range	0~2^32-1 or 0~ring counting resolution×counting magnification-1
Encoder ring count resolution setting[1]	Supported (ring counting resolution setting range is 0~65535)
Count initial value setting	Supported (the initial counting value setting range is 0~2^32- 1)
count backwards	support
Encoder input hardware filtering	Support (level 0~15)
Probe function (high-speed hardware latch)	support
Probe input frequency	1MHz
Compare output function	support
Compare output signal response speed	50us
Input and output pin function selection	support
Power-off storage	support
Dimensions	100×14.8×68.67mm
weight	50g
Wiring	Screwless quick plug
Installation method	DIN 35mm rail mounting
Operating temperature	-10°C~+60°C

storage temperature	-20°C~+75°C
Relative humidity	95%, no condensation
Protection level	IP20

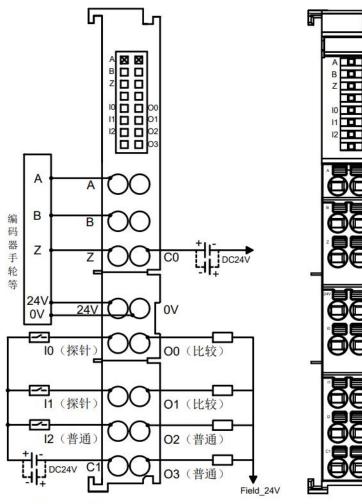
3.9.2. Panel structure



3.9.3. Indicator function

name	logo	color	state	status description
Encoder input AB phase indicator light	А	green	Always on	Encoder is enabled
	В		go out	Encoder is not enabled
Encoder input Z phase indicator light	Z	green	Always on	Encoder Z phase clear function is enabled
			go out	Encoder Z phase clear function is not enabled
Input channel indicator	10~12	green	Always on	The channel has signal input
			go out	Channel has no signal input
Output channel indicator	00~03	green	Always on	The channel has signal output
			go out	Channel has no signal output

3.9.4. Wiring diagram



*编码器ABZ相NPN/PNP兼容,公共端为C0 *输入点NPN/PNP兼容,公共端为C1 *输出点为NPN 0

02

3.10. 5V differential incremental encoder counting module

The plug-in encoder counting module can be connected to an external 5V differential incremental encoder. The module supports Z phase clearing, comparison output, probe latch and other functions.

3.10.1. Technical Parameters

Interface parameters		
bus protocol	S-Link	
Process data volume: Downstream	10 Bytes	
Process data volume: Upstream	18 Bytes	
Channel type	Encoder input channel: 1 set of channels (A phase, B phas and Z phase), PNP/NPN	
	Probe input channel: 2 channels, PNP/NPN	
	Ordinary digital input channels: 1 channel, PNP/NPN	
	Comparison output channels: 2 channels, NPN	
	Ordinary digital output channels: 2 channels, NPN	
refresh rate	1ms	
Technical Parameters		
System input power	5VDC	
Field side power supply rating (range)	24VDC (18V~36V)	
Input channel voltage rating (range)	5VDC (differential)	
Encoder pulse input mode	AB quadrature (ABZ), direction pulse (Pul+Dir), double pulse (CW/CCW)	
Encoder pulse input frequency	1MHz	

Report channel real-time speed	support
Z phase clear	support
Counting magnification setting	4x/2x/1x (default 1x)
ring count	support
Counting range	0~2^32-1 or 0~Ring counting resolution×counting magnification-1
Encoder ring count resolution setting[1]	Supported (ring counting resolution setting range is 0~65535)
Count initial value setting	Supported (the initial counting value setting range is 0~2^32-1)
count backwards	support
Encoder input hardware filtering	Support (level 0~15)
Probe function (high-speed hardware latch)	support
Probe input frequency	1MHz
Compare output function	support
Compare output signal response speed	50us
Input and output pin function selection	support
Power-off storage	support
Dimensions	100×14.8×68.67mm
weight	50g
Wiring	Screwless quick plug
Installation method	DIN 35mm rail mounting
Operating temperature	-10°C~+60°C
storage temperature	-20°C~+75°C

Relative humidity	95%, no condensation
Protection level	IP20

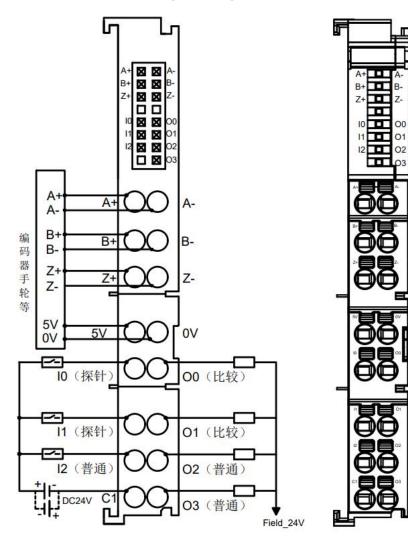
3.10.2. Panel structure



3.10.3. Indicator function

name	logo	color	state	status description
Encoder input AB phase indicator light	A+/A-	green	Always on	Encoder is enabled
	B+/B-		go out	Encoder is not enabled
Encoder input Z phase indicator light	Z+/Z-	green	Always on	Encoder Z phase clear function is enabled
			go out	Encoder Z phase clear function is not enabled
Input channel indicator	10~12	green	Always on	The channel has signal input
			go out	Channel has no signal input
Output channel indicator	00~03	green	Always on	The channel has signal output
			go out	Channel has no signal output

3.10.4. Wiring diagram



*输入点NPN/PNP兼容,公共端为C1 *输出点为NPN

4. Installation and removal 4.1. Installation guide

Installation\disassembly precautions

- Make sure the cabinet has good ventilation measures (such as installing an exhaust fan in the cabinet).
 - Do not install this device next to or above equipment that may cause overheating.
- Be sure to install the module vertically and maintain air circulation around it (there should be at least 50mm of air circulation space above and below the module).
- After the module is installed, be sure to use the fixing buckle on the left side of the coupler module to secure the module.
- Installation/disassembly must be performed with the power supply turned off.
- Be sure to install it on a fixed rail.

4.2. Installation and disassembly steps

Module installation a	Module installation and removal					
Module installation	1. Install the coupler power module on the fixed rail first.					
steps	2. Install the required I/O modules or function modules on the right side of the power module in sequence.					
3. After installing all required modules, install the end caps to the module assembly.						
	4. Rotate the orange fixing buckle on the left side of the coupler module to secure the module.					
Module removal steps	1. When disassembling a module individually, you can directly pull the orange pull-out bar of the module outward.					
	2. Continue to pull the orange pull-out bar to disassemble and pull out the module directly.					
	3. If you need to replace the module, just insert the new module into the empty space after disassembly.					

4.3. Installation diagram

• Coupler power module and I/O module installation steps

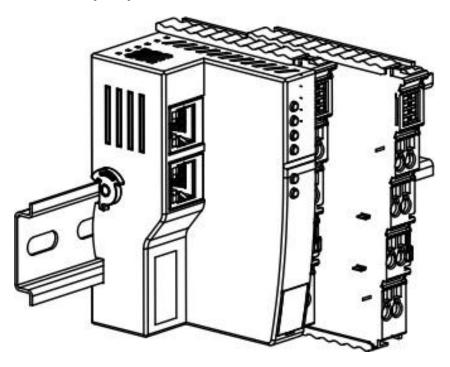
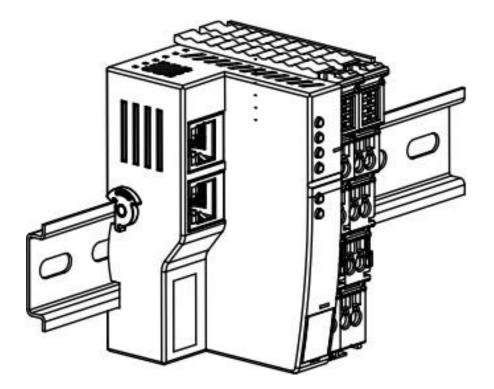


Figure ①

Align the coupler power module vertically with the guide rail slot, push it in place, and install the I/O modules on the right side in sequence, aligning them with the right side of the power module, as shown in ① on the left.



Figure(2)

As shown in Figure ②, push the I/O module firmly toward the rail. When you hear a "click" sound, the module is installed in place.

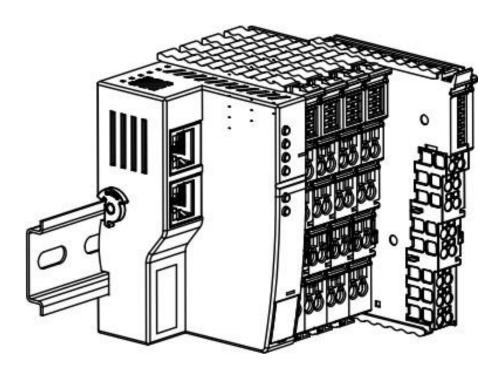


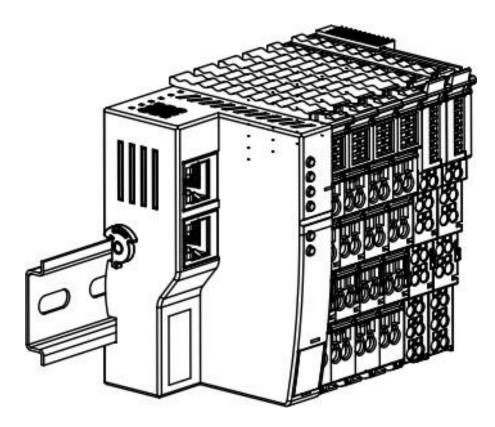
Figure ③

Install the required I/O modules or function modules one by one, align the left card slot of the module with the rightmost side of the installed module, and push it in as shown in Figure ③. When you hear a "click" sound, the module is installed in place.

- End cover installation steps

Figure ④

Install the end cover on the right side of the last module, aligning the groove side of the end cover with the guide rail, as shown in Figure ④. For the installation method, please refer to the installation method of the I/O module. After the end cover is pushed in place, as shown in Figure (5).



Picture (5)

• Disassembly steps

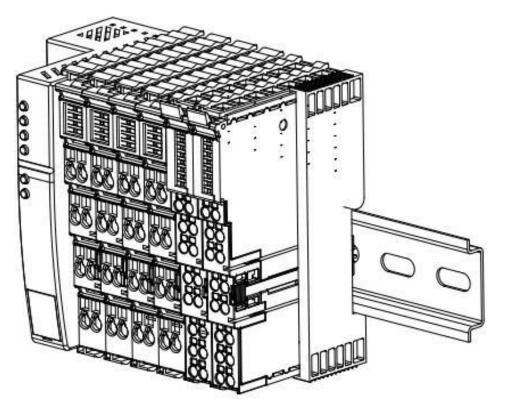


Figure6

You can directly pull out the orange pull-out bar of the module to be removed or replaced, as shown in Figure 6.

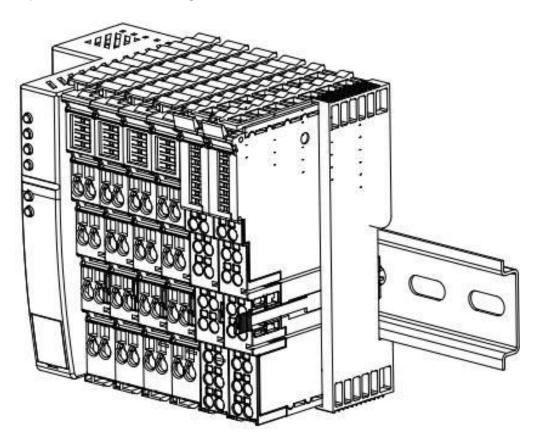


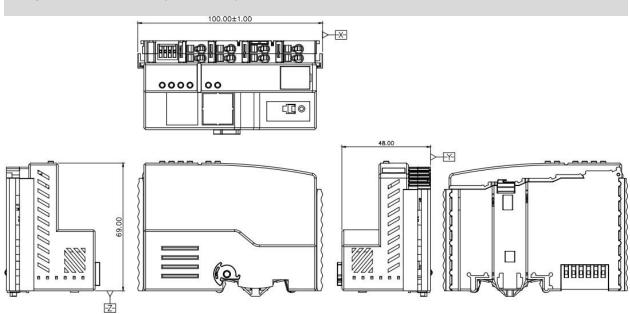
Figure 7

After the orange pull-out bar is pulled out, continue to pull out, as shown in Figure ⑦, and the module can be pulled out directly.

4.4. Dimensions

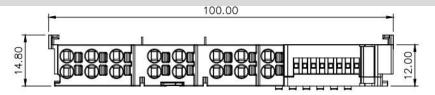
4.4.1. Coupler dimensions

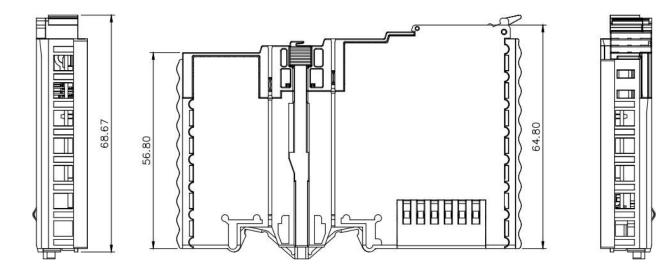
Coupler dimensions (unit: mm)



4.4.2. 16 Channel Cage Housing Dimensions

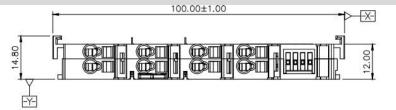
16-channel I/O module, common terminal module, temperature acquisition module outline specifications (unit: mm)

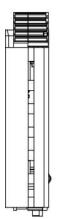


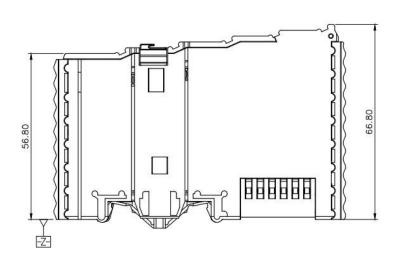


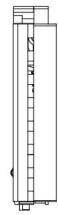
4.4.3. 8-Channel Cage Housing Dimensions

8-channel I/O module, power module and extended power module outline specifications (unit: mm)

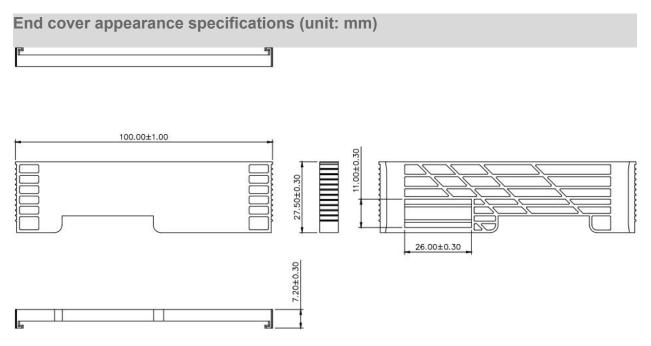








4.4.4. Terminal Bezel Module Dimensions



Note: They are all installed using DIN 35 mm standard rails. The DIN rail specifications are 35*7.5*1.0 and 35*15*1.0 (unit: mm).

5. wiring

5.1. Terminals

Terminals					
Power module terminals	Number of poles	8P 28~12 AWG 0.2~2.5 mm ²			
	Wire diameter				
I/O module terminals	Number of poles	8 channel cage housing	8P		
		16 channel cage housing	16P		
	Wire diameter	8 channel cage housing	28~12 AWG 0.2~2.5 mm ²		
		16 channel cage housing28~16 AWG 0.2~ mm²			
bus interface	2×RJ45	Category 5 or above UTP or STP (STP recommended)			

5.2. Wiring Instructions and Requirements

Power wiring precautions

- The module system side power supply and the field side power supply must be configured and used separately. Do not mix them.
- PE must be reliably grounded.

Wiring tool requirements

5

The power terminals and I/O module signal cable terminals adopt a screw-free design, and the cables can be installed and removed using a flat-blade screwdriver (specification: ≤3mm).

Stripping length requirements





The recommended cable stripping length for power and signal wire terminals is 8~9 mm.

Wiring method

For single-strand hard wires, after peeling off the corresponding length of wire, press down the spring tab and insert the single-strand wire.





Multi-stranded flexible wires, after stripping the wires of corresponding length, can be directly connected or used with corresponding standard cold-pressed terminals (tubular insulated terminals, reference specifications are shown in the table below), press down the spring tab and insert the wire at the same time.

The specifications of power terminals and signal wire terminals are as shown in the following table:

Specification table of tubular insulating terminals					
Specification requirements	model	Wire cross-sectional area mm ²			
	E0308	0.3			
	E0508	0.5			
The length of the tubular insulated terminal L is 8 mm	E7508	0.75			
	E1008	1.0			
	E1508	1.5			
	E2508	2.5			

6. use

6.1. Parameter Description 6.1.1. Output signal clear/hold

The clear/hold function is for modules with output channels. This function can configure the output action of the module when communication is disconnected. Clear output: When communication is disconnected, the module output channel automatically clears the output.

Keep output: When communication is disconnected, the module output channel always keeps output.

The EtherCAT coupler keeps the output by default, and the PROFINET coupler clears the output by default.

6.1.2. Digital input filtering

Digital input filtering prevents the program from responding to unexpected rapid changes in the input signal, which may occur due to switch contact jumps or electrical noise. The current default configuration of digital input filtering is 3ms, and the supported setting range is 0~20ms. When configured to 3ms, clutter within 3ms can be filtered out, and channels cannot be configured individually.

An input filter time of 3 ms means that a single signal changes from "0" to "1", or from "1" to "0" for 3 ms before it can be detected, while a single high pulse or low pulse shorter than 3 ms will not be detected.

6.1.3. Analog filter settings

Analog input filter function

The analog input filtering function can average the A/D converted data internally to reduce the impact of fluctuations on the input signal due to noise, etc.

The analog input performs moving average processing with the specified number of A/D conversions.

Filter function configuration

Each channel can be configured independently, configuration range: 1~200, default 10 times.

The sampling rate of the 8-channel module is: 1.25KHz/8 channels (800us/8 channels);

The sampling rate of the 4-channel module is: 2.5KHz/4 channels (400us/4 channels).

6.1.4. Analog range configuration

The analog range setting function is used to set the range of the analog quantity (for details on the range, see <u>3.4.1 Technical Parameters</u>).

This manual uses TIA Portal V18 as an example to introduce the parameter configuration method of the PROFINET coupler + I/O module combination. For detailed steps, see Chapter <u>6.2.1 Parameter settings</u>, after modification is completed, power must be turned on again.

This manual uses CODESYS as an example to introduce the parameter configuration method of the EtherCAT coupler + I/O module combination. For specific steps, please refer to the parameter settings in chapter 6.2.1. After the modification is completed, it is recommended to power on again.

6.1.5. Temperature acquisition module configuration

Sensor type selection

The module supports sensor type configuration function. The same module only supports the same type of sensors, and a single channel cannot be configured.

Note: The default sensor type is PT100.

Filter function

A single channel of the module can filter each measured value through the filtering function, and perform sliding average processing on the first N collected data to reduce the jitter range of the measured values and improve stability and accuracy.

Filtering time = number of module cycles (N) × module cycle time

Module cycle time = conversion time + disconnection detection time

Remarks: ① N configuration range is 1~10.

② Default setting of filter parameters: 1/time.

Channel enable function

The module can determine whether the channel is used through the "enable/disable" parameter settings. If the channel is set to not be used, the channel is disabled and - 9999 will not be displayed regardless of whether the sensor is connected or not.

Note: All channels are set to Disable by default at the factory.

The temperature acquisition module is enabled by default after being successfully connected to the XB6-El0002 and XB6-CB0002 couplers.

Disconnection detection

Thermocouples (TC), resistance thermal sensors (RTD) and resistance sensors all support disconnection detection, and will display -9999 when disconnected.

Temperature/resistance data collection

The upstream data (Input) of the temperature module is the temperature or resistance data collected by each channel. The data of each channel is a 2-byte signed integer. The collected data is 10 times the actual data. Divide the read data by 10 to get the real temperature or resistance value in °C or Ω .

Data compensation function

The downstream data (Output) of the module is a manual compensation function for each channel data, and the data compensation value can be input according to actual needs. After setting the compensation value, the compensated temperature or resistance value will be automatically calculated in the upstream data (Input), that is, the upstream data is the final compensated temperature or resistance data. Divide the read data by 10 to obtain the compensated temperature or resistance value in °C or Ω .

6.2. PROFINET coupler configuration application

6.2.1. Application in TIA Portal V18 software environment

1. Preparation

- Hardware environment
- Module preparation, this description uses PROFINET coupler RP000PN + 16-channel digital input module RP1600P + 16-channel digital output module RP0016P + 4-channel analog voltage output module RP0004V + 4-channel Analog current input module RP0400A + temperature acquisition module RP04RD topology as an example
- 2. One computer with TIA Portal V18 software pre-installed
- 3. PROFINET special shielded cable
- 4. One Siemens PLC, this description takes Siemens S7-1200 as an example
- **5.** One switching power supply
- 6. Module mounting guide rails and guide rail fixings
- 7. Device Configuration File

• Hardware configuration and wiring

Please operate in accordance with the requirements of "<u>4 Installation and Disassembly</u>" and "<u>5</u> <u>Wiring</u>"

2. New construction

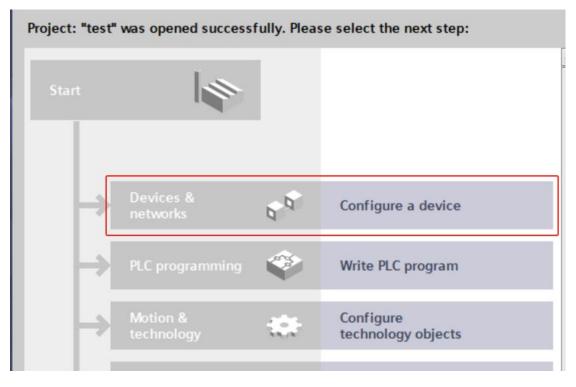
1. Open the TIA Portal V18 software, click "Create New Project", and click "Create" after entering all the information, as shown in the figure below.

	Create new project	
Open existing project	Project name:	test
open existing project	Path:	D:ldesktop
🥚 Create new project	Version:	V18
	Author:	Administrator
Migrate project	Comment:	^
Close project		
		2 🗸 🗹
		Create

- Project name: Custom, you can keep the default.
- Path: The project keeps the path, which can be kept as default.
- Version: You can keep the default.
- Author: You can keep the default.
- Note: Customized, optional.

3. Add PLC controller

1. Click "Configure Device" as shown in the figure below.



2. Click "Add New Device", select the PLC model currently used, and click "Add", as shown in the figure below. After the addition is completed, you can see that the PLC has been added to the device navigation tree on the left.

	Add new device		 	
Show all devices	Device name:			
🥚 Add new device	PLC_1			
Configure networks		SIMATIC 57-1200 CPU 1211C ACIDC/RIy CPU 1211C ACIDC/RIy CPU 1211C DCIDC/DC CPU 1211C DCIDC/DC CPU 1212C DCIDC/DC GE57 212-1A310X80 GE57 212-1A430-0X80 GE57 212-1A450-0X80 GE78 212-1445 DCIDC/RIy GE78 121455 DCIDC/RIy GE78 121555 D	DI8 x 24VDC on board; 4 h with digital si board; signal 3 communicati expansion; Pf transport pro	CPU 1212C DC/DC/DC CPU 1212C DC/DC/DC 6E57 212-1AE40-0XB0 V4.4 (75 KB; 24VDC power supply with SINK/SOURCE, DQ6 x 24VDC end A12 ight-speed counters (expandable gnal board) and 4 pulse outputs on board expands on-board 1/0; up to tion modules for serial on; up to 2 signal modules for I/O NOFINET I/O controller, 1-device, tocol TCP/IP, secure Open User ion, 57 communication, Web server, er DA
and the first the	Open device view			Add

4. Add GSD configuration file

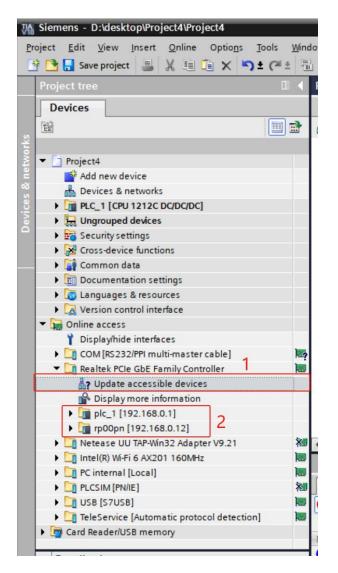
- 1. In the menu bar, select "Options->Manage Generic Station Description File (GSDML) (D)".
- 2. Click "Source Path" to select the folder where the GSD file is stored.
- 3. Check whether the status of the GSD file to be added is "Not Installed". If it is not installed, click the "Install" button. If it is already installed, click "Cancel" to skip the installation step.

	Options Tools Window Help	
Ľ	Y Settings	
	Support packages 2	
	Manage general station description files (GSD)	
ľ	Start Automation License Manager	
	Show reference text	
l	🛄 Global libraries	•

lanage general sta Installed GSDs	GSDs in the				
Source path: D:lo	lesktop\Project4\A	dditionalFile	GSD		
Content of importe	ed path		1		
File		Version	Language	Status	Info
gsdml-v2.3-kinco-	rp00pn_v1.0.13	V2.3	English	Already installed	RPOOPN
2					
-					
<			1111	2	>
				Delete Install	Cancel

5. Scan for connected devices

- 1. Click "Online Access -> Update Accessible Devices" in the left navigation tree.
- 2. After the update is completed, the connected slave devices are displayed, as shown in the figure below.



The computer's IP address must be in the same network segment as the PLC. If not, modify the computer's IP address and repeat the above steps.

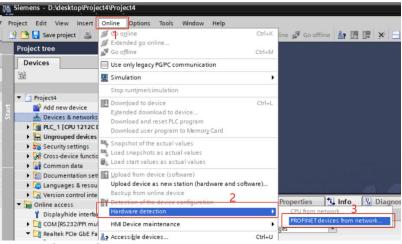
3. If the coupler's IP address and the PLC are not in the same network segment, you can click "Online and Diagnosis" of the coupler to reassign the IP address, as shown in the figure below.

RS series Remote IO User Manual Publication

Project tree		Online access 🔸 Realtek PCIe	GbE Family Controller 🔸 rp00pn [192.168.0.12] 🔸 rp00pn [192.168.0.12] [192.168.0.12]
Devices			
副		Diagnostics General	Assign IP address
		Content of the second sec	Assign IP address to the device Devices connected to an enterprise network or directly to the internet must be appropriately protected against unauthorized access, e.g. by use of firewalls and network segmentation. For more information about industrial security, please visit http://www.siemens.com/industrialsecurity
Documentation settings Dial Languages & resources Wersion control interface Online access Display/hide interfaces Display/hide interfaces	1		MAC address: 8C -F3 - E7 - 21 - 76 - BC Accessible devices IP address: 192 . 168 . 0 . 12 Subnet mask: 255 . 255 . 0 Use router Router address: 192 . 168 . 0 . 12
plc_1 [192.168.0.1] Tp00pn [192.168.0.12] Voine & diagnostics Interese UU TAP-Win32 Adapter V9.21 Intel(R) W+Fi & AX201 160MHz	1	< <u> </u>	Assign IP address 4

6. Add slave device

1. In the menu bar, select "Online -> Hardware detection -> PROFINET devices from network".



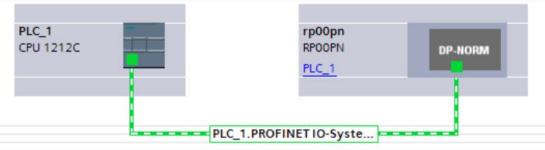
2. Click "Start search", check the scanned devices and add them to the device.

		Type o	of the PG/PC interface: PG/PC interface:	E PNIE Realtek PCIe GbE Family Controller		•
	Ac	cessible nodes of the sele	cted interface:			1 Start sear
	1977	PROFINET device name	Device series	IP address	MAC address	Junior
		rp00pn	PNIO	192.168.0.12	8C-F3-E7-21-76-BC	-
	2					
_	4					
					ted for detection, it is adde	

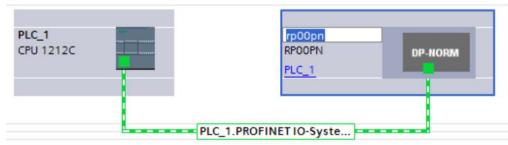
 Double-click "Device&networks -> Network view", click "Not assigned (blue font)" on the slave device in the network configuration screen, and select "PLC_1. PROFINET interface 1", as shown in the figure below.

Project tree	Project4 > Devices & networks		_ # # ×
Devices	🚰 Topology view	h Network view	Device view
12	🗈 💦 Network 🖞 Connections HM connection 💌 🐮 🖫 🗐 🖽 🛄 🍳 ±	2 4	Network overvi 4 🕨
Project4 Add new device Add new device Project4 RC_1 [CPU 1212 DODODCD] RC_1 [CPU 1212 DODODCD] Security settings Security settings Security settings Common data Common data Common data Common settings Common set	PLC_1 CPU 1212C 3 Not estimate 4 PLC_1 PROPINET interface_1		 ♥ Device \$7-1200 statio ♥ PLC_1 ♥ GSD device_1 ♥ rp00pn

4. After the connection is completed, it is as shown in the figure below.



5. Click the device name to rename the device, as shown in the figure below.



6. Click "Device view" to enter the device overview. The order of the I/O modules is consistent with the actual topology. The system automatically assigns the I/O

address. The I/O address can be changed by yourself, as shown in the figure below.

			🛃 Тор	ology vie	w 🖁 N	letwork view	Device view	
Dev	ice overview							
*	Module	 Rack	Slot	I address	Q address	Туре	Article number	T
	▼ rp00pn	0	0			RPOOPN	1234567	1
	PN-IO	0	0 X1			PNIO		ſ
	RP0808P_1	0	1	1	1	RP0808P		
	RP0016P_1	0	2		23	RPOO16P		
	RP1600P_1	0	3	23		RP1600P		-
100								

7. Assign device name

 Switch to the "Network View", right-click the connection line between the PLC and the coupler, and select "Assign Device Name", as shown in the figure below.
 Devices & networks

		🖉 Т
Network Connections HMI connection	📲 🖿 🛄 🔍 ±	
PLC_1	rp00pn	
CPU 1212C		ORM
	PLC_1	
	C_1.PROFINET IO-Syste	
		Ctrl+X
	1 Eiii Copy	Ctrl+C
	📺 Paste	Ctrl+V
	× Delete	Del
	Rename	F2
	Assign to new DP mas	ter / 10 controller
	Compile	•
	Download to device	•
	💋 Go online	Ctrl+K
	🖉 Go offline	Ctrl+M
	Q Online & diagnostics	Ctrl+D
	2 Assign device name	
	Assign PROFisate addi	ess
	Receive alarms	
	Update and display fo	
	Show catalog	Ctrl+Shift+C
	Q Properties	Alt+Enter

- 2. The "Assign PROFINET device name" window pops up. Check whether the MAC address on the module silk screen is the same as the MAC address of the assigned device name.
 - PROFINET device name: The name set in "Assign PROFINET device name".
 - Type of PG/PC interface: PN/IE.
 - PG/PC interface: The actual network adapter used.

3. Select the slave device in turn, click Update List, and click Assign Name. Check whether the status of the node in "Accessible Nodes in the Network" is "OK", as shown in the figure below.

Assign PROFINET device	name.					>
_		Configured P	ROFINET de	vice		
			device name:		5	
		Cor	verted name:			
			Device type:	CPU 1212	C DC/DC/DC	
		Online acces	s			
		Type of the P	G/PC interface:	PN/IE		-
		P	G/PC interface:	Realtek	PCIe GbE Family Controller	• •
		Device filter				
			show devices (of the same typ	e	
		Only	show devices 1	vith bad paran	neter settings	
			show devices (· · · · · · · · · · · · · · · · · · ·	
	Accessible dev	ices in the network:				
	IP address	MAC address	Device	PROFINET de	wice name Status	
	192.168.0.1	E0-DC-A0-B1-5	\$7-1200	plc_1	🕑 ОК	
			2			
Flash LED						
					1	3
					Update list	Assign name
					Opdate list	Assign name
Online status information						
 Search completed. 	. 1 of 2 devices we	ere found.				
						Close

4. Click Close.

8.2.1.8. 8. Download the configuration structure

8. Download configuration structure

- 1. In the "Network View", select the PLC.
- 2. Click the Dutton in the menu bar to download the current configuration to the PLC.
- 3. In the pop-up "Download extension to device" window, configure the configuration as shown in the figure below, and click "Start Search".
- 4. Click "Download".

	Device	Device type	Slot	Interface type	Address	Subnet
	PLC_1	CPU 1212C DC/D	10000000	PN/IE	192.168.0.1	
	PLC_1	CF0 1212C DOD	1 X1	PINIE	192.168.0.1	PN/IE_1
		Type of the PG/PC inte	rface:	PN/IE		•
		PG/PC inte			bE Family Controller	-
		Connection to interface/su	bnet:	Direct at slot '1	X1'	•
		1st gat	eway:			*
	Device	Device type	Interf	ace type Ad	dress	Target device
_						
······································	Device PLC_1 -	Device type CPU 1212C DC/D - 2		19	dress 2.168.0.1 ter address here	Target device PLC_1
н. — - — — З		CPU 1212C DC/D	. PN/IE	19	2.168.0.1	
ash LED		CPU 1212C DC/D	. PN/IE	19	2.168.0.1	
ash LED		CPU 1212C DC/D	. PN/IE	19	2.168.0.1	
ash LED		CPU 1212C DC/D	. PN/IE	19	2.168.0.1	
ash LED	PLC_1 -	CPU 1212C DC/D	. PN/IE	19	2.168.0.1	PLC_1 - 1 <u></u>
status informa	PLC_1 -	CPU 1212C DC/D	. PN/IE	19	2.168.0.1 ter address here	PLC_1 - 1 <u></u>
estatus information nnection estab an completed.	PLC_1	CPU 1212C DC/D - 2 with address 192.168.0.1. rs of 3 accessible devices fou	PN/IE PN/IE	19	2.168.0.1 ter address here	PLC_1 - 1 <u></u>
estatus information nnection estab an completed.	PLC_1	CPU 1212C DC/D - 2 with address 192.168.0.1. rs of 3 accessible devices fou	PN/IE PN/IE	19	2.168.0.1 ter address here	PLC_1 - 1 <u></u>

5. Select "Continue without syncing" as shown in the image below.

Software synchronization	Status	Action	
▼ PLC_1			
 'Program blocks' 			
Main [OB1]	•	Upload and overwrite in the project	
 'PLC tags' 			
Tags	•	Manual synchronization required	
		III	

6. Select "Stop All".

us	1	Target		Message	Action				
1	A	▼ PLC_1		Ready for loading.	Load 'PLC_1'				
	4	•	Protection	Protection from unauthorized access					
	4			Devices connected to an enterprise network or directly to the internet must be appropriately protected against unauthorized access, e.g. by use of firewalls and network segmentation. For more information about industrial security, please visit http://www.siemens.com/industrialsecurity					
	0	•	Stop modules	The modules are stopped for downloading to device.	Stop all				
	0	•	Device configurati	Delete and replace system data in target	Download to device				
	0	•	Software	Download software to device	Consistent download				
	0		Text libraries	Download all alarm texts and text list texts to device	Consistent download				
					Refre				

- 7. Click Load.
- 8. Click "Finish".
- 9. Power on the device again.

9. Communication connection

1. Click the button, and then click "Go Online". If the icons are all green, the connection is successful, as shown in the figure below.

Project tree		Project4 🔸 Devices & networks 💦 💶 🖬 🗮 🗙
Devices		🛃 Topology view 🔒 Network view 📑 Device view
1 Miles		💦 Network 🔢 Connections HM connection 💌 🕮 🖫 🔭 🚘 🚺
		📮 IO system: PLC_1.PROFINET IO-System (100) 🔼 🔤
Project4	🗹 🔍 🔨	
📑 Add new device		
h Devices & networks		PLC_1
Digital PLC_1 [CPU 1212C DC/DC/DC]	V	CPU 1212C
Ungrouped devices	=	
🕶 📑 rp00pn [RP00PN]	V	
Device configuration		PLC_1.PROFINET IO-Sys
Online & diagnostics		FLC_T.FROTINETTO-Sys
p00pn [RP00PN]	~	
RP0808P_1	~	•
RP0016P_1	~	
RP1600P_1	_	
🕨 📷 Security settings		rp00pn
Cross-device functions		RPOOPN DP-NORM
🕨 🧃 Common data		PLC_1
Documentation settings		
Languages & resources	~	
✓ Details view		

10. Parameter setting

1. Open the "Device View", right-click the module name while offline, and click "Properties", as shown in the figure below.

								🛃 Topolog	y
							ice view		
Device overview									
1 Module		Rack	Slot	I address	Q address	Туре	Article number	Firmware	
▼ rp00pn		0	0			RPOOPN	1234567	V10.00.00	
PN-IO		0	0 X1			PNIO			
RP0400V_1		0	1	6875		RP0400V		1.0	
RP0004V_1		0	2		6471	RP0004V		1.0	
RP0400A_1		0	3	7683		RP0400A		1.0	
RP0808P_1		0	4	1	1	RP0808P		1.0	
RP0016P_1		0	5		23	RP0016P		1.0	
RP1600P_1		0	6	2 2		RP1600P		1.0	
RP01RS_1	Change de Start device				72111	RP01RS		1.0	
		e tool							
	X Cut			Ctrl+X					
	Сору			Ctrl+C					
	Paste			Ctrl+V					
	X Delete			Del					
	Rename			F2					
	Pack addre	sses							
	Unpack ad	dresses							
	Compile			•					
	Download t	to device		•					
	💋 Go online			Ctrl+K					
	Go offline			Ctrl+M					
	😵 Online & di		i.	Ctrl+D					
	Assign dev	ice name							
	Update and	d display f	orced op	erands					
	Cross-refer	ences		F11					
	Cross-refer	ence infor	mation	Shift+F11					
	Show catal	og	Ct	rl+Shift+C					
	Export nod	lule labeli	ng strips.					Q Prop	
General Cross				Alt+Enter				Prope	2

2. On the properties page, click "Module Parameters" to select the digital input filter parameters of the 16-channel digital input module, as shown in the figure below.

RP1600P_1 [RP1600P]		🧐 Properties 🚺 Inf	Diagnostics
General IO tags	System constants Texts		
General Inputs	Module parameters		
Module parameters	RP1600P Parameter		
	RP1600P Parameter		
	Digital Input Filter:	3ms	
	Module failure		
	Input values with module failure:	With the "Keep last value" setting, you cannot evaluate the value status of the inputs. Input value 0	

3. Digital input filter parameters can be configured according to actual use needs, as shown in the figure below. After the configuration is completed, re-download the program to the PLC. The PLC and module need to be powered on again.

Device overview					
RP1600P_1 [RP1600P]			Q Properties	🗓 Info 📱 Diagnostics	
General IO tags Sys	stem constants Texts				
General Inputs	Module parameters				
 Module parameters I/O addresses 	RP1600P Parameter				
iio addresses	RP1600P Parameter				
	Digital Input Filter:	3ms 3ms			 ▼ ▲
	Module failure	4ms 5ms			^
	Input values with module failure:	6ms 7ms 8ms 9ms 10ms 11ms 12ms			
		13ms 14ms			~

4. The range configuration and analog input filter parameters of the 4-channel analog current input module are as shown in the figure below. After the configuration is completed, re-download the program to the PLC, and the PLC and module need to be powered on again.

Module 🖌	Rack	Slot	I address	Q address	Туре	Article number	Firmware	Comment	Access	
▼ rp00pn	0	0			RPOOPN	1234567	V10.00.00		PLC_1	
PN-IO	0	0 X1			PNIO				PLC_1	
RP0400V_1 1	0	1	6875		RP0400V		1.0		PLC_1	
RP0004V_1	0	2		64 71	RP0004V		1.0		PLC_1	
RP0400A_1	0	3	7683		RP0400A		1.0		PLC_1	-
RP0808P_1	0	4	1	1	RP0808P		1.0		PLC_1	
RP0016P_1	0	5		23	RP0016P		1.0		PLC_1	
RP1600P_1	0	6	23		RP1600P		1.0		PLC_1	
RP01RS_1	0	7	84123	72111	RP01RS		1.0		PLC_1	
	0	8								
	0	9								
	0	10								
	0	11								
ieneral	ystem constan		exts		2		Q Prope	erties 🗓 Info	U Diagnostics	
eneral IO tags Sy eneral iputs iodule parameters	Module pa				2		S. Prope	rties 11 Info	Uiagnostics	
eneral IO tags Sy eneral puts odule parameters	Module pa	arameters A Parame	eter	-t: 0m&-2			S Prope	rties <u>i Info</u>	Diagnostics	
eneral IO tags Sy eneral puts odule parameters	Module pa RP0400/	arameters A Parame	ss eter lange Selec		0mA 0~65535		<u>G</u> Prope	rties <u>1 Info</u>	2 Diagnostics	
eneral IO tags Sy eneral puts odule parameters	Module pa RP0400/ c	A Parameters	ster lange Selec	t: 0mA~2	0mA 0~65535 0mA 0~65535		<u></u> Prope	rties <u>1</u> Info	2 Diagnostics	
eneral IO tags Sy eneral iputs iodule parameters	Module pa RP0400/ c c	A Parameters A Parame Channel 0 Ri Channel 1 Ri Channel 2 Ri	e ter lange Selec lange Selec	t: 0mA~2	0mA 0~65535 0mA 0~65535 0mA 0~65535		<u></u> Prope	rties <u>11</u> Info	Diagnostics	
eneral IO tags Sy eneral iputs iodule parameters	Module pa RP0400/ c c	A Parameters	e ter lange Selec lange Selec	t: 0mA~2	0mA 0~65535 0mA 0~65535		<u>G</u> Prope	rties <u>1</u> Info	U Diagnostics	
eneral IO tags Sy eneral iputs iodule parameters	Module pa RP0400/ c c c	A Parameters A Parame Channel 0 Ri Channel 1 Ri Channel 2 Ri Channel 3 Ri Analog Inp	eter lange Selec lange Selec lange Selec lange Selec	t: 0mA-2 t: 4mA-2 t: 4mA-2	0mA 0~65535 0mA 0~65535 0mA 0~65535		<u></u> Prope	rties <u>14 Info</u>	U Diagnostics	
eneral IO tags Sy eneral iputs iodule parameters	Module pa RP0400/ c c c c	A Parame Channel O Ri Channel 1 Ri Channel 2 Ri Channel 3 Ri Channel 3 Ri Analog Inp	eter lange Selec lange Selec lange Selec but Channe Filter(1-200	tt: 0mA~2 tt: 4mA~2 tt: 4mA~2 10 0): 10	0mA 0~65535 0mA 0~65535 0mA 0~65535		<u></u> Prope	rties <u>1</u> Info	V Diagnostics	
eneral IO tags Sy	Module pa RP0400/ c c c c	A Parame Channel O Ri Channel 1 Ri Channel 2 Ri Channel 3 Ri Channel 3 Ri Analog Inp	eter lange Selec lange Selec lange Selec lange Selec	tt: 0mA~2 tt: 4mA~2 tt: 4mA~2 0): 10	0mA 0~65535 0mA 0~65535 0mA 0~65535		<u></u> Prope	rties <u>1</u> Info	V Diagnostics	
eneral IO tags Sy eneral iputs iodule parameters	Module pa RP0400/ c c c c	A Parameters A Parame Channel 0 Ri Channel 1 Ri Channel 2 Ri Channel 3 Ri Channel 3 Ri Analog Inp Analog Inp	ange Selec lange Selec lange Selec lange Selec out Channe Filter(1-200 out Channe filter(1-200 out Channe	tt: 0mA-2 tt: 4mA-2 tt: 4mA-2 10 11 11 12	0mA 0~65535 0mA 0~65535 0mA 0~65535		<u></u> Prope	rties <u>1</u> Info	V Diagnostics	
eneral IO tags Sy eneral iputs iodule parameters	Module pa RP0400/ C C C C	Analog inp	ange Selec lange Selec lange Selec lange Selec out Channe Filter(1-200 out Channe Filter(1-200 out Channe Filter(1-200	tt: 0mA-2 tt: 4mA-2 tt: 4mA-2 10 11 10 11 10 12 10 13	0mA 0~65535 0mA 0~65535 0mA 0~65535		<u></u> Prope	rties <u>1</u> Info	V Diagnostics	

5. The range configuration parameters of the 4-channel analog voltage output module are as shown in the figure below. After the configuration is completed, re-download the program to the PLC, and the PLC and module need to be powered on again.

Device overview											
1 Module		Rack	Slot	I address	Q address	Туре	Article number	Firmware	Comment	Access	
▼ rp00pn		0	0			RPOOPN	1234567	V10.00.00		PLC_1	
PN-IO		0	0 X1			PNIO				PLC_1	
RP0400V_1	1	0	1	6875		RP0400V		1.0		PLC_1	
RP0004V_1		0	2		6471	RP0004V		1.0		PLC_1	-
RP0400A_1		0	3	7683		RP0400A		1.0		PLC_1	
RP0808P_1		0	4	1	1	RP0808P		1.0		PLC_1	
RP0016P_1		0	5		23	RP0016P		1.0		PLC_1	
RP1600P_1		0	6	23		RP1600P		1.0		PLC_1	
RP01RS_1		0	7	84123	72111	RP01RS		1.0		PLC_1	
		0	8								
		0	9								
		0	10								
		0	11						1		
								Prope	erties 🗓 Info	3 Diagnostics	
eneral IO tags	Systen	n constan	its T	exts		2					
eneral Iodule parameters		<i>N</i> odule pa	arameter	5							
D addresses		RP0004	V Parame	ter							
		Channel 0 Range Select: 0V~10V 0~32767									
		Channel 1 Range Select: 0V-10V 0-32767									
	_			lange Selec		OV -32768~32767					
											-
		0	hannel 3 0	ange Selec	+ 10\/-1	OV -32768~32767					

6. The configuration parameters of the temperature acquisition module are as shown in the figure below. After the configuration is completed, re-download the program to the PLC, and the PLC and module need to be powered on again.

ject4 ► Ungrouped devi	res i rpo						I.a.		- 7
12	1 1		1 -			📑 Topology view	n Netw	ork view	vice view
rp00pn [RP00PN]			🛄 🔍 ±						5
an a									
						>	100%	×	- 7
evice overview							-		
Module	R	ack Slot	I address	Q address	Туре	Article number	Firmware	Comment	Α.
▼ rp00pn	0	0			RPOOPN	1234567	V10.00.00		P
PN-IO	0	0 X1			PNIO				P
RP0400V_1	0	1	6875		RP0400V		1.0		P.,
RP0004V_1	0	2		6471	RP0004V		1.0		P.,
RP0400A_1	0	3	7683		RP0400A		1.0		P.,
RP0808P_1	0	4	1	1	RP0808P		1.0		P.
RP0016P_1	0	5		23	RPOO16P		1.0		P.
RP1600P_1	0	6	23		RP1600P		1.0		P.
RP04RD_1	0	7	8491	7279	RP04RD		1.0		Ρ.
<					111				
4RD_1 [RP04RD]						Q Properties	1 Info	B Diagnostics	
eneral IO tags	System cor	octanto	Texts						
		is tarits	TEALS		3				
eneral Catalog information	Modu	le paramet	ers						
catalog information	DDC	4RD Param	-						
lodule parameters 2	RPL	4KD Param	eter						
D addresses		Temperature	e Sensor Sele	THE BA					
					ocoorte_n				
			nelO Filter(1-1						
		Chanr	nel1 Filter(1-1	0): 1					
		Chanr	el2 Filter(1-1	0): 1					
	1	Chanr	el3 Filter(1-1	0): 1					
			annel O Enab	-					
	-		annel 1 Enab						-
			annel 1 Enab						•
			annel 2 Enab		-				

7. Right-click the coupler module in the device view, select "Properties", and you can see the output signal clear/hold parameters, as shown in the figure below. After the configuration is completed, re-download the program to the PLC, and the PLC and module need to be powered on again.

Project4 🕨 Ungrouped dev	ices Frp00	on [RPUUI	'N]				P Topolog	v view 🔒 Net	work view 📑 De	vice view
					Dev	ice view	i oporog	y new jaga nee		nee nen
Device overview) hotel				
Wodule	Rac	k Slot		Q address	- 1	Article number	Firmware	Comment	Access	
▼ rp00pn	0	0	Taddress	Q address	RPOOPN	1234567	V10.00.00	Comment	PLC_1	-
PN-IO	0	0 X1	_		PNIO	1234307	10.00.00	_	PLC_1	
RP0400V_1	0	1	6875		RP0400V		1.0		PLC_1	
RP0004V 1	0	2	0075	6471	RP0004V		1.0		PLC_1	
RP0400A_1	0	3	7683	0471	RP0400A		1.0		PLC_1	
RP0808P_1	0	4	1	1	RPO808P		1.0		PLC_1	
RP0016P_1	0	5		23	RP0016P		1.0		PLC_1	
RP1600P_1	0	6	23		RP1600P		1.0		PLC_1	
RP01RS_1	0	7	84123	72111			1.0		PLC_1	
	0	8								
	0	9								
	0	10								
	0	11								
00pn [RP00PN]							S Prope	erties 🔥 Info	B Diagnostics	
General IO tags	System const	tants	Texts			3				
		curres	TURUS			2				
General Catalog information	Module	paramet	ers							
PROFINET interface [X1] General	Settir	ng for Cle	ar/Hold							
Ethernet addresses	0	ata Clear o	r Hold Setting	s: Clear						-
Advanced options Module parameters 2				Clear Hold						
Shared Device				-						

11. Function verification

1. Expand the project navigation on the left and select "Monitoring and Enforcement Table", as shown in the figure below.

Project tree	•
Devices	
▼ T Project4	
Add new device	
Devices & networks	
PLC_1 [CPU 1212C DC/DC/DC]	
Device configuration	
🛂 Online & diagnostics	=
🕨 🚘 Program blocks	•
Technology objects	
External source files	
PLC tags	•
▶ Le PLC data types	
▼ 🤤 Watch and force tables	
Add new watch table	
Force table	
Online backups	
Carces	
OPC UA communication	
Device proxy data Program info	
PLC alarm text lists	
Local modules	
Distributed I/O	
✓ Ingrouped devices	
▼ I rp00pn [RP00PN]	
Device configuration	
😧 Online & diagnostics	

2. Double-click "Add New Monitoring Table" to add a new monitoring table to the system, as shown in the figure below.

	🗉 📢 Pr								
Devices									
(B)		🖗 🔮 🖉 🔓	9, 9, 19 00 00						
		i Name	Address	Display format	Monitor value	Modify value	9	Comment	Tag comment
▼ 🔄 Project4	V 🔵 \land 1		Add new>						
Add new device									
📥 Devices & networks									
PLC_1 [CPU 1212C DC/DC/DC]	2 •								
Device configuration									
S Online & diagnostics									
🕨 🙀 Program blocks									
Technology objects									
External source files									
PLC tags									
Eq PLC data types									
 Watch and force tables 									
Add new watch table	1								
Force table									
Watch table_1	2								
Online backups									
🕨 📴 Traces									
OPC UA communication									
Device proxy data									
Program info									
E PLC alarm text lists									
Local modules	X								

3. Open the "Device View" and view the module's channel Q address (channel address of the output signal) and I address (channel address of the input signal) in the device overview.

For example, the "I address" of the 16-channel digital input module is 2~3, the "Q address" of the 16-channel digital output module is 2~3, and the "I address" of the 4-channel analog current input module is 76~ 83, the "Q address" of the 4-channel analog voltage output module is

64~71, the "I address" of the temperature acquisition module is 84~91, and the "Q address" is 72~79, as shown in the figure below.

Image: Proper law Image: Proper law Image: Proper law Image: Proper law Image: Proper law Image: Proper l							🚽 Topology view	A Netwo	rk view	Device view
Device overview I address Q address Type Article number Firmware Comment Y Module Rack Slot I address Q address Type Article number Firmware Comment Y mp0opn 0 0 0 RP00PN 1234567 V10.00.00 Y mp0opn 0 0 X1 PNIO Y mp0opn 0 0 X1 PNIO	rp00pn [RP00PN]			1 🔍 ±						E
Period Indule Rack Slot I address Q address Type Article number Firmware Comment Y Module Rack Slot I address Q address Type Article number Firmware Comment Y PNO 0 0 0.1 PNIO Y RP0400V_1 0 0.1 6875 RP0400V 1.0 Y RP0400V_1 0 2 6471 RP004V 1.0 Y RP0400A_1 0 3 7683 RP0400A 1.0 Y RP0400F_1 0 4 1 1 RP0808P 1.0 Y RP05016P_1 0 5 23 RP1600P 1.0 Y RP060P_1 0 6 23 RP160P 1.0 <td< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>100%</th><th></th><th></th></td<>								100%		
Module Rack Slot I address Q address Type Article number Firmware Comment Y rp00pn 0 0 0 RP00PN 1234567 V10.00.00 Y PNHO 0 0.1 6875 RP0400V 1.0 Y RP0400V_1 0 1 6875 RP0400V 1.0 Y RP04004_1 0 2 6471 RP0004V 1.0 Y RP0400A_1 0 3 7683 RP0400A 1.0 Y RP0400A_1 0 4 1 RP0808P 1.0 Y RP0400F_1 0 5 23 RP016P 1.0 Y RP1600P_1 0 6 23 RP160P 1.0						low low low of				
Y = rp00pn 0 0 RP00PN 1234567 V10.00.00 Y = PNHO 0 0 X1 PNIO PNIO 1.0 Y = PNHO 0 1 6875 RP0400V 1.0 Y = RP0400V_1 0 1 6875 RP0400V 1.0 Y = RP0400A_1 0 3 7683 RP0400A 1.0 Y = RP0400A_1 0 3 7683 RP0400A 1.0 Y = RP0808P_1 0 4 1 1 RP0808P 1.0 Y = RP0016P_1 0 5 23 RP1600P 1.0 Y = RP1600P_1 0 6 23 RP1600P 1.0 Y = RP1600P_1 0 6 23 RP1600P 1.0	Device overview									
Y PNHO 0 0 X1 PNIO X RP0400V_1 0 1 6875 RP0400V 1.0 X RP0400V_1 0 2 6471 RP0040V 1.0 X RP0400A_1 0 3 7633 RP0400A 1.0 X RP0400A_1 0 3 7633 RP0400A 1.0 X RP0400A_1 0 5 23 RP0400A 1.0 X RP0016P_1 0 5 23 RP016P 1.0 X RP1600P_1 0 6 23 RP1600P 1.0 X RP1600P_1 0 6 23 RP160D 1.0	W Module	Rack	Slot	I address	Q address	Туре	Article number	Firmware	Comment	
Y RP0400V_1 0 1 6875 RP0400V 1.0 Y RP0004V_1 0 2 6471 RP004V 1.0 Y RP0400A_1 0 3 7683 RP0400A 1.0 Y RP0308P_1 0 4 1 1 RP0308P 1.0 Y RP0306F_1 0 5 23 RP0306P 1.0 Y RP030F_1 0 6 23 RP0306P 1.0 Y RP030F_1 0 6 23 RP030F 1.0 Y RP1600P_1 0 6 23 RP1600P 1.0 Y RP1600P_1 0 7 7.2 7.2 RP40P 1.0	🗹 🔻 rp00pn	0	0			RPOOPN	1234567	V10.00.00		
R P0004V_11 0 2 6471 RP0004V 1.0 R P0400A_11 0 3 7683 RP0400A 1.0 R P0400A_11 0 3 7683 RP0400A 1.0 R P0508P_1 0 4 1 1 RP0508P 1.0 R P0506F_1 0 5 23 RP016P 1.0 R P1600P_1 0 6 23 RP1600P 1.0	PN-IO	0	0 X1			PNIO				
V RP0400A_1 0 3 7683 RP0400A 1.0 V RP0808P_1 0 4 1 1 RP0808P 1.0 V RP016P_1 0 5 23 RP016P 1.0 V RP1600P_1 0 6 23 RP1600P 1.0 V RP1600P_1 0 72 78 RP040P 1.0	RP0400V_1	0	1	6875		RP0400V		1.0		
RP0808P_1 0 4 1 1 RP0808P 1.0 RP0016P_1 0 5 23 RP0016P 1.0 RP1600P_1 0 6 23 RP1600P 1.0 Image: Provide Part of the Part of	RP0004V_1	0	2		6471	RP0004V		1.0		
RP0016P_1 0 5 23 RP0016P 1.0 RP1600P_1 0 6 23 RP1600P 1.0 RP1600P_1 0 6 23 RP1600P 1.0	RP0400A_1	0	3	7683		RP0400A		1.0		
RP1600P_1 0 6 23 RP1600P 1.0	RP0808P_1	0	4	1	1	RP0808P		1.0		
	RP0016P_1	0	5		23	RP0016P		1.0		
✓ RP04RD_1 0 7 8491 7279 RP04RD 1.0	RP1600P_1	0	6	23		RP1600P		1.0		
	RP04RD_1	0	7	8491	7279	RP04RD		1.0		
			9							

4. Fill in the input and output channel address in the address cell of the monitoring table, such as "IB2", "IB3", "QB2", "QB3", "IW76~IW82", QW64~QW70", "IW84~

IW90", QW72~QW78", press the "Enter key", after filling in all, click the button to monitor the data, as shown in the figure below. The input and output values of each module can be monitored in the monitoring table. When a certain channel of the digital input module has a valid voltage, the input value can be monitored in IB2 and IB3; The analog voltage input module can be monitored in IW76~IW82 Monitor the input voltage value of each channel; for the corresponding relationship between code value and voltage and current, please refer to 3.4.1 technical parameters, the temperature acquisition module is 10 times the actual temperature or resistance value in degrees Celsius or Ω . (twenty four)

	tempei	rature o	or resistan	ce value	e, in degi	rees	Celsius or Ω . (_ twenty four_
Project	4 + PLC_1 [CPU 12	12C DC/DC/D] • Watch and forc	e tables 🕨 Wa	tch table_1			_ # = ×
		2						
22	12 19 10 91 9	8 27 PP PP						
i	Name	Address	Display format	Monitor value	Modify value	9	Comment	Tag com
1		%IB2	Hex	16#00				^
2		%IB3	Hex	16#00				
3		%QB2	Hex	16#00				
4		%QB3	Hex	16#00				
5		%IW76	Hex	16#0000				
6		%IW78	Hex	16#0000				=
7		%IW80	DEC+/-	0				
8		%IW82	DEC+/-	0				
9	1	%QW64	DEC+/- 3	0				
10		%QW66	DEC+/-	0				
11		%QW68	DEC+/-	0				
12		%QW70	DEC+/-	0				
13		%IW84	DEC+/-	249				
14		%IW86	DEC+/-	-9999				
15		%IW88	DEC+/-	-9999				
16		%IW90	DEC+/-	-9999				
17		%QW72	DEC+/-	0				
18		%QW74	DEC+/-	0				
19		%QW76	DEC+/-	0				
20		%QW78	DEC+/-	0				
21								

5. Enter "FF" in the "Modified Value" cell of QB2, click the ²⁴ button to write, and see that the corresponding channel indicator light of the digital output module lights up (__ 29_); The analog current output module can force output for each channel in QW64~QW70. In the monitoring meter output control QW72~QW78, set the temperature compensation value to 50, which is 5°C. After setting the

compensation value, channel 1 The temperature is 30.7°C, as shown in the figure below.

		212C DC/DC/D	C] • Watch and for					_ # # ×
	2							
9 9	1. 19 lo 91	1. 2 1 1	7		1			
i	Name	Address	Display format	Monitor value	Modify value	9	Comment	Tag com
		%IB3	Hex	16#00				
		%QB2	Hex	16#FF	16#FF		4	
		%QB3	Hex	16#00				
		%IW76	Hex	16#0000				
		%IW78	Hex	16#0000				
		%IW80	DEC+/-	0				
		%IW82	DEC+/-	0				1
		%QW64	DEC+/-	32767	32767		4	
0		%QW66	DEC+/-	0				
1		%QW68	DEC+/-	0				
2		%QW70	DEC+/-	0				
3		%IW84	DEC+/-	307				
4		%IW86	DEC+/-	-9999				
5		%IW88	DEC+/-	-9999				
6		%IW90	DEC+/-	-9999				
7		%QW72	DEC+/-	50	50		4	
8		8 %QW74	DEC+/-	• 0				
9		%QW76	DEC+/-	0				
0		%QW78	DEC+/-	0				
1								
2								
3								
<					1			>

6.3. EtherCAT coupler configuration application

6.3.1. Application in CODESYS software environment

1. Preparation

- Hardware environment
- 1. Module preparation, this description uses EtherCAT coupler RP00EC + 8-channel digital input and output module RP0808P + 4-channel analog voltage input module RP0400V + 4-channel analog voltage output module RP0004V + 4-channel analog current input module RP0400A + 4-channel Analog current output module RP0040A + temperature acquisition module RP04RD. The topology is an example of a computer with pre-installed CODESYS software.
- 2. One Kinco PLC (this description takes model AX500 as an example)
- 3. EtherCAT dedicated shielded cable
- 4. One switching power supply
- 5. device profile
- Hardware configuration and wiring

Please operate in accordance with the requirements of "<u>4 Installation and Disassembly</u>" and "<u>5</u> <u>Wiring</u>"

• Computer IP requirements

Set the IP address of the computer and the IP address of the PLC to ensure that they are in the same network segment.

2. New construction

1. Open the CODESYS software, click "New Project", customize the project name, and click "OK".

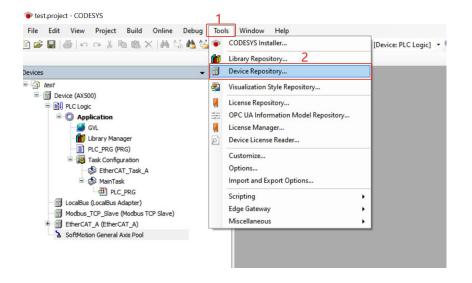
	Project Build Onlin		Window Help 핵계 1월 월 양 아 > =	₩ (1 %1 41 41 8 ¢ 1	토(금) · · ·	- D ×
Devices		- 4 ×	Start Page X	~	_	
			CODESYS V3.5 SP19 Patch	k.		
			Basic operations	Latest news		
			1 New Project			Î
			Open Project		×	
			New Project		~	
			- Libraries Projects	emplates	dard Standard project w	
			A project containing one device, one applic	ation, and an empty implementation fo	PLC PRG	
			Name test	adding and an engry implementation re		
			Location D:\desktop		v	
				3	_	
				OK	Cancel	
			L	6 . 10	THE SEAL	111 Cacat
			Close page after project load	CODECVO	0.5.0010	
Sevices POUs		role et r	Show page on startup	CODESYS	/3.5 SP19	•
	0 P	rojectr	name: Custom.			-
Standard F	Project				×	
61	You are abou objects within		new standard project. This wi	zard will create the	following	
	- A program F - A cyclic task	LC_PRG in th which calls P	e as specified below e language specified below LC_PRG : version of the Standard libra	ary currently installe	:d.	
	Device	AX500 (Kinco	Automation(Shanghai) Co., L	td.)	~	
	PLC_PRG in	Structured T			~	
	-	2				
		2				
				ОК	Cancel	

- Select the device and programming language: "Device" selects the corresponding PLC model, and "PLC_PRG in" selects the programming language.
- After entering the project attributes, click "OK" to complete the creation.
 - 3. Click "Device -> Communication Settings" in the left navigation tree, click "Scan Network" and wait until the scan is completed, as shown in the figure below.

File Edit View Project Build Online [
📽 🖬 🚳 1 い ce 🕹 🖻 🛍 X 1 🖊 😘	🍐 🍊 🗍 🧐 🧐 🏦 🛱	🛗 - 🗋 🔛 Application [Device: PLC Logic] 🔹 😋 🥰) = * [[] ?] ?] *] *] \$ \$	郡 〒 型
rices 👻 🕈 🗙	Device X	2		
	Communication Settings	Scan Network Gateway - Device -		
E DU PLC Logic	Applications			100
Library Manager	Backup and Restore	• •		
Task Configuration	Files	Select Device		>
	Log	Select the Network Path to the Controller	Device Name:	Scan Network
LocalBus (LocalBus Adapter)	PLC Settings	AX500 [0064] 3	Gateway-1	Wink
EtherCAT_A (EtherCAT_A)	PLC Shell		Driver:	
SoftMotion General Axis Pool	Users and Groups		TCP/IP	

3. Install XML file

1. Click "Tools -> Device Repository" in the menu bar.



2. Click "Install" in the pop-up "Device Repository" window, select the XML file path of the module, and click "Open" to complete the installation, as shown in the figure below.

) cation	Location	System Repository (C:\ProgramData		ces)					~	Edit Locations
VL prary Manager .C_PRG (PRG)		evice Descriptions		1						1
sk Configuration	String for	a full text search		Vendor	<all th="" v<=""><th>endors></th><th></th><th></th><th>×</th><th>Install Uninstall</th></all>	endors>			×	Install Uninstall
→ 新加卷 (D:) →	Desktop → ax	(500 → io		~ 0		earch io			۸ ۹	Export
Name	2 [^]		Date modifie	ed	Тур	e	Size			
EcatTermin	al_Kinco_V1.09	_ENUM.xml	2024/2/21 14	:42	XM	L Document		299 K	3	
	S-KINCO-KPUU	PN_V1.0.14-201	2024/2/27 20	. 10	AIV	L Document		100 K		Details
										Close
catTerminal_Kinco	_V1.09_ENUM	xml			~ 3	EtherCAT ESI (Open	-	Cancel	~	

4. Add equipment

1. Click "Online Config Mode" in the toolbar below the menu bar to enter the online configuration mode, as shown in the figure below.

🌘 tes	t.proje	ect - COD	ESYS													
			-			-			ow Help						_	
1		6 0	CH &	• C :	× /4 (s 🐴 🌿	Щ 5	1 %	1 🔓 📩	• 🖞 🔛	Application [Dev	ice: PLC Logic]	- 05 08	+ =	4°	Č≣ €∃ ¢∃ →∃ \$
Devices	{					•	φ Χ								0	nline Config Mode

2. Right-click the EtherCAT device module and select "EtheCAT_A -> Scan for Devices" to scan the device, as shown in the figure below.

Eile Edit ⊻iew Project	-	ild <u>O</u> nline <u>D</u> ebug <u>T</u> ools B × Ma 🎸 Ma 🏰 1	Win N %
Devices		→ ₽ ×	
= j test		•	-
= 😳 📆 Device [connected] ((AX50	0)	Con
PLC Logic			App
Application Library Man	boar		
PLC_PRG (P			Bac
E Task Config		n	File
EtherC			rile
🖹 🍪 MainTa		100 M	Log
d) PLC			
-Co 🗊 LocalBus (LocalB			PLC
Modbus_TCP_Sta		todbus TCP Slave)	PLC
EtherCAT_A (EtherCAT_A (EtherC		Cut	Ĩ
Solution Gene	1	Сору	e
	8	Paste	- 1
	×	Delete	0
		Refactoring	
	6	Properties	e
	See.	Add Object	
	6	Add Folder	F
	-	Add Device	83
		Insert Device	ľ
2		Scan for Devices	5
-		Disable Device	-
		Update Device	1
	ď	Edit Object	
	0		E
		Edit Object With	
		Edit IO mapping	e
		Import mappings from CSV	
		Export mappings to CSV	

3. In the "Scanned Devices" window, click "Scan Device" and then assign the address "Assign Address" to the scanned module, and copy all modules to the project "Copy All Devices to Project", as shown in the figure below.

anned Devices				
Device name	Device type RF00EC	Alias Address		
- RP0808P	8 Channel Digital IO, PNP			
- RP0016P	16 Channel Digital Output, PNP			
	16 Channel Digital Input, PNP			

4. Then exit the online configuration mode Sand re-enter S. If there is no abnormal communication, a green arrow will appear in front of the device, as shown in the figure below.



5. Then exit online configuration mode again 🕙.

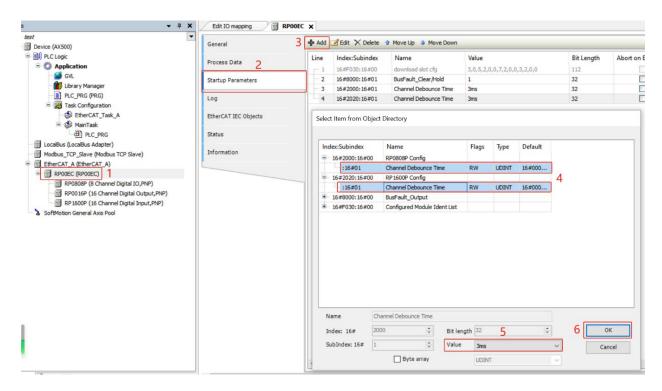
5. EtherCAT coupler module configuration

 Double-click the coupler module in the left navigation tree to configure startup parameters "RP00EC -> Startup Parameters", add startup parameters in the startup parameters, on the parameter setting page, you can configure the output signal clear/hold function, configure it to "0" The output will be cleared. If set to "1", the output will be maintained. After the configuration is completed, click "OK". After all parameters are configured, the program needs to be downloaded to the PLC again, and the PLC and module need to be powered on again. As shown below.

- + ×	Edit IO mapping RPOOEC	×								
test Device (AX500)	General 3	-	Add ZEdit 🗙 Dele	te 🔹	Move Up 🕹 Move Down					
PUC (AX30) PLC Logic G Application G Application	Process Data 2	Lin	1 16#F030:16#0	ex 0	Name download slot cfg		,0,7,2,0,0,	3,2,0,0	Bit Length	Abort on Err
Ibrary Manager IC_RRG (PRG) Washington Task Configuration GetterCAT_Task_A	Startup Parameters Log EtherCAT IEC Objects		2 16#8000:16#0 Select Item from Ob		BusFault_Clear/Hold	1			32	
● 愛 ManTask 一 ① PLC_PRG 一 ③ LocaBus (LocaBus Adapter) 一 ③ Modbus_TCP_Slave (Modbus TCP Slave) ● ④ 目therCAT_A (EtherCAT_A)	Status		Index:Subindex 16#2000:16#0 16#2020:16#0 16#2020:16#0 16#8000:16#0	0	Name RP0808P Config RP 1600P Config BusFault_Output 4	Flags	Туре	Default		
EtherLaf A (EtherLaf A) EtherLaf A)			:16#01 ★ 16#F030:16#0	E	BusFault_Clear/Hold	RW	UDINT	16#000		
			Name Index: 16# SubIndex: 16#	8000 1	ult_Clear/Hold Bit Vali Byte array	length 32 ue 1 UDIM	π	\$ *	5	6 ок Cancel

6. Digital IO module configuration and use

1. Double-click the coupler module in the left navigation tree to configure startup parameters "RP00EC -> Startup Parameters", add startup parameters in the startup parameters, and on the parameter setting page, you can set the input signal filtering time for the digital input module, as shown in the figure below.



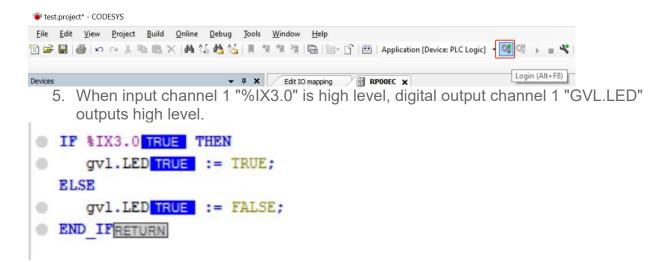
2. Right-click the coupler module in the left navigation tree to modify the IO mapping "RP00EC -> Edit IO mapping", as shown in the figure below.

File Edit View Project	Build Online Debug To	ols
8 M M 🕘 📲 📽	🖻 🖻 🗙 A 😘 🐴 😘 I	1
evices	- ₽	×
- test		•
E Device (AX500)		
PLC Logic		
Application		
Library Ma	naner	
PLC_PRG		
🖹 🎆 Task Confi		
- 😂 Ether	AT_Task_A	
🖻 🍪 MainTa		
- @ PL		
LocalBus (LocalBus		
Modbus_TCP_Slave		
RPODEC (
RP08	Cut	
RPOO RPOO	Сору	
- 📆 RP16	Paste	
- 👌 SoftMotion Ge 🗙	Delete	
	Refactoring	٠
6	Properties	
1200	Add Object	
	Add Folder	
	Add Device	
	Insert Device	
	Disable Device	
	Update Device	
G	Edit Object	
	Edit Object With	
2	Edit IO mapping	
	Import mappings from CSV	
POUs B M	Export mappings to CSV	

3. In the window "Edit IO mapping", you can map global variables for IO channels or modify the IO mapping address, as shown in the figure below.

	▼ Find	Filter Show all		- Add FB f	for IO Channel
Device (AX500) IPLC Logic IPLC Application	Variable B- M RPODEC B- M RPOBOSP	Channel	Address	Туре	Description
- 🥌 GVL - 🎁 Library Manager	= 16#1600 Outputs				
PLC_PRG (PRG)	Application.GVL.LEE	Channel 1	%QX0.0	BIT	Channel 1
E Task Configuration	- **	Channel 2	%QX0.1	BIT	Channel 2
EtherCAT_Task_A	- **	Channel 3	%QX0.2	BIT	Channel 3
🗐 🍪 MainTask	- *	Channel 4	%QX0.3	BIT	Channel 4
PLC_PRG	**	Channel 5	%QX0.4	BIT	Channel 5
LocalBus (LocalBus Adapter) Modbus_TCP_Slave (Modbus TCP Slave)	-*•	Channel 6	%QX0.5	BIT	Channel 6
	🍫	Channel 7	%QX0.6	BIT	Channel 7
EtherCAT_A (EtherCAT_A)	- **	Channel 8	%QX0.7	BIT	Channel 8
- TRANSEC (RPODEC)	🖹 🔛 16#1A00 Inputs				
RP0808P (8 Channel Digital IO,PNP)	- *•	Channel 1	%IX3.0	BIT	Channel 1
RP0016P (16 Channel Digital Output, PNP)	- *•	Channel 2	%IX3.1	BIT	Channel 2
RP1600P (16 Channel Digital Input, PNP)		Channel 3	%IX3.2	BIT	Channel 3
SoftMotion General Axis Pool	¥p	Channel 4	%IX3.3	BIT	Channel 4
	*•	Channel 5	%IX3.4	BIT	Channel 5
	- *0	Channel 6	%IX3.5	BIT	Channel 6
	- *	Channel 7	%IX3.6	BIT	Channel 7
	×p	Channel 8	%IX3.7	BIT	Channel 8
	#- 🕤 RP0016P				
	# 100P				

4. Click "Login" in the toolbar below the menu bar 🖾 to download the program for verification.



7. Analog IO module configuration and use

 Right-click the EtherCAT device module and select "EtheCAT_A -> Scan for Devices" to scan the device, as shown in the figure below. In the "Scanned Devices" window, click "Scan Device" and then assign the address "Assign Address" to the scanned module, and copy all modules to the project "Copy All Devices to Project", as shown in the figure below.

	p	Scanned Devices			
P X V	Con	Device name	Device type	Alias Address	
PLC Logic	App	B- RPOOEC	RPOOEC	1	
Application Ibrary Manager	~~~	- RP0004V	4 Channel Analog Output, Voltage		
PLC_PRG (PRG)	Bad	RP0400V	4 Channel Analog Input, Voltage		
🖻 🧱 Task Configuration	File				
B EtherCAT_Task_A		- RP0004A	4 Channel Analog Output, Current		
PLC_PRG	Log	RP0400A	4 Channel Analog Input, Current		
LocaBus (LocaBus Adapter) Modous TCP Save (Modous TCP Save) EtherCAT_A (Eth	PLC PLC				
Ra Copy R Paste ➤ Delete	e Ci				
<u>R</u> efactoring					
Properties					
Add Object Add Folder Add Device	5				
Insert Device					
2 Scan for Devices Disable Device					
Update Device			_		
Edit Object Edit Object With	a	Assign Addre	55 2		Dinoi allierences to

2. Double-click the coupler module in the left navigation tree to configure startup parameters "RP00EC -> Startup Parameters", add startup parameters in the startup parameters, and on the parameter setting page, you can set the channel range for the analog IO module, as shown in the figure below. Click "OK" to complete the configuration.

test	→ ₽ X	PLC_PRG Device	GVL I RPOOL	C 🗙 🔮 EtherCAT_Task_A	R	P0004A	RP0	400A	RP0004V	K
Device (AX500)	•	General	🕂 Add 🖉 Edit 🗙 Dele	te 🕆 Move Up 🕀 Move Down						
PLC Logic GVL GVL		Expert Process Data	Line Index:Subind	00 download slot cfg),0,32,2,0,0,3	30,2,0,0	Bit Length	A
Library Manager		Process Data Z Startup Parameters	2 16#2000:16# 3 16#2010:16# 4 16#2030:16#	01 Channel 1 Range Setting	-10~+10	V(-32768~ V(-32768~ (0~65535)			16 16 16	
Task Configuration EtherCAT_Task_A		Log	5 16#2020:16#	01 Channel 1 Range Setting	0~20mA((0~65535)			16	
S S MainTask → B PLC_PRG ↓ LocalBus (LocalBus Adapter)		EtherCAT IEC Objects	Select Item from Obje	ct Directory						
Modbus_TCP_Slave (Modbus TCP S	lave)	Status	Index:Subindex	Name	Flags	Туре	Default			
EtherCAT_A (EtherCAT_A)		Information	= 16#2000:16#00	RP0004V Config						
RP00EC (RP00EC)	a Outruit Valtage)	· · · · · · · · · · · · · · · · · · ·	:16#01	Channel1 Range Setting Channel2 Range Setting	RW	UDINT	16#000			
			:16#02	Channel3 Range Setting	RW	UDINT	16#000			
			:16#04	Channel4 Range Setting	RW	UDINT	16#000	4		
RP0400A (4 Channel Analo			· 16#2010:16#00	RP0400V Config				1000		
SoftMotion General Axis Pool			* 16#2020:16#00	RP0004A Config						
			* 16#2030:16#00	RP0400A Config						
			* 16#8000:16#00	BusFault_Output						
			# 16#F030:16#00	Configured Module Ident List						
			Name	hannel1 Range Setting				1	6	T
					-	E	140			-
			Index: 16# 2	000 🗘 Bit ler	ngth 16	5	\$		ОК	
			SubIndex: 16# 1	2 Value	-10-	+101/-327	68~32767)		Cancel	i

3. Right-click the coupler module in the left navigation tree to modify the IO mapping "RP00EC -> Edit IO mapping", as shown in the figure below. In the "Edit IO mapping" window, map global variables or modify the IO mapping address for each analog IO channel, as shown in the figure below.

Itest.project* - CODESYS File Edit View Project Build Online Debu	ug Tools Window Help	ring	Filler Show	THE SHOW BI					
ile Edit View Project Build Online Debu 같은 🖬 🕼 와 여 🐰 🐚 📾 🗙 約4 🛟 🏄	· · · · · · · · · · · · · · · · · · ·	Variable	Channel	Address	Туре	Description			
vices 👻 👻	A X PLC_PRG	RP0004V							
1 test	▼ Find	= 16#1600 Outputs							
Device (AX500) Device (AX500) Device (AX500)	Variable		Channel 1	24 01410	-	Channel 1			
😑 🔘 Application	RP00EC	Application.GVL.AO_U	100 State 200 C	%QW0	INT				
GVL	= m RP0004V		Channel 2	%QW1	INT	Channel 2			
PLC_PRG (PRG)	🛞 - 🍫 Apple	🖷 🍢	Channel 3	%QW2	INT	Channel 3			
Task Configuration	B-50 B-50	<u>ن</u>	Channel 4	%QW3	INT	Channel 4			
EtherCAT_Task_A	8-54	= 1 RP0400V							
D PLC_PRG	8- 1 RP0400V	🖻 📴 16#1A01 Inputs							
LocalBus (LocalBus Adapter) Modbus_TCP_Slave (Modbus TCP Slave)	= 16#1A01	🗐 🦄 Application.GVL.AI_U	Channel 1	%IW2	INT	Channel 1			
EtherCAT A (EtherCAT A)	8-19	🖹 🧤	Channel 2	%IW3	INT	Channel 2			
RP00EC (RP00EC) Cut RP004V (4 Channel Analo		🗰 🧤 .	Channel 3	%IW4	INT	Channel 3			
RP0400V (4 Channel Analo		<u> </u>	Channel 4	%IW5	INT	Channel 4			
RP0004A (4 Channel Analo 🕮 Paste		- m RP0004A							
RP0400A (4 Channel Analo X Delet		= 16#1602 Outputs							
	toring •	Application.GVL.AO_I	Channel 1	%OW4	UINT	Channel 1			
	erties	÷	Channel 2	%QW5	UINT	Channel 2			
	Object Folder	🚊 - 🍫	Channel 3	%QW6	UINT	Channel 3			
	Device		Channel 4	%QW7	UINT	Channel 4			
Insert	Device		Channel 4	76QVV7	UINI	Channel 4			
	le Device								
Sec. Sec. Sec. Sec. Sec. Sec. Sec. Sec.	te Device Object	= 16#1A03 Inputs							
	Diject With	Application.GVL.AI_I	Channel 1	%IW6	UINT	Channel 1			
	0 mapping	😟 🧤	Channel 2	%IW7	UINT	Channel 2			
	rt mappings from CSV	🕀 🍫 -	Channel 3	%IW8	UINT	Channel 3			
	rt mappings to CSV	🚊 🍫	Channel 4	%IW9	UINT	Channel 4			

4. Click "Login" in the toolbar below the menu bar 🖾 to download the program for verification.



5. For details about the corresponding relationship between code value and voltage and current, please refer to <u>3.4.1Technical parameters</u> (___19__). Modifying the value of variable "value_U" can change the actual voltage of analog voltage output channel 1. The variable "gvl.Al_U" can monitor the code value of analog voltage input channel 1. Through the conversion of the corresponding relationship between code value and voltage, the actual input voltage can be monitored in the variable "gvl.Al_U_value", as shown in the figure below. (___twenty two_)

Modifying the value of the variable "value_I" can change the actual voltage of analog current output channel 1. The variable "gvI.AI_I" can monitor the code value of analog voltage input channel 1. By converting the corresponding relationship between code value and voltage, the actual input current can be monitored in the variable "gvI.AI_I_value", as shown in the figure below.

9 // Analog IO - Voltage 10 //analog output - voltage 11 gvl.AO_U[21299 := TO_INT(value_U_6.5 * 65535 / 20); // value_U := -10.0V .. 10.0V 12 //analog input - voltage 13 gvl.AI_U_value_6.49 > := gvl.AI_U[21259 * 20.0 / 65535; // gvl.AI_U_value -> -10.0V .. 10.0V 14 15 // Analog IO - current 16 //analog output - current 17 gvl.AO_I[14745] := TO_UINT(value_I_4.5 * 65535 / 20); // value_I := 0.0mA .. 20.0mA 18 //analog input - current 19 gvl.AI_I_value_4.5 > := gvl.AI_I[14747] * 20.0 / 65535; // gvl.AI_I_value -> 0.0mA .. 20.0mA 19 gvl.AI_I_value_4.5 > := gvl.AI_I[14747] * 20.0 / 65535; // gvl.AI_I_value -> 0.0mA .. 20.0mA

8. Configuration and use of temperature acquisition module

 Right-click the EtherCAT device module and select "EtheCAT_A -> Scan for Devices" to scan the device, as shown in the figure below. In the "Scanned Devices" window, click "Scan Device" and then assign the address "Assign Address" to the scanned module, and copy all modules to the project "Copy All Devices to Project", as shown in the figure below. test.project* - CODESYS

Eile Edit View Project Build Online Debug Jools Wine

n Devices
Bevice name Device type Alias Address BeroDec RPODEC 1 RPO4RD 4 Channel Analog Input, TC/RTD

 Double-click the coupler module in the left navigation tree to configure startup parameters "RP00EC -> Startup Parameters", add startup parameters in the startup parameters, and on the parameter setting page, you can set the sensor type for the temperature acquisition module ((__ 5_)3.6.1 See above), channel filter time, channel enable configuration, as shown in the figure below. Click "OK" to complete the configuration.

Index:S	Index:Subind 16#F030:16# 16#2000:16# 16#2000:16# 16#2000:16# 16#2000:16#00 115#01 115#01 115#01 115#01 115#04	00 download slot (01 Sensor Type 05 Channel 4 Filter 09 Channel 4 Enab	Time le	Flags	3,2,0,0	Bit Le 48 32 32 32 32 32 Default 16#000 16#000	ength	Abort on Error	
1 2 3 4 Select Iter	16#F030:16# 16#2000:16# 16#2000:16# 16#2000:16# 16#2000:16# 16#2000:16#00 16#01 16#01 16#02 16#03 16#04	00 download slot 4 01 Sensor Type 05 Channel4 Filter 09 Channel4 Enab t Directory Name RP04RD Config Sensor Type Channel1 Filter Time Channel2 Filter Time	Time le	I,0,38 K I Enable	Type UDINT UDINT	48 32 32 32 Default 16#000			
Select Iter	16#2000:16# 16#2000:16# 16#2000:16# m from Object Subindex 22000:16#00 :16#01 :16#02 :16#03 :16#04	01 Sensor Type 05 Channel4 Filter 09 Channel4 Enab t Directory Name <u>RP04RD Config</u> Sensor Type Channel1 Filter Time Channel2 Filter Time	Time le	K 1 Enable	Type UDINT UDINT	32 32 32 32 Default 16#000			
Select Iter	16#2000:16# m from Object Subindex :2000:16#00 :16#01 :16#02 :16#03 :16#04	09 Channel4 Enab t Directory RP04RD Config Sensor Type Channel1 Filter Time Channel2 Filter Time	le	Enable Flags RW RW	Type UDINT UDINT	32 Default 16#000			
Select Iter	m from Object Gubindex 2000:16#00 :16#01 :16#02 :16#03 :16#04	Name RP04RD Config Sensor Type Channel 1 Fiter Time Channel 2 Fiter Time		Flags RW RW	Type UDINT UDINT	Default 16#000 16#000			
Index:S	ubindex 2000:16#00 :16#01 :16#02 :16#03 :16#04	Name RP04RD Config Sensor Type Channel1 Filter Time Channel2 Filter Time		RW RW	UDINT	16#000 16#000			
Index:S	ubindex 2000:16#00 :16#01 :16#02 :16#03 :16#04	Name RP04RD Config Sensor Type Channel1 Filter Time Channel2 Filter Time		RW RW	UDINT	16#000 16#000			
Index:S	ubindex 2000:16#00 :16#01 :16#02 :16#03 :16#04	Name RP04RD Config Sensor Type Channel1 Filter Time Channel2 Filter Time		RW RW	UDINT	16#000 16#000			
- 16#.	2000:16#00 :16#01 :16#02 :16#03 :16#04	RP04RD Config Sensor Type Channel1 Filter Time Channel2 Filter Time		RW RW	UDINT	16#000 16#000			
- 16#.	2000:16#00 :16#01 :16#02 :16#03 :16#04	RP04RD Config Sensor Type Channel1 Filter Time Channel2 Filter Time		RW RW	UDINT	16#000 16#000			
- 16#.	2000:16#00 :16#01 :16#02 :16#03 :16#04	RP04RD Config Sensor Type Channel1 Filter Time Channel2 Filter Time		RW RW	UDINT	16#000 16#000			
	:16#01 :16#02 :16#03 :16#04	Sensor Type Channel 1 Filter Time Channel 2 Filter Time		RW	UDINT	16#000			
	:16#02 :16#03 :16#04	Channel 1 Filter Time Channel 2 Filter Time		RW	UDINT	16#000	1		
	:16#03 :16#04	Channel2 Filter Time							
	:16#04			PC VV		10#000			
				RW	UDINT	16#000	- \		
1 1	:16#05	Channel4 Filter Time		RW	UDINT	16#000		4	
	:16#06	Channel 1 Enable		RW	UDINT	16#000		4	
	:16#07	Channel2 Enable		RW	UDINT	16#000	1		
	:16#08	Channel3 Enable		RW	UDINT	16#000	/		
- L.	:16#09	Channel4 Enable		RW	UDINT	16#000]*		
E 16#	8000:16#00	BusFault_Output							
± 16#	F030:16#00	Configured Module Id	ent List						
	: 16# 20		Bit lengt Value	th 32		¢		<mark>б</mark> ОК Cancel	
	Index SubIn	Index: 16# 20 SubIndex: 16# 1	Index: 16# 2000	Index: 16# 2000 文 Bit leng SubIndex: 16# 1 文 Value	Index: 16≠ 2000 Bit length 32 SubIndex: 16≠ 1 Value K	Index: 16# 2000	Index: 16≠ 2000 € Bit length 32 € SubIndex: 16≠ 1 € Value K	Index: 16# 2000	Index: 16# 2000

3. Click "Login" in the toolbar below the menu bar 🖾 to download the program for verification.

	 t* - COL		Build	Online	Debug	Tools	Window	<u>H</u> elp		
1	⊜ ∣ ⊧⊃	0%	h 🖪 🤇	× 144 č	s 🐴 😘	1.1	1 31 21	🕒 🔤 - 🗗 🔛	Application [Device: PLC Logic]	· 🕼 🍕 🔸 🔳 ⊀ 🛛
Devices	 				•	д X	Edit IC	mapping	POOEC X	Login (Alt+F8)

4. In the navigation tree on the left, double-click "RP04RD -> Module I/O Mapping" of the temperature acquisition module to monitor 10 times the actual temperature of the input channel of the temperature acquisition module. The read data needs to be divided by 10 to obtain the real temperature or resistance value in °C or Ω . The specific operation is shown in the figure below. The actual temperature read on channel 4 of the temperature acquisition module is 29.4°C. In addition, you can also set the temperature compensation value for the channel. After setting the compensation value, the channel temperature is the sum of the actual temperature and the temperature compensation value.

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ff Device [connected] (AX500)	Module I/O Mapping		Find		Filter Show all			- 🕂 Add FB for IO C
PLC Logic B O Application	Module IEC Objects	2	Variable	Mapping	Channel	Address	Туре	Current Value
- 🥘 GVL	Information		B- 🍫		Channel 1 Offset	%QW0	INT	0
Library Manager			iii		Channel 2 Offset	%QW1	INT	0
PLC_PRG (PRG)			🛞 - 🍫		Channel 3 Offset	%QW2	INT	0
E Isk Configuration			. <u>.</u>		Channel 4 Offset	%QW3	INT	0
EtherCAT_Task_A			😑 🦳 16#1A00 Inputs					
🖻 🍪 MainTask		- /	🖻 – 🦄		Channel 1	%IW2	INT	-9999
PLC_PRG		3	🕀 - 🏘 -		Channel 2	%IW3	INT	-9999
🖸 🔟 LocalBus (LocalBus Adapter)			😑 – 🐐		Channel 3	%IW4	INT	-9999
Modbus_TCP_Slave (Modbus TCP Slave)			₩-¥₽		Channel 4	%IW5	INT	294
Image: State Control and State Con								